Teaching in the 21st Century...

EMPOWERING TEACHERS TO LEARN, CREATE AND CHANGE THEIR CLASSROOM

DIGITAL SKILLS FOUNDATION

www.dsf.global

Dear Educator,

Do you remember that one teacher who made a difference in your school time, pushed you, believed in you, and made you go the extra mile?

That is YOU now.

As a teacher in this century, you are the inspiration, the facilitator of knowledge, and most importantly, the coach of the students that you are preparing for their next steps in life. At any level of our education system, we require people like yourself to provide our children with the confidence, skills, and curiosity to build their future in this ever-changing, dynamic world full of opportunities. The main challenge for any teacher is to ensure that children think by themselves, analyse, solve problems, see the bigger picture, are creative in what they do, and collaborate with others. How much richer is your life when you work as a team, engage your mind, and find solutions?

While this book provides you with a very practical approach to teaching and learning, it also will give you ideas. You can add these in the book in the blank spaces to make your teaching more engaging, more interesting, and more interactive by considering each learner as a potential human resource to change the world.

Assist them in making the best out of themselves and take pride in yourself as a changemaker.

You are shaping the future. Thank you for your commitment to change education together with us.

Join us on our community: **https://www.facebook.com/groups/dsfeducators** where people share ideas, teach, and learn from each other.

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DSF Educators are teachers and Master Trainers that completed their online training with DSF and are eager to stay connected and continuously improve their teaching skills.

Annemijn PERRIN

CEO Digital Skills Foundation
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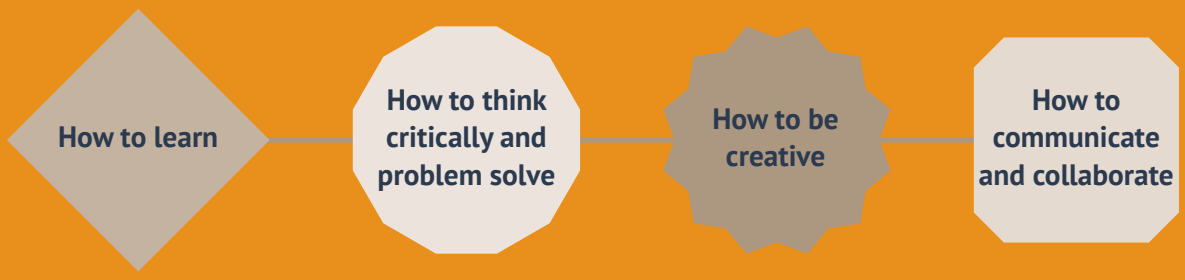
PART 1:

21st-Century Teaching and Learning

INTRODUCTION TO 21ST CENTURY LEARNING

The world has changed immensely in the last 40 years. The way education has been taught in the past is no longer the way students should be taught today. Twenty-first-century skills are considered the most critical skills for our students to succeed in today's workplace as students need to learn:

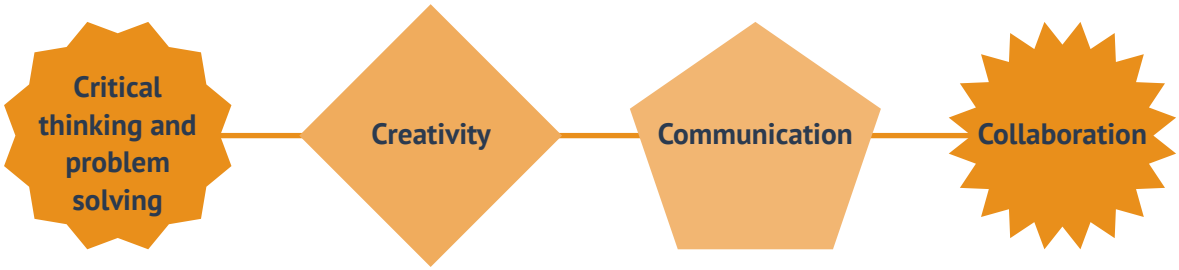


These basic skills will allow our students to become intentional, confident learners who know how to tackle problems, communicate and collaborate with those around them. They will critically think through problems to come up with the best solutions. They will be curious and will develop good leadership skills. With all of these, they will be able to compete in the global workforce. A 21st-century education is about enabling the skills students need to succeed in this new world and helping them to grow the confidence to practice those skills. And these skills need to be taught. Students don't automatically know how to analyse, interpret, or listen properly.

The 21st-century skills are divided into three categories:

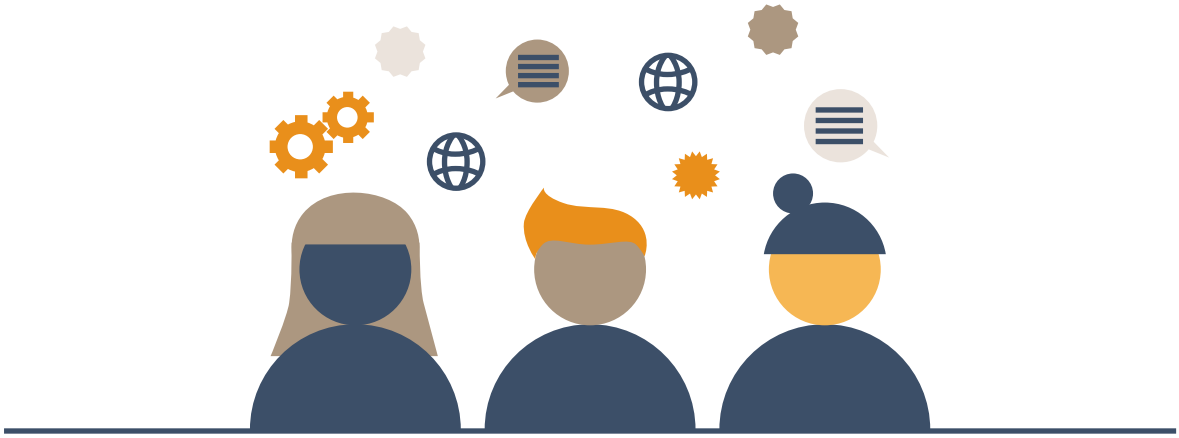
Each of those skills is broken down into different categories. Let's take a deeper look at them:

Learning skills (the 4 C'S)



Critical thinking and Problem Solving

- Students need the ability to solve problems in real time. Why?
  - In the future complex problems that we can't even conceive right now will be everywhere.



The more students can devise practical solutions to the problems they encounter, the more successful they will be. Problem solvers also work independently from higher supervision – they are initiative takers and aren't afraid to make mistakes. They learn from their mistakes and reflect on the processes to create more efficient and economical solutions.

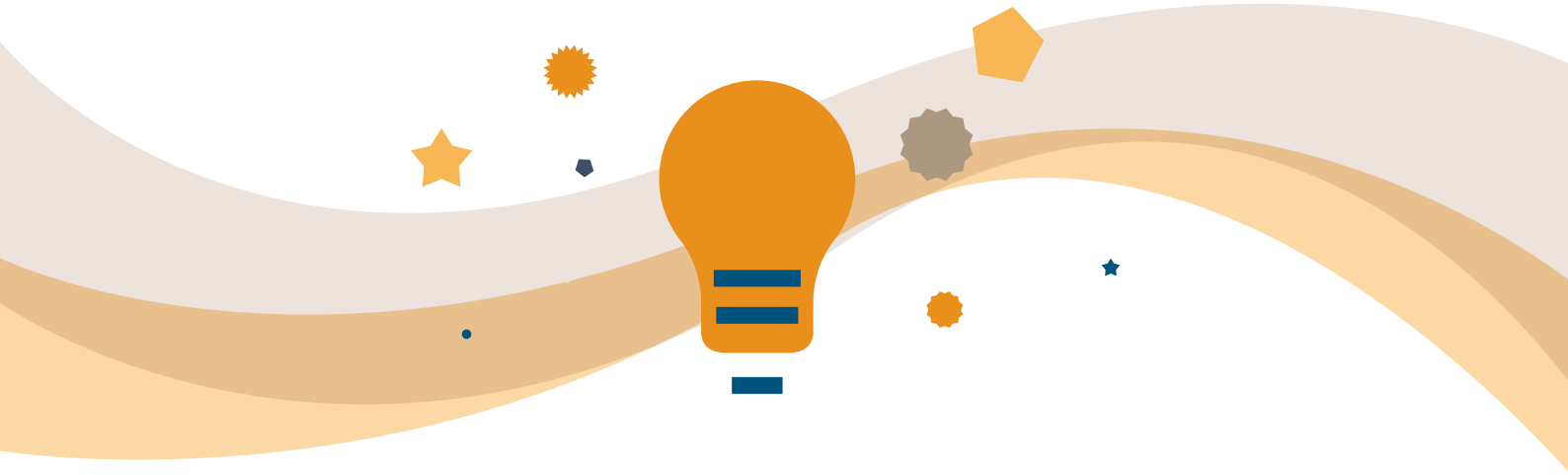
- Critical thinking skills include analysis, interpretation/reflection, evaluation, inference, and problem-solving/decision-making. This involves:
  - Asking questions,
  - Defining a problem,
  - Examining the evidence,
  - Analysing assumptions and biases,
  - Avoiding emotional reasoning,
  - Avoiding oversimplification,
  - Considering all interpretations,
  - Using higher level thinking skills; analysing, evaluating and
  - Reaching creative solutions for problems.

CLASSROOM ACTIVITIES / EXAMPLES

- Give your students a new item about climate change. They can reflect on different arguments, learn more about the topic, and reach a reasoned conclusion. They can discuss how or if climate change is affecting the area/country they live in
- Have students create a critical design challenge
  - *Ask students, who are working in pairs, to construct some type of container that will keep a raw egg from cracking when dropped from ever-increasing elevations*
- Keeping it Real
  - *Have students identify a challenge and cooperatively solve a real problem in their schools or the community. You may set the parameters, including a time limit, materials and physical boundaries.*
- Drawing Inferences: To infer something means reading between the lines before concluding. Drawing inferences involve data analysis and data interpretation by reviewing factual data.
  - *For example, giving a case study such as sustainable energy sources and asking them to analyse the case and draw inferences from it. Inferences can also be drawn by showing subject-specific videos.*
- Gap Fill In
  - *Students are shown a picture projected in the front of the room, if possible. At the top of their paper, students should write: "What is happening in this picture?" At the bottom of the page, they should answer with what they believe is happening in the photo simply in 1-2 sentences or according to the age/grade this activity is being done with. In the middle of the page, students write down the steps they took to arrive at that answer. Students are encouraged to write down the evidence they see that supports their conclusion.*
- Worst Case Scenario
  - *Construct a scenario in which students would need to work together and solve problems to succeed, like being stranded on a deserted island or getting lost at sea/jungle/town. Ask them to work together and devise a solution that ensures everyone arrives safely. You might ask them to develop a list of 10 must-have items that would help them most or a creative passage to safety. Encourage them to vote, and everyone must agree to the final solution.*
- Connect different ideas: Elementary school teachers can ask students if they know anyone who has to take a bus to work and why it would be necessary for that person to have a train schedule. Questions like these help children consider different situations (delayed buses, for example) and potential solutions (taking the train instead), helping them apply prior knowledge to new contexts.
- Compare & Contrast: Have your students compare and contrast just about anything to get them critically thinking.
  - *For example, students can compare and contrast the book the class is presently reading with another one they read or an exciting science lesson with the previous one.*

Creativity

- Creativity in digital and non-digital environments allows students to develop unique and valuable solutions. Why?
  - Students of today are natural producers and consumers of information and are natural problem solvers, but this can be significantly advanced with engagement in their work.
  - This comes from doing rewarding projects, and meaningful tasks that give them challenges that they can solve using their imagination.
  - Creativity is a means of adaptation and empowers students to see concepts in a different light – this leads to innovation.
  - Students are always searching for ways to express themselves and their uniqueness, and this can be used as they face the same level of exciting challenges and figure out how to meet them.
  - It is imperative that this side of students is allowed and encouraged to come forth in their learning.



CLASSROOM STRATEGIES / ACTIVITIES / EXAMPLES

- Practice Divergent thinking – the breaking up of old ideas and making new connections
  - *Introduce "thinking backwards" exercises. For example, tell them, "29 is the answer. "What might the question be?" or "Nelson Mandela is the answer. What might the question be?". Students should generate many different questions that fit the answer rather than think there is one right answer (or question)*
- Brainstorming on any topic is a creative activity
  - *In science class, tell your students that your coffee cools too quickly in your cup and then ask your students to brainstorm a list of what might slow down the cooling process, write a hypothesis about each one, and then design an experiment*
- Producing new ideas – when students have to produce new ideas or reorganise existing ones, that fosters creativity
  - *In mathematics class, instead of giving the students a word problem using division, have them create the word problem using division, and have their peers solve their word problem*

Communication

- Not just speaking, listening and writing individually but communication via multiple multimedia formats. The requirement is for students to communicate effectively through speaking and writing and visually through video and imagery. Why?
  - Students must convey ideas effectively among different media channels.
  - Effective communication is one of the most underrated soft skills. Poor communication is why many projects fall apart in school and the workplace.

CLASSROOM STRATEGIES / EXAMPLES / ACTIVITIES

- Whether students are listening to you, listening to a podcast, or watching a video, make sure they have a purpose during the listening. Pause for a few minutes and have students write down what they just heard. (listening)
- Have students partner up to discuss what they heard in the lesson. You can stop during the lesson and direct students to discuss what they just heard. (listening)
- Have students record a draft of their production on their phones to see how it sounds and make adjustments before they present it to the class (speaking)
- Have students do a book talk in front of the class. They can talk about the plot of the book and the characters as well as why they liked/did not like the book. (speaking)
- Students create a book about their family traditions. They share these with students in a lower grade and ask about their family traditions (writing and speaking)
- Students create a poster about one simple type of machine that is used for everyday purposes. They share it on the school wall for others to see and learn from (writing)

Collaboration

- Students must collaborate seamlessly with people in real-time and virtually, as well as in physical and virtual spaces. Why?
- The world has become a global village; students in the digital age are social and constantly co-creating things. Not having opportunities for collaboration in school as well, they become disengaged.
  - Collaboration is essential for both their learning and their mental health. Online communication tools enable the workforce to constantly communicate and collaborate daily, no matter where they are.
- The ability to collaborate is essential in a global economy. Yet, it is the most difficult of the "4 C's"

CLASSROOM EXERCISES / ACTIVITIES

- Have students locate data from a variety of sources and compile the information in a spreadsheet where they will then analyse the information together and suggest solutions to any issues that they find
- Put students in groups of 2-3 and challenge them to build a tower using a limited number of materials. Materials could include tape, glue, string, straws, toothpicks, marshmallows, spaghetti, etc. Time the activity and see which team builds the tallest tower
- Divide students into groups of 5 – 6. Have the students stand in a circle and take their hands. The goal is to weave arms and bodies in and out so that a knot or "pretzel" forms while remaining locked together, holding hands. Because the biggest challenge is not being able to stop holding hands throughout the knot/pretzel-making process, students must discuss the best plan of action to remain connected. Students should work together to form the knot/pretzel and unweave themselves to return to their original positions in the circle. If groups unlock their hands, they may be required to start over or sit out while other groups finish the challenge.

Literacy Skills

These skills focus on how students can recognise facts and trustworthy sources to separate them from the misinformation that floods the Internet. They include:

Information Literacy

→ These skills help students understand facts, figures, statistics, and data and how to separate fact from fiction which is critical in this day and age.

CLASSROOM EXAMPLE

→ Fact or Fiction. Give an article to your students that they have to read and separate fact from fiction. See the example in **Appendix A** titled "Fact or Fiction?" You can choose any article and add fictional parts or devise fictional statements.

Media Literacy

Understanding the methods and outlets in which information is published and distinguishing between ones that are credible and ones that are not, learning which outlets to ignore and which to embrace

CLASSROOM ACTIVITY

→ Teach students to read past the headline, check the date and author credentials, gauge the tone and language, and identify biases in an article. When you are done, have them design a newspaper that features either real or fake news or some combination of the two, and have other students see if they can identify each type.
→ When spotting fake news, a student should check other sources for the same story. Since different sources report different details in varying levels of depth, students will gain a more accurate perspective on an issue when they read, listen, or view it more widely. Have students create a poster or a mind map listing different kinds of sources, including which ones are reliable and which ones aren't.

Technology Literacy

Understanding concepts such as computers, cloud programming, and mobile devices is critically important in this world, as understanding what device/tool performs what tasks and why.

Life Skills

These are the intangible elements of a student's everyday life that focus on both personal and professional qualities and include the following:

- Flexibility
- Leadership
- Initiative
- Productivity
- Social Skills

THINK ABOUT

Do you incorporate 21st century skills into your classroom? If not, how would you begin to do this? What would you focus on first? If you do, how would you expand what you do?

The 21st Century Classroom

The following are characteristics of the 21st-century classroom:

Flexible learning environment

→ The classroom should have learning environments that support individual and group work, provide space for presentation and exploration, promote interaction and a sense of community, and foster formal and informal learning.

EXAMPLE

→ Move desks into groupings to create working areas for teams of students working on a project, or put desks in a circle if you are having a class discussion.

Learning outside the classroom

→ Learning does not have to occur within classroom walls. If students have access to technology such as laptops, tablets or smartphones, they can access information and continue their learning. If they have no technology, they can still do several different activities.

EXAMPLE

→ Take students outside to find different geometric shapes either in man-made items or in nature. Have them draw what they see and summarise the geometric shape and its use.

Technology Integration

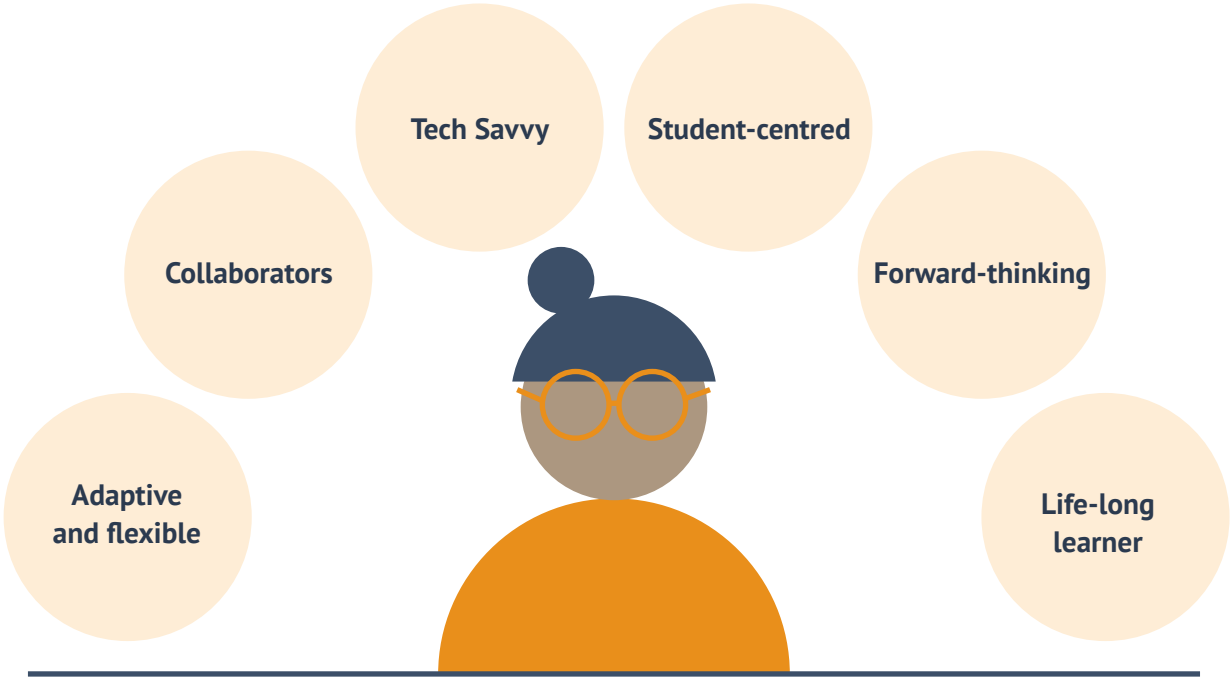
→ Integrating technology into the classroom makes learning more fun and engaging, and it helps to provide students with essential skills that will prepare them for the workplace environment.

EXAMPLE

→ Guide students to do independent research on their tablets, laptops, or phones, where they can take their information and create a website, a podcast, a multimedia presentation, or a poster or report

The 21st Century Teacher

The teacher of the 21st century differs from the 20th-century teacher because of what learners expect from him/her. Today's teachers must keep up with technological advances, stay updated about new information, and make the learning process active. Here are some attributes of a 21st-century teacher:



Adaptive and flexible

- They must be adaptable to the changes being made in the school
- They must use teaching strategies that prepare our students for the future, not the past.
- Teachers must adapt to ever-changing tools, innovations, and dependencies that keep changing.

Collaborators

- Teachers and students need to know how to collaborate in the space to ensure students have access to the best information possible.
- Teamwork amongst teachers has become an essential skill to ensure effective curriculum implementation and learning from each other based on prior experiences

Tech Savvy

- They understand that technology in the classroom, whether for lessons, grading, or assignments, enables students to have a better learning experience.
- They are aware that technology can make their use of time more effective
- They must be willing to explore and learn on their own about different technologies

Student-centred

- → Teachers are expected to become facilitators of learning by inspiring their students to take ownership of their education
- → Teachers must guide students towards developing their questions, conduct research, contact experts, and create presentations

Forward-thinking

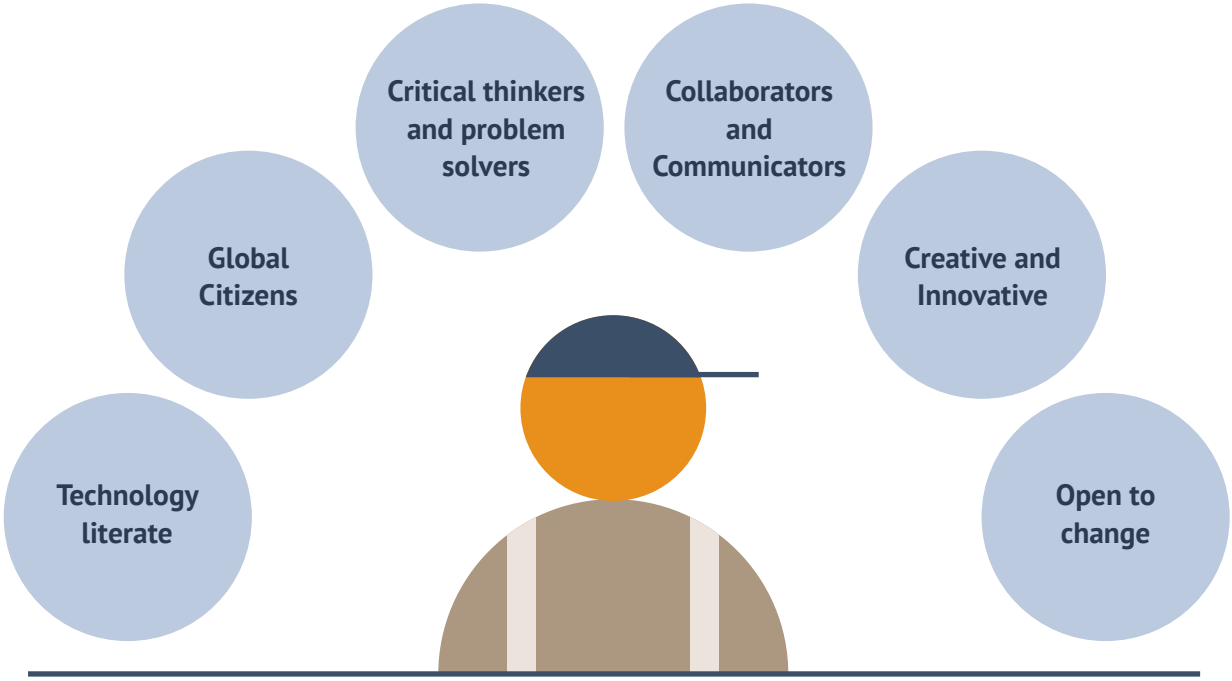
- → A 21st-century educator is progressive. They anticipate new learning opportunities.
- → They want to ensure that ALL their students are prepared for success in the future.
- → They are constantly looking for new ways to engage their students.

Life-long learner

- → A 21st-century teacher must have the drive to stay current concerning new tools to use in education, and they take pride in their knowledge base.
- → They should update their lessons to make them current and more relevant to the day-to-day scenarios students are confronted with.
- → They must routinely seek out learning opportunities that will help them improve their professional craft.

21st Century Student

The world is different, and students expect different things from their education. These children have never lived in a world without technology! They are constantly connected to their friends and family, expect to learn anywhere, anytime, and are creative and want to be engaged. They are ...



- **Technology literate:** they know how to use their phones and computers – but they don't know how to use them for learning
- **Global Citizens:** students care about global issues such as the environment, health concerns, and economic growth as well as learning about different cultures
- **Critical thinkers and problem solvers:** they question things, they find information on their own, they want to be engaged
- **Collaborators and Communicators:** they are very social and are not afraid to communicate their ideas and thoughts
- **Creative and Innovative:** they no longer are interested in rote learning and memorisation and want to look towards discovery, analysis, and innovation.
- **Open to change:** they embrace it!

These things you have just read about make the classroom a different place from years prior. It is our job to ensure that we meet today's students' needs. Let's start exploring how we can do that. **For more information on 21st-century learning, please see Appendix B.**

THINK ABOUT

Think about the characteristics of a 21st century teacher. How do you fit in this model? How would you like to change? And your classroom - is it a 21st century classroom? If not, what can you do to make it one?

STUDENT ENGAGEMENT

This is not a simple construct. There are a variety of definitions and views on student engagement, and it may be defined or interpreted differently depending on where or who you are. For example, in one place, engagement may be measured by observable behaviours such as attending class, actively listening, participating in discussions, following the rules, and turning work in on time. Engagement may be understood as enthusiasm, curiosity, optimism, motivation, or interest. A good starting definition for student engagement from the Great Schools Partnership is:

"The degree of attention, curiosity, interest, optimism, and passion that students show when they are learning and being taught,"

Students who are curious, passionate, and genuinely interested in what they're being taught are likely to become motivated, lifelong learners.

Students have reported that work they found engaging includes:

- Work that encouraged curiosity
- Work that allowed the students to be creative
- Work that has students collaborate positively with others
- Work that sets high but achievable expectations according to the student's personal best

These students are attracted to their work, they persist even if there are challenges and they are very excited when they complete their work.

On the other hand, work that did not engage students includes:

- Repetitive work, where they do the same exercise over and over
- Work that required little thought – that they just had to memorise
- Work that does not motivate them, or they find they don't autonomy (control)
- Content that has no relevance, and they perceive a disconnect between the subject and their lives

Additional reasons that students are disengaged include:

- Large class sizes
- Poor discipline
- Poor sense of competence as they have no self-confidence
- They have little or no positive interaction with other students and the teacher
- Gifted students who are bored
- Repeating students
- In many cases, "outside of the classroom seems more interesting than inside".

Nonetheless, your task as a teacher is to keep them engaged to ensure learning and skills development.

LET'S LOOK AT SOME STRATEGIES FOR ENGAGING YOUR STUDENTS:

1. Use activities where the students are involved. Simple tasks include:
   - A. Underline reading with coloured pencils
   - B. Having students take notes as you are talking
   - C. Drawing pictures to illustrate vocabulary words
   - D. Use physical objects during maths to illustrate a problem,
   - E. Generate good word problems for students to solve - make the word problems relevant to their lives. Even better, have the students create the word problems
   - F. Debates involve students as they generate their arguments. It is more than the information they are learning - they must also learn to organise and present their thoughts. **Examples** of good debate questions include
     - i. Should Romeo and Juliet have followed their families' advice?
     - ii. Should students wear uniforms to school?
     - iii. Do we need both fractions and decimals?
     - iv. Should mobile phones be allowed in the classroom?
     - v. Is cloning ethically acceptable?
     - vi. Are genetically modified foods viable solutions?
     - vii. Is artificial intelligence dangerous?
     - viii. How secure is mobile banking?

2. Model curiosity
   - → Start something new at home – a new hobby or sport- or take an online class that you find interesting. Share your experience with your students – the excitement, the rewards and the challenges – it will inspire them to try something new themselves

3. Ask questions; open-ended questions
   - → Open-ended questions engage students as it makes them think as they have to seek out their answers since these questions cannot be answered with a yes or no, or a shrug of the shoulders. **Examples** of how to start these questions are
     - i. What would happen if.....
     - ii. Why did.....
     - iii. What did you think when.....
     - iv. How do you feel about.....
     - v. What is your opinion on.....
     - vi. Why is this.....
     - vii. How would you explain.....
     - viii. What is different about.....

4. Practice and encourage active listening
   - **A.** Keep good eye contact
   - **B.** Paraphrase what the speaker said.
     - → **Example:** "So you want to create a classroom section specifically for reading?"
   - **C.** Be patient – do not interrupt the speaker (Interrupting says you don't care about what the speaker is saying)
   - **D.** Withhold judgement, do not jump to conclusions

5. Present new information in chunks
   - → You must win their attention every ten minutes to keep students engaged.
     - **i.** Use the 10/2 strategy, where you present new information in 10 minutes chunks and limit that to 2 – 3 main points
     - **ii.** After the 10 minutes, initiate 2 minutes of discussion
     - **iii.** Allow 2 minutes for the students to process the information individually

6. Look for the Hook
   - **A.** Try to relate the information to your student's daily interests or lives
     - → **Example:** If your students love a specific sport, create your maths lesson around that sport (statistics perhaps), the geography of the arena locations and the backgrounds of a favourite player with a memoir or biography.
   - **B.** Find books related to your student's interests
     - → **Example:** If you have students who love horses, you can talk about how the invention of the automobile diminished the need for horses or have students who love science relate to the history of inventions
   - **C.** Start a lecture with an unusual detail or little-known fact
     - → **Example:** "Leaders have been around since humans began to live together in clans and tribes. Leadership research, however, is a relatively new field, with the first analyses of leadership starting only in the early twentieth century."
   - **D.** Using a quotation from someone in the field or popular culture can set the scene
     - → **Example:** "The first rule of leadership: everything is your fault."—Hopper, A Bug's Life
   - **E.** Start with a photo; as they say, a picture is worth a thousand words.

F. Use a mystery box
   - → **Example:** Put different items in a box to explain what they will be learning about. Students make predictions and discuss what they believe those objects will have to do with the upcoming lesson

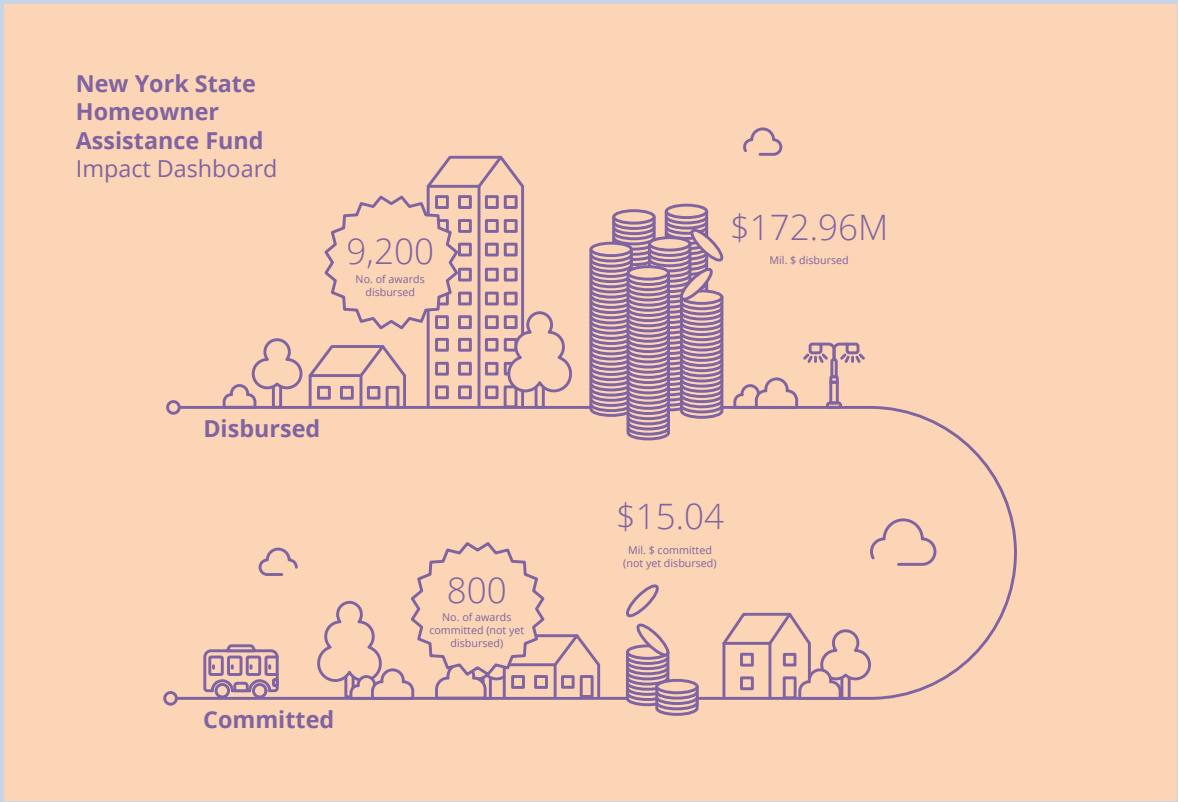
7. Give the students a choice
   - A. With content
     - → Allow them to choose the resources they want to use based on what suits them
   - B. With product
     - → Allow them to choose how they will demonstrate their knowledge
     - → Will they do a poster, an essay, or a presentation?
   - C. With process
     - → Allow them to verify and affirm with work by people who matter. For example**:** if students are revising school menus, let them talk to the people who currently create the menus, nutritionists, and those that consume the food

8. Master motivation
   - → Motivated students will demonstrate higher levels of engagement. There are two types of motivation: intrinsic and extrinsic
   - A. Intrinsic motivation will encourage students to be engaged because they find personal meaning, fun, or a challenge in work.
     - → **Example:** A student learning new vocabulary words because they love to read, or reading about something because it is fun to learn
   - B. Extrinsic motivation involves doing something because there is a reward or to avoid punishment
     - → **Example:** Giving students extra credit for bringing things to the classroom, free computer time, stickers on tests or small prizes (an Example is a pencil) for doing the work.

ADDITIONAL PRACTICAL IDEAS TO ENGAGE YOUR STUDENTS:

- → Make sure you know why this learning is relevant. Students often ask, "Why do we need to know this" - find out how students will use the learning in real life and incorporate that into your introduction
- → At the beginning of class, have a small discussion about the upcoming topic and let students share what they already know about the topic - this activates prior knowledge which will connect the lesson to what they already know, which gives them a context for the new learning
- → Have students write their thoughts and questions at the end of the lesson
  - → **Example:** Find two different ways to solve this problem, OR Which of the characters in this story would you most like to meet?
- → In the middle of class, do a brain break. Pause for a few minutes and do something unexpected.
  - → **Example:** Take a yoga break, OR pick a student to start a story with one sentence. Each student adds a sentence, and the story must end with the last student

→ Using technology. Students love using technology in the classroom. Challenge them to create something they have never created before, like an infographic (a representation of information in a graphic format designed to make the data easily understandable at a glance)



→ Tap into student interests by playing a song that is the most popular in their age group. Try to connect the words to something you are learning in class
→ Show your passion and love for the subject. When you are enthusiastic, your students will join in.

Now that you understand the basics of student engagement, let's talk about content shifting from a teacher-centred environment to a student-centred environment!

THINK ABOUT

How engaged are your students? What could you do to make them more engaged in your classroom?

MOVING TO A STUDENT-CENTRED CLASSROOM

A teacher-centred classroom is probably how you were educated. Here the teacher is the vessel of knowledge and dispenses this knowledge to the students. The students are passive learners who listen to lectures and do rote learning, which is boring for many students and leads to a less involved learning environment.

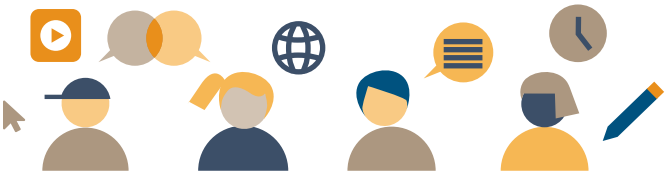
When we say the teacher-centred approach differs from the student-centred approach, what would the difference then be? Let's look at the table below:

Content

Teacher-Centered Approaches	Student-Centered Approaches
The content is established by a curriculum, and all learners study the same topics simultaneously.	Students study topics based on curriculum and standards but are allowed numerous choices within the topic of study.
Students can access limited information selected by the teacher or the school library.	Students have unlimited access to unlimited information of varying degrees of quality, where they have access to the Internet.
Topics of study are typically isolated and disconnected from each other.	Students research content in a way that shows connections between subjects.
Students memorise facts and occasionally analyse information critically. There is little focus on applying facts or concepts to various real-world situations.	Students learn concepts and facts and frequently engage in high-level analysis, evaluation, and synthesis of various materials. There is an emphasis on showing how concepts apply to various real-world situations.

Students work to find correct answers. Short isolated lessons with correct and incorrect answers	Students work to construct any one of several possible correct answers. Investigations are longer, and answers may vary with data support and justification
Teachers choose activities and provide materials at the appropriate level.	Students select from various teacher-provided activities and often determine their level of challenge at which to work.
The teacher is the information giver—the sage on the stage—helping learners acquire skills and knowledge.	The teacher is the facilitator—the guide on the side—providing opportunities for students to apply skills and construct their knowledge.
Learning starts with what students do not know.	Learning starts with students' previous knowledge.
Teaching is an instructive process.	Teaching is a constructive process.
Students complete short, isolated activities and lessons around specific content and skills.	Students work on activities and projects connected to long-term goals to build deep conceptual understanding and proficient strategy use.

Classroom Environment



Teacher-Centered Approaches	Student-Centered Approaches
Students learn passively in an often-silent classroom.	The classroom environment resembles an active workplace with various activities and sound levels depending on the work.
Students usually work individually.	Students often collaborate with peers, experts, community members, and teachers.

Assessment

Teacher-Centered Approaches	Student-Centered Approaches
Students take paper-and-pencil exams silently and alone. The questions are kept secret until test time, so learners must learn all the material even though only part of it will be tested.	Students know how they will be assessed, receive feedback from the teacher and their peers throughout a unit, and have multiple opportunities to assess their learning.
Teachers are primarily accountable for student learning.	Teachers and students share accountability for learning and achievement.
Students are assessed at the end of a period to proceed to the next level.	Students are continuously assessed throughout the project.
Learners are extrinsically motivated to get good grades, please teachers, and gain rewards.	Learners' interests and involvement promote intrinsic motivation and effort.

Technology

Teacher-Centered Approaches	Student-Centered Approaches
Teachers use technology to explain, demonstrate, and illustrate various topics.	Learners use various technology to conduct research, communicate, and create knowledge.

Benefits

The goal of student-centred learning is to develop independent, responsible learners. There are many benefits to a student-centred classroom. They are:

1. Students take an active role in their education
   - **A.** Students establish relationships with their teachers to discuss ideas. The teacher facilitates the students' learning. Teachers move around the classroom and check in with the student's progress and productivity
   - **B.** Students do more talking, and the teacher is a resource for the students
2. Students who learn in a student-centred environment are more confident, can better articulate their thoughts and are better leaders
3. Student test scores increase because they apply the information they are learning and thus understand it. Classroom management improves as students are engaged and on task
4. The creativity students use to work in a student-centred environment is incredible. Students work together and generate a group-think mentality, coming up with information and solutions they couldn't do on their own
5. Student-centred classrooms foster collaboration with group projects

Student-centred can involve small lessons, where students do independent hands-on activities that are often not connected. Or it can include students working on a more extended project-based unit. To make it simple, if you walked through a school and multiple classrooms, **this is what you would look for** to identify student-centred learning:

1. You see active learning in the classroom
   - **A.** In an active learning classroom, it is not the teacher talking. It is the students. Teachers who are used to lecturing can transition by calling on students more often and guiding students into dialogue with each other
   - **B.** Students are moving around using multiple senses. They engage with each other, discuss, draw, build and collaborate

     → **Examples:** Students working together to solve a mathematics problem, creating a map of an area for a geography lesson, putting together a history timeline creatively, or creating a Venn diagram together of aspects of ecology

   - **C.** A combination of delivery methods ensures each lesson appeals to auditory, visual and kinesthetic learners - videos, quizzes, group work, lectures, and presentations

2. Students are collaborating
   A. Instead of just the teacher being able to answer a problem/question, students working together can give each other feedback and help. Often, explaining to other students is more effective for understanding than when it comes from the teacher

   B. **Example:** Turn and talk is a simple way to introduce collaboration in the classroom. This strategy permits all students to participate in the discussion, rather than only a few students participating in a class-wide discussion. All students can process new learning while engaging in meaningful conversation with a classmate by turning around and engaging in a conversation with another student.
      → How to use:
      i. Pose a question or a prompt for students to discuss. Give a time limit (ex 2 - 3 minutes)
      ii. Have students turn to a specific partner that has been decided ahead of time
      iii. Talk - Set a timer for the allotted time and have the students discuss the question/prompt. At the end of the discussion, randomly call on students to share their thoughts and ideas

3. There is differentiation during the lessons. This can take place in various ways:
   A. Content - what the students learn

   → **Example:** During literature class, the books the students read will depend on their reading level. Some may be much higher than grade level, while others may read below. The book matches their ability

   B. Process - how they learn

   → **Example:** Allowing auditory learners to listen to audiobooks, giving kinesthetic learners a hands-on interactive assignment,

   C. Product - what they create to demonstrate their learning

   → **Example:** Allow students to choose what they want to create, such as a book report, an oral report, a diorama, a skit, a poster - whatever they feel is best for them to demonstrate their knowledge

   D. Environment - where they learn

   → **Example:** allow some students to group and sit on the floor in the corner to have their discussion, allow others to work individually if that is what they like at their desks

4. There is social-emotional learning going on in the classroom
   A. In a student-centred classroom, the teacher recognises that there is more than just "reading, writing, and mathematics" to be taught

B. Teachers also teach the following:
- **i.** Self-management: emotions and behaviours
- **ii.** Social awareness: showing understanding and empathy to others
- **iii.** Self-awareness: recognising one's strengths and weaknesses
- **iv.** Responsible decision making: making ethical, constructive choices
- **v.** Relationship skills: forming positive relationships, working in teams, dealing with conflict

5. Voice and choice is offered to the students in the classroom

→ **Examples** include student teams working on a story of their choice, asking students what they enjoyed about a unit, asking them what they are interested in learning about, and choosing how they are going to present their work.

6. Students are engaged with technology integration.

→ **Examples** include students working on collaborative documents, creating videos or presentations, researching, meeting with experts in chat rooms or via email or videoconferencing, and creating podcasts, blogs, and websites.

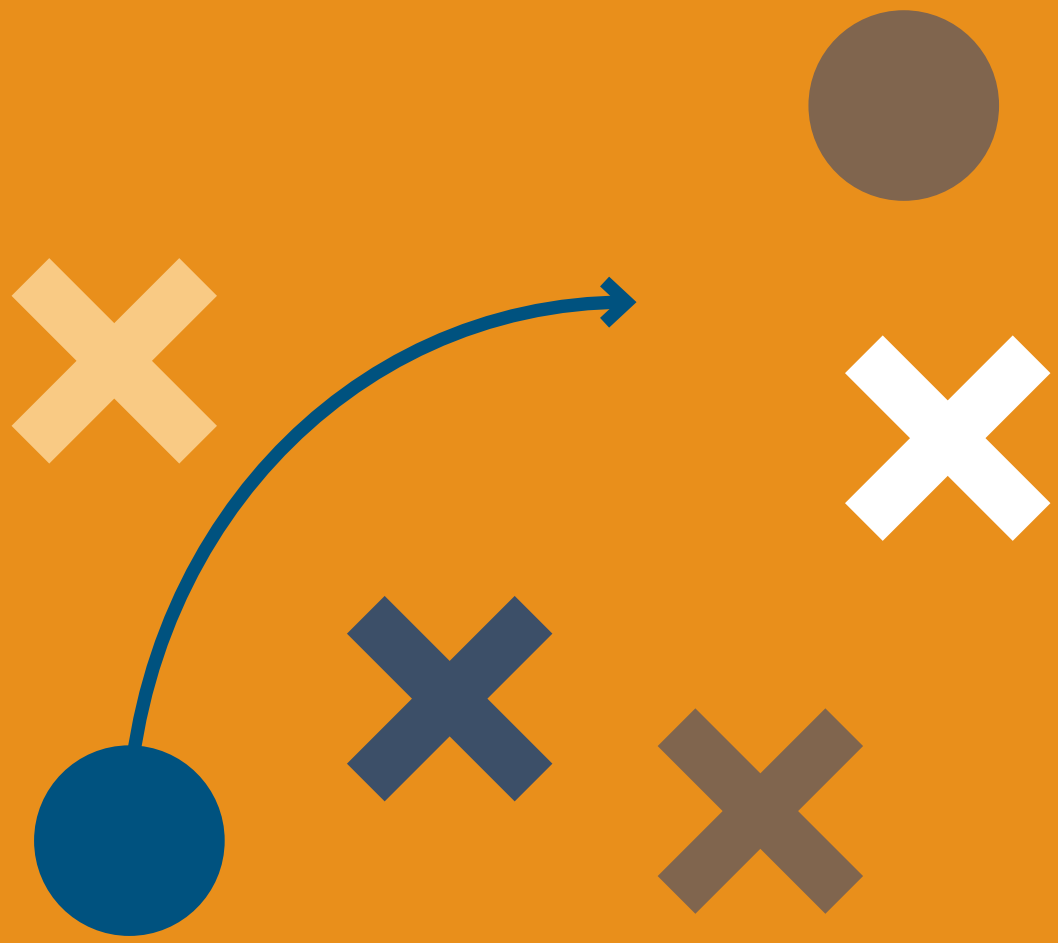
When moving to a student-centred classroom, take small steps at once- try making one or two changes per lesson. Remember that you are learning as your students are learning. You might want to start with a Talk and Turn (see above) in one of your lessons. Or have a group of three students work on a mathematics problem together. From there, you can add more and more components to the student-centred classroom.

THINK ABOUT

How does your classroom reflect a student-centred learning environment. How would you like to make it more student-centred? What would you do first? Second? Third?

CONTENT LESSON PLAN – THE 3M'S

When thinking of a student-centred classroom, it is important to plan the lessons carefully you will teach. In this next section, you will learn how to create useful, relevant, and meaningful lesson plans to motivate students. These lessons can be used independently or within a project-based unit. Remember, even when implementing project-based learning, you will also be teaching lessons (mini-lessons and longer lessons) within that unit. We will focus on the 3 M's - Meaningful, Memorable, and Motivating.



Meaningful

The first M to include in your lesson is *meaning*. Meaningful lessons do much more than present information for learners to consume. They actively engage the learner in making meaning. One of the most common mistakes in lesson design is assuming. Teachers forget that what is common knowledge to them may be unknown territory for learners. This is a good way to ensure the learner is lost before he or she begins. There is no point in creating a lesson if the content does not make sense to them. Your learners immediately need to see the relevance of the material and appreciate the benefit they gain from it. Look at the material from the student's point of view to make it impact the most.

Tips to make Learning Meaningful:

Connect Content with Meaning

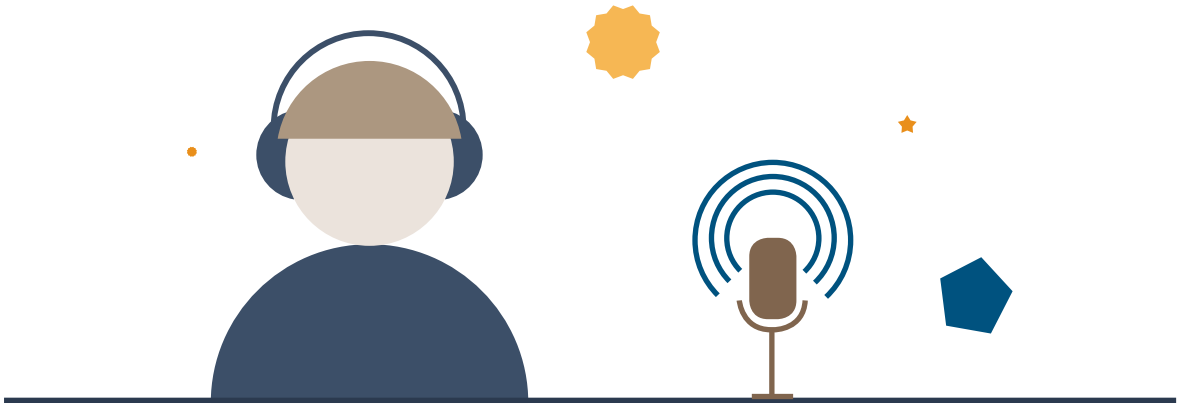
This can be achieved when students are offered the opportunity to link their classroom activities to real-life experiences. It is important to bear this principle in mind, especially with rigorous content. Teachers might want to adapt innovative activities such as storytelling, arts, graphic, and mnemonics. Meaningful content should also follow meaningful assessments.

→ Instead of just telling students facts about things, connect them to what they care about in their daily lives. Acquaint students with real-world research, listen to podcasts and have them publish their work on things that matter to them in the news, such as protests, the environment, etc.

Discourage Rote Memorisation

Do not encourage students to burn facts into memory by reading and rereading the text. Familiarity and fluency with a text are often ineffective and misleading indicators of true learning.

→ Students will not remember what they memorised. They will often forget it as soon as they have been tested. When they read the text, have them analyse or evaluate what they are reading instead of just reading it. Make the text an active learning experience by having them take notes or write down specific words from the text.



Encourage Self-Assessment

These techniques foster learning and memory. For example, teachers should remind students to assess themselves regularly. This will have direct effects on improving subsequent retrieval and also helps the students better calibrate what they know and don't know. Students can be asked to explain aloud to themselves (and sometimes others) how and why certain themes and terms connect.

- Provide detailed study guides for tests and quizzes, with ample time for students to assess their learning and seek extra help. Ask students to assess their learning after each major lesson. This can be as simple as writing a reflection in a journal. Other **Examples** include:

EXAMPLES

- An emoji worksheet where students have to look at the statement and match the emoji's. You can use Happy face, Thinking Face and Crying face for the choices
- Have them answer questions such as:
  - Did I meet the criteria for the assignment?
  - Was this easy, challenging, or difficult? Why?
  - What do I need more help with?
  - Did I check my work properly?
  - What will I do differently next time?
  - If you had to explain today's lesson to a friend, what would you tell them?
- Exit Ticket - have students write the answers to 1 or 2 questions and hand them to you as they leave the classroom
- Selfie - if your students are allowed to use their cell phones, have them take a picture of themselves using and emoji face and show it to you before they leave class
- Pair and Share - have students pair up with another student to discuss what they learned and see what they might need help with
- Draw that they remember about the topic

Let Students Figure Out the Problem.

While improving learning and memory, students may have difficulty if the feedback is not detailed. If students are told about the errors every time, they will never know how to solve the problems independently.

- Have your students identify and correct mistakes from anonymous student work to give them practice in identifying where they may have gone wrong.

Give Frequent Low-Stake Assessments

Assessments should be used to gauge learning progress, not just test how much data a student can remember. Frequent low-stakes assessments will help the student understand that it's not all about testing but learning. This strategy reinforces learning and improves long-term memory, no matter how familiar or redundant students may regard certain quiz material.

Examples include a simple quiz at the beginning of class, a whole class discussion, and writing in their journal - all of these are NOT graded but are used as formative assessments.

EXAMPLE

Making content meaningful – Topic – Decimals (4th/5th grade)

Background: computation of decimals is often a tough skill to master. To make the learning meaningful, this teacher decided to give the students **"why"** they need to know this.

- Ms Gabor wrote the number 1.39 on the board and asked the students what they recognised about this number
- Student responses included: "That looks like a price", "I've seen that in the grocery store", and "part of that is a decimal", "it has a decimal point"
- The teacher noticed that many of the responses related decimals to money. Once she connected that idea, she had the students create a class mall. Each group of shoppers chose a "store" in the mall, drew a few products that would be found in their store and labelled each with the price. The "stores" were put on the wall. They became the discussion point for their computation with decimals
- She then taught the basics of adding, subtracting, and multiplying decimals, gave each group of students 20€ that they could spend and sent them around the room to "buy" things with their money
- Students had to figure out what they could buy (**e.g.** One shirt cost 6,39€ so how many could they buy?). The teacher heard conversations like
  - "One candy whistle is 0,49€. If we change it to 0,50€, we can multiply 12 times 0,50€ to get 6,00€."
  - "How much money will I get back if I give the cashier five euros for one of the toy cars?"
- As the students figured out their purchases, the teacher realised they now had connections that mattered to them.
- At the end of the lesson, she asked them how knowing decimals help them with shopping. The students said they could find out exactly how much money they needed to spend to purchase what they needed or wanted
- And then she asked them where else they may need to know how to work with decimals, and answers included:
- "When my mom pumps gas, it tells how many litres and how much she owes in decimals."
- "When I watch sports, I see decimals, so maybe I could use those to help me see how many more points one team has."
- "Now I can shop alone without asking someone for help."
- The students made personal connections and made the topic meaningful

https://www.responsiveclassroom.org/making-learning-meaningful-its-all-about-the-why/

Memorable

The next M of learning is memorability. You have to create a lasting impression with your delivery of content. You have to engage emotions and make learning experiences compelling and remarkable.
A learning experience that no one remembers is just wasted time and effort. Traditional learning materials are full of text that many learners have trouble retaining. You can produce promising and impactful effects when delivering a lesson through

- → **imagery,**
- → **games,**
- → **practice exercises.**

Include interactivity to have learners active. At regular intervals, engage the learner in scenarios that require them to apply their new knowledge.

Tips to make Learning Memorable:

Use humour
Crack jokes and examples your audience could connect to throughout the session. This can help turn a heavy subject, such as statistics, into a less intimidating topic.

Use technology
Using technology can be a great way to make students remember, yet, teachers need to be careful that the technology is not getting in the way of the teaching. Ensure that the technology is advancing learning.

Manage your time:
It is recommended to frequently check the actual time spent on a given section. This will help to control boredom and maintain interest as opposed to a lack of interest if the session is prolonged unnecessarily. Remember the 10/2 rule - ten minutes of talking and two minutes of discussion or individual writing.

Motivational

The final M of the puzzle is motivation. While you cannot force a person to learn, you can create an environment that is more conducive to learning. If learners are motivated, they will want to learn more.

Tips to make Learning Motivational:

Involve your students.
You will not keep your students motivated if you do not involve them and let them take an active role in your classes. The past ways of teaching, where teachers talked for most of the lesson, with students taking a passive part, have become obsolete. Hand over control to your students - offer them choices on how the material will be presented. Ask students for input regarding methods by which they learn best

Build relationships with your students.
Showing a personal interest in your students will also inspire their trust in you and make it more likely that they will be open to learning new material without the fear of failure.

Provide praise for big and little things.
It is essential to allow students to be successful. Give them tasks where they can see the results of their efforts. That feeling of 'yeah, I did it!' when they have done a problematic exercise boosts their motivation. Tell the students how proud you are of them when they learn a new concept that you know they had difficulty understanding. Recognise when one student does something kind for another student. Recognise the class when they have followed the classroom rules for a day or week. Send POSITIVE notes to the parents and ensure that the student knows you are doing so.

Set clear, attainable goals for every lesson.
You want your students to leave your class thinking it was worth their while. Start your lessons by displaying your agenda and objectives, so students know what they will learn. At the end of the class, point to the agenda and go over everything they have learned. The students need to see where they are now and where you will take them next.

Use different materials
We all know that our students prefer looking at a screen than at a book, so use:
- visuals
- flashcards
- infographics
- quizzes,
- make use of new technology.

As teachers, it's up to us to seek out new resources that may benefit our classes, and bringing technology into our lessons is a great way to motivate students.

Set up a token or points system.
Many students require external rewards for motivation. Some may think of this as "bribery" and, thus, undesirable. The reality is that we all work for external rewards; we call it a paycheck. Also, rewards give students something tangible to remind them of an accomplishment.

Be Expressive and Smile
Greet the students with a smile every day and tell them that you are glad to see them. When you appear happy and motivated, your students will respond in kind.

THINK ABOUT

How do you incorporate the 3 M's in your lesson plans? What else would you like to add?

PROJECT-BASED LEARNING DEFINED

Now that you know the components of how to create a great lesson, we are going to learn about Project-based learning, which involves students working on projects that involve:

- **A challenging idea connected to the standards**
- **A higher-order question**
- **Sustained inquiry**
- **Authenticity**
- **21st-century skills**
- **Student's voice and choice**
- **Public presentation**

There is a definite difference between having students "do a project" and designing a "project-based learning" unit. Many teachers do "projects" that may include creating a diorama, building a model, or creating a poster. These are usually done at the end of a unit where all the content has already been delivered, often via lectures, worksheets and readings. These are known as "dessert" projects. They are fun, and the kids like them are often a special treat.

Characteristics of a dessert project are:

- The project is an add-on at the end of a unit
- The teacher gives directions on how to complete the project
- It can be completed alone
- It remains in the school, with the result often displayed in the classroom

EXAMPLE

- At the end of a book that the class read, students create a diorama, or a book jacket, or a "review" of the book
- At the end of a unit on Newton's laws of motion, students create a container for an egg and drop it from different heights to see if the egg is broken or not
- At the end of a unit on nutrition, students design a menu for school lunches

Project-based learning is the actual "main course" of learning. The teacher becomes a facilitator and not a knowledge provider. The project is the unit.

Characteristics of project-based learning are:

- The project is the unit
- Focuses on an extensive and open-ended question, challenge, or problem for the student to research and respond to and/or solve
- It is driven by student inquiry
- It involves collaboration and guidance by the teacher
- It is tied to a real-world issue or application
- Results of the project are shared beyond the classroom

EXAMPLE

- Planning a garden that meets specific design objectives, then plant and tend the garden. At the end of the growing season, iterate the design to improve it for the next season based on how the garden was or was not successful in meeting the objectives
- Designing a new form of government (or democracy, precisely) that addresses some perceived shortcoming of existing democratic forms (partisanship, non-functioning checks-and-balances, etc.)
- Launching a recycling program that solves an identified problem with existing recycling programs. This can be done at a household level, school level, neighbourhood level, or city level
- Students are confronted with the sudden realisation that their school is using too much electricity. Together, they must work in teams to solve the energy crisis problem at their school. Students create a driving question that will carry them throughout the project. Each team researches and learns about fossil fuels, renewable energy, and alternative energy sources. After being provided actual data from the school, each group of students creates their solution to the problem and presents their ideas to local community members.
- Task students with conceptualising and mapping out a smartphone app that addresses a problem within your country. To add a maths element, they can budget the necessary resources to develop it.

- **To see more Examples of PBL, go to Appendix C.**
- **To see a more in-depth comparison of a project vs project-based learning, go to Appendix D**

THE DRIVING QUESTION

When designing a project, you have to develop the driving or essential question posed to the students that get them to investigate a problem or process. This open-ended question is asked to the students BEFORE any instruction is given. It is a broad question requiring them to investigate and come up with solutions or answers – requiring them to use their higher-order thinking skills. The goal is to get students to THINK!

These questions:

- → **Guide the project work for students**
- → **Creates a sense of interest or challenge to students**
- → **Remind them of why they are doing what they are doing!**

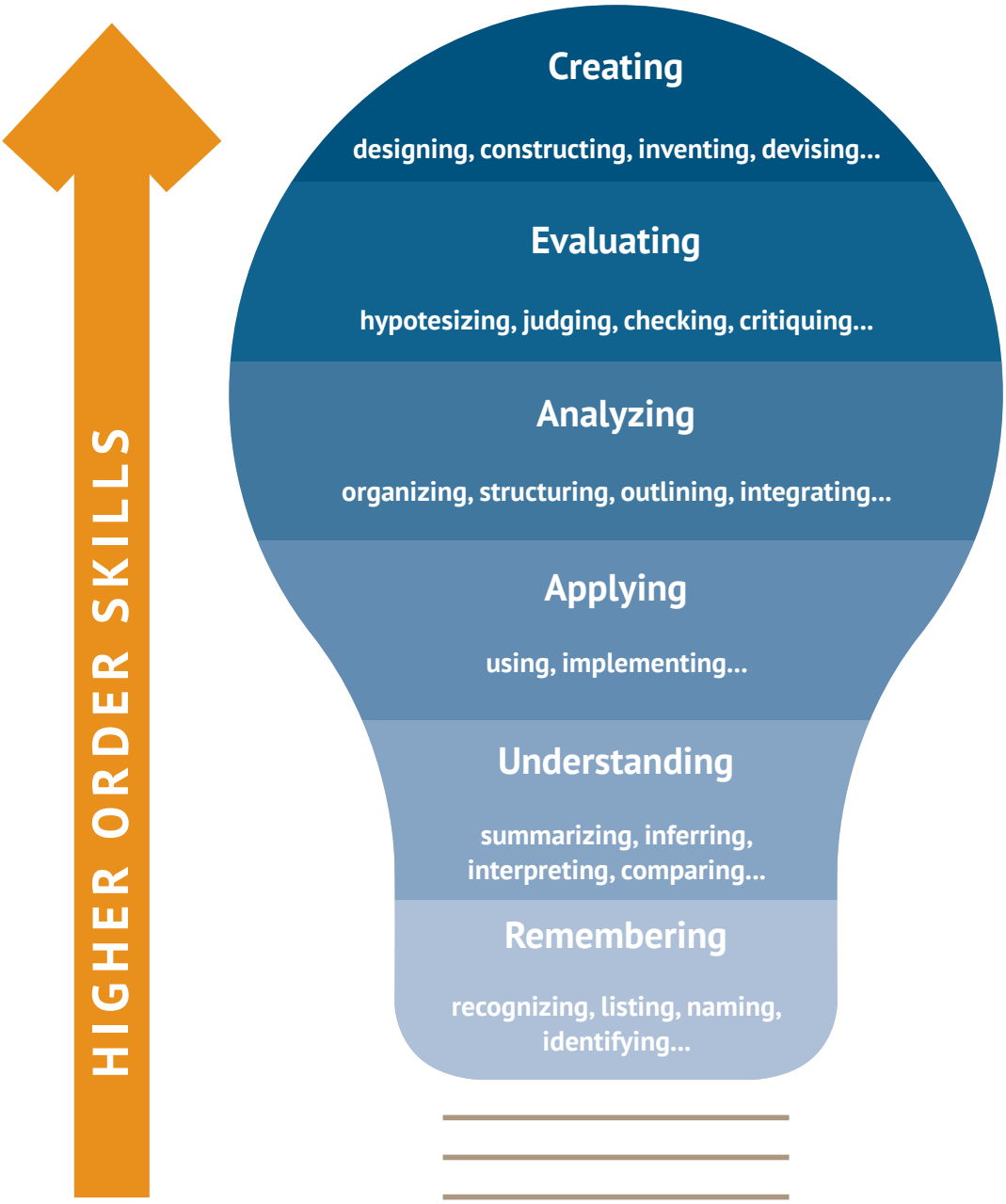
They also

- → **Guide the planning for teachers**
- → **Capture and communicate the purpose of the project.**

Along with the driving question, there will also be content questions. Content questions are necessary to get facts so students can answer the driving question.

Bloom's Taxonomy

Before we look at the questions, let's talk about higher-order thinking skills, specifically Bloom's taxonomy. Bloom's Taxonomy is a hierarchical classification of the different levels of thinking and should be applied when creating course objectives. There are six levels. The three levels on the bottom reflect lower-level thinking, while the top 3 levels reflect higher-order thinking. Your driving question should come from the top 3 levels, while your content question can come from the bottom 3.



Question Starters

Here are some **Example** question starters for each level:

LEVEL	QUESTION STARTER
Remembering	What is.....? What happened after.....? How many.....?
Understanding	Can you clarify.....? What was the main issue? What does _____ mean?
Applying	What would happen if.....? What factors might you change if.....? How is _____ an **Example** of _____?
Analysing	How is _____ similar to _____? What events were preventable? How might you illustrate.....
Evaluating	Do you think. _____ is a good or bad thing? What are the consequences of.....? If you were the judge, what would.....?
Creating	Can you see a possible solution to.....? How would you improve.....? How might you design a _____ to _____?

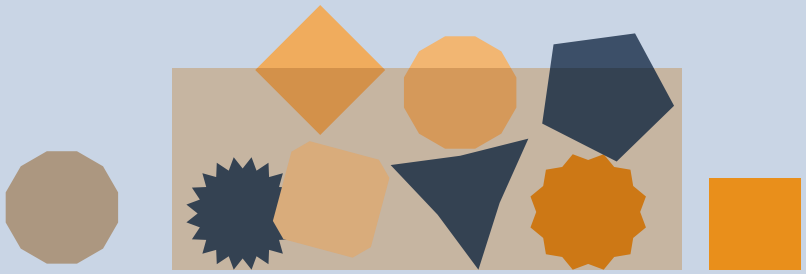
Let's look at what driving and content questions look like.

Driving questions

- Open-ended
- Require higher order thinking
- No one obvious correct answer

EXAMPLES INCLUDE:

- Are rainforests worth saving?
- How can we ensure the frogs in our park don't die?
- How can we decrease our carbon footprint at our school?
- How can we create an effective learning program to teach senior citizens how to use a tablet?
- Why don't I fall off my skateboard?
- Why have stories always been important throughout history?
- What makes a good running shoe?
- What does it take to change the world?
- How would you modify the plan to make this most cost-effective?
- Which of the following would you recommend for people to purchase and why?



- Is there a better solution to the way this was packaged?
- How might the story be different if Rabbit did not trick Fox?
- Using the characteristics of flowering plants, create a new plant
- Which two main characters in the story would you prefer to have as a friend? Why?
- Which of the environments we have studied seems like the best place for you to live? Defend your answer
- Design a different way of solving this problem.

Content questions

- Directly support content standards and learning objectives
- Have specific "right" answers
- They are important because students need to know the "facts" to think about an answer for the driving question

EXAMPLES INCLUDE

- What are the elements of a story?
- What are the layers of the earth?
- What are numerators and denominators?
- Who are some early explorers?
- What are the different methods of showing statistics?
- List the parts of a flower
- Explain how the heart is like a pump
- Explain what is happening in the water cycle
- What is the definition of a verb?
- What are three symbols found on maps?
- Where does the story take place?
- Why are symbols used on maps?

Notice that the driving questions can have more than one correct answer, and students have to justify or support their answer, while the content questions have one correct answer.

For an extensive list of Driving and Content questions, see Appendix E.

Devising these questions is one of the hardest things you will have to do. Some hints:

Write your driving question and see if you can find the answer in the textbook or online

- If you can, it is not a driving question – you need to re-write it so you cannot find one correct answer in a book or online

EXAMPLE

- Not a driving question: Who are some community members?
  - A driving question: Which of our community helpers are most important? Which community helper would you like to be?
- Not a driving question: Who are the main characters in Shakespeare's Macbeth?
  - A driving question: Why do you still read Shakespeare? OR How is Shakespeare's work relevant to my life?

Write your questions so that they are attractive to students. **For example:**

- → Teacher sounding: How does the author use voice and perspective to reflect on your childhood and community?
  - → Student engaging: How does our childhood shape who we are as teenagers?
- → Teacher sounding: How did erosion, volcanism, plate tectonics, and other forces shape our region's topography and natural features?
  - → Student engaging: Why are so many hills and valleys around here?

In addition to teachers creating questions, we also have to encourage students to ask questions.

If we want to truly prepare students to think deeply and solve complex issues and use 21st century skills, they need to learn how to ask questions!

THINK ABOUT

Do you use driving questions in your classroom? Or do you stick with content questions? Think of a unit that you can create a driving question for. How do you think your students would react to a higher order question?

DESIGNING A PROJECT-BASED LEARNING UNIT (PBL)

Using a Current Lesson

PBL is not a stand-alone teaching method; it is not something you will only sometimes do. You have to pick the units that can be transformed into a PBL unit. As you think about implementing a project-based unit into your classroom, ask yourself this question:

Do I have an instructional unit that I want to transform? The first rule is you don't have to start from scratch - look at what you teach and think about what you can turn into a project. Many themes you teach can be made into a project, where they learn what they need to know as they work and apply what they know to something concrete. What engaging, relevant real-world problems could students attempt to solve related to the unit's concepts and skills? And how are these ideas connected to the curriculum standards?

Here are a few in-depth Examples of projects:

EXAMPLE

Elementary grades

1. In this language arts project for the early elementary grades, students compile and compose photographs (their own or ones from newspapers) that tell compelling stories about their community. To prepare for this challenge, they interview adults who are experts in photography. Then they identify locations that they think make their community special. They also write informational text to accompany their photos. To make their work public, students publish online or create a kid-friendly travel brochure for their community visitors' centre.

2. Students work together to investigate local species that are (or were) native to the area and are now endangered or threatened. Students record findings in field journals and compare them with the populations in various ecosystems and habitats worldwide. Students research and record information such as the inherited traits, learned behaviours, adaptations, life cycles, and food chains of critical species in various habitats and make connections to the local species and habitat they are investigating. Students work together to determine why the species is no longer thriving or surviving and how they might protect or positively affect it. Then students communicate this information to their larger community.

(https://my.pblworks.org/project/species-survival)

EXAMPLE

Middle Grades

1. In this project, students discuss bullying and learn about the issue through watching videos, engaging in online research, and reading informational text. Students also learn about the Upstander/Bystander framework as they decide what to do about the issue. The class creates and surveys their peers to gather information about the extent and effects of bullying in their school/community. Students craft wrote proposals to present individually to school/district leaders, arguing for new or revised bullying policies and making a specific evidence-based case for the content of those policies. In teams, students produce podcasts, videos, or social media campaigns, aimed at peers, younger students, or their community, advocating for a change in behaviour and taking a stand against bullying. This project can also focus on cyberbullying.

   https://my.pblworks.org/project/stand-or-stand

2. This project introduces students to the concept of a "golden age" in the history of civilisations around the world—a time when civilisation flourished and there was peace, prosperity, and achievement. Working in teams, students choose a particular civilisation, such as Ancient Mesopotamia, Egypt, Greece, or Rome; the Tang Dynasty in China; the African empires of Ghana, Mali, and Songhai; the Maya, Inca, and Aztecs; Indus Valley Civilization and the Gupta Empire in India; and 8th–14th-century Islam. Students research their civilisation's golden age and why it declined or ended, then communicate their learning to the public through a museum exhibit.

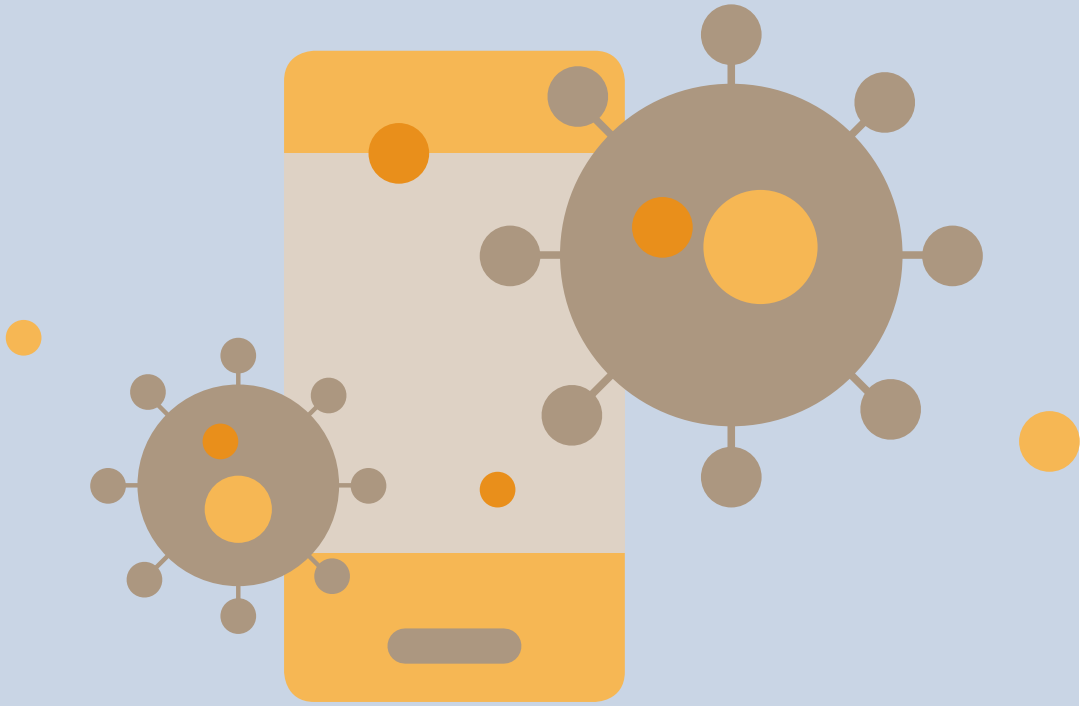
   Each team creates a museum exhibit that showcases their civilisation's golden age and explains why it ended. The exhibits are displayed at a community/school event to which other students, parents, and community members are invited. Students are prepared to summarise their conclusions when asked by visitors to their museum exhibit. Individually, students write an argument for what lessons we can learn from history that can be applied to our civilisation in the present day. They publish these arguments in a booklet as a companion guide to the museum exhibit.

   https://my.pblworks.org/project/golden-age

EXAMPLE

Secondary School

1. The COVID-19 pandemic is a complex challenge that has changed our lives. In this project, students use a human-centred design process to develop an app that helps people to slow the spread of COVID-19 in their communities. Students analyse data about the spread of COVID-19; learn about interventions such as contact tracing, social distancing, and testing; and interview potential app users. They develop and iterate paper prototypes of their apps and create an app pitch that integrates their understanding of public health, the mathematics of viral spread, and human-centred design.



2. When we go shopping, it's easy to get caught up in the stories marketers sell us: we tend to want the fastest cell phones, the snazziest sneakers, or the most delicious lattes. But what are the REAL stories behind the products we know and love? In this project, students take on the role of investigative reporters, researching the origin stories of various everyday products. Each team of students selects a different popular brand-name item and researches the political, environmental, economic, and social impacts of the item's manufacture and distribution, following the product from the extraction of raw resources to the consumer. Students compile their research into a magazine article for an audience of potential consumers of those products. Then, in a panel, they discuss their findings and potential solutions to help promote sustainable production now and in the future.

https://my.pblworks.org/project/scoop-our-stuff

HERE ARE SOME MORE EXAMPLES:

- If you teach about how plants grow, parts of the plant, etc., you can have your students do a garden at the back of the school, incorporating their mathematical knowledge to plot out the garden, and their knowledge of plants to decide what to plant in the area based on the needs of the plants. They also must keep the garden going so the vegetables make it to harvest. These vegetables can then be given to those in need of food in the neighbourhood
- If you teach geometry, the challenge for your students is to apply the geometric principles of triangles, volume, and coordinates to the mapping and design of a multi-purpose arena in a limited area. The arena must serve as a venue that can be easily converted for use by two sports, plus it serves as a concert venue if needed. Students will form design teams to create a map showing how the arena can be converted for the two sports. The map and design ideas will be presented in the final presentations to the local City Council.
- If you teach geography, have your students take on the role of travel agents and come up with a road trip from their city to another that they feel would be a popular place for people to visit. They additionally need to create a budget to decide how and where they want to spend their money. This will encompass landforms and other geographical features to entice people to take their route.
- If you teach physics, Newton's Laws of Motion, you can have your students create a theme park with different roller coasters built from materials they collect from home or school
- If you teach mathematics, your focus is fractions and decimals, students can create a school store. They need to be able to design what the store will sell and apply their maths learning to the selling process, as well as a business plan for their store to be successful
- If you teach chemistry. You are teaching about acid-base reactions, balancing equations, and decomposition reactions. Give the students this problem: You work as a chemist at a large food sciences laboratory. You received the following inquiry from a local bakery. The head baker at a local bakery recently hired an inexperienced baker. The new baker complained to the head baker that none of their cookies would rise. What can you do to help them make the best cookies?
- If you teach chemistry when having students learn about states of matter, atomic theory, and basic atom anatomy, they can be given this problem: Your company, Can-Do Enterprises, is a manufacturer of tin cans and steel cans with a tin-plating. Recently, one of your tin suppliers has been accused of trading in conflict resources. To avoid bad press (and karma), Can-Do is looking into the feasibility of changing its plating from tin to another elemental material. Students come up with suggestions on how to address this problem.

The bottom line is to think about what you already teach and go from there!

Authenticity

Authenticity is critical in a project-based unit. When designing your project, it has to connect to a real-world context or impact, or the project has to do with the personal concerns or interests of the students. Think about what authentic roles students can take to solve their problems.

EXAMPLES INCLUDE

- Master gardeners to create a vegetable gardens and grow vegetables for those people in need
- A baker who needs to help their intern baker with a recipe to create the best cookies
- An entrepreneur who has to come up with the business plan for a school store
- A chemist who has to create a new container for food
- A group of engineers who have to design a roller coaster park
- A travel agent who has to design a trip for some VIP's who want to see flora and fauna in your area
- Waste management professionals who devise a recycling program at their school

There are different levels of authenticity of projects. They are:

Not authentic ☒ these are the dessert projects mentioned earlier. They include students creating an essay or poster, doing a book report or making a presentation on a topic they researched. These are done at the end of a unit

Somewhat authentic ☒ these have a task that is similar to something in the real world, such as taking on the role of a scientist or author and creating the kind of products that people use, but they are never used

Fully authentic ☒ students do work that does impact their community or they advocate for a cause. They may perform a service or create something that will be displayed outside of the classroom.

Not all projects have to be entirely genuine. You might start with a unit to have, create something at the not-authentic end of the spectrum, and then, over time, progress to a fully authentic one.

Other Questions

A few other things to ask yourself:

- How might I have my students work collaboratively?
- How can I make sure I include 21st-century skills?
- Do I have technology that I can incorporate into this unit? If so, what will I do or have my students do?
- What is my driving question going to be?

Sustained Inquiry

A project-based unit is based on inquiry. Inquiry is an approach that starts with your driving question (or a higher-order thinking question). The student's research discovers answers, asks more questions, gathers ideas, tests their ideas and draws conclusions. This is known as *sustained inquiry*. Engaging in inquiry does not mean logging hours in the library or on the computer searching for information. Especially with elementary students, inquiry happens in various settings and experiences. Students can find answers to questions from many sources, including readings, experts, experiments, and fieldwork. And this is something that you will have to teach, as they do not know how to engage in this process instinctively. You may want to have some mini-lessons, which are about 20 minutes in length, to help them.

EXAMPLE

- Brainstorming techniques that have them develop ideas and/or questions they want to learn about
- How to analyse a map that includes things such as what they see, what the map includes, the symbols, then it was drawn, why it was drawn, what does it show?
- Annotating and paraphrasing sources
- Using concept maps to organise ideas
- How to create a plan for how they are going to use their work time
- How to devise their higher-order questions

EXAMPLE

Here is an Example unit that students in 6th grade engaged in:

The goal of the 4-week long project was for the students to develop a low-fat, cost-effective ice cream and persuade a mock school board to add this ice cream to the school cafeteria menu. The questions students brainstormed at the outset of this ice cream project launched the inquiry process that deepened and extended their learning, allowing them to accomplish the goal of the task. Inquiry-encouraging activities that a teacher might incorporate at various stages of this project could include

- Collecting, organising, and displaying data on preferred flavours of current ice creams.
- Mini-lessons and/or nonfiction readings about protein, sugar, fat and their effects on the body.
- Looking at ice cream commercials and advertisements and observing what makes for an effective ad.
- Researching ice cream recipes to understand what ingredients are typically used.
- Experimenting with different ingredients in an ice cream maker to determine what could replace existing ingredients or be added to existing ingredients to make a healthier version of ice cream.

(https://www.gettingsmart.com/2017/10/18/combining-inquiry-and-pbl-3-guidelines-for-success/):

Implementing a Project

Managing a project-based classroom isn't easy - at first! You need to get used to a different way of teaching and learning. Here are some tips for managing your classroom:

- Once you have introduced the driving question and a summary of the project, let the students compile a list of questions that will help them learn and let you know what they may need help with
- Make sure you students have a choice and voice that show their strengths in the project. Give them a choice in the group or individual product to demonstrate their learning. It will keep them invested and engaged

EXAMPLES

For a final product, let your students decide how they will present their learning. Ideas are:

- An awareness campaign poster
- PowerPoint presentations
- A short skit or play
- A formal business plan to be presented to the town council
- A website
- A blog
- A book that can be handed to younger students
- A magazine
- An interactive exhibit
- Make a video tutorial
- Produce a podcast
- Make a documentary
- Do a live presentation to the community
- Write and present a proposal
- Host a school event/fundraiser event

- You need to teach your students to self-manage their time and their tasks. This can be mini-lessons that we talked about earlier

EXAMPLES

- Introduce to them time management logs and task lists that help them break things down into manageable bits
- Show them how a calendar to plan time is important
- Meet with team representatives when making announcements or doing a short mini-lesson - it saves you time and your students time

- To make sure students are getting the content and skills they need, make sure you include many formative assessments. It also holds students accountable and gives them good feedback to improve what they are doing
- Be willing to "give up the power". Be present but give the students space to take ownership and problem solve
- Continually have the students reflect on the driving question
- Use team contracts to ensure that students follow the norms of their group work
  - **See Appendix F for an example of a simple team contract**
- Be intentional about grouping students. Consider academic, artistic, and leadership ability - you want to set them up for success
  - consider putting those who are "slackers" or don't want to do the work, in one group. Someone will have to step up and when they do, praise them! The others may step up as well
- Allow for conflict - remember that they are problem-solving. Don't step in too soon. But be available to teach them how to solve conflicts.
- And, importantly, celebrate achievements. This gives affirmation to the students, and you can do it simply by giving stickers on their work or a quick shout-out in front of the whole class
- Make sure within your project that there is individual and group accountability. Students must demonstrate their learning regarding the content and skills they are learning

EXAMPLES OF INDIVIDUAL ACCOUNTABILITY:

- Mastery check using an exit ticket. Give the students questions they will answer at the end of class, or have them free-write what they did/learned that day. You need to review them to know if you have to address any student's lack of learning the following day
- Quizzes/tests - these should be short and the first thing they do when entering class. They can be self-graded, or you can collect them to take a look at how they are doing. Try to do scenario-based questions so they can show their knowledge and logic skills in coming up with the answers
- Questions as they are working - as the facilitator. You should be walking around from group to group and asking questions
- Questions as they are presenting. No one ever said you had to wait to ask a question. Let the students know that you may ask them questions as they present their work
- End of project reflection. This is another formal way for students to tell you how things went, what big ideas they took away from their project and how it went with their peers

- Create engaging projects that are authentic and relevant to the students. When the students are engaged, they will work hard on the project, and it is less likely that there will be any issues
- If there are issues, ask yourself, "How is my project not authentic, relevant or engaging. What can I do to change it"?

Project Timeline

Your project timeline will differentiate between what you do before, during and after the project. It may change during the project and will be different for the students.

Before the project

- Have your summary for the students, including the project goals, ready. Your students may have questions or ideas that you hadn't thought about. You may make some minor changes to incorporate their ideas
- Have a general timeline (e.g. this will take one week to complete) but be flexible as things often change during the project
- Make sure you have all your resources, your mini-lessons ready
- Form the groups for the students

During the project

- Engagingly, introduce the scenario to your students and let the students brainstorm questions they want to research or investigate
- Introduce the mini-lessons at appropriate times
- Gather the class for any whole group instruction (remember, you will have whole group instruction during your project). For example: if you are doing a project where the students are planting a garden, your whole group instruction might include parts of the plant, leaf structure, photosynthesis, etc., all things students will need to know to be successful with their garden
- Monitor the groups' progress
- Implement formative assessment
- Support the students
- Look at the students' reflections daily

After the project

- Set up student-led conferences for them to share their learning with their parents or other community members
- Reflect on what went well and what didn't - make the changes to your unit NOW so you are ready for next year
- Review student work to decide on what you might need to focus on regarding whole group, small class, or individual instruction

- **See Appendix G for an Example of a high-level timeline. For your first project, you will want much more detail.**
- **See Appendix H for a PBL checklist that, at a high level, can help you plan your project-based unit.**

Remember, you will not become a PBL expert overnight - it will take time and a lot of adjustments to your plan. But that is what reflection and learning are all about. Also, remember that you do not have to do a multi-week project! Your project can be short - start with something you can do in two or three days. Try it - enjoy it- and you will see your students truly engaged in their learning!

THINK ABOUT

Think about the units you teach. Choose one and using the material above, rework it into a project-based unit. How have you addressed each of the points you just learned about?

ASSESSMENT

One big question you may have is how you assess your students in a project-based or student-centred environment. Let's start by defining formative and summative assessment practices.

Formative assessment

What is the goal of formative assessment?

According to the Glossary of Education Reform, the general goal of formative assessment is to collect detailed information that can be used to improve instruction and student learning while it's happening. What makes an assessment "formative" is not the design of a test, technique, or self-evaluation, per se, but the way it is used—i.e., to inform in-process teaching and learning modifications.

(https://www.edglossary.org/formative-assessment/)

These are low-stakes assessments that generally need to be checked and not graded. It will give a basic read on your students or your class. It will inform you whether you need to address a concept again differently, if you have to go deeper into a lesson for their understanding, or if things are on track and you can continue as planned. Formative assessments are integrated into the teaching, such as a teacher asking students to raise their hands if they feel they have understood a newly introduced concept. You will need to adjust your teaching and re-teach for understanding if they don't. You can collect samples of the learners' work during the period you want to assess. Then, use these samples to discuss the headway they've made with each learner. This allows them to see their progress, strengths, and areas that need further practice. Let's look at some other **Examples** of formative assessments:

EXAMPLE

- Entry and exit slips. As the students enter the room, have them write what they remember from the previous lesson on paper. Exit slips are similar - have them write what they learned that day.Sort the responses into three piles: Students got the point; they got it and didn't. Based on the responses, you can modify the next lesson to address concepts students have failed to comprehend or skills they may struggle with. Here are **Examples** of prompts you can ask them:
  - What are three things you learned, two things you're still curious about, and one thing you don't understand?
  - How would you have done things differently today, if you had the choice?
  - What I found interesting about this work was...
  - Right now I'm feeling...
  - Today was hard because...
  - If your students are young, they can draw happy or sad faces to show their understanding
- Low-stakes quizzes or polls that cover the material they are working on or mini lessons that you have taught. You can do a quick poll where students just raise their hands or electronically use a polling app. You can grade the quizzes, or you can have them grade their own, or they can do peer grading

EXAMPLE

- Using the driving question as a formative assessment is a relatively simple process. At the end of every lesson, ask the students, "How did our lesson today relate to the driving question?" If they can respond successfully and elaborate, you will know that you have tied the lesson sufficiently to the project and that you have a better feel for future instructional needs.
- Checklists given at the beginning of the instructional activities help guide them towards success
- to Journal reflections. Pose the same questions as you might for an exit ticket but have them free to write for five minutes in their journal
- Have students draw a concept map to represent their understanding of a topic
- Questions that you ask groups as you walk around the classroom while they are working
- In a history class, students assume the role of a specific historical figure, relevant to course content, and pair with a classmate from the same setting. Each student in the duo must write a series of letters. These letters should discuss an event or isolated period that's historically significant. As well as acting as a formative assessment, the exercise can effectively prepare students for essays, reports, long-answer tests and other summative assessments.
- Self-assessment, where they identify what they know and what they need more help on. You can also use sticky notes to get a quick insight into what they need to work on. Please give them a general question on what they need to work on and have them post the notes on the wall.

Formative assessment should be continuous throughout a unit, not a one-time thing. Whatever method of formative assessment you will be using will help guide you during a project or in a student-centred environment so that you can help your students succeed in their learning journey.

Summative assessment

What is the goal of summative assessment?

The summative assessment aims to evaluate student learning at the end of an instructional unit by comparing it against some standard or benchmark. Summative assessments are often high stakes, meaning they have a high point value.

This assessment focuses on evaluating instead of improving learning, which is what formative assessment does. Renowned educator Kay Burke writes, "The only feedback comes in the form of a letter grade, percentage grade, pass/fail grade, or label such as 'exceeds standards' or 'needs improvement.'" In other words, formative methods are an assessment *for* learning, whereas summative ones are an assessment *of* learning.

EXAMPLES OF SUMMATIVE ASSESSMENTS INCLUDE:

- End of a unit or chapter tests
- Mid-term exam
- A formal paper
- A project

Tests and papers are not the only summative assessment examples. One major type of summative assessment includes **Performance-based assessment**.

SOME EXAMPLES OF WHAT STUDENTS CAN DO INCLUDE:

- Writing a script and creating a short play, movie, or song about the concept or strategy
- Have students create a 10 - 15 minute podcast about the core concept from their project/unit. Specific students can be in charge of each podcast, and if there is a midterm at the end of the term, these can be used as study guides
- Creating a detailed infographic for a final project is an effective way for students to reinforce what they've learned. They can cover definitions, key facts, statistics, research, how-to info, graphics, etc.
- Have the students come up with their product and present their idea to you.

When using any of the examples above, use a rubric. A rubric is a scoring guide used to evaluate the quality of students' constructed responses, or simply, it is a set of criteria for grading assignments. Rubrics help define quality, and students should use the rubric to judge their work. Take a look at **Appendix J** to see examples of rubrics. Here are some other strategies for summative assessments:

- When designing tests, use language, phrases and **Examples** similar to what was used in the lesson. This makes them clear and compelling questions
- Blind grading is used to make sure there is no bias - have the students write their names on the back of the paper so you won't see it until after you have graded
- Make sure you do not include questions that have nothing to do with the content you are testing for. An **Example** would be if you are testing measurement and spatial sense, don't include questions on linear equations
- Create the final test after you have taught the lessons. This way, you are not "teaching to a pre-made test", which may or may not address the lessons you taught
- Make the test real-world relevant. Use real-world word problems on a test (and in your teaching) to illustrate the true relevance of the subject.

Now that you have learned about formative and summative assessments think about how you would use these in a project-based lesson/unit. The good news is you do not have to invent a whole new grading system. But there are adjustments you need to make! Here are some tips to help you:

- Emphasise formative assessment and use it often. Review the **Examples** above. Choose a couple of them to use throughout the project.
- There are fewer traditional and graded homework assignments, so let your students and their parents know this ahead of time - it will help manage their expectations.
- Do not give one grade for the entire project. Break up the project so that you have several summative assessments or products that the students present.
- Make sure there is individual work that you can grade so that you do not give a group grade
- Use tests and quizzes - occasionally. Just don't use them all the time
- Make sure your rubrics have quality clear criteria. Teach the students to self-assess their work using the rubric. They will not know what quality work is, so as a class, give some "**Examples**" of student work and grade them together, so they understand the rubric's language. Notice in the **Example** below, along with the qualifier (superior job, significant work), there is a detailed description of what is expected. Also nice that there is a section for the students to comment on why they chose the grades they did. This makes them think about their work more deeply. And most importantly, give the students the rubric at the beginning of the project, as it is a superb guide to help them be highly successful!

Summary (10 pts)

Include a 1-2 paragraph summary telling the audience what the book or movie is about. Include the time period for this piece of work.

10 9	8	7	6	5 - 0
Superior job	**Significant work**	**Satisfactory work**	**Limited understanding**	**Little or no understanding**
You have written, in your own words, a very concise summary that provides a detailed overview	You have written, in your own words, a good summary that tells what your story is about	You have written, in your own words, a summary that is either too short or too long that gives an idea of the story	You don't understand what a summary is and only alluded to what the story is about	Either this is missing or you didn't tell at all what the story is about

Main task or problem that the main character faces (5 pts)

This slide explains a pressing issue that the character must resolve as part of the story.

→ Explains pressing issue(s) the character must resolve as part of the story.

→ Explain the resoultion to the problem

5	4	3	2	1
Superior job	**Significant work**	**Satisfactory work**	**Limited understanding**	**Little or no understanding**
You were very clear describing what this problem was, what the resolution was and how it is part of the story and you have given supporting documentation	You were very clear describing what this problem was, what the resolution was and how it is part of the stor	You have given a very simple description of the problem and resolution in very general terms	You have described a part of the story but it is unclear how this is a problem and/or you have no resolution	You have not described the story or a problem at all

Your comments to support your score:

THINK ABOUT

Think about the assessments you currently use. Choose a few new formative and/or summative assessments to try in your classroom

PART 2:

Bringing Technology into Your Teaching

YOUR DIGITAL SKILLS

Today's technology surrounds our students. There are computers, tablets, and smartphones. These technologies are used extensively in many workplaces; therefore, teachers need to integrate technology into their teaching and the student's learning. Access to technology is often a barrier, but even a little bit of technology can transform the classroom over time.

Everyone needs to acquire digital skills in this day and age; however, there are specific digital skills that a teacher cannot survive without. You are increasingly required to deliver digitally or in a blended environment. The advantages are clear regarding time saved and updating changes quickly. Let's look at some non-negotiable skills.

Digital Documents

A digital document is a file comprising text in electronic form. You would use a word processor or text editor to write and create an electronic document on a computer. After a document is created, it can be circulated online or made into a hard copy by printing it.

The soft copy (electronic version) of a document is easily editable and can be used to receive inputs from the participants. Images and data tables can be embedded in the word document.

Documents are used all the time in the classroom, by both the teacher and the student. It can be the same as a written activity used for a face-to-face class. **Examples** include:

- A quiz or test
- An essay
- Directions for a project
- Worksheet/Answering questions on the topic
- Writing feedback
- Solving a problem
- A presentation
- Newsletter
- Brochure
- Memos

Tools Used to Create a Document

A Document file can be created using a word processing program. Documents can be created and stored online using web tools like Google Docs. Some of the common forms of document files are as follows:

- Microsoft Word document
- Google docs
- WordPerfect document
- WPS Word
- Notepad
- OpenOffice Writer

Tips to create a good document

Some tips to create a document are as follows:

- Font style and size used in the document must be simple and legible
- Spacing must be appropriate
- Images and visuals should be used as needed to make a point
- Include only what is necessary for an easy to read format

PDF's

If you want to have a document that the students cannot edit or change, you will use a PDF. These files are locked and used for viewing, not editing. The formatting is preserved, so they look the same whether the student is viewing them on a computer, tablet or smartphone. Today almost everyone has a version of Adobe Reader or another program on their computer that can read a PDF file

PDF's can be provided when the teacher wants to give documents to the participants as a handout. **Examples** include:

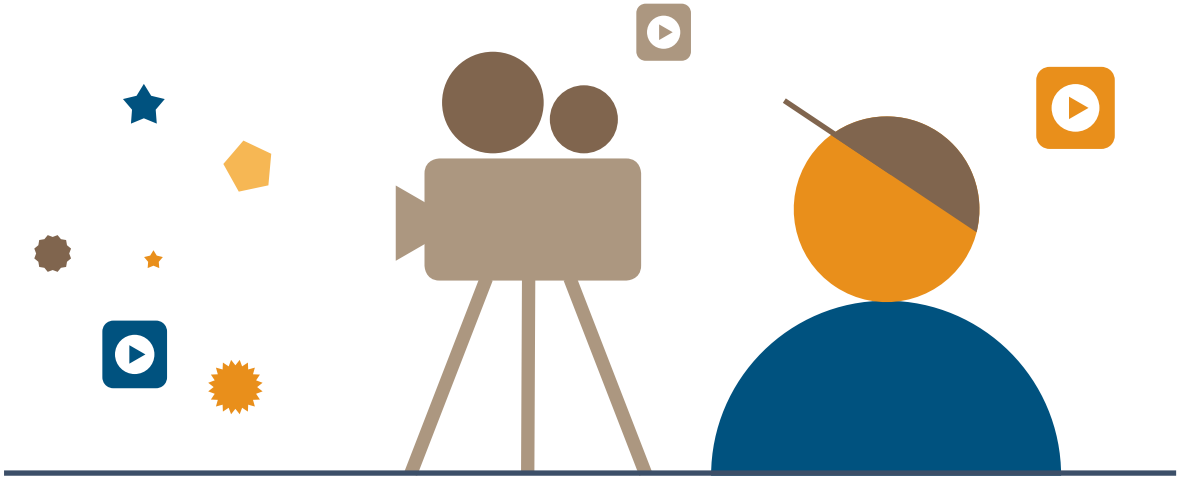
- An article for a case study
- Rules of an activity or game
- Procedures or steps to perform
- Handouts.

Tools Used to Create a PDF

There are several ways to create PDF files, but the method will largely depend on the device in use. For example, for Microsoft Word in Windows 10, go to the Print dialogue box, then select PDF from the list of printers at the top. This allows the creation of a PDF of anything printable, including documents, emails, and web pages. MS Word also allows the 'Save as', option to save the file as a PDF.

Another option is to use a PDF converter like Smallpdf, a free app that runs in a web browser. Smallpdf can convert various file types—such as Microsoft Office documents (MS Word, PowerPoint, Excel, etc.) into a PDF format.

Video Content



Video is any format that features or includes video filmed by the teacher or downloaded from the internet. Typical forms of video content include pre-recorded videos, live videos, vlogs, animations, and webinars. Videos are an essential part of a blended learning environment.

Often a video is used as a part of a presentation, as it is easy to digest, engaging and entertaining. It can be used to demonstrate an experiment or give information on a concept you are studying. Recorded videos can save time, resources, and energy rather than conducting the same experiment or demo repeatedly. It also allows the students to watch it repeatedly to improve their understanding and observation skills.

Tools Used to Record a Video

To record a video, a good camera (a Mobile Phone camera also works) can be used. Several videos can be downloaded from the internet or streamed live on YouTube during the session.

Tips to present videos

To display video files, always note the following:

- Record the video in good lighting conditions with clear audio.
- Video should be relevant to the subject and crisp.
- To edit long videos, various free tools are available, like Windows Movie Maker for PC and Power Director or Kine master apps, etc., for mobile devices.
- To save time, inserting the video link in the presentation or inserting the video in the presentation can be helpful.

Data

Can be used in the presentations to showcase facts & figures to support the topic/module. The participant can also collect data for analytical purposes, case studies, and problem-solving exercises.

Tools Used to View Data Reports

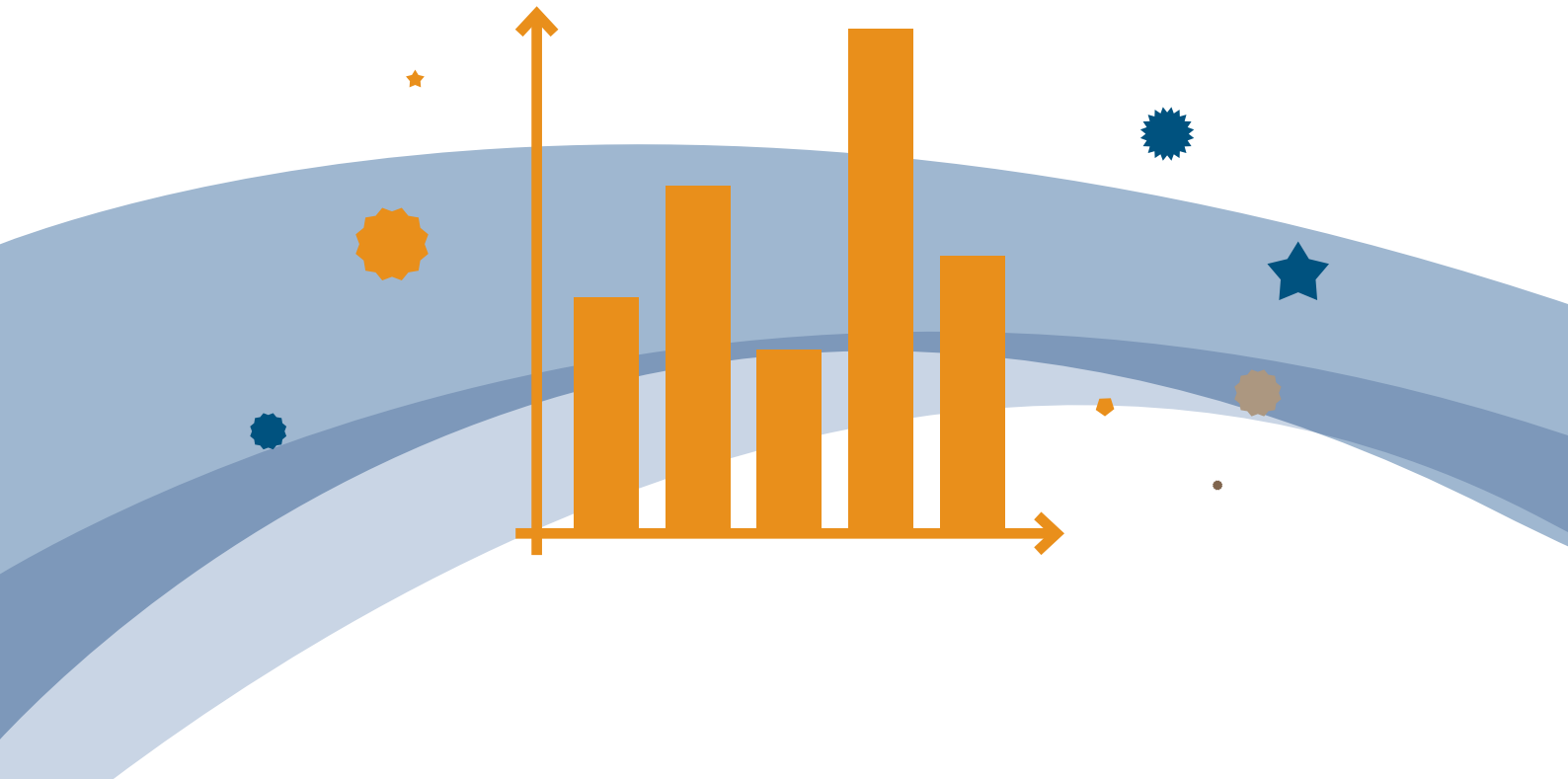
Data can be created on spreadsheets in the following tools.

- Microsoft Excel
- Google Spreadsheets
- Open Office Calc
- Libre Office Calc
- Numbers Spreadsheet (Apple proprietary)
- Calligra Sheets
- Gnumeric

Tips to present data effectively

Data can be created most effectively by:

- If you are making a point using data ensure it is up-to-date
- Keep the data simple and easily accessible
- Graphical representations (bar graph, line graph, etc.) can be an add-on for better understanding.
- Sheets can be stored digitally to make them accessible and editable for the participants.



Presentations

Multimedia presentations have become a standard for many teachers in the classroom. They have moved their "lectures" from the chalkboard to a presentation. Within a presentation, teachers can embed photographs, images, video, audio - all kinds of media to enhance student understanding and increase student engagement.

Tools to create multimedia presentations:

- Microsoft PowerPoint
- Google Slides
- Sway
- Nearpod
- Prezi
- Canva

Tips to create presentations

- Keep them text light - the fewer words on your slides, the better, stick to keywords
- Start with a summary slide at the beginning to include what the presentation is intending to accomplish and identifying the main topic and at the end to summarise what was governed and the main point
- Don't read the text on the slides unless it is powerful quote
- Relevant images, animations, videos and media should be used
- Presenter must avoid flashy transitions
- Practice before you present. Make sure all the images load and the audio works, as well as check to see that the text can be read clearly and the colour scheme is good
- Follow the 10-20-30 rule:
  - less than ten slides
  - last no longer than 20 minutes
  - use a font size of 30

LMS Platforms

A Learning Management System platform (LMS) is a software application for the administration, documentation, tracking, reporting and delivery of educational courses. An LMS platform helps you organise your content and courses and manages a learner's progress. All the above content can be added to the LMS for your class in a very organised format. The student can view this content directly on the LMS and need not opt for different platforms like e-mails or other websites. Also, most LMS platforms can conduct Live Classes with the students and teach them using the resources and content already in the LMS. This content is available to the students even after the teaching session and can be easily accessed at any time. After deciding on the time, date, duration, and topic to be covered in the Live Class, the details can be entered into the LMS. Learning Management systems are used in face-to-face, online, and blended learning environments. Often your school will choose 1 LMS for the entire school, so there is consistency from teacher to teacher and class to class.

Examples of LMS Platforms

Google Classroom
Google Classroom is a free web service designed for teachers to create classes, distribute assignments, give quizzes and communicate with students. It combines Google Drive for assignment creation and distribution, Google Docs, Sheets and Slides for writing, Gmail for communication and Google Calendar for scheduling.

Moodle
Moodle is a free, open-source online learning platform. Moodle allows teachers to create and manage courses and assessments. Moodle is mobile-friendly, with about 20 activity types available, allowing teachers to add plugins.

Managing the Online Environment

Managing is one piece of the administrative work of the educator/teacher. In online and distance learning specifically, a lot of administrative work is required to keep the data and progress of a student updated. Some points to manage academic operations in a better way are as follows:

- **Monitor and stimulate involvement.** The art of teaching is knowing when to encourage learning and when to step aside to get out of the way of learning.
- **Be clear and consistent about online and classroom expectations.** In a blended classroom, where the online and face-to-face environments merge, expectations can become confusing to learners.
- **Troubleshoot minor technology problems.** The learner will likely expect you to help with technical problems. While you cannot be expected to provide solid technical support for the learners, technical problems are often minor. They can be resolved by simply pointing the learner in the right direction. Further, if a referral to tech support can be avoided for minor issues, the learner experience will not be interrupted or derailed.
  - have the students ask each other for a solution if they are having a technical issue
    - students can help each other – you may use the rule "ask three before you ask me" to get students to try to find the answers through other users
- **Monitor the environment.** In an online environment, it is impossible to be everywhere at once. Use the LMS and other tools to track the students' activities.
- **Clarify goals and objectives.** Learners acquire deeper knowledge when they understand how activities relate to course goals and objectives. Strategic reminders help to keep them focused on what they are learning and why.
- **Give direction.** Encourage learners to establish and commit to a personal timeline. In distance learning, where little to no synchronous interaction is possible, the open-ended nature of a course can be a great pitfall.

Although students may be familiar with technology, they need to learn how to use it best for learning. Additionally, they may need help understanding how to be safe, responsible and effective on the Internet. It is up to us to teach students how to be responsible digital citizens. So let's start by looking at Digital Citizenship.

THINK ABOUT

How are your digital skills? Do you need to practice in order to be able to create the documents you need for a 21st century classroom? What do you think you will use the most when creating with technology?

DIGITAL CITIZENSHIP

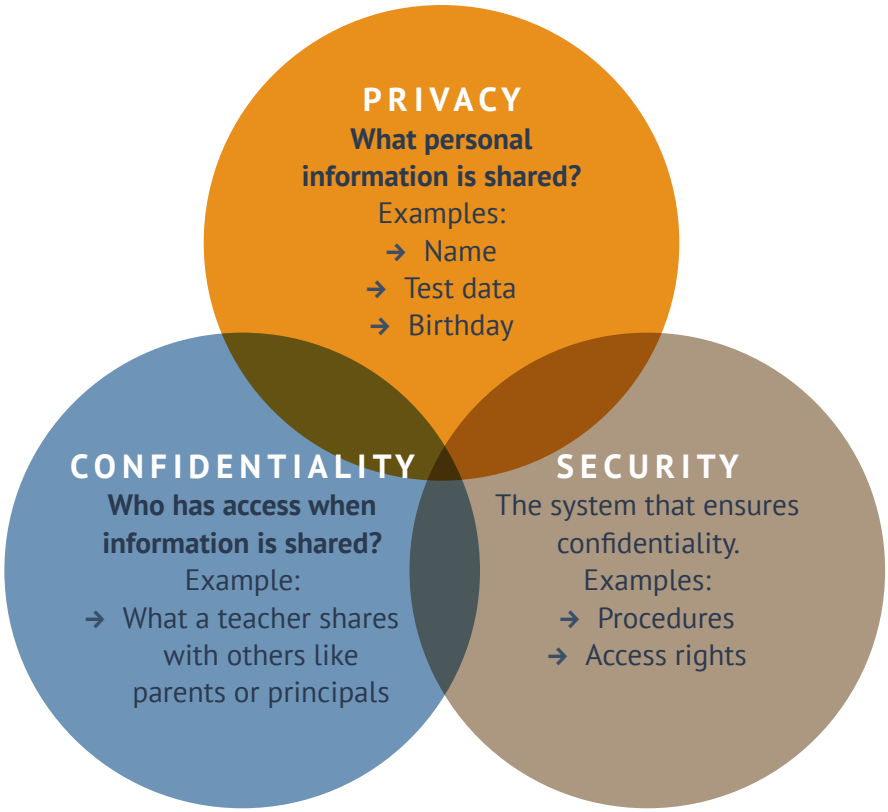
Digital citizenship refers to the responsible use of technology by anyone who uses computers, tablets and smartphones and interacts with others online. As a teacher, it is part of your responsibility to teach students how to be safe, responsible, and effective when using technology. Teachers need to learn how to protect the information of their students, their work and sensitive information. And equally important, internet ethics that focuses on the unauthorised use of computer systems, software theft (piracy), information privacy, unauthorised collection and use of information, and copyright must be included.

Most school districts require students (and often their parents) to sign an Acceptable Use Policy, which governs students' use of the internet at school and covers a wide range of issues around the rights, responsibilities, and privileges, as well as discipline, connected to computer use. See **Appendix K** for two examples of Acceptable Use Policies.

Confidentiality and Privacy

Confidentiality involves a set of rules usually executed through **confidentiality agreements** that place restrictions or limit access to certain types of **information**. In both a face-to-face classroom and online, data privacy is the same.

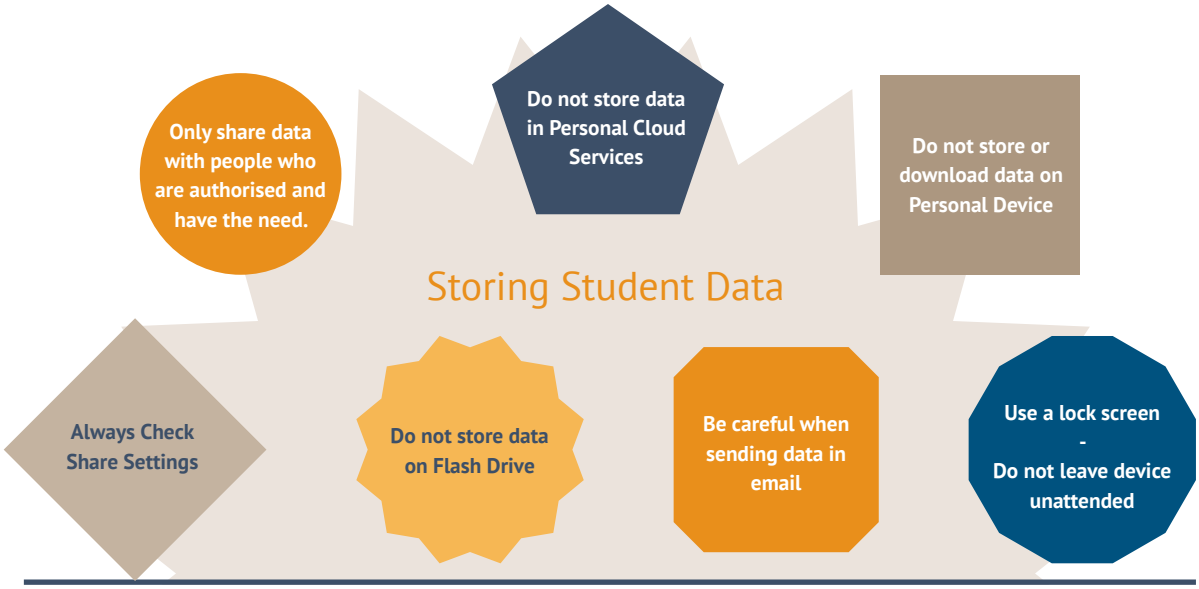
Educators use data to inform instruction, empower parents and communities, and help policymakers make decisions and target resources. How do you ensure, as teachers, that you have the knowledge to make key data privacy decisions and follow best security practices? For some educators, talking about data privacy and security can be overwhelming. To help teachers feel comfortable with this topic, the first step is to ensure they understand the difference between privacy, confidentiality, and security.



When considering privacy, teachers should remember that all student personal information belongs to the student and, therefore, should be kept private. This information includes things like assessment results, grades, and demographic information.

Teachers can ensure students' privacy by empowering them to share only the information they want and helping them understand how sharing their personal information can impact them. Confidentiality comes into play when private data is shared.

Students trust their teachers to keep their data confidential and share it carefully. Teachers and schools are responsible for holding every student's data in confidence and sharing it only with necessary parties such as parents, other teachers, and administrators. Finally, teachers can keep student data private and confidential by establishing transparent security practices in their classrooms. They may consider how and where they share student data and how it is accessed. When teachers choose secure online tools to use with students, safely store student data, or teach students best practices for keeping their data private and safe, they create the best line of defence. Consider the following ideas for secure data storage:



These practices can help teachers keep student data confidential. For example, when sharing documents or grades with a tool like Google Drive, teachers should double-check who they share the document with and each individual's rights (view, edit, or suggest).

Many teachers will use a student number instead of the name – this will keep the data anonymous if an unauthorised user finds the data. This will ensure that only those who have an educational need can access the documents. Other practices can also keep student data secure. Some are physical measures such as not using external storage devices like flash (USB) drives, which can easily be misplaced or stolen and using a screen lock with features such as password protection, fingerprint access or facial recognition. Other practices are technical measures, such as using only approved cloud storage and email services. Some schools have carefully vetted their preferred and required tools and services to ensure that student data is secure. Therefore, teachers should use only these tools. These considerations and practices can ultimately ensure student data security.

Unvetted Educational Apps

How to handle students' use of unvetted educational apps to complete tasks and projects?

Educators should encourage students to be creative and use education apps for projects. This is a teachable moment—an excellent opportunity to talk with the student about digital citizenship. Here are **Examples** of questions you could use to start the conversation with your student:

1. Did you have to make an account to start using the app? If so, did you have to provide personal information (email, name, age, etc.)?
2. Does the app require parental permission? Who can access your e-mail and other information now that you've created that account?
3. Does the app developer share your information with others? (It is in their privacy policy.)
4. Does the app collect additional information, such as contacts or the user's location?

In all likelihood, your student will not know the answers to some of these questions, but they must be aware. Encourage them to discuss their choices of apps at home with their parents as well.

Cyber safety is about being safe online - keeping information safe, keeping yourself safe online, respecting other people online and using good internet etiquette (netiquette) for you and your students. You can do several things to be safe, such as

- → Avoid sharing personal information like names, ages, addresses, phone numbers and credit card information
- → Create strong passwords to keep your information safe. You can go to this website to test the strength of your passwords **https://howsecureismypassword.net/**
- → Read privacy policies so that you know what information is being collected by a website
- → Adjust privacy settings. Keep them strict about limiting strangers from accessing your information
- → Be wary of chat rooms as people are not who they always say they are. Online predators visit chat rooms to see if they can get someone to meet up with them
- → Avoid online offers as these often open up an opportunity for unauthorised access to your computer
- → Keep the anti-virus software up to date.

HERE ARE SOME EXAMPLES OR IDEAS FOR EDUCATING STUDENTS ON ONLINE SAFETY:

- → Integrate online activities. Have them set up a blog that you monitor. They can discuss many things without giving away too much information. They need to practice online safety, which is one way to do it
- → Create a student pledge. As a class, come up with ten rules you and your students promise to practice regarding safe internet use. This can include what to post online, what to share, and anti[bullying. Here are some examples:

EXAMPLES

Rules for Elementary School

I will tell a parent or guardian if something online makes me feel sad, scared or uncomfortable

I will never meet face-to-face with anyone from the internet

I promise to be kind online and use proper netiquette

Rules for Middle/High School

I agree to think before I post and never post content that may put me at risk or ruin my future (e.g. inappropriate images or messages, vulgar language or my home address)

I will always inform a parent or guardian when meeting a friend online and meet in a public place with a parent or guardian

I will respect people online. I will not say or post anything offensive or threatening and will never harass and embarrass anyone by posting inappropriate content

Smartphone Tips for Students

Never share personal information like your address, passwords, phone number

Only add people you know

Never publish anything you wouldn't want family or future employers to see

Balance screen time with green time

Be polite online

Keep your phone out of reach during school hours

https://www.pandasecurity.com/en/mediacenter/family-safety/internet-safety-for-kids/

- Discuss digital footprints. Many students, especially younger students, do not understand that once something is posted on the internet, it is public and will be there forever. Even if they delete it, others will have a copy of the posting. Students need to ensure they don't post something that can come back to haunt them later.
- Involve parents and grandparents - educating them is key to keeping their children safe.
- Make internet safety fun. There are a lot of games out there that simulate internet safety that your students can take.

Here is a website with lots of online lessons by grade level for your students: https://www.commonsense.org/education/articles/23-great-lesson-plans-for-internet-safety

Cybersecurity

Cybersecurity is the practice of protecting networks, systems and programs from criminal or unauthorised use. Why are we so concerned about cybersecurity? Look at these fast facts:

- Every minute $17,000 is lost due to phishing attacks (the fraudulent practice of sending emails purporting to be from reputable companies to entice individuals to reveal personal information, such as passwords and credit card numbers)
- 94% of malware (software that is specifically designed to disrupt, damage, or gain unauthorised access to a computer system) is delivered by email
- 64% of companies said their data was potentially compromised within the last year
- 60% of data breaches involve vulnerabilities that could have been avoided with the right security update

Here are six rules of cyber safety that you and your students need to know and practice

1. Never leave your device unattended. One minute it is there. The next, it disappeared. The resale value of your technology leaves it vulnerable to theft. And it isn't just the device. It is also the data on the device. For example, there may be information on passwords, addresses, and birthdates, all things that criminals can put together to commit identity theft.
2. Click with caution. One careless click is all it takes to get malicious software onto your device. It is important not to click on a link in an email, rather, go to the website itself and contact customer service to see if they sent you something. Most antivirus software will catch these phoney emails before they get to you, but not always.
3. Never share your password. It is important to keep it private and to use strong, unique passwords that have a combination of upper and lower case letters, numbers and symbols
4. Be wary of using social media. Many social media sites require students to be over 13 years of age, but it is hard to check that. Check privacy settings to keep your information private. Do not accept friend requests from people you don't know. That is especially important for children as they often want to have a lot of "friends".
5. Make online purchases from secure sites. Make sure the beginning of the site is https: (the S stands for secure) rather than just http:
6. Ensure that your antivirus software is up-to-date. Additionally, ensure you only use legitimate antivirus software and never turn off the firewall on your device.

Information Ethics

It is equally important for students to learn how to use technology ethically (and you as well!) There are many components to information ethics that will be covered here.

- **Illegal Downloads**. This is a huge issue all over the world. It covers copyrighted material such as movies, music, software and games. The most extensive illegal download that both adults and children engage in is downloading music. People who create these materials deserve to get paid for their work, just like a doctor deserves to get paid when they treat you, or a shopkeeper deserves to get paid when they sell you something. There are fair use guidelines for teachers which allow them to use certain amounts of material for educational purposes. Here is an **Example** of an activity you can do with your students regarding downloads:
  - Put students in the role of the creator of the piece in question (writer/singer of a song, producer of a movie, or designer of a video game) and have them reflect how they would feel if their piece was illegally downloaded if they didn't get paid for the hard work they did.

- **Plagiarism** is when you copy and paste information from the internet and claim it as your own. It is so effortless for students to copy and paste either text or images and claim it as theirs. Therefore, many students are accused of plagiarism because they simply do not understand it and don't know how to avoid it. It is the role of the teachers to
  - educate their students on what plagiarism is.
    - Inform them upfront that plagiarism is using someone else's work or ideas without giving proper credit. In other words, because you are not giving attribution to the owner of the original work or idea -- you are presenting the idea or thought as your own.
    - students need to understand that if they submit work they copied, they are giving the impression that they are the author even though they are not, which is illegal. A simple **Example** could be students taking someone else's work and passing it or lending it to other students to complete their projects.

HERE ARE SOME EXAMPLES OF HOW TO TEACH STUDENTS TO AVOID PLAGIARISM:

- Do a lesson where you show them examples of plagiarism
- Give students practice in citing their sources through a class activity of looking up short texts and citing the sources as a whole class
- Teach students how to summarise. This is not an easy skill, so practice helps
- Teach students how to paraphrase, where they put an idea into their own words
- Teach students when to use quotes if they must use the exact words.

Be consistent in dealing with plagiarism and violations - document all the conversations and share plagiarism reports and violations with the parents/students. Drive a point that such acts will not be dealt with a soft stance.

Use sites such as Grammarly, Easy Bid or Plagiarism Checker that have free plagiarism checkers. The system then runs the project with their database of similar work submitted in the past and similar work from the internet. The system then assigns scores to each of the passages submitted by the students in their project. This can be a starting point for teachers to lead their investigation into Plagiarism.

Tips to Deal with Student Malicious Online Practices

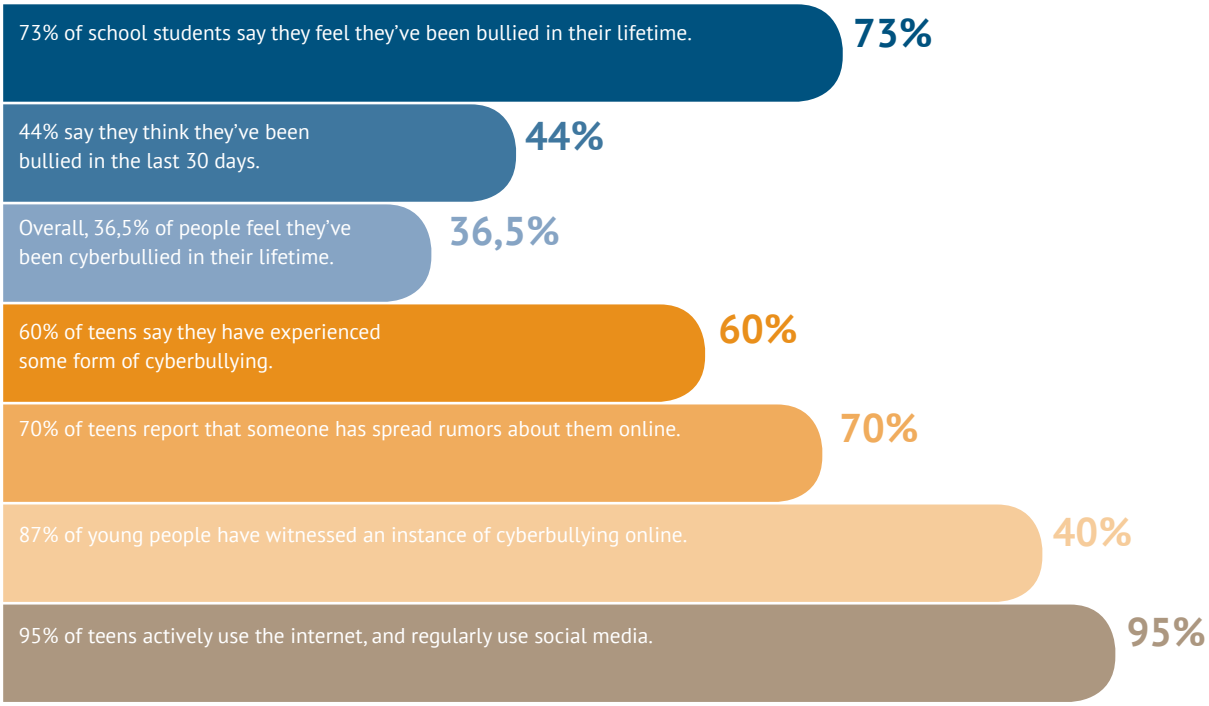
1. **Dynamic tests and projects** - Teachers should ensure and inform their students in advance that the testing will be flexible and changing. A test that changes the order and content of the questions will keep the students on their toes, unable to prepare for a cheating strategy. Teachers must upgrade their knowledge constantly as opportunities for students to cheat, change and evolve.
2. **Proctoring** - Use the student's microphone and camera to monitor the tests, especially if students engage in online learning. Teachers can use an external vendor to do the live proctoring and report incidents to the faculty teams. A "lockdown browser" can be helpful for this purpose.

Cyberbullying

Cyberbullying is no different than face-to-face bullying! Cyberbullying involves sending or posting damaging or cruel messages or images using the internet or other devices. This can happen in chat rooms, emails, instant messaging, blogs, social media sites, etc. Remember what we said earlier - when something is posted, it is there forever - so it is essential to teach students that this is unacceptable. Many schools have strict policies regarding cyberbullying. Check your school to see what they have in place and if they don't have anything, consider leading a task force to get guidelines implemented. Students around the world have committed suicide due to being bullied online.

Take a look at the chart that shows data about cyberbullying:

KEY CYBERBULLYING STATISTICS, TRENDS, AND FACTS



These are some of the common types of cyberbullying:

- Posting hurtful, nasty, or humiliating rumours or comments about an individual online
- Publishing an embarrassing or nasty photo or video
- Creating a fake webpage about another individual
- texting, emailing, or messaging hurtful comments directly to another person
- Triggering religious, racial, ethnic, or political hatred online by posting hate comments or content
- Spreading rumours in a chat room or on social media

Here are some things to discuss with students that they can do if they are bullied.

- Tell someone at school, such as a counsellor, teacher or another adult. They can often help police track down an online bully
- Ignore the bully but do not respond
- Do not retaliate as this can escalate the issue and make it much worse
- Save the evidence so that others can help find and stop the perpetrator
- Block the bully on your devices

You, the teacher, need to set an example to students of responsible use in an online environment. There are numerous materials online that are readily available for you to use. Spend some time and look through these resources to see what you can incorporate into your classroom!

THINK ABOUT

Are you digitally literate? Are you cyber safe? Do you follow the rules for copyright? How do you think you will teach your students to be good digital citizens?

STUDENT MENTAL HEALTH

Moving to an online environment is difficult for teachers, students, or parents. Over the last couple of years, there have been soaring rates of depression, anxiety, trauma and loneliness that have impacted young people. This has disrupted schooling and social opportunities with their peers.

1 in 7 kids aged 10-19 experience **at least one** mental health condition.

The World Health Organization (WHO), which estimates that one in seven 10-19 years old's experience at least one mental health condition, identifies the most common (or dominant) categories youth experience as:

Emotional disorders, including depression and anxiety
- → Behavioural disorders, including anorexia and bulimia
- → Psychosis, including hallucinations or delusions
- → Suicide and self-harm
- → Risky behaviour, including substance abuse and unprotected sex

Educators are often the first to notice mental health problems. Let's take a look at some red flag behaviours that teachers can identify and help get students the help they need to rectify the situation:

Typical Behaviours (a change from the usual),	**Unusual Behaviours,**	**Academic Performance Problems (sharkin, 2006),**
Becoming irritable/short-tempered/obsessive	Emails and other forms of communication are accusatory, manipulative, sexually inappropriate or threatening	Late assignments from the beginning of course
Sudden deterioration in the quality of work	Discussions and posted contents are: Bizarre, fantastical, paranoid, disruptive, confused, or show disorientation	Failing quality of work from the beginning of course
Abruptly begins turning in late assignments	Student seems out of touch with reality	Not returning emails or phone calls
Becoming disrespectful in discussion posts and in the classroom	Language that is not acceptable in the classroom, lack of respect for teacher and peers	Not turning in work at all
Stops responding to email		Not re-doing work when given an opportunity
Content of work becomes negative/dark/odd in tone		Ongoing display of anxiety about assignments

Some other behaviours to look for are:

- → Students feeling sad or withdrawn for more than 2=two weeks
- → Trying to harm themselves, or making plans to do so
- → A sudden overwhelming fear
- → The desire to be mean to others
- → Extreme difficulty in concentrating
- → Severe mood swings

Creating a positive, safe school environment is a first step in demonstrating that student mental health matters by:

- → Developing and enforcing anti-bullying policies and training students and teachers on how to intervene
- → Removing stigma around mental health by openly discussing mental health and creating an environment where students can openly talk with others about their challenges
- → Make it okay to ask for help and that asking for help is normal, whether help is talking to a trusted teacher, counsellor, or a mental health professional

Some of the other ways that can help maintain the student's mental health are as follows:

1. **Educate:** educate staff, parents, and students on symptoms and how to get help

2. **School Environment:** Provide a safe, positive school and classroom environment

3. **Teach:** teach and reinforce positive behaviours and decision-making

4. **Mental Health Education:** Provide links to articles on issues common to students (e.g. stress, fatigue, depression, anxiety, eating disorders, substance abuse)

5. **Crisis Services:** Prominently display phone numbers for crisis and/or suicide hotlines.

6. **Self-help Services:** Provide access to tools for self-evaluation, with accompanying articles on strategies for coping with common mental health issues.

7. **Counselling Services:** Provide links to the school counselling centre and clearly state what services are/are not available to distance students. Feedback channels must be in place to ensure that students or faculty who make inquiries for services receive a personal response.

TECHNOLOGY INTEGRATION

As mentioned earlier, students may be familiar with how to use their phones or even a computer, but using it for deep learning is something students who are starting to use technology in the classroom are unfamiliar with. Let's start with a story.....

Meet Mrs Banda and her son Joseph. Joseph came home from school one day and had the following conversation with his mother:

Mrs Banda: *Hi Joseph, how was school today?*

Joseph: *Great, mom - I handed in my slideshow that I put together from my research on Canada*

Mrs Banda: *Excellent, Joseph. What did you learn about Canada?*

Joseph looked at his mother like a deer in headlights. He didn't know what to say.....

Mrs Banda: *Joseph.....why can you not answer this simple question? You did the research, didn't you? Or did you copy and paste the information you found online into the slideshow?*

Joseph: *Sorry, mom, I just copied and pasted the information. It was easy that way.*

Mrs Banda: *I can see why you did it - it is not any different than when I was in school, and I copied the information from a book - but at least I had to write out every word, so I learned a few things! You learned nothing!!!*

Mrs Banda, a teacher herself, went to talk to Joseph's teacher as she thought this may have been her first assignment using technology for her students. She was right. This was Ms Soko's first time using technology with the students. Mrs Banda explained what happened with Joseph and shared that many students probably did the same. So she thought this was a tremendous mentoring moment.....

Mrs Banda: *Ms Soko, I am so glad you are trying technology in the classroom. I did the same thing the first time I used technology. You would never think that students could learn less using technology! I think it is how you presented the assignment. What was your goal?*

Ms Soko: *I wanted the students to research different countries worldwide, and then they would present what these countries were like.*

Mrs Banda: *Yes, they did the research by copying and pasting, and then they can read off the slides. To engage in deep learning, how about next time you have them pick their country, research it, and then compare and contrast what they learned about that country with our country? Then they will have to learn the information and use their higher-order thinking skills to see how they are similar and different to our country. Give them the question, "**How does our country make us similar or different to theirs**?" or "**How and why are places connected?**" What do you think?*

Ms Soko: *That is a great idea! I like those questions; they are pretty broad, so they can incorporate as much or as little as they want! They will learn so much more that way. Thank you so much, Mrs Banda, for helping me out here!*

This scenario is not uncommon in classrooms across the world. ***It is vital to frame the project with a driving question to engage higher-order thinking skills*** *so students can't or won't copy and paste.* Teachers new to technology integration also tend to do simple projects, like having their students type essays or research on the internet. Technology can bring so much more to the classroom. Let's look at the **SAMR model**, a framework to show the impact of technology on teaching and learning.

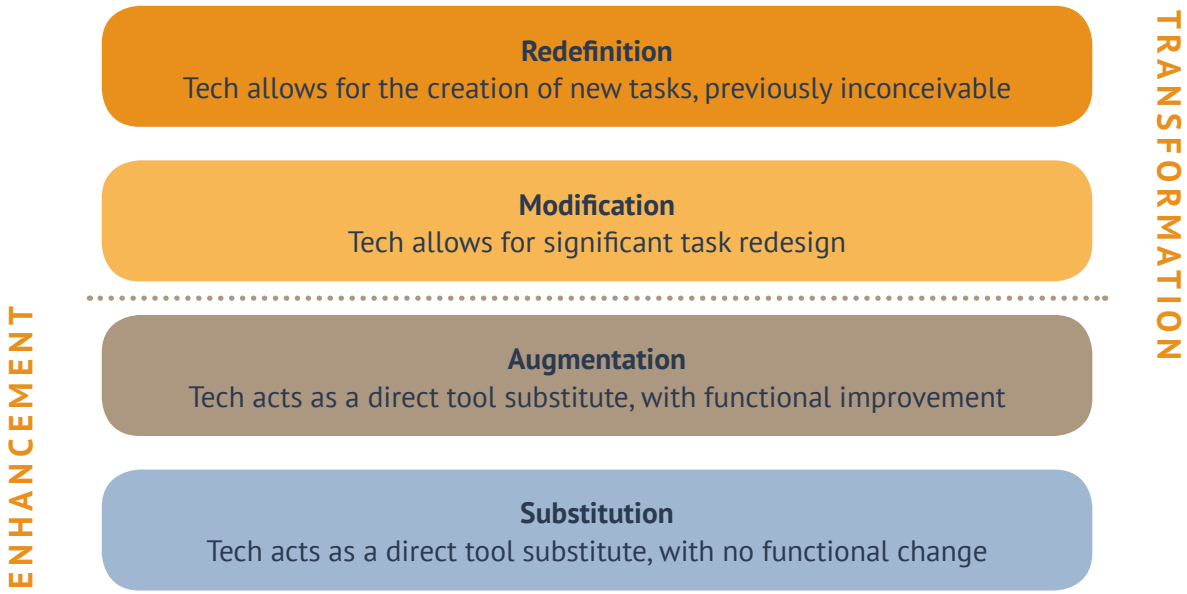
The SAMR Model

Popularised by Dr Ruben Puentedura, the model supports and enables teachers to design, develop, and infuse digital learning experiences that utilise technology.

There are two levels here - the enhancement level (lower level) and the transformation level (higher level). Each has two components to it. Although teachers may start on the substitution level, they must move to other levels to take advantage of deep technology integration.

Enhancement level

- **Substitution** where the technology acts as a direct tool substitute with no functional change. In short, the same task could be accomplished without technology.
  - **Example:** Camera to digital camera, online quizzes instead of pen and paper, a book to eBook, hand-written journal to a word processor,
  - Remember that substitution strategies do not change the learning process or outcome.
- **Augmentation,** where technology is a direct tool to substitute with some functional improvement. The same task could be accomplished without technology, but technology makes it easier, faster, or more efficient.
- It also allows for the introduction of more independent and student-centric learning. Using technology as a source of information, students can start actively learning without requiring constant teacher-led instruction.
  - **Examples:** Independent internet research as opposed to getting the information from the teacher, spell check or dictionary on word processing, cut/copy and paste, teacher instruction is supplemented with a video that clarifies a hard-to-explain concept

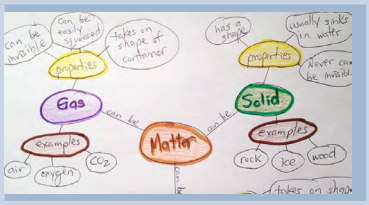


Transformation Level

- Modification is where technology allows for significant task redesign. The task now may include elements that are not possible without technology, such as an authentic audience, off-site collaboration, or multimedia
  - **Examples:** Wikis and Google Docs—to collaborate and share comments or edit work online together, student response systems (clickers to respond to questions), use of digital recorders to record voice and create podcasts, informational video instead of a standard oral presentation
- Redefinition is where technology allows for the creation of new tasks, previously inconceivable. Redefinition isn't the same as 'high tech'. A learning experience is redefined when it integrates technology seamlessly and meaningfully to open new doors for student learning – regardless of how sophisticated that technology might be.
  - **Examples:** Blogs or websites that allow for comments and review by others, videos or films where students can create, model, or summarise their learning and publish online to be seen by the broader community, Skype or video-conferencing to connect to experts or other classrooms around the world.

LET'S TAKE A LOOK AT A COUPLE OF OTHER EXAMPLES:

Original Task: Essay-style written response to a story, play or article	
Substitution	A word processor replaces the pencil and paper task
Augmentation	Along with the word processor, students can use spell and grammar check to check their work and add images
Modification	The updated writing is now shared using a blog so that students can receive feedback from multiple peers
Redefinition	Instead of creating a written essay, students convey their thoughts by creating a multimedia video to share on a website

Original Task: Create a concept map demonstrating understanding of properties of matter		
Substitution	Concept mapping software is used as a replacement for the pen and paper version	
Augmentation	Concept mapping software allows for illustration and links to other levels	
Modification	Concept maps are a graphic portion of a blog post in which students write learning reflections as well as post comments and discuss peer learning	
Redefinition	Using Minecraft, students model the three states of matter and record them as a video. They post and add reflections, as well as allow comments from others.	

https://prezi.com/embed/r1-_udbvf6kb/

Original Task: Research earthquakes and write a report on keeping safe	
Substitution	Students use a word processor to write their report on earthquakes and the design of structures in earthquake zones.
Augmentation	Students embed materials and hyperlinks to referenced materials above.
Modification	Students design a structure and post online where they receive comments and engage in discussions.
Redefinition	Students research valid sources to interview experts via structure design. They design the structure and gather an expert panel who analyse and give feedback on the designs.

As you get more comfortable with the SAMR model, use Bloom's Digital Taxonomy to give yourself ideas of what students can do:

#bitesizePD

Bloom's Digital Taxonomy

FRACTUS LEARNING

Bloom's taxonomy	Bloom's modified taxonomy	Bloom's extended digital taxonomy	Functional Levels	Activities with digital tools
		Sharing	Publicly sharing, publishing, broadcasting	Contributing to open social networks, publishing, broadcasting, networking
Evaluation	Creating	Creating	Designing, constructing, planning, producing, inventing, devising, making	Programming, filming, animating, blogging, video blogging, mixing, re-mixing, wiki-ing, videocasting, podcasting, directing
Synthesis	Evaluating	Evaluating	Checking, hypothesising, critiquing, experimenting, judging, testing, detecting, monitoring	Blog commenting, reviewing, posting, moderating, collaborating, refactoring, testing
Analysis	Analyzing	Conceptualizing	Comparing, organising, deconstructing, attributing, outlining, finding, structuring, integrating	Hacking, mashing, linking, validating, reverse engineering, cracking
Application	Applying	Applying	Implementing, carrying out, using, executing	Running, loading, playing, operating, uploading, sharing with group, editing
Comprehension	Understanding	Connecting	Interpreting, summarizing, inferring, paraphrasing, classifying, comparing, explaining, exemplifying	Boolean searches, advanced searches, blog journaling, tweeting, categorizing, tagging, commenting, annotating, subscribing
Knowledge	Remembering	Doing	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding	Bullet pointing, highlighting, bookmarking, group networking, shared bookmarking, searching

Higher Order Thinking Skills

Lower Order Thinking Skills

Technology should not be used unless it improves the learning process. There are times when the more traditional methods work just as well. THE SAMR model is like a toolbox - it helps you find the right one. When thinking about technology integration, ask yourself these key questions:

- How can my lesson be improved using technology?
- What am I hoping to achieve by using this technology?
- How will it make a difference to my students' learning?
- How can I engage and empower students through technology?
- How can online learning more closely resemble authentic, real-world learning?

Using technology in the classroom lets your students know that you are connected to the rapidly changing world, flexible, and adaptable. You want them to succeed with technology seamlessly as part of their lives.

THINK ABOUT

What do you think your journey will be when you integrate technology? What level of the SAMR model will you aim for in the first year?

BLENDED LEARNING

There is a trend in education towards blended learning. Blended learning is a design where you integrate face-to-face instruction with online interaction in a seamless and complementary way.

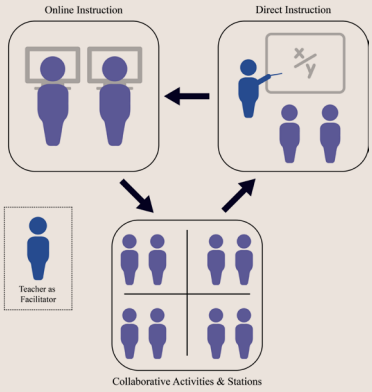
The blended learning continuum can be any of the following:

- Mostly online where most of the instruction is online with occasional meetings face-to-face
- More online where instruction is mainly online with students meeting daily face-to-face
- Even mix where it is split 50/50
- More face-to-face where most instruction is in the classroom but there are online components
- Mostly face-to-face, where the instruction is in the classroom with some online, limited resources Here, are some **examples** of blended learning lessons:

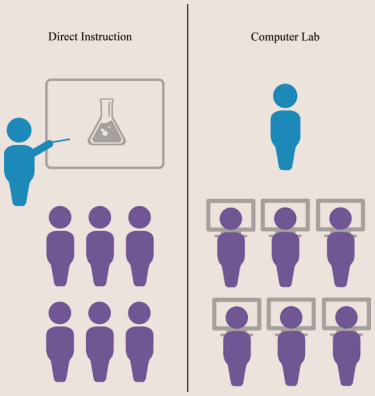
EXAMPLES

- Students take a field trip to a local planetarium during an astronomy unit and become interested in the constellations. The teacher posts videos on the topics of interest and assigns students different videos to watch outside class. While watching the videos, students take notes and record impressions. Back in school, students get into small groups to discuss important concepts from their videos.
- In a primary school history class, students study ancient civilisations' contributions to our world today. Outside of class time, the students access sites the teacher has shared for them to research and a discussion board where students can participate in an online discussion focused on the origin of democracy. Back in class, the students work in small groups on a project where they develop their civilisations. Project work continues outside of class by using online collaboration tools.
- Students in this French class are all at different levels. To meet the needs of all the language learners, students are divided into small conversation groups that rotate through discussions with their teacher. Since class time is focused on developing conversational skills, students do self-paced grammar and vocabulary exercises that the teacher posts online and organise for each level.

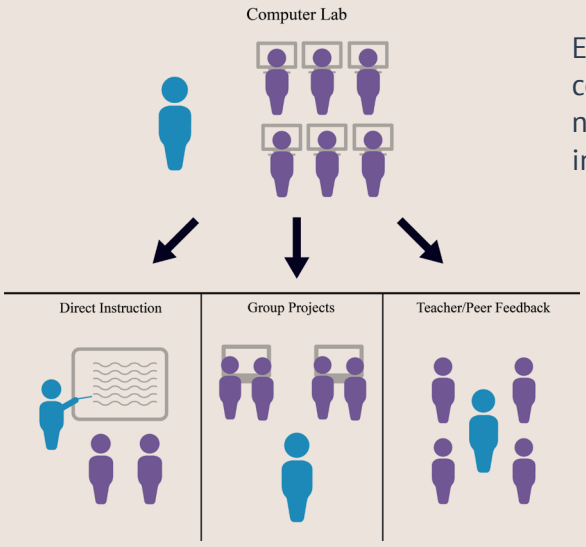
Several models can be implemented in the classroom. Let's look at them:



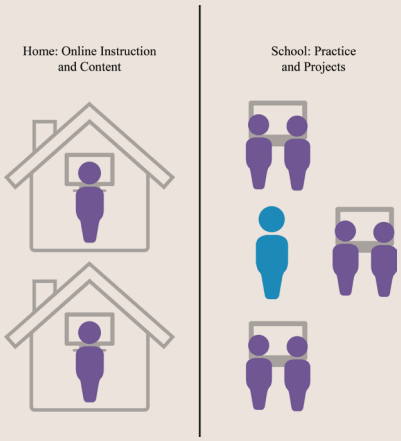
Station rotation is where students rotate through stations on a fixed schedule, typically in groups. This is similar to the non-technology centres model.



Lab rotation is similar to station rotation, but here students rotate as a class to the computer lab for the online learning portion.



Each student has a list of what they need to complete in **individual rotations**. They may not necessarily go to all the stations and are done individually

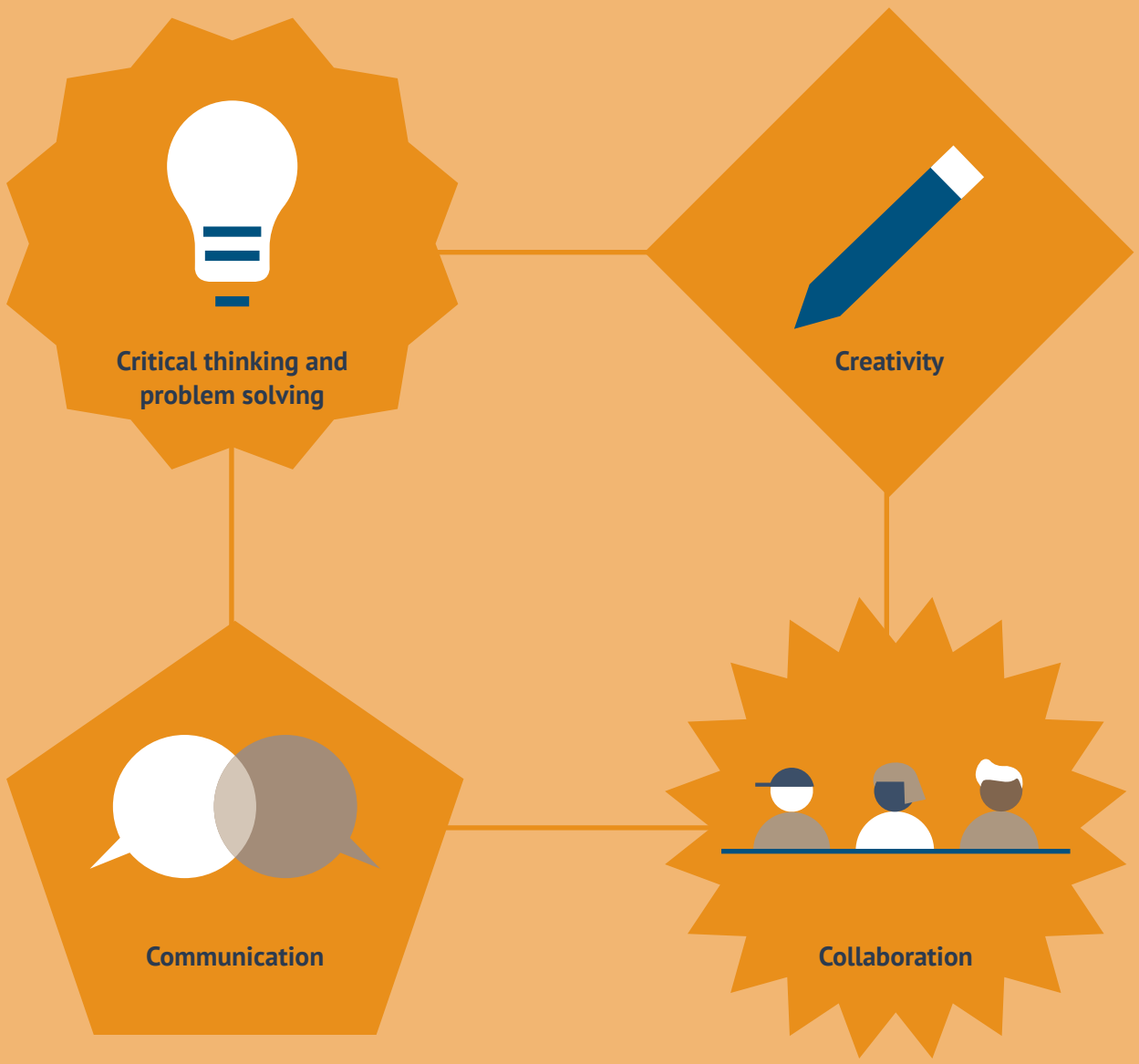


Flipped classroom model is where students learn the content at home. The classroom time is used for projects or students working together to solve problems

Whichever of the models or the continuum you choose, what is essential is that you try.
Start simple by having a little bit of technology in your lessons. As time and equipment improve, you can add more and more.

THE 4 C'S - REVISITED

Earlier, we discussed the 4 C's. Let's revisit them while looking through the lens of using technology.



COMMUNICATION

"Good communication is the bridge between confusion and clarity."

– Nat Turner

Communication includes four parts: Speaking, Listening, Writing, and Reading. Part of our job as educators is to help build effective students through these modes of communication. The advancement in technology has allowed for many types of tools that allow our students to express thoughts and ideas and communicate effectively. Today, millennial learners are comfortable as well as confident in communicating virtually.

When communication is effective, both the student and the teacher benefit. Communication makes learning easier, helps students achieve goals, increases opportunities for expanded learning strengthens the connection between student and teacher, and creates an overall positive experience. Whether an educator is teaching a student, working with a colleague, or meeting with a parent, effective communication is required to guarantee the success of our learners. Teachers need to understand the basics of the communication process, its significance and the various digital tools enabling effective communication in both face-to-face and virtual classes. When communicating with students, whether in a face-to-face or a virtual classroom, we are communicating to give information or gain an understanding and build relationships. But communicating in a virtual world takes a bit more thought and planning, primarily due to the absence of visual clues such as body language in the online environment.

Importance of Effective Communication in a Virtual or Blended Classroom

Effective communication is essential in a virtual classroom:

Sense of Community:
Since virtual classrooms lack physical connections, an educator must foster a sense of community among the virtual learners. This would help them feel connected with the teacher and their co-learners. A sense of community will also be a safe place where students can be comfortable sharing their thoughts and ideas.

EXAMPLES:

- Create small breakout groups and change them up often. Here students can work together and make connections with other students
- Simultaneous chat: Give students a prompt to respond to in chat but tell them not to post their responses until everyone is ready. This activity allows everyone to participate equally and find shared perspectives.

Classroom Lessons:
As a teacher, you put a lot of time and effort into developing activities and student-friendly content. Communicating the content of the lessons as well as instructions is very important.

- Post all slide shows and other materials that you used during a lecture to the learning management system so students can review them at any time
- When giving verbal directions for activities, make sure you also have them written down, either on the screen or post them in the chat for students to read. Remember, not everyone is an auditory learner, and many students need to see things are written to understand them

Student Engagement:
Engaging students virtually is challenging, and the solution is effective online classroom communication. Student engagement can be done effectively through various forms of interaction using collaborative tools and techniques. Look for opportunities to engage students that result in a deep understanding of concepts

- Novelty –have students learn how to create an infographic, or have them record their responses
  - show students how their learning connects to the real world, such as the following:
    - Adolescent Issue: The search for identity: Who do I want to be? What do I want to become?
      i. Content/Topic: Percentages
      ii. Connection: To determine your likes and dislikes, compute the percentage of your life spent in various activities.

- Choice - give students a choice in tasks to perform or ways to report or establish their learning goals, as this gives them a voice in their learning. For example, let them choose how they are going to demonstrate their knowledge at the end of a lesson, such as a podcast, a slideshow, a brochure, an essay, etc., all using various tools of communication
- Challenge- balance the sense of increasing skills and challenge to keep students interested in the content

Enhances Creativity and Innovation:
Young minds are full of creative ideas that can lead to innovation. You need to kindle their creativity through effective online communication in a virtual classroom as their teacher.

EXAMPLES INCLUDE:

- Put students in small groups where they can brainstorm ideas on how to create a recycling plan at their school – when students hear their peers' ideas that tend to generate further thinking
- To encourage creativity, do a short activity where you ask your students to come up with a variety of uses for a fork or to come up with ways to draw a perfect circle using only items found in the classroom, or have them recreate a historical event taking on the persona of a superhero and communicate their responses in a variety of ways

Boosts Student Morale:
Morale refers to self-confidence and esteem. Virtual one-on-one communication with the students, even in the form of feedback, can play a vital role in lifting their morale. Thus, helping students to emerge more confident.

Types of Communication

Digital Tools for Effective Online Classroom Communication

This demands one-on-one communication along with group interaction. This can be possible through various digital tools and collaborative techniques. A few digital tools to enable effective online classroom communication are listed below. However, you can choose one or multiple tools depending on your course requirements.

- **Announcements:** Announcements form an integral part of a classroom, either offline or online. Announcements include giving the class schedule in the form of a timetable or activity planner, deadlines for assignment/project submission, exam-related announcements, parent-teacher meet announcements or announcements about any other vital information. An educator can use the following medium for making official announcements.
- **Websites:** The official website of a school should have a section for each teacher where they have all their class materials and make all the official announcements. Students should be aware of it daily and before the next class.
- **Official Messenger Groups:** The teacher should set up a class site on an app like WhatsApp, or any other local app that is widely used by students. Here the teacher can post important information for the class. The teacher may want to restrict this group to only allowing themselves to post so that students won't miss any announcements.
- **Google Calendar:** Teachers need to plan and organise their activities well in advance. A monthly planner for all the academic activities can be made, and the same can be shared with the students' Google calendars. can be shared with students through any platform.
- **Online Discussion Forums/Boards:** Many people think online discussion boards are the most important part of an online course. In a typical f2f classroom, students see each other and interact together. In an online course, discussion boards provide that same visible, interactive space for students to interact with their peers. They can generate ideas through brainstorming sessions, clarifying doubts or as a general platform to share knowledge. Teachers can put up a topic in these forums for discussion or ask students to respond on a rotational basis. Often a discussion board is built into a learning management system (LMS). But not always. Here are some examples of online discussion forums if you don't have one:
  - Google Classroom
  - Padlet
  - Poll Everywhere Socrative
  - NowComment
  - Flipgrid
- **Online Publishing:** Online publishing can be done in multiple ways by the teacher and by the students. They can write a blog, post on a website or create an eBook. For example, teachers can have individual blogs in which they can post subject-related content and ask students to subscribe to and follow the blog. Students can also leave comments in the com-

ments section. Students can create blogs as it gives students a voice and allows them to share their knowledge with an audience who will read their posts. Websites can serve as a running history of class activities by the teacher. A class website can be used as a platform for students to communicate information about what is going on in the classroom, respond to discussion questions, or demonstrate their learning. eBooks enable teachers and students to publish their writing. Examples of online publishing sites include

- Blogs: WordPress, Wedublogs, Weebly, Wix
- BloggerWebsites: Weebly, Wix, SimpleSite
- eBooks: Book Creator, STorybird and Shake up Learning

- **Oral Communication*:*** Oral communication skills include listening and speaking. Three ways to communicate in a virtual classroom using oral communication include video conferencing, audio recording a podcast, and Vlogging
  - **Video Communication:** There are various players in the market that offer modern cloud HD video communication. *For* example, Zoom, Google Meet and Microsoft Teams are one of the best for oral communication through video conferencing as they are user-friendly and offer multiple features to the users in the free app. However, the paid version comes with an additional set of features.
  - **Podcast:** A podcast is a digital audio file, often an episodic series, that is made available to a group of subscribers. Teachers can create carefully scripted content through a podcast and upload the same either on Google Classroom or the website. Students can download it by logging in and listening to the same at ease. Don't forget that a podcast is also an excellent way for your students to demonstrate their understanding of a topic/lesson.
  - **Vlogging**: A Vlog is similar to a blog but has a video along with the audio. Vlogging is a good way to create an impact on the students in the virtual learning environment as they get to see the speaker as well. They are typically updated regularly.

Some tools that can be used for oral communication include:

- Podcast: Audacity, Vocaroo
- Vlogging and Videoconferencing: Flip, WeVideo, Educreations, Zoom for Education, Google Meet, Microsoft Teams for Education

Non-Verbal Communication: It is very tough to gauge non-verbal communication in a virtual classroom. However, as a teacher, you should look for certain non-verbal cues from the students actively. *For* example, watch their facial expressions when the cameras are on in a live session, and encourage students to use emojis to express doubts or clarity by raising a hand or showing a thumbs-up symbol in emojis.

Feedback and its Importance in Virtual Classroom Communication

Feedback is one of the critical components of the communication process. It is the response given by the receiver of the message to the sender of the message. Feedback can be immediate in real-time, as in the case of face-to-face communication in a video conference, or it can be at a later date. Feedback can also be positive or negative. Regular and prompt feedback given by the teacher motivates students to better their performances. In a virtual classroom, feedback can be divided into two types:
A blend of the above feedback can be used to make online communication meaningful.

Tips to Improve Online Communication Etiquette

Dress appropriately:
Remember, the first impression is the last impression and dressing is one of the forms of Non-Verbal communication. Although you might be in the comfort of your house, dress appropriately. Wear professional clothes just like you would in the face-to-face classroom. Expect the same for your students

Background:
Since your students would be peeping into your house through the virtual classroom, select a good spot or corner in your house that is less cluttered and free from distraction. While teaching virtually, things in the background of the speaker grab attention quickly, which may cause a distraction for the listeners. Keep it simple, neat and tidy. Communicate to parents that they should do the same for their child in their house

Rules of the class:
Make a list of the dos and don'ts in your virtual classroom and explain them to your students in the first class. Basic rules could be:

- logging in on time
- all cameras on
- practicing with the technology
- being appropriately dressed in front of the camera
- do not abuse the chat box
- using proper spelling and grammar when writing
- raising your hand to respond to a question
- no eating and so on

Mute all:
Either you as the host of the session can mute all the participants upon entry or tell them to mute themselves as they enter to avoid disturbance in the background.

Lock the meeting room:
Virtual meeting rooms also have the feature of locking the session. Hence, to reprimand latecomers and maintain the classroom's discipline, you can lock the meeting after 5 minutes of starting the session. But then understand that you will have to catch that student up.

No Sarcasm: sarcasm is very difficult to understand the commentator's intent online. What might seem like a joke to you can come off to others as rude. It is best to be polite and direct in your communication.

Do not post anything for the students in ALL CAPS: this is thought of as yelling. Just like you would not yell at your students in the f2f classroom, make sure you are not yelling in the online classroom

Collaboration in Classroom

"Collaboration allows us to know more than we are capable of knowing by ourselves."

– Paul Solarz

Definition

A collaborative classroom refers to creating a joint learning environment, enabling the students to participate actively, think critically, troubleshoot problems, provide alternative solutions to a problem, and offer feedback to the co-learners through several planned activities and interactions.

It is an established fact that alone we can do so little, but together, we can do so much. Collaboration in classrooms is the essence of millennial learning and is equally important in brick-and-mortar buildings and in digital learning. Collaboration is one of those essential skills that employers have identified all over the world. Think about collaboration in the real world:

- Doctors and nurses work together to take care of a patient
- Making a movie involves close collaboration between videographers, directors, and cast members
- A marketing product designer works with a user experience designer, a developer, and a content writer on a product
- Teachers work together to create lessons

Collaboration is not a new skill – it has been used through the years. Think of the early inventors working with their co-workers to create what we have today. But we haven't always used collaboration in schools. It is time to make the shift. And honestly, collaboration isn't all that different if you are working in a face-to-face environment or an online environment. So let's go a little deeper in our understanding of collaboration, no matter what environment you are going to use it in.

Need for Collaboration in Classroom

- Times have changed ,and millennial learners are the target set of audience, it is essential to have a collaborative classroom in every learning environment.
- Practical exposure enhances the interpersonal skills of the pupils in a much better way than mere one-sided lecturing or talking by the teacher.
- It is one of the effective mediums to gauge the understanding of the subject matter by the pupils.
- Students learn from each other and help brainstorm creative ideas.
- Apart from subject clarity, it acts as an effective tool in nurturing the leaders of tomorrow who will be taking over the world in the years to come.

A Framework for Collaboration

A framework can help you plan and implement effective collaboration in your classroom. The visual below shows you what you to think about as you plan:

PURPOSE

The reason you are having the students collaborate. Will it be for improved content learning, improved teamwork/communication skills, global citizenship?

SCOPE

The length and depth of the collaboration - will they be doing short-term projects? Long-term projects? What activities will be there to support their work and projects?

TYPE

What kind of collaboration do you have in mind - how will the students interact with each other? Will they be giving and receiving feedback? How will they share their thoughts? How will they share responsibility for displaying their knowledge? How will they conduct research?

COLLABORATORS

Who are the individuals and groups participating. Examples include:

- individual students interacting with each other
- groups of students interacting with other groups
- students interacting with experts or community members

DIGITAL TOOLS

What are the online and other digital tools students can use to support the collaboration? Will they use online spreadsheets, or blogs, or other shared documents?

1. **Purpose:** You will want to start by defining the purpose of the collaboration. Your purpose will often be to increase content learning, but you must also think about teamwork and global citizenship.

SOME EXAMPLES ARE:

- Students locate data from various sources about poaching and compile the information in an online collaborative spreadsheet where they will analyse it.
- Students will use online surveys to gather data and information from their peers and family members on recycling. They will use this data to develop recommendations in their presentation on how to encourage environmental awareness.

2. **Scope:** Introducing collaborative activities into your classroom can be overwhelming, especially if you come from a traditional, teacher-centred classroom. Start by adding some short collaborative activities to the lessons you already teach. Try to expand your use of collaborative activities without significant changes when you first start.

SHORT-TERM COLLABORATIVE EXAMPLES INCLUDE

- Partner work
- Discussions
- Feedback
- Study groups
- Guest speakers,
- Short classroom activities.

3. **Collaboration Types:** There are many different types of collaboration. Students just working together on a worksheet is not collaborating.

SOME IDEAS FOR COLLABORATIVE TYPES INCLUDE:

- Sharing of ideas, where students ask questions, ask for opinions, share information, etc.
  - activity: brainstorming using a graphic organiser
  - activity: blog post asks for responses to the question the student posted regarding local pollution
- Giving and receiving feedback, where they review peers' work and ultimately their own
- Students are put into groups, and they are required to stay together for many weeks or months working on an extensive project
  - activity: students put a survey together to gather data for their months-long recycling project
- Jigsaw collaboration, where each person in a group is responsible for learning about a specific aspect and then sharing
  - activity: each student researches a different aspect of the country they are presenting on and puts it all together in one wiki

4. **Collaborators:** There are many different ways students can collaborate and many different people they can collaborate with. Students can benefit from collaborating with others in their classroom, in their community, or far across the globe.
   - → Students in your own classroom
   - → Students in another classroom
   - → Students in different cities using their computers and smartphones
   - → Different community members such as senior citizens, relatives, professionals and parents

5. **Digital Tools:** There are many different digital tools and platforms. Some questions include:
   - → Which tools benefit our students the most?
   - → What purpose will each specific tool serve for our students?

There are eight different categories of collaborative tools. Here are some categories and **example sites** for each:

- → **Research tools:** Bookmarking, File sharing
  - → Google Drive
  - → Google Photos
  - → Diigo

- → **Collaborative writing:** blogs, collaborative documents
  - → Google Drive/Google Docs
  - → Edublogs
  - → PB Works

- → **Messaging and Communication:** instant messaging and videoconferencing
  - → Zoom
  - → Google Classroom

- → **Visual Creation** – mind mapping, graphics
  - → Bubbl
  - → Popplet
  - → Mindomo

- → **Audio Creation** – podcasting
  - → Audacity
  - → Voicethread

- → **Project Management** – calendars, to-do lists
  - → nTask
  - → Zenkit

- → **Data Collection** – forms, polls, surveys
  - → Google Forms
  - → Poll Everywhere
  - → Survey Monkey

- **Teacher Productivity** – assessment, calendar, notetaking
  - Kahoot
  - Google Calendar
  - Quizstar

In addition to the framework, you need to think about the following:

Form Midsize Groups: An ideal group size would be 3-4 students per group. Ensure there are no 'free riders in the group. Give them the liberty to appoint a group leader amongst themselves. Create 'breakout rooms' to effectively manage groups. The digital platforms offer amazing collaboration tools like screen sharing, breakout rooms, call-ins and many more. Make the most effective use of the same.

Set the Norms: You being the educator as well as the moderator, set proper guidelines and rules for every activity. Ensure that there is no ambiguity. You need to build trust and encourage open communication between you and your students and between the students.

Feedback Mechanism: Establish an effective feedback mechanism through open communication. Encourage positive as well as negative feedback without being judgemental.

Appreciation and Recognition: Appreciation acts as a stimulus to do better in the next assignment. Give due recognition to the deserving participants and appreciate the efforts put in by every participant. Such appreciation & recognition by the concerned teacher acts as a strong motivational force and thereby enhances their performance.

Strategies to Build on Student Collaborations in the Classroom

There are various types and forms of classroom collaboration that can be effectively used. Some of the best strategies to engage students by building collaborative classrooms are as follow:

- **Flipped Classrooms:** It is a reverse form of the traditional teaching method. It is a technique where the teacher gives a video or other material to the students in advance, often as homework. For example, students can watch video lectures on their own, and when they come to their next class, you can give them a situation or a problem pertaining to the video lecture they have seen. In a f2f classroom, you can put them into groups. In a virtual classroom, you can group them into breakout rooms. Here, students will learn to work out the problem(s) through collaborative learning. You can drop into these breakout rooms, or monitor the f2f groups to see how they are performing or if they have any questions. Teachers can also use Google Classroom to engage students in text-based discussions where they can share their knowledge about the topic, brainstorm questions or make predictions. A few tools can be used in the Flipped Classroom:
  - FlipGrid,
  - Padlet,
  - Seesaw,
  - EdPuzzle,
  - PlayPoist,
  - Kahoot,
  - Google Drawing, Canva.

Student performance can improve as they spend more time collaborating and helping each other.

- **Projects/Assignments:** All Subjects have a lot of scope for projects and assignments.

AN EXAMPLE IN A VIRTUAL CLASSROOM COULD BE:

- In a science subject, you can give individual topics to students for science experiments that can be done from the comfort of their home. Topics include testing PH using cabbage or a beetroot if you want them to learn about acids and bases without using PH test strips. Simply tell students to boil a red cabbage or beetroot. Tell students to test various substances in the resulting water. Have students work in pairs to compare the results of the substances they tested and have them come up with a conclusion that they can agree on.
- Another experiment could be exploring how sugary drinks affect teeth. In this case, an eggshell can be used as a replacement for teeth due to its calcium content. Students can use eggshells to determine how sugary and aerated drinks stain the teeth and damage the enamel. You can ask the students to record the process by shooting a video or clicking before and after pictures. In the next class, you can group these students in a breakout room and ask them to discuss their experiments.

- Students can create presentations to the rest of the class.

- **Role Plays:** Pick up real-life scenarios or create scenarios and ask your students to play the roles of people in that scenarios. This is also an ideal simulation game technique. Please note that role plays are not dramas. Dramas have fictional characters. Whereas role play is stepping into the shoes of an existing renowned personality in a predefined situational context.

EXAMPLE

- For example, you teach different leadership styles in social studies. Form groups of 2-3 students and assign them a leadership style such as autocratic, democratic, etc. Ask them to identify at least one renowned leader for that leadership style, pick up any famous situational context about that leader, and design a role play. You can put them in breakout rooms for discussions. After they are ready with the dialogues, they can perform the role plays.

- **Subject-Specific Surveys:** Encourage students to use tools such as Google Forms and Google Docs to conduct mini-surveys about your subject. It could be a small consensus survey.

EXAMPLE

- If you are teaching about biodegradable products, put your students in groups or pairs and ask them to create a survey using Google Forms to understand how many people use biodegradable products and which are they. Give them an appropriate sample size and ask them to circulate the questionnaire among their network of people. Later, the analysis could be presented in class.

- **Group Discussions:** group create groups of 4-5 students (in a virtual classroom, put them into breakout rooms), pick up any subject-related topic, a current trending topic or any abstract topic and ask them to discuss the topic for about 10-15 minutes. Give guidelines for discussion, like discussing the meaning of the topic, its pros and cons, facts and figures, valid **Examples**, etc. This enhances their interpersonal skills to a great extent. Drop into the breakout rooms during the discussion time. Have one student from each group summarise the main points they talked about (or have a recorder jot down the main points and upload it to the platform).

- **Go to Appendix L to see the benefits of a collaborative classroom**

Planning for Collaboration

Students do not automatically know how to work collaboratively. You need to teach skills and model behaviours. Do not be surprised if, at first, your students do not collaborate well. Here are a few tips and strategies:

1. Establish clear goals
   - → Both group and individual goals must be stated to keep your students on track

2. Choose tasks that are appropriate for the groups..
   - → Not everything should be group work. Brainstorming, problem-solving, and decision-making are all good collaborative activities

3. Structure the tasks
   - A. Give written instructions on the tasks students are to complete
   - B. Make sure they understand what the final product/outcome is

4. Group the students
   - → No more than five students in a group. 3-4 is the optimum number

5. Teach teamwork skills
   - A. How to respond non-judgmentally to each other via role plays
   - B. Dealing with students who are not doing their fair share
     - i. Randomly call on group members to report on the group's work
     - ii. Have students write daily journals documenting what they completed

6. Constructively resolve disagreements
   - → listen to understand
   - → check for understanding
   - → brainstorm solutions together

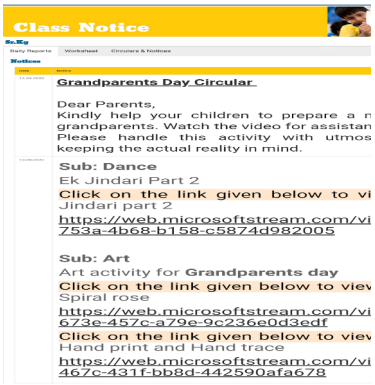
7. Time management skills
   - → teach skills such as organisation, planning and focus and let students practice

8. Create group roles
   - → Assign each student a specific role and rotate every day
   - → Role **examples:** recorder, reporter, fact-checker, summariser, designer/artist

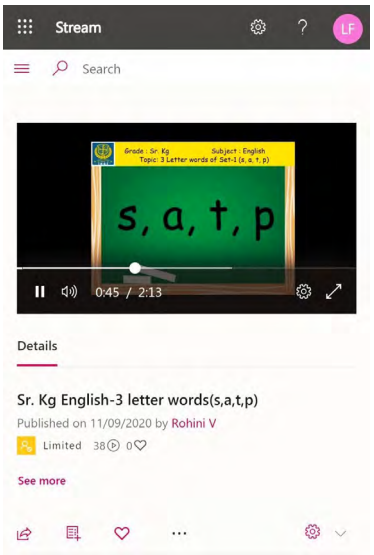
Parent and Community Collaboration

Parents and community members form an integral part of stakeholders in any educational institute. The following case study emphasises on how schools can use technology and a proper digital platform to collaborate with parents.
A school in Mumbai, India – communicates daily with the parents through its website in collaboration with Microsoft Teams. All the parents are registered by the school on the Microsoft Teams app and are provided with a username and password. The parents can change the password after the first login.

After the parents log on to the school website, they have to click on the grade of their child. On clicking the right grade of their child, the page directs them to Microsoft teams, where the daily activities, worksheets and reports are uploaded by the teacher.



On clicking on the link day-wise and subject-wise, a video is played, and parents are instructed about the activities to be done at home.



Exchanging Ideas & Supporting Colleagues

Online learning education is becoming an integral part of education in many schools. It has become imperative that teachers collaborate on ideas, curriculum, delivery, participation, and feedback as they take on the newer challenges of teaching online. Doing this together creates a sense of clarity among teachers and makes them more efficient and effective in achieving their teaching goals, whether qualitative or quantitative. Here are some consolidated points that you can consider.

Resources

Preparing for online lectures and providing quality content can be enormous. But remember, you do not have to recreate the wheel. Start with a lesson you currently have. Adapt it. Then spend time sifting through the depth of available online resources and prepare a list. Give yourself a time limit on the internet when looking for resources. Next, shorten the list to just a few so as not to overwhelm the learners. Explore the various ways resources could be used to support the objectives. Vet the resources for all subject areas and invite other teachers to review the final resources selection and make amends if necessary. This includes feedback on videos, activities, and other resources before they are uploaded and shared with students.

Accessibility

Teachers should make sure there is an ease in accessibility for students. It means that students can complete tasks across multiple devices, such as cell phones, tablets, and computers. Teachers should log in as students for each other to test the site and ensure there are no glitches in the flow of information or task completions.

Teachers should work together to present their work to specially-abled children/students. You can partner with support staff to devise plans for differentiating digital learning and providing individual instruction. Teachers should select the content they want to teach, and everyone should collaborate to explore digital platforms that support the processes they want to use or the products they want students to create.

EXAMPLE:

Include a science lesson on electrical circuits with video and audio support for language learners and highly visual poster charts made for specially-abled learners.

Assist with pre-recorded videos for lessons.

Teachers should work with the support staff and collaborate on pre-recorded video lessons in a way that is not only engaging for the students, but it also motivates them to participate. Especially during the online learning era, teachers should get on a virtual call and provide each other with lesson delivery and feedback. Pre-recorded videos can come across as boring and unfruitful; however, using features such as live streaming and Premier on YouTube can give the students a sense of focus and a sense of "now" in the classes.

Co-plan and co-teach lessons

To promote positive risk-taking and help support the transition to online teaching, teachers should co-plan synchronous and asynchronous lessons and co-teach synchronous lessons using platforms such as Zoom and Google Meet.
Educators should meet online weekly to ensure they stay connected and up-to-date on lesson plans and co-teaching schedules. All teachers should have access and editing rights to all platforms, at all times. Ensure that all the progress is recorded across devices and platforms. There should not be any duplicity of tasks between teachers' co-planning and co-teaching. They should also agree on the grading and overall assessment of students. Also, agree on the criteria for project completion and sharing of results with parents or students.

CRITICAL THINKING

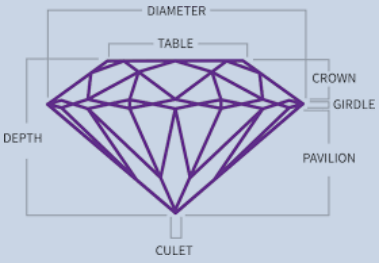
Definition

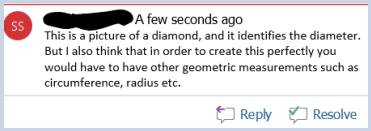
Critical thinking means making clear, reasoned judgments. It is important for teachers to help students build their critical thinking skills through well-established structures and routines that require students to analyse information and provide evidence for their answers or conclusions. Many technologies promote critical thinking, many of which you might have explored. Here are some **examples** of learning activities with technology:

- **Text Annotation**: have students think critically about what they read on the web by asking them to use online tools to insert comments and questions about what they read:

CLASSROOM EXAMPLE

- Students doing Web research on how different occupations use geometry, use an online tool to insert their comments and questions into the Web site. They later review their comments and use them as part of a presentation on the importance of geometry in the real world.
- Tools: A.nnotate, Diigo, Markup





- **Demonstrations of Learning in different formats:** Interpreting a concept through graphics, the arts, or movements can help students think of an idea more in-depth.

EXAMPLE

- Instead of taking a traditional quiz about the history of atomic theory, small groups of students create a comic strip where they show how different scientists, over time, learned from each other to create theories about atoms.
- Tools: Audacity (podcast), Canva and Pixton (comic strips),

TIP

When you think about critical thinking, you may be tempted to look for strict categories, such as Bloom's Taxonomy. Terms and concepts used to describe critical thinking overlap and repeat themselves. As you think about these skills, try not to get bogged down in the "correct" use of the vocabulary, but instead, work at expanding your way of applying all aspects of critical thinking to your instructional practice. What you call a type of thinking does not matter. What matters is that your students are doing it!

CREATIVITY

"Creativity is a wild mind and a disciplined eye."

- Dorothy Parker

Creativity never waits for that perfect moment because imagination is an ongoing phenomenon. Being imaginative is more important than mere theoretical knowledge. And this is how creativity finds its way into the classroom.

Creativity is much more than regular art and craft. Creativity is 'out of the box thinking. To teach "out-of-the-box thinking" among students, one must first locate the box. The box here resembles the conventional ways of doing things. And out of the box thinking refers to adopting unconventional ways of doing things.

Definition

Creativity is a process of unleashing one's potential by generating new ideas, alternatives or possibilities thereby solving some existing problem(s) or experiencing life from a totally different perspective.

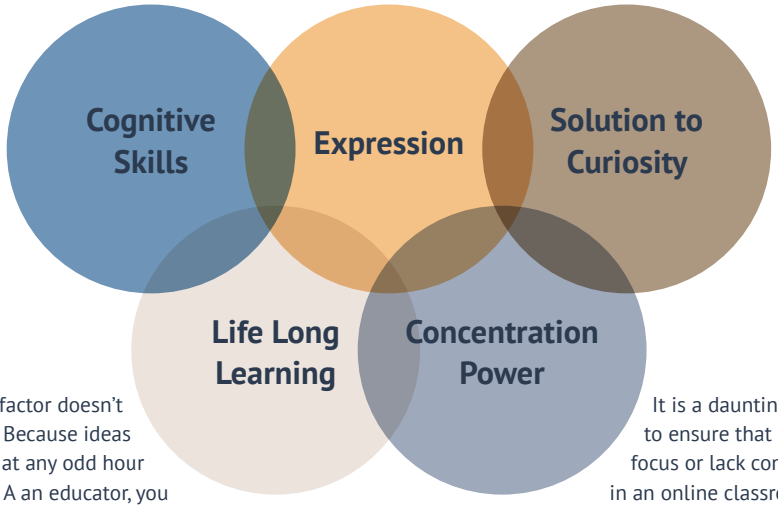
Importance of Creativity in Digital Learning

A creative learning Environment has various benefits. Some of the major benefits are shown in the diagram below.

Cognitive skills refer to the mental processing skills - a function of the brain. Creativity is an intellectual activity and develops the cognition skills of a child. It helps a child in comprehending and reasoning.

Everyone has a different way of expressing their views and emotions. Building a creative learning environment through a digital medium can be therapeutic for students who find it difficult to express themselves otherwise.

To be creative is to instill imagination that feeds the curious mind. Young minds are full of curiosity an to channelize the curiosity in the direct direction, enabling a creative learning environment is the solution.



Time, place and age factor doesn't restrict creativity. Because ideas can cross one's mind at any odd hour and at any location. A an educator, you just need to have a right approach and nurture it with utmost care.

It is a daunting task for teachers to ensure that students don't lose focus or lack contentration especially in an online classroom. Creative activities will keep your learners engaged thereby increasing their concentration power and focus.

Tips for Enhancing Creativity in the Classroom

In addition to the examples of creativity in the classroom at the beginning of the handbook, here are some other ways to enhance creativity, especially in the digital classroom.

- Build in a lot of discussion with open-ended questions and give your students the chance to think outside of the box.

EXAMPLE:

- What 20th century invention do you think had the greatest impact on society? Where do you think technology will take us next? What if it is true that all matter can be reduced to pure energy? What type of research might physicists engage in if this is true? It will be during these kinds of discussions that creative ideas will flow, and one creative idea will spark another.

- Engage in Digital Storytelling: this can improve learners' creative skills and help them experience the meaning of their own work.
  - Tools: Slidestory, Storybird
- Introduce creative thinking blogs. Topics can be discussed openly without worrying about grading or grammatical errors as they post what they want and comment on other learners' material

Digital Tools for Enabling Creativity in Students:

Students can use various digital tools to showcase their creativity for any of the above tips. Some of the digital tools that you can use to enable creativity in students are as follows:

- Storybird - Storybird gathers visually stunning artwork and images from artists and illustrators around the world and invites students to turn those images into creative stories.
- Infinite Arcade - a game construction kit that allows kids to create anything they can image
- Tiki-Toki - a free web-based software that allows anyone to create interactive and visually stimulating timelines
- Buncee - a multimedia display tool that allows students to easily create displays and narrate them through microphone recordings.
- FlipGrid - teachers create discussion topics, and students can respond with video recordings
- Shadow Puppet EDU - resource rich video slideshow maker for elementary classrooms
- Wick Editor - students design interactive games and animations

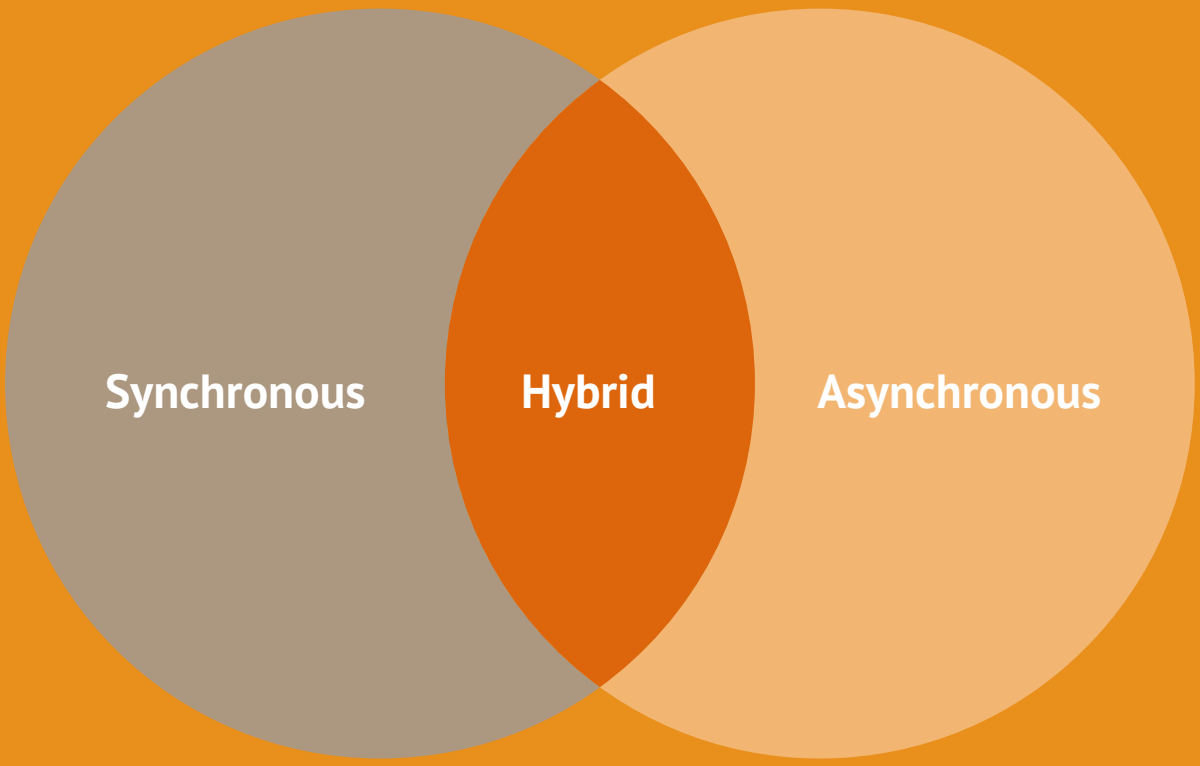
Remember to check any of the tools that you plan to use in advance. They tend to change often, and they will also go from a free site to a paid site. Do not be caught unaware!

THINK ABOUT

Which of the 4 C's do you focus on now in your classroom? What would you like to add?

CREATING AN ONLINE CLASS

When creating an online class, you may need to select one of the following three teaching styles, as shown in the diagram.



Synchronous Learning

Synchronous learning experiences happen in real time with learners engaged simultaneously. It is similar to classroom teaching, where all the students attend at the same time but in online mode. Synchronous learning typically has the instructor give some instruction (lecture, directions, etc.), and the learners would engage with the others in the class. Some **Examples** would be a group discussion on live chat and video conferencing tools like Google Meet, Skype or Microsoft Teams. Some other **Examples** of tools to use in Synchronous Learning include the following:

EXAMPLES

- Streaming video platforms like Facebook Live or YouTube Live.
- Live chats
- Web conferencing tools
- Call-based teaching on Phones
- Virtually simulated environments

Asynchronous Learning

Experiences happen over some time with learners accessing the content and completing assignments at their own pace, on their schedule. The session can be pre-recorded in video mode, or programs such as Microsoft PowerPoint can be used to present the topic with a voice-over from the teacher. The students can work on the assignment based on their time availability but within the assigned submission date. In Asynchronous learning, a student can view, review and revise the content multiple times, which can be helpful for the student. Some of the types of tools or strategies for Asynchronous learning can include the following:

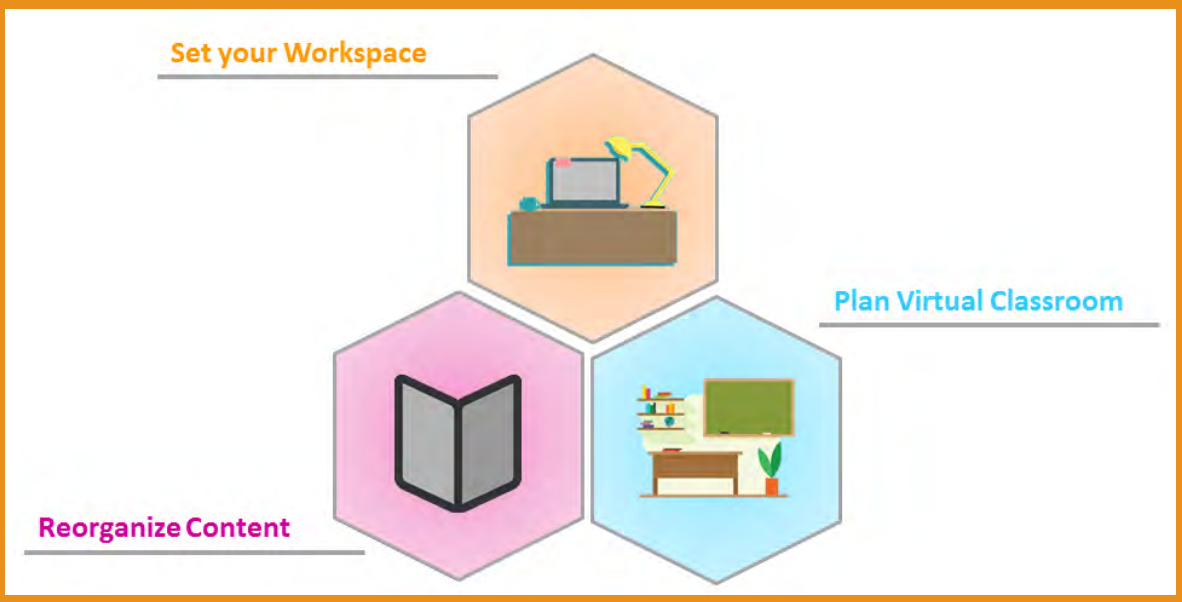
- Downloadable pre-recorded lectures
- Presentations with or without voice-over
- Online sites with lessons such as the Khan Academy
- Forums and discussion boards
- E-mail communication

Hybrid Learning

This involves content being available to the learner both in asynchronous and synchronous mode. This means that the teacher is available for face-to-face sessions, and the content is available online for reference. Hybrid learning is also called Blended learning.

ADAPTING TO THE CHANGING ENVIRONMENT,

The diagram shows the three aspects you can focus on when adapting to the new online teaching environment. Some of the points that you can cover under each are mentioned below.



Set your Workspace

- **Set up your webcam**. Webcams make a big difference in learner engagement. Even if you plan on sharing something on your computer screen for most of your sessions, having your webcam on makes it clear that everyone is paying attention.
- **Set up a second display**. You can make virtual sessions work from a single laptop screen, but a second display will make it easier to manage the various files and programs you might have up while running your virtual class.
- **Coordinate with others at home.** The fewer distractions you have, the more you can focus on creating a great learning experience. This is especially important for those of you working from home. Create signs, close doors and set expectations about when you will and won't be available.

Plan Your Virtual Classroom

- **Don't let people be anonymous**. If your learner group is of a reasonable size, make them share their webcam or at least a photo of themselves.
- **Take time to build a sense of community**. Don't abandon camaraderie-building activities. Play bingo through chat or use some good icebreaker games. Especially when you first start in the online classroom
- **Select an assistant**. Have an assistant who can help you to fix technical issues and monitor chat to push meaningful questions. If you cannot have an assistant, ask one of your learners to volunteer and rotate assistant duties amongst class members.
- **Test-drive an unfamiliar feature**. If you are new to virtual classrooms, it can be tempting to use the range of features available on most platforms like Zoom, WebEx, or Teams. We recommend that you do not try the features all at once. As you get more comfortable, try different features, and you will find it easier to streamline instruction.

Re-organise Content

- **Intersperse presentation with user activity**. Even the most charismatic speaker will have trouble holding a virtual classroom's attention if all he/she does is present a PowerPoint for sixty minutes. Break up the presentation for frequent user activities.
- **Keep text off the screen**. When presenting, show interesting and motivating images as a backdrop instead of putting only plain text on-screen. Also, ensure that the learners have access to a print version of what is taught to refer to later.
- **Plan activities**. As you redesign your lessons, think about sending learners on a field trip around the house to share something that aligns with your content.

Let's look at some of these a little deeper.

Adapt your lesson for an online class

A rapid transition to e-learning may seem daunting to educators who, just a few weeks ago, were teaching in brick-and-mortar classrooms. But educators should trust that their pedagogical instincts around designing compelling learning experiences also hold for a remote classroom. While the goal of e-learning is not to recreate the physical classroom, educators can make incremental changes to adapt their existing curriculum for the shift to e-learning. The key here is to adapt your current lessons. You do not have to recreate the wheel and start from the beginning again.

Well-designed e-learning begins with a solid, foundational understanding of what students need to know and be able to do – no different than in a face-to-face classroom. Educators may also leverage this opportunity for e-learning to explore less-assessed areas like design and computational thinking.

Online Research for the Content

Teachers create both contents and look for pre-made content to address their teaching curriculum. There are five basic steps in content research that you need to follow when looking for content for any topic. These steps are explained in the diagram below.

A shift to e-learning does not require a massive shift in existing pedagogy or instructional design. With the right tools, e-learning can present an opportunity to enhance or extend effective teaching practices.
That said, student engagement is critical. You want to make sure your students are involved in the lesson and have some sort of accountability. Otherwise, they will tune you out.

Tips for an Engaging Online Class

- Know your content and research the curriculum.
- Break your lesson into manageable chunks. Intersperse with activities or challenges to keep them engaged
- Promote online collaboration work within smaller student groups.

CLASS EXAMPLE:

- After a whole group discussion on a poem that the class is studying, the teacher puts the students in groups of 4 in breakout rooms. Each group is given a shared Google doc with a new poem. The group is to analyse this poem and brainstorm various text elements.

- Create online quizzes to be given to students at regular intervals.
  - These can be formal quizzes or if you give the students an activity to do before class, give them a short quiz to see if they have mastered the content.
- Would you Rather – have an icebreaker that gets students talking? Have a list of prompts that you can use throughout the year. At the beginning of class, ask students what they would rather do and say why they chose what they did

EXAMPLES INCLUDE:

- Would you rather live without gravity or the laws of motion?
- Would you rather go back to the dinosaur age or explore the depths of the ocean?
- Would you rather play the air guitar or the air drums?
- Would you rather be a robot or a dinosaur?
- Would you rather travel on a train or an aeroplane?
- Would you rather do art projects or science projects?
- Would you rather read a story or a poem?
- Would you rather forget a pencil or forget a notebook?
- Would you rather win a race or win a debate?
- Would you rather start school early or start school late?

- Have in-class learning games

EXAMPLES INCLUDE

(https://teambuilding.com/blog/online-classroom-games):

- Virtual Pictionary is an online version of the classic game, where one player illustrates a word, while teammates attempt to guess it. Split your class into two teams, and text the word to the illustrator using Zoom's private chat feature. The illustrator can then use the video conference software's screen share abilities to show their drawing, while the other team members guess. Teachers can use Virtual Pictionary to teach vocabulary and develop creative skills.
- Virtual Trivia is a fun way to test your class's knowledge on a particular topic. First, amass a list of trivia questions and answers. Then, divide the class into teams, who will compete to answer the most questions quickly and correctly. Virtual Trivia is a fantastic online classroom game because it is an exciting way to confirm whether your class retained the necessary knowledge.
- Alphabet Chain is a terrific online classroom game for expanding students' vocabularies. To play, choose a category. Your students then name words that fit that topic, except that every proposed word needs to start with the last letter of the previous work. If a student is unable to think of another word, then they are out. The last student standing wins.

- Give assignments over some time that the students can submit at a later date.
- Create interactive multimedia presentations.
- Create videos for the students that can be seen at any time by students.
- Include captions/transcripts in your videos if the feature is available.
- Break larger classes into smaller groups.
- This can be splitting the class into two or four groups or creating smaller groups of two to four.
- Avoid lecture format. Ask the students to research and read about the topic before attending the online live classes. Give them a pre-class activity to do, whether it is watching a video or reading an article.
- Set a due date for assignments to be submitted as you would in your normal classroom.
- Inform the students on the ways to communicate with you after class. It can be through e-mail, phone or any messaging service.
- Check for understanding using a chat feature
- Use the Think-Pair-Share strategy using breakout rooms and discussion questions.

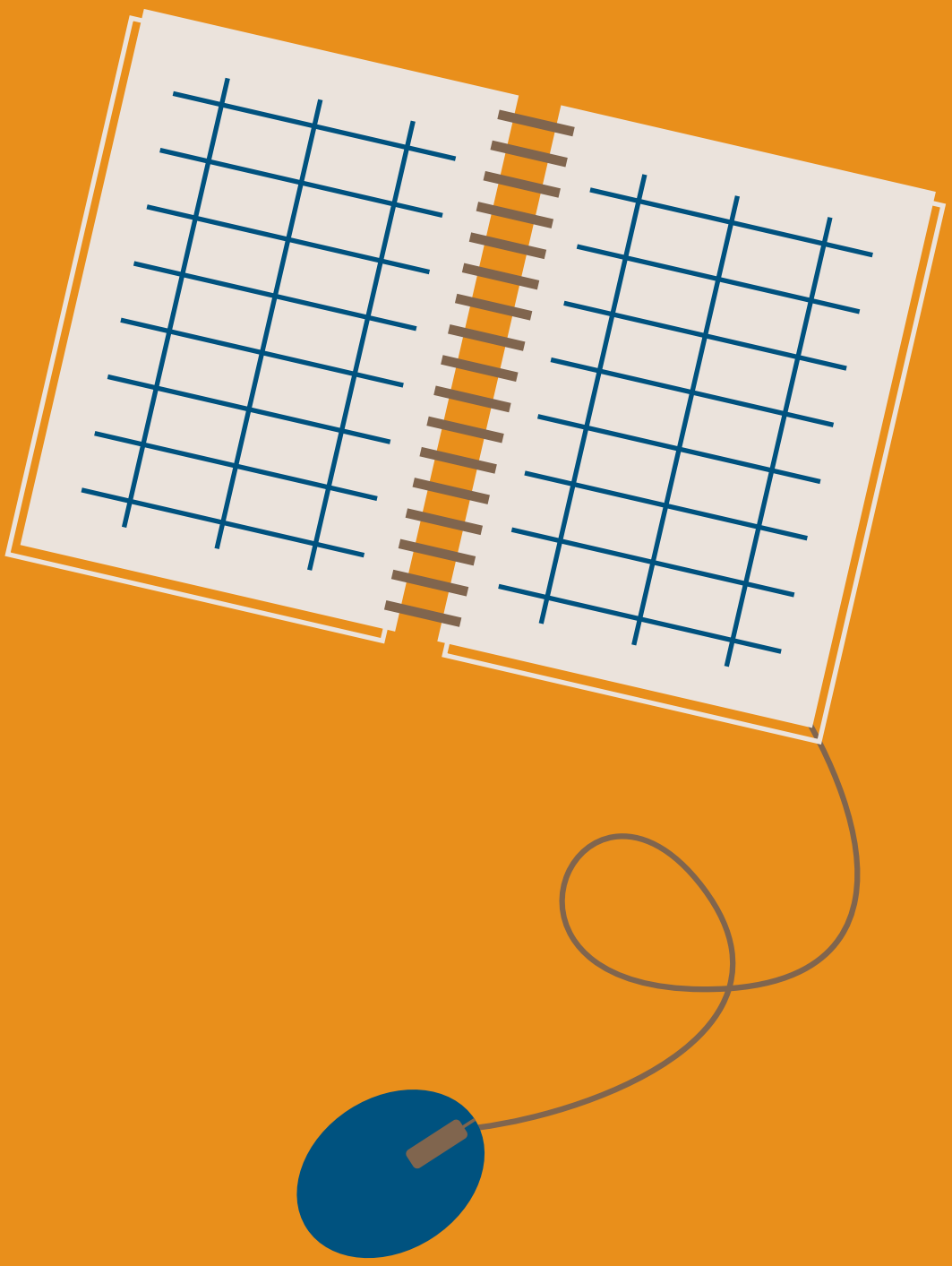
Technology Available

When approaching e-learning, use resources that are readily available. Ideally, you must know what access parents may have at home, although you may not know what specific devices are available. Students without devices may need to borrow from friends or neighbours. Digital classrooms that rely on collaborative involvement and student communication also demand more powerful devices, ideally with integrated webcams.

Your students may use different devices based on the situation in your area. Some of the technology-based learning tools that are required in distance learning are as follows:

- Laptop or desktop PC
- Web camera, microphone, speaker and/or headset
- Mouse and Keyboard
- High-speed internet connection
- Video conferencing software
- Access to Learning Management System (LMS) and other teaching tools (optional)

DESIGNING THE ONLINE LESSONS



Creating Curriculum Calendar

Designing the content is similar to your face-to-face classroom – you need to have your goals, your objectives, your lessons, your resources, etc. Below you will find a sample table for you to follow to create your curriculum calendar if you do not already have one. This is just a sample, and you may edit and update it as required for your course. More columns may also be added or removed as per your requirements.

Sample Curriculum Calendar

Objectives	Resources	Activities	Duration	Assessment
Unit 1 Objective 1:				
Objective 2:				
...	.....	...		

Unit 2 Objective 1:				
Objective 2:				
.....	.....	...		

Tools and Platforms for Online Teaching

There are different platforms and tools for content that can help manage teaching and learning, such as communication tools, learning management systems or other tools that teachers, parents or students can use to create or access educational content. NOTE: Many of these tools and platforms can also be used in a face-to-face classroom – they are not exclusive to online teaching.
Some of the types are as follows:

Live Class (Synchronous)

A live class is an online teaching and learning environment where the teacher engages with his/her audience live with the help of video conferencing. This is the most engaging and personalised connection, allowing two-way communication and increasing active participation.

A live or virtual classroom is used when the teacher wants to mimic a physical classroom and acquire direct face-to-face feedback from the participants during the session. It also requires all the students to show up at the same time.

Tools Used to Conduct a Live Class
Examples of tools that can be used for a live class: follows:
- Google Meet
- Zoom
- Skype
- Microsoft Teams

Tips for a Live Class
It can be made effective by using the below-mentioned tips.
- Design highly interactive sessions.
- Make use of blended learning (Combination of online learning and individual or group work)
- Use of various tools (Text, diagrams, images, audio and videos)
- Online learning activities

IN CONCLUSION

As we said at the beginning of the handbook, the world is different today than it was even 20 years ago. You, as the teacher, are an artist! You begin with a vision and then transform it into reality. This requires an understanding of the material, the tools one can use, and the processes by which to use them. It will take time and practice, and with the technologies available, it will be a learning curve, shifting your practices. Not only are you learning how to use the technologies, but you are learning the new methods of teaching that encompass technology best. The timing has never been better for using technology to enable and improve learning at all levels. So go forward, little or big steps - it doesn't matter as long as you take steps. Embrace change, and don't be afraid, as it will pay off in preparing your students to be successful in the future!

APPENDICES

Appendix A

Fact or Fiction?

(Read or give a copy to each student, or groups of students if you want them to work together)

Below is a biography of Martin Luther King (substitute your own article if you have one). Following the article are nine statements. Indicate whether each statement is fact or fiction.

Introduction

The Reverend Dr Martin Luther King Jr. was one of the most influential and inspirational Civil Rights leaders in American history. Born in 1929, King graduated from Morehouse College in 1948 and then from the Crozer Theological Seminary with a Bachelor's in Divinity in 1951. He received a Ph.D. in Systematic Theology in 1955 from Boston University. Standing with Rosa Parks in 1954, King became pastor of the Dexter Avenue Baptist Church in Montgomery, Alabama where he led the bus boycott in Montgomery, Alabama after Rosa Parks was arrested for refusing to give up her seat on a public bus. The boycott lasted 381 days and resulted in King being arrested. Despite his arrest, the boycott ultimately resulted in the Supreme Court outlawing discrimination on intrastate buses. Perfecting the Peaceful Protest After the boycott, King helped in the founding of the Southern Christian Leadership Conference (SCLC) which advocated the peaceful protest of Black churches concerning Civil Rights (especially in the American south).

Primarily inspired by the non-violent protests conducted by Mahatma Gandhi in India, King was instrumental in helping his cause gain national attention through the media. Because of his efforts, civil rights became the top political issue of the early 1960s.

He Had a Dream

In 1963, King delivered the immortal speech "I have a Dream" in front of the Lincoln Memorial during the March on Washington. Over 250,000 people gathered around the National Mall in support. King's speech electrified the crowd and is considered one of the greatest speeches in American history. King later led protests and gave speeches for the African American right to vote, desegregation, and fair hiring.

King is Instrumental in the Passing of the Civil Rights Act of 1964

In 1964, King's hopes were realized when congress passed the Civil Rights Act of 1964 and then the Voting Rights Act of 1965. On October 14, 1964, King was awarded the Nobel Peace Prize for his leadership in non-violent protest.

Anti-war Sentiments

King became a prominent political figure and expressed his opposition to American involvement in the Vietnam War. In 1967, King called America "the greatest purveyor of violence in the world today." Although King was always hated by southern white segregationists, his speech against America turned many in the mainstream media against him.

Assassination

In 1968, while he was organizing a march to protest the working conditions of black sanitation workers in Memphis, Tennessee, he was assassinated by James Earl Ray at the Lorraine Hotel. Because he was under FBI surveillance at the time, many believe the agency was involved in the assassination (although there is no proof). Furthermore, some reports have suggested that the FBI, and its chief officer J. Edgar Hoover, threatened to reveal evidence of extra-marital affairs King engaged in if he refused to curtail his Civil Rights efforts.

Powerful Legacy

300,000 people attended King's funeral. President Lyndon B. Johnson declared a National Day of Mourning. Today, numerous schools, buildings, and highways are named for Martin Luther King Jr. In 1986, a U.S. national holiday was established in honour of Martin Luther King Jr., which is called Martin Luther King Day. It is observed on the third Monday of January each year, around the time of the King's birthday. On January 18, 1993, for the first time, Martin Luther King Day was officially observed in all 50 U.S. states. Below is an excerpt from King's famous I have a Dream speech.

I have a dream that one day this nation will rise up and live out the true meaning of its creed: "We hold these truths to be self-evident: that all men are created equal."
I have a dream that one day on the red hills of Georgia, the sons of former slaves and the sons of former slaveowners will be able to sit down together at a table of brotherhood.
I have a dream that one day even the state of Mississippi, a state sweltering with the heat of injustice, a state sweltering with the heat of oppression, will be transformed into an oasis of freedom and justice.
I have a dream that my four children will one day live in a nation where they will not be judged by the colour of their skin but by the content of their character.
I have a dream today.
I have a dream that one day down in Alabama, with its vicious racists, with its governor, having his lips dripping with the words of interposition and nullification, one day right there in Alabama, little black boys and black girls will be able to join hands with little white boys and white girls as sisters and brothers.
I have a dream today.
I have a dream that one day every valley shall be exalted, every hill and mountain shall be made low, the rough places will be made plain, and the crooked places will be made straight, and the glory of the Lord shall be revealed, and all flesh shall see it together.
This is our hope. This is the faith that I go back to the South with.
With this faith, we will be able to hew out of the mountain of despair a stone of hope. With this faith, we will be able to transform the jangling discords of our nation into a beautiful symphony of brotherhood. With this faith, we will be able to work together, to pray together, to struggle together, to go to jail together, to stand up for freedom together, knowing that we will be free one day.

Statement	Fact	Fiction
Martin Luther King was involved in the Montgomery Bus Boycott		
Martin Luther King won the Nobel Peace Prize		
Some believe the FBI was involved in King's assassination		
Martin Luther King graduated from Harvard University		
All 50 states began observing Martin Luther King Day in 1986		
King's I have a Dream Speech was given in front of the Lincoln Memorial		
King's non-violent protests were inspired by Mother Theresa's work in India		
Although few people attended the I have a Dream Speech, it became one of the most famous in American history		
King was assassinated in Memphis, Tennessee		

Statement (ANSWERS)	Fact	Fiction
Martin Luther King was involved in the Montgomery Bus Boycott	X	
Martin Luther King won the Nobel Peace Prize	X	
Some believe the FBI was involved in King's assassination	X	
Martin Luther King graduated from Harvard University		X
All 50 states began observing Martin Luther King Day in 1986		X
King's I have a Dream Speech was given in front of the Lincoln Memorial	X	
King's non-violent protests were inspired by Mother Theresa's work in India		X
Although few people attended the I have a Dream Speech, it became one of the most famous in American history		X
King was assassinated in Memphis, Tennessee	X	

Appendix B

More about 21st-century learning

In 21st-century workplaces, workers
- analyse, transform, and create information
- collaborate with coworkers to solve problems and make decisions
- perform various complex tasks using sophisticated technology.

In 21st-century homes, families
- are entertained by watching, creating, and participating in various media
- making consumer decisions by looking for information on the Internet,
- staying in touch with friends and family members through various technologies.

In 21st-century communities, citizens
- use the Internet to stay informed about local, national, and global issues
- communicate and persuade others about their opinions using different technologies,
- comply with government regulations without leaving their homes.

As machines take over routine tasks in the workplace, a far more significant proportion of employees are engaged in tasks that require them to be flexible and creative problem solvers. Home life is also more complex in the 21st century as emerging technologies provide almost infinite possibilities for entertainment, leisure-time activities, and participation in community activities.
21st-century schools must prepare learners to work in today's workplaces, and teachers must stay current with how learners and families use technology in their daily lives.

In 21st-century schools, students
- work on complex, challenging tasks that require them to think deeply about the subject matter and manage their own learning
- collaborate with peers, teachers, and experts on meaningful tasks using higher-order thinking
- use technology to make decisions, solve problems, and create new ideas

To help students achieve levels of full participation in their communities, teachers must focus on the 21st-century skills, listed below, that will help learners adapt to changing society and technology:

Accountability and Adaptability	Exercising personal responsibility and flexibility in personal, workplace, and community contexts; setting and meeting high standards and goals for one's self and others; tolerating ambiguity
Communication Skills	Understanding, managing, and creating effective oral, written, and multimedia communication in a variety of forms and contexts
Creativity and Intellectual Curiosity	Developing, implementing, and communicating new ideas to others; staying open and responsive to new and diverse perspectives
Critical Thinking and Systems Thinking	Exercising sound reasoning in understanding and making complex choices; understanding the interconnections among systems
Information and Media Literacy Skills	Analysing, accessing, managing, integrating, evaluating, and creating information in a variety of forms and media.
Interpersonal and Collaborative Skills	Demonstrating teamwork and leadership; adapting to varied roles and responsibilities; working productively with others; exercising empathy; respecting diverse perspectives
Problem Identification, Formulation, and Solution	Ability to frame, analyse, and solve problems
Self-Direction	Monitoring one's understanding and learning needs; locating appropriate resources; transferring learning from one domain to another
Social Responsibility	Acting responsibly with the interests of the larger community in mind; demonstrating ethical behaviour in personal, workplace, and community contexts

Source: Partnership for 21st Century Skills (www.21stcenturyskills.org).

Appendix C

More examples of Project-based Learning

(from PBL Works)

- Have students choose a pizza restaurant, research its prices and apply linear algebra concepts to find the base cost of a pizza. These same concepts will allow students to determine how much each additional topping costs. Students should research – individually or in small groups – how much it costs to source each topping. They can then determine which type of pizza yields the greatest and smallest profit margins. Doing so acts as an introduction to basic economic concepts, encouraging students to critically think about business.
- Students, in the role of financial advisors, are challenged to find the best use of $25 so that it makes the most impact on a community. They will select a project from the organisation, Kiva.org, to lend a $25 microloan. In order to help students determine the best use of the funds, they will conduct interviews with a banker to learn how lending works and the investors to learn what projects they are passionate about. Students will also factor in repayment schedule and delinquency & default rates for the given project and microlender. They will present their recommendations to investors, as well as the school and the local community to get their Kiva projects fully funded.
- In this project, (9-year-old) students use measurement, data, and fraction concepts to develop, implement, and monitor an action plan for reducing their family's impact on the environment. Each student team focuses on one resource: water, garbage, food waste, electricity, or car gas use. Teams research information, such as the amount of water per minute of the shower or the number of miles per gallon used by a family car, and then they conduct home inventories of their family's use of these resources for 1 week (**e.g.**, timing the length of showers, the weight and volume of garbage, or the number of watt-hours used by key household devices). Students graph their individual family data and collective team data on line plots. After measuring their families' current use of resources, students set goals for reducing resource use by a given fraction and identify strategies to help their families achieve these goals (**e.g.**, "We will reduce our use of water by one-quarter through taking shorter showers and making sure the dishwasher is full before running it.") Students communicate these strategies and goals to their families in the form of an informative/explanatory letter and then measure and graph changes in their families' resource use as they implement their action plans. As an alternative, if there are barriers to measuring data about resource use at home, students might consider measuring the use of resources in the classroom or across the school.
- Students work in teams to learn about the causes, features, and risks of common natural hazards* and then produce preparedness campaigns or guides for each major type of hazard. Students will conduct in-depth research on their natural hazards, including in-person or virtual interviews with people who have experienced these hazards firsthand, as well as with scientists, engineers, and disaster preparedness specialists. As they develop their readiness guides, students consider questions such as, "What precautions can communities take in advance to reduce the impact of this hazard?" and "Which communities or members of a community are most at risk in the face of this natural hazard? How can we work together to ensure safety for all?"

- In this project, students explore the use of masks in various world cultures, learning about the origins, purpose, and use of masks in rituals, performances, fashion, occupations, and so on. They consider how masks function as objects that enhance beauty and appearance, provide protection or concealment, display power, or indicate change and transformation. Students use what they learn about masks to inform a reflection on the ways that they wear masks in their own lives and the different faces they put on for themselves and others. They create a mask that artistically represents one of these faces and presents it as part of a collaborative exhibition.
- In this project, students partner with a local historical society or archive to explore, research, and interpret primary source images and documents from a significant event or period in local history that connects to a larger historical moment or social movement. They read narratives and first-person accounts from the period in question to build background knowledge. Then students work together in teams, to create an interactive museum app that provides context and background for the images and artefacts and connects them to the larger historical moment or social movement.
- In this project, students study how laws are made and how laws affect certain members of society. By looking at the historical context (**e.g.**, significant amendments such as the 13th and 14th), students will examine how certain laws came to be and the ways in which laws can disproportionately affect different community members. Student teams will analyse current events and issues such as immigration, gun safety, or voter age to identify a law that they would like to change to more justly serve society. Students draft a proposal of a new law or an amendment to an existing law (proposition or legislation) and take action to get the law passed or changed at the local, state, or federal level.
- Students delve deeply into urbanisation-related challenges throughout this project. They investigate these issues by collecting and analysing news sources on a specific topic (possible topics include climate change, energy, housing, migration, land, or gender equality) from an interest-based role. As a class, they think critically about what cities are doing globally to promote sustainable development and they view and discuss videos, articles, and podcasts related to urbanisation. Ultimately, each student team presents their findings on their focus issue and makes recommendations on how all cities can implement strategies for sustainable development at a mock Expert World Cities Meeting
- Product packaging often uses materials and processes that negatively affect the Earth. In their role as design engineers, students use the engineering-design process and geometric modelling to redesign a product's packaging to render it more sustainable. Students explore the volume, surface area, and dimensions of complex shapes to develop prototypes that meet the product's packaging design constraints while limiting the packaging material used and/or waste generated
- In this project, students identify situations in which individuals need protection from collisions or impact and then propose and build protective solutions. Some **Examples** include more secure baby strollers or shopping carts; helmets for high-impact sports such as skateboarding, football, or biking; and a shoe design that lowers the impact of running. In the process of the project, students learn concepts of Newtonian physics and apply those concepts to the analysis of the type of collision and the design of their solutions. Students confer with subject matter experts (such as industrial designers, fabricators, or engineers) at key points throughout the project to inform and gather feedback on their product designs.

Appendix D

Projects	Project-Based Learning
Can be done at home without teacher guidance or team collaboration.	Requires teacher guidance and team collaboration.
Can be outlined in detail on one piece of paper by the teacher.	Includes many "Need to Knows" on the part of the students and teachers.
Are used year after year and usually focus on product (make a mobile, a poster, a diorama, etc.).	Is timely, complex, covers many TEKS, and takes a team of highly trained professionals significant time to plan and implement.
The teacher work occurs mainly after the project is complete.	The teacher work occurs mainly before the project starts.
The students do not have many opportunities to make choices at any point in the project.	The students make most of the choices during the project within the pre-approved guidelines. The teacher is often surprised and even delighted with the students' choices.
Are based upon directions and are done "like last year."	Is based upon Driving Questions that encompass every aspect of the learning that will occur and establishes the need to know.
Are often graded based teacher perceptions that may or may not be explicitly shared with students, like neatness.	Is graded based on a clearly defined rubric made or modified specifically for the project.
Are closed: every project has the same goal. (As in the example above, the end result is always The Alamo.)	Is open: students make choices that determine the outcome and path of the research.
Cannot be used in the real world to solve real problems.	Could provide solutions in the real world to real problems even though they may not be implemented.
Are not particularly relevant to students' lives.	Is relevant to students' lives or future lives.
Do not resemble work done in the real world.	Is just like or closely resembles work done in the real world.
Do not include scenarios and background information or are based on events that have already been resolved.	The scenario or simulation is real or if it is fictitious, is realistic, entertaining, and timely.
Are sometimes based around a tool for the sake of the tool rather than of an authentic question. (Make a Prezi.)	Use technology, tools, and practices of the real world work environment purposefully. Students choose tools according to purposes.
Happen after the "real" learning has already occurred and are just the "dessert."	Is how students do the real learning.
Are turned in.	Is presented to a public audience encompassing people from outside the classroom.
Are all the same.	Is different.
Make a model (or diorama or mobile . . .) of the Alamo.	Design a fortification that would take your community through a bio or other non-traditional attack and make a recommendation to the city council for future planning.

Appendix E

Driving and Content Question Example

Although the following questions are divided into three general grade levels, many of these questions can be used with almost any grade.

ELEMENTARY SCHOOL CURRICULUM-FRAMING QUESTIONS	
Driving Questions	**Content Questions**
What is special about frogs that help them survive? How are frogs different from me?	What are the basic structures of the frog? What are the adaptations of animals that allow them to live in specific environments? What is the life cycle of a frog?
Which of our community helpers is the most important? Which community helper would you most like to be?	Who are some community helpers? What do they do?
Why do we need manners? How can we all get along?	What are manners? What manners help us get along on the playground or in the classroom? How are the manners of the Pilgrim children taught differently from the ones we are taught?

ELEMENTARY SCHOOL CURRICULUM-FRAMING QUESTIONS	
Driving Questions	**Content Questions**
Are all animals worth protecting? If you were an African animal, which one would you most like to be and why?	How do animals in Africa adapt to their environment? What do African animals need to survive? What are the characteristics of African animals?
How does the way an author writes (style) make a story more interesting?	What are the elements of a story? What traits of writing does the author use?

ELEMENTARY SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
How are fractions used on the job, and are they needed to get the job done right? How can understanding fractions make your life easier?	What is a fraction? How do you add, subtract, multiply, and divide fractions? What are numerators and denominators? How do you change a mixed numeral into an improper fraction?
How do I decide which route to take? What can maps tell us about people, places, and environments?	What symbols and location identifiers are found on a map, and what do they mean? How do you measure using a map?
What can our school do to help save an endangered species? How can humans and endangered species share a region?	What makes an animal an endangered species? What is needed in your species' habitat?

ELEMENTARY SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
Can I go outside and play today? How should I prepare for the weather today?	Where does rain come from? What causes the seasons of the year? What are some things people do to prepare for different weather conditions?
Is it time to rhyme? Why rhyme?	What is rhyme? What words sound the same? How can you tell words that rhyme?
Could a volcano erupt in my backyard? What type of mountain would make the best building site and why?	What are the layers of Earth? What are the three types of volcanoes? How are mountains made? How do we know that a volcano is dormant?
Why is Cinderella a favourite story all over the world? How would the Cinderella fairy tale change if a different character telling the story?	What are the elements of a fairy tale? What is the point of view? In what ways are all of the Cinderella stories from around the world similar?
What can shadows tell us?	What causes a shadow? How do you measure your shadow? What causes your shadow to change?

MIDDLE SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
What impact did early explorers have on the development of the world and their home country? How did early explorers change the world?	Who are some of the early explorers? Where did these explorers go? What did they find?
Are rainforests worth saving? How do people and animals live in rainforests, and how can they best coexist?	What is a rainforest? What lives in a rainforest? Where are rainforests located?
How can we use natural resources to create energy?	What are natural resources? What are natural resources used for? What are the differences between renewable and nonrenewable resources? What are some **Examples** of each?
What can I do to reduce health risks? How do the systems of the body work together to keep me healthy? How can I be healthy?	What are some health risks? Why are they considered to be health risks?

MIDDLE SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
What is special about a cell? What can cells tell us about the organization of other systems?	What are the features of a cell? What are the stages of cellular respiration in a human cell? What are the differences between an animal and plant cell?
How is ancient Egypt still with us today? How does the past affect the future?	What was the political structure of ancient Egypt? What were some customs of ancient Egypt?
Which of Leonardo da Vinci's areas of expertise had the most impact on today? How was Leonardo da Vinci an inspiration for the future? How can one live beyond one's time?	What is Leonardo da Vinci famous for? Who were the patrons of Leonardo da Vinci?
How is our life different today because of _____ conflict?	What were the causes and results of the _____ war?

MIDDLE SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
How much do Greek and Roman mythology influence literature and our everyday life?	Who are some of the gods in Greek and Roman mythology, and what are their attributes?
How does community history affect today's community values?	When was our community founded and by whom? What are some laws we have in our community? What are some problems in our community?

MIDDLE SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
How do the times in which a composer works affect his or her music? How do composers from different eras compare?	Who were some famous composers from different time periods and countries? What are some musical styles?
Is our life anything like that of the ancient Egyptians? Have things really changed that much?	Why was the river Nile so important to the ancient Egyptian civilization? What religious, cultural, and scientific contributions were established by the ancient Egyptians?
Is disease inevitable? Is prevention really the best medicine? What is the diagnosis? How can you be sure it is correct?	What are the functions and weaknesses of each of the body systems? What is the definition of *disease?* What benefits do we get from exercise?

HIGH SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
What does the music of today tell about us?	Who were some composers of the 60s?
How does a composer's life influence his or her music? What does the music from the 60s say about its time period and culture?	Who were some famous composers of the past and present?
Does society have a responsibility to treat diseases? What are our individual roles in their prevention, containment, and treatment?	What are some common diseases in the world today? How are diseases treated?
How can geometry help me understand the world around me? When playing golf, how can knowing the angles of incidence and reflection help you to make a hole-in-one?	How do you calculate the square footage of a given room in order to buy the right amount of carpet? How does a GPS unit locate coordinates?
What can we do to help those in need? How can famine be prevented?	What are some of the causes of famine in _____? What kind of relief efforts are currently underway in _____?

HIGH SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
When you decide to buy a house, how do you choose the right home for you? How can you plan for the future to ensure you will be able to afford the home and lifestyle of your dreams?	How does financing affect the actual price paid for a home? What factors determine how much home one can afford? How do regional factors affect home prices? How do loans work?
What is the physics behind the stars?	What makes up the galaxies?
What can we learn about ourselves by studying the galaxy?	What are stars? How can we know how far a star is from Earth?
How much does history influence literature?	Where did_____ get his or her stories? What was the political and social environment during the time of the metaphysical poets?

HIGH SCHOOL CURRICULUM-FRAMING QUESTIONS	
Driving Questions	**Content Questions**
Can science, discovery, and invention go too far? Should we put limitations on science?	What are some important scientific discoveries of the past 20 years?
Are 200-year-old laws still relevant today? What laws, national or local, may be challenged sometime in the future?	What were the laws our country was founded on?
Why do humans often react to conflict with violence?	In *Lord of the Rings, how does* _____ respond to conflict? What is the climax of the conflict and the story?

HIGH SCHOOL CURRICULUM-FRAMING QUESTIONS	
Driving Questions	**Content Questions**
How does impressionist art represent life in the late 1800s? How did impressionist art change society in the late 1800s? How does your own art reflect your life?	Who were the famous artists of the impressionist movement?
How do wars start, and can they—and should they—be prevented? Who benefits from war?	What countries were involved in WWII? Which countries were aligned together? What are some significant events of WWII? What were the major provisions of the Treaty of Versailles?
What makes good music, art, or poetry?	Why were the artwork of Vincent van Gogh and Wassily Kandinsky considered controversial or "bad" during their lives by the public, the art critics, and their contemporaries? How has a public opinion about the art of Vincent van Gogh changed over time?
Environment or DNA, what influences our individuality?	What does *DNA* stand for? What are the four chemical bases that make up DNA?

HIGH SCHOOL CURRICULUM-FRAMING QUESTIONS

Driving Questions	Content Questions
Why do we still read Shakespeare? How do Shakespeare's poems and plays impact and accurately reflect modern life? How is Shakespeare's work relevant to my life?	How does the author reveal the character of Hamlet to the audience? What are Hamlet's external and internal conflicts? Why does Hamlet feign madness?
What *really* is happening to our environment?	What are some of the environmental problems that are occurring in our country today?
Are there scientific discoveries that should not be pursued?	What is cloning? How does cloning work?
How can photographs help us interpret the past? How does photojournalism impact public opinion?	What is one rule of composition, and how is it applied to photography?
What was the impact of conquest on the ancient world? What effect did empires have on daily life in the ancient world?	What were the accomplishments of your historical figure?

**Some questions are from Katherine G. Simon's article, "The Blue Blood Is Bad, Right?

Appendix F

Team Contract

Team Members: _____

_____

_____

_____

1. Goals of Group: _____

_____

_____

_____

2. How will your team know they are on track to be successful during the project?

_____

_____

_____

3. Roles and Responsibilities

A. Leader: _____
Responsibility: _____

B. _____ : _____
Responsibility: _____

C. _____ : _____
Responsibility: _____

D. _____ : _____
Responsibility: _____

4. Team Norms
A. Responsible _____
B. Respect _____
C. Safe _____
D. _____
E. _____

5. Team Agreements

Please describe the group's expectations about behaviour during the project.

A. Decision Making:

B. Conflict: _____

Warning: _____

Teacher Meeting: _____

Plan: _____

6. Team Signatures:

_____

_____

_____

Appendix G

Weeks	Teacher-led Activities	Individual Student Tasks	Group Tasks	Community Connections
Week 1	Introduce project scenario and explain expectations	Complete a K.-W-L Chart (What I Know, What I Want to Know, What I Learned)	Brainstorm questions	
	Discuss the driving question	Hypotesise	Decide on topic Brainstorm questions	Assess community energy costs
	Gauge student needs Evaluate web sites Review expectations on reflections Monitor group work	Calculate actual energy costs	Create project plan, begin research	Meet with town's energy experts
Week 2	Mini-lesson collaboration		Conduct research on what items could be turned into solar	
	Demonstrate solar cooker	Record progress	Raise money to purchase components of small solar lights	Discuss with the engineer the design process
	Instruct in 21st-century skills mini lesson Monitor and revise	Research		Request donations from the community
Week 3	Monitor groups, instruct mini-lesson	Reflect on progress	Build and test their solar lights, cookers	
	Monitor groups		Develop presentation	Share presentation with the community
	Reflect	Reflect	Reflect	Give feedback

Appendix H

Essential Project Design Elements Checklist

DOES THE PROJECT MEET THESE CRITERIA?			
KEY KNOWLEDGE, UNDERSTANDING, AND SUCCESS SKILLS The project is focused on teaching students key knowledge and understanding derived from standards, and success skills including critical thinking/problem solving, collaboration, and self-management.			
DRIVING QUESTIONS OR PROBLEM The project is based on a meaningful problem to solve or a question to answer, at the appropriate level of challenge for students, which is an open-ended, engaging driving question.			
SUSTAINED INQUIRY The project involves an active, in-depth process over time, in which students generate questions, find and use resources, ask further questions, and develop their own answers.			
AUTHENTICITY The project has a real-world context, uses real-world processes, tools, and quality standards, makes a real impact, and/or is connected to students' own concerns, interests, and identities. Students take on real roles and complete real tasks			
STUDENT VOICE & CHOICE The project allows students to make some choices about the products they create, how they work, or how they use their time, guided by the teacher and depending on their age and PBL experience.			
CRITIQUE & REVISION The project includes processes for students to give and receive feedback on their work, in order to revise their ideas and products or conduct further inquiry.			
PUBLIC PRODUCT The project requires students to demonstrate what they learned by creating a product that is presented or offered to people beyond the classroom			

Appendix J

Rubric Examples

	CRITERIA				POINTS
	4	3	2	1	
Introduction/ Topic	Student properly generates questions and/ or problems around a topic	Student generates questions and/ or problems	Student requires prompts to generate questions or problems	Questions or prompts are teacher generated	
Conclusions reached	Numerous detailed conclusions are reached from the evidence offered	Several detailed conclusions are reached from the evidence offered	Some detailed conclusions are reached from the evidence offered	A conclusion is made from the evidence offered	
Information gathering	Information is gathered from multiple electronic and non-electronic sources and cited properly	Information is gathered from multiple electronic and non-electronic sources	Information is gathered from a few electronic and non-electronic sources	Information is gathered from one non-electronic or electronic sources only	
Summary paragraph	Well organized, demonstrates logical sequencing and sentence structure	Well organized, but demonstrates illogical sequencing or sentence structure	Well organized, but demonstrates illogical sequencing and sentence structure	Weakly organized with poor sequencing or sequence structure	
Grammar and spelling	Punctuation and capitalization are correct	There is one error in punctuation and/or capitalization	There are two or three errors in punctuation and /or capitalization	There are four or more errors in punctuation and/or capitalization	
				TOTAL	

Elementary Opinion Writing Rubric

Designed by Catlin Tucker

Blended_Learning_inGRades_4-12

Element	Needs Improvement 1	Fair 2	Strong 3	Excellent 4
Opinion with reasons	Opinion is unclear; no reasons are given	Opinion is clear but reasons are unclear or incomplete	Opinion is clearly state and reasons are stated	Opinion is clearly stated and reasons are strong
Evidence	Opinion is not supported. No evidence provided	Attempts to support opinion and reasons with facts, however, the information is unclear or inaccurate	Supports opinion and reasons with facts and necessary details	Supports opinion and reasons with strong, accurate facts and thorough details
Explanation	Little to no explanation of the information presented	Explanation attempts to discuss the information but is unclear at times	Clear explanation that discusses most of the information presented	Clear and concise explanation that thoroughly discusses the information presented
Conclusion	Abrupt ending. No concluding statement	Ends with a concluding statement that does not clearly relate to opinion stated	Ends with a concluding statement about the opinion stated	Effectively ends with a strong concluding statement
Organization and Transitions	Little to no attempt at organization	Attempts to organize ideas, but transitional language needs to be added	Organizes ideas in a logical way. Transitional language used	Strong organization and transitional language used throughout
Mechanics (spelling and grammar)	Distracting mechanical errors throughout	Mechanical errors distract at times	A couple errors present, but they do not distract	Mechanics reflect careful editing

3rd Grade Informative/Explanatory Writing Rubric

Name_____

	1 Needs Support	2 Approaching Standard	3 Meets Standard	4 Exceeds Standard
Introduction	Does not introduce topic	Attempts to introduce topic	Introduces topic	Introduces topic in an interesting way
Content	Does not use facts, definitions, and details	Attempts to use facts, definitions, and details	Uses facts, definitions, and details	Uses many facts, definitions, and details
Linking Words	Does not use linking words	Attempts to use linking words	Uses linking words correctly	Uses many linking words correctly to connect ideas within categories of information
Closing	Does not provide a closing	Attempts to provide a closing	Provides a closing	Provides a strong closing
Mechanics	Does not use capitalization, punctuation, and spelling correctly	Attempts to use capitalization, punctuation, and spelling correctly	Uses most capitalization, punctuation, and spelling correctly	Uses capitalization, punctuation, and spelling correctly

7th Grade Science Inquiry Rubric

Scientific Inquiry Rubric

	1 pts - Beginning	2 pts - Progressing	3 pts - Proficient	4 pts - Exemplary
Identifying questions and formulating hypotheses that may be examined through scientific investigations	Testing the question is not possible. Hypothesis is missing or unclear	There are testable questions however the hypothesis does not directly answer the question	There are testable questions, and the hypotheses can lead to a scientific investigation	Formulates testable questions and hypotheses that are specific, based on scientific concepts and lead to scientific investigation
Designing and conducting a scientific investigation	Little attempt is made to control and manipulate variables. Major flaws in the design of the investigation. Extensive teacher intervention required	Flaws are evident in identifying variables. Design of the investigation has some flaws. Some teacher intervention is necessary	Identifies what variable is controlled and what are manipulated. Design is logical and requires minimal teacher intervention	Identifies what variable is controlled and what are manipulated. Design is logical to the hypotheses and requires no teacher guidance
Using appropriate tools and techniques to collect and record data	Collects and records invalid data. Uses inappropriate equipment and techniques, data collected contains inaccuracies which alter the result	Collects and records objective data but incorrectly uses equipment and techniques	Collects and records complete and objective data and uses appropriate equipment and techniques	Collects and records data which is complete, accurate and objective. Uses appropriate equipment and techniques
Using Evidence to develop explanations and describe relationships between evidence and explanation	Unable to draw inferences (interpretation of an observation)	Students draw faulty inferences based on patterns or previously help ideas	Students draw inferences based on relationships, perceived patterns or previously held ideas	Data is analyzed objectively. Students draw logical inferences based on observed patterns and relationships which lead to questions for further investigations
Communicating procedures, results, and explanations of the scientific investigation	Scientific information is unclear, presentation lacks focus, and organization and it hinders communication	Scientific information has some clarity, presentation has some focus and organization that permits communication	Scientific information is communicated clearly, presentation is focused and organized, and facilitates communication	Scientific information is communicated clearly and precisely but may also include inventive/ expressive dimensions. Presentation is effectively focused and organized (uses tables, charts, figures, models) and the variety of media enhance communication

Appendix K

Example of Acceptable Use Policy from Westport Public Schools Grades 6-12

https://www.westportps.org/parents/acceptable-use-policy

ACCEPTABLE USE AGREEMENT: INTRANET/INTERNET
Middle Schools and High School * (including Summer School)

I understand that the Westport schools provide electronic resources, including Internet access and storage space for students' work, as an integral part of the curriculum. Behaviour and language in the use of these resources should be consistent with classroom standards. I agree to the following responsibilities and restrictions:

1. I will use the electronic resources, including storage space, only for educational purposes related to work in Westport schools, and not for any personal, commercial or illegal purposes.
2. I will use the Internet only with the permission of the staff member in charge.
3. I will not use games or other electronic resources that have objectionable content or that engage me in an inappropriate simulated activity.
4. I will not give my password to any other user, nor attempt to learn or to use anyone else's password, and I will not transmit my address or telephone number, or any personal or confidential information about myself or others.
5. I will not upload, link, or embed an image of myself or others to unsecured, public sites without my teacher's permission and a signed parental permission slip.
6. I will not make statements or use the likeness of another person through website postings, email, instant messages, etc., that harass, intimidate, threaten, insult, libel or ridicule students, teachers, administrators or other staff members of the school community, make statements that are falsely attributed to others, or use language that is obscene.
7. I will not attempt to access, upload, or transmit material that attacks ethnic, religious or racial groups or material that is pornographic or explicitly sexual in nature.
8. I will not violate copyright laws, damage or tamper with hardware or software, vandalise or destroy data, intrude upon, alter or destroy the files of another user, introduce or use computer "viruses," attempt to gain access to restricted information or networks, or block, intercept or interfere with any email or electronic communications by teachers and administrators to parents, or others.
9. I will not use or create for others, any program to interfere with, change, or interact with programs, security settings, systems, or devices that are the property of the Westport Public Schools and are used for school-related purposes by students, their parents and staff.
10. I will not imply, directly or indirectly, either publicly or privately, that any program or "app" I create is associated with, or a product of, the Westport Public Schools, nor will I either directly or indirectly associate any such program with any Westport Public School logos or images.
11. I will report any problems to the supervising staff member.

12. I understand that my use of the school system's computers is not private and that the district reserves the right to monitor use to assure compliance with these guidelines; violations may lead to revocation of computer access and/or other disciplinary measures.
13. I understand that the prohibited conduct described above is also prohibited off campus when using private equipment if it has the effect of seriously interfering with the educational process and that such off-campus violations may lead to disciplinary measures. I understand that the Westport schools allow me to bring my own devices, such as phones, tablets and computers.

To be permitted to bring my own device, I agree to the following responsibilities and restrictions:

1. I will follow all school rules while using my own device on school grounds. I understand that the rules outlined above regarding my use of school computer resources apply to my use of my own device on school property and that rule 11 above applies to my use of my device off school property.
2. I will not take photos or record videos of any student, teacher or administrator unless I have that individual's express permission to do so.
3. I will not use my device during class unless expressly instructed to do so by a teacher, and I will immediately comply with a directive to turn my device off, to put my device away or to turn my device over to a teacher or administrator.
4. I understand that my device may be confiscated at any time and that a teacher or administrator may view the contents of my device, including but not limited to, texts, emails or social media postings, if it appears that I may have used my device in violation of school rules or this Agreement.
5. I understand that the district is not responsible for the theft, damage or loss of my device and I understand that I am not permitted to leave my device at school overnight unless it is secured in a locked locker.

Student's Name: _____School: _____Grade: ___

Student's Signature: _____Date: _____

Parents: I have read, understood, and discussed with my son or daughter this Acceptable Use Agreement, and I give him or her permission to use electronic resources, understanding that this access and use of personal devices on school grounds is conditional upon adherence to the agreement. Although students are supervised when using school resources, and their use of school resources is electronically monitored, I am aware of the possibility that my son or daughter may gain access to material that school officials and I may consider inappropriate or not of educational value.

Parent's Name:_____Parent's Signature:_____

Date: _____

* STUDENTS MAY NOT USE COMPUTERS OR BRING THEIR OWN DEVICES UNLESS THIS AGREEMENT IS SIGNED AND RETURNED TO THE PRINCIPAL.

Wellesley Public Schools Grades 2 - 5

https://wellesleyps.org/technology/wp-content/uploads/sites/21/2017/05/wpselemaup.pdf

WELLESLEY PUBLIC SCHOOLS TECHNOLOGY NETWORK
Acceptable Use Policy Elementary (Grades 2-5)

Student Agreement School: _____ Teacher: _____

Student's Name: _____

I agree to follow all of the rules for using the instructional computer network in the Wellesley Public Schools. I understand that:

- Computers at school are to be used for educational purposes only.
- The use of the computer network is a privilege, not a right, and I will use appropriate language and behaviour when using the network.
- I will not use the network to send or receive illegal or inappropriate materials.
- I will not give my password to anyone else; I will not use anyone else's account or move, change or delete anyone else's work.
- I will only use the Internet for school purposes and only with a teacher in the room.
- I will not give out personal information about me or others (such as name, address, or telephone number) on the Internet.
- I will not use email or Instant Messenger unless a teacher has told me to.
- I will not download anything from the Internet without permission from a teacher.
- I will not change any computer settings or install programs on school computers without permission from a teacher.
- If I do not follow the rules, I will not be allowed to use the computer network for a period of time and may face additional school disciplinary action.

_____ Student Signature Date_____

A parent or guardian must read and sign: I, _____, parent/guardian of _____, have read and understand the contract, which my child has signed in order to use the Wellesley School District's Instructional Network. I have discussed this contract with my child to help them understand it. I fully agree with the contents of the contract and recognise that my child must abide by it.

_____

Appendix L

Benefits offered by Collaborative Classrooms

Collaborative classrooms offer various benefits. We divide these benefits in two parts, for students (learners) and teachers (educators) as follows:

FOR STUDENTS	FOR TEACHERS
Enhanced Interpersonal Skills: Interpersonal skills, also known as soft skills refer to the essential skills for communicating with others. It includes communication skills (verbal and non-verbal), listening skills, leadership skills, team-building skills, negotiation skills, openness to feedback, empathy, etc. A collaborative classroom paves the way to hone all these interpersonal skills of a student.	***Concept Clarity:*** As teachers invest a lot of time in preparing for their sessions, concept clarity is one of their objectives. Collaborative classrooms help in making the concept clear through practical applications in form of assignments, projects, peer interactions, etc.
Brainstorming: Brainstorming is a creativity technique used for idea generation. The group lists ideas about a topic or problem. Young minds have the potential to come up with some great ideas only if given a chance to brainstorm. All these listed ideas can be discussed in the class and the most feasible ones can be selected.	***Goal Realisation:*** One of the major goals of any teacher is to be able to achieve the Program Outcomes (PO) and Course Outcomes (CO) through innovative teaching and learning methods. Collaborative Classrooms help in realising these goals.
Critical Thinking: Critical thinking forms a base for rational judgement. It helps the students to analyse the pros and cons of a given situation, scenario or case study. Inculcating critical thinking in students is of utmost importance to help them make the right decisions in life.	***Inculcating Critical Thinking Attitude:*** Building a critical thinking attitude amongst students is of utmost importance to develop rational thinking ability in a child. Giving them situational analysis scenarios can help in achieving this objective.

FOR STUDENTS	FOR TEACHERS
Deductive reasoning: Deductive reasoning or deductive logic is a process of reasoning and narrowing the available options to reach the most logical conclusion. For **Example**, teachers can give a set to provide students with a set of possible options for a specific problem and the students can narrow down on one solution that is most feasible under the given circumstances.	***Effective Teamwork:*** Learning through a collaborative classroom is all about teamwork and enhancing team spirit. Through a collaborative classroom, teachers can play an active role in honing the team-building skills of their pupils and witness an increase in productivity through effective teams.
Feedback Mechanism: Collaborative classrooms present an opportunity for the students to work with each other, share information and evaluate each other's ideas. Creating a system for feedback and accepting it positively, can help each co-learner to improvise on their specific skill set. Giving and receiving feedback by the co-learners should be encouraged by the teachers.	***Nurturing Aspiring Leaders:*** The world needs some great leaders to take over. And the teachers are in the realm of creating those great leaders. By having an interactive class through effective collaborations, they indeed act as nurturing forces that groom and shape some great leaders.
Boosting Confidence and Morale: When the students start participating in the classroom through such collaborations, it helps them to overcome their stage of fear and anxiety. Such a collaborative learning environment further boosts their confidence and lifts their morale.	***Overcoming Geographical Barriers:*** The new age of learning through digital platforms helps in overcoming the barriers of distance. Thus, enabling teachers to reach out to the maximum number of students all across the globe.

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Books

UNESCO ICT Competency Framework for Teachers - *Intel® Transforming Learning Course*
Digital Learning Fundamentals - *Intel® Transforming Learning Course*
Digital Online Learning – *Sanjaya Mishra*
Open Educational Resources (OER) for Open Schooling Teachers' Guide – *Commonwealth of Learning – The William and Flora Hewlett Foundation*

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