



Engaging 21st Century Learners using Digital & Physical Technologies

Association of Science Teachers (AST)
October 24, 2025

Presented By: Matthew T. Ngo | mngo@hrce.ca
PhD Candidate (St. Francis Xavier University)
Physics Educator at Citadel High School



COMPUTER LOGIN: You can log in using GNSPES

A LITTLE ABOUT ME

Career Information

- 16 years teaching in the Halifax Regional Centre for Education (HRCE).
- Primarily teaching Physics 11 and 12, and the IB Physics Curriculum.
- Presenter for AST for 5 Years (Online and in-person)
- Part-Time instructor for the Master of Education program at StFX.

Education and Experiences

- Inter-University PhD program in Educational Studies at St. Francis Xavier University.

Dissertation Working Title:

Exploring the ideology of success for racialized learners in high school physics.

- Master of Education in Educational Leadership and Administration (StFX; 2017)
- Master of Education in Curriculum and Instruction (StFX; 2014)



In high school, there are many factors and circumstances that lead to the success of students. Because success can mean different things to different individuals, it is context specific. Authors such as Duckworth et al.

[Show more](#)

Speaker

 **Speaker**
Matthew T Ngo
St. Francis Xavier University



Items of Focus for Today's Workshop

We're going to figure out practical tools to help engage learners in our classrooms:

- 01** **Mentimeter:** Interactive engagement and assessment tool (free)
- 02** **Miro:** Online collaborative tool (free)
- 03** **Plickers:** Interactive formative assessment tool (free) ****low tech****
- 04** **Padlet:** Online collaborative tool (free) ****collaborative****
- 05** **Podcasts:** Teacher centric: Recording activities to support additional learning

There will be allotted time to explore some of these tools to support learning activities!



Anchoring the Conversation

“The **prescriptive methods** of teaching in subject areas, such as science, mathematics, English, history, has been **appropriate**. How **effective** are they? What practices do we need to re-consider so that learning becomes **less of a chore**, but becomes an active pursuit? Are there **ways** we can make learning more engaging?”

Please hold your thoughts as our first activity will commence.

MENTIMETER

 Mentimeter

Bring engagement to every class



Lectures

Keep every student engaged

[Learn more](#)



Assessments

Perfect for formative and summative

[Learn more](#)



Seminars

Spark debate and discussion

[Learn more](#)



Student events

Engage large audiences

[Learn more](#)

Instructions for Using Mentimeter

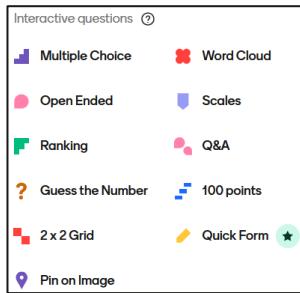
A 'free' Mentimeter account has 50 participants per month

Mentimeter can import PowerPoint, Google Slides, and Miro (next activity)!!!



Tools Needed

- Computer (Internet and Projector)
- ChromeBook or Computer with Internet (Students)



What can Mentimeter do?

1. **'Word Cloud' option** – You can use it to have students share their 'Big Ideas' that came out of a particular lesson.
2. **A private 'Q&A' space** – Suppose you are doing an activity and students are shy about asking for help. They can send a Q&A immediately through Mentimeter and have it appear anonymously.
3. **'Ranking Activity'** – Provide a context for feedback
4. **'100-points'** – Provide context for feedback

MIRO

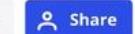


mi

Team Meeting



Present



Project brief

A screenshot of a mobile application interface. At the top, the title 'Design Manager Sync Agenda' is displayed in bold black text. Below the title is a list of agenda items, each consisting of a redacted title and a redacted description. To the right of the list is a sync status icon, which is a blue square with a white checkmark and a small downward arrow. Below the sync status icon are two buttons: 'Auto' and a downward arrow icon. The bottom of the screen shows a navigation bar with a blue square icon, the text 'Design Manager Sync Agenda', and a small circular icon with the number '1'.

Brainstorm ideas

The image shows a digital workspace interface. At the top, there are two yellow callout boxes: one on the left for 'Juan' containing the text 'Add inspirational images to aid customers', and one on the right for 'Rubin Kotowicz' containing the text 'Develop task update functionality' with a progress status of 'In progress'. Below these are several icons: a bold 'B', a list icon, a link icon, a 'S' icon, a blue circular icon, a '2' icon, a tag icon, a smiley face icon, a document icon, a message icon, a lock icon, and a star icon. A horizontal ellipsis '...' is also present. In the center, there is a blue rectangular card with rounded corners and a bounding box, containing the text 'Transfer data from Google Sheets'. A pink callout box for 'Miriam' is pointing to this central card. To the right of the central card is another yellow callout box for 'Adria Weinert' containing the text 'Set up email notification system' with a progress status of 'In progress'.

Action items

- Develop task update functionality
- password reset
- Set up email notification system

Project plan

Timeline	Q1		
Releases	Release 1		
Desired Experience	Describe user experience and emotions	Collaborate with the team	Always feel in control of who sees what.
Must-Have Capabilities	Service Catalog Version 1. In progress jan 19	Calendar integration	
User Experience Improvements	User onboarding To do jan 12 — jan 23		New tem

Instructions for Using

A 'free' Miro account has a single workspace with 3 editable boards! It is a good space for multiple groups of students to collaborate and share with teachers viewing.

Once you create an account, let me know, and we can try it out together!



Tools Needed

- Computer (Internet and Projector)
- ChromeBook or Computer with Internet (Students)



What can Miro do?

1. Have students provide feedback on multiple topics
2. Students find key facts to a broader topic and share with the class
3. Keeping all groups of students connected!
4. As administrator, you can delete messages and live monitor who is posting / writing what.

Show Miro In Action Video

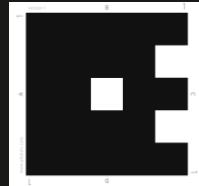
PLICKERS



Instructions for Using plickers

Please do not bend or mark on these Plicker Cards!

Do not share the card # to people nearby 😊



READY TO PLAY?



Tools Needed

- Computer (Internet and Projector)
- Smartphone with Internet (for the Teacher)
- Plicker Cards
- Question Bank for Your Class



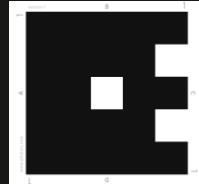
Ideas to Support Learning

1. **Not assigning names to the number on the card:** It encourages all students to take part without risk of being “outed” for incorrect responses. You can randomize the cards each time. Or, you can tell them to hide their card numbers forever.
2. **If you choose to assign names to numbers:** You can have the formative assessments recorded on the Plickers system.

Instructions for Using plickers

Please do not bend or mark on these Plicker Cards!

Do not share the card # to people nearby 😊



All our printable card options

We offer free cards in a range of formats:

Standard - for a set of 40 cards, [click here](#)

Expanded - for a set of 63 cards, [click here](#)

Large Font - for a set of 40 cards, designed for those who prefer larger lettering, [click here](#)

Jumbo - for a set of 63 oversized cards (one per page), [click here](#)

I highly recommend just printing them on cardstock via photocopier (cheaper)

plickers free

\$0.00 /month

- ✓ Unlimited Classes
- ✓ Unlimited Reports
- ✓ Create Sets with Unlimited Questions
- ✓ Unlimited Media Search
- ✓ Shared Packs
- ✓ Unlimited Scoresheet
- ✓ Priority Support

[Stay on Free Plan](#)

plickers pro

\$8.99

Save 33% when you pay annually

- ✓ Unlimited Classes
- ✓ Unlimited Reports
- ✓ Create Sets with Unlimited Questions
- ✓ Unlimited Media Search
- ✓ Shared Packs
- ✓ Unlimited Scoresheet
- ✓ Priority Support

[Start Free Plickers Pro Trial](#)

PADLET (New for 2025)



AI recipes BETA

Discussion board	<small>New</small>	Class activity creator	<small>New</small>	Lesson plan	Ideas for class activities
Timeline of events		Reading list		Map of historical events	Assessment polls
Rubric		Custom board			

Recipes

[View all](#)

Art showcase	Book reviews	Lesson plan	Map
Polls	Pros and cons list	Reading log	Resource board

Instructions for Using



Since we are limited by time, it may be best to use Padlet on your Smartphones.

You do not need an account, but having one gives you a lot of abilities!



Tools Needed

- Computer (Internet and Projector)
- ChromeBook or Computer with Internet (Students)



What are we doing for today's workshop?

1. 'Art Showcase' (idea to research inventions or biographies)
2. 'Brainstorming Board' (similar to a KWL approach)
3. 'Research Notes' Board (good to organize findings / notes)

Many other cool features:

- A 'Video or Audio' Response Board on a Topic
- Meeting Minutes (good for staff meetings or admin roles)

PADLET ART WALL



Padlet

matthewwng01 • 7m

Art showcase

Post your art!

matthewwng01 6 minutes from now

Marie Curie



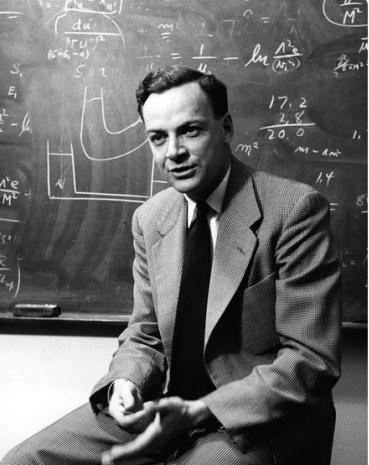
Who was Marie Curie and what were her contributions in Science?

0 likes 0 comments

+ Add comment

matthewwng01 4 minutes from now

Richard Feynman



Who was Richard Feynman and what were his contributions in Science?

0 likes 0 comments

+ Add comment

matthewwng01 2 minutes from now

Chien-Shiung Wu



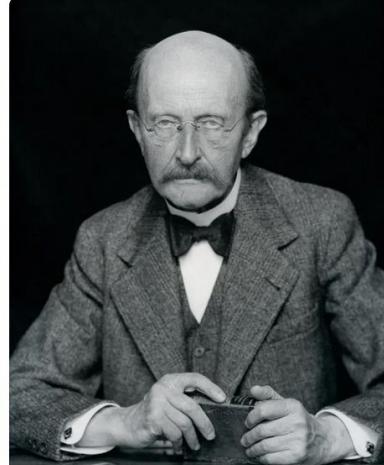
Who was Chien-Shiung Wu and what were her contributions in Science?

0 likes 0 comments

+ Add comment

matthewwng01 less than a minute ago

Max Planck

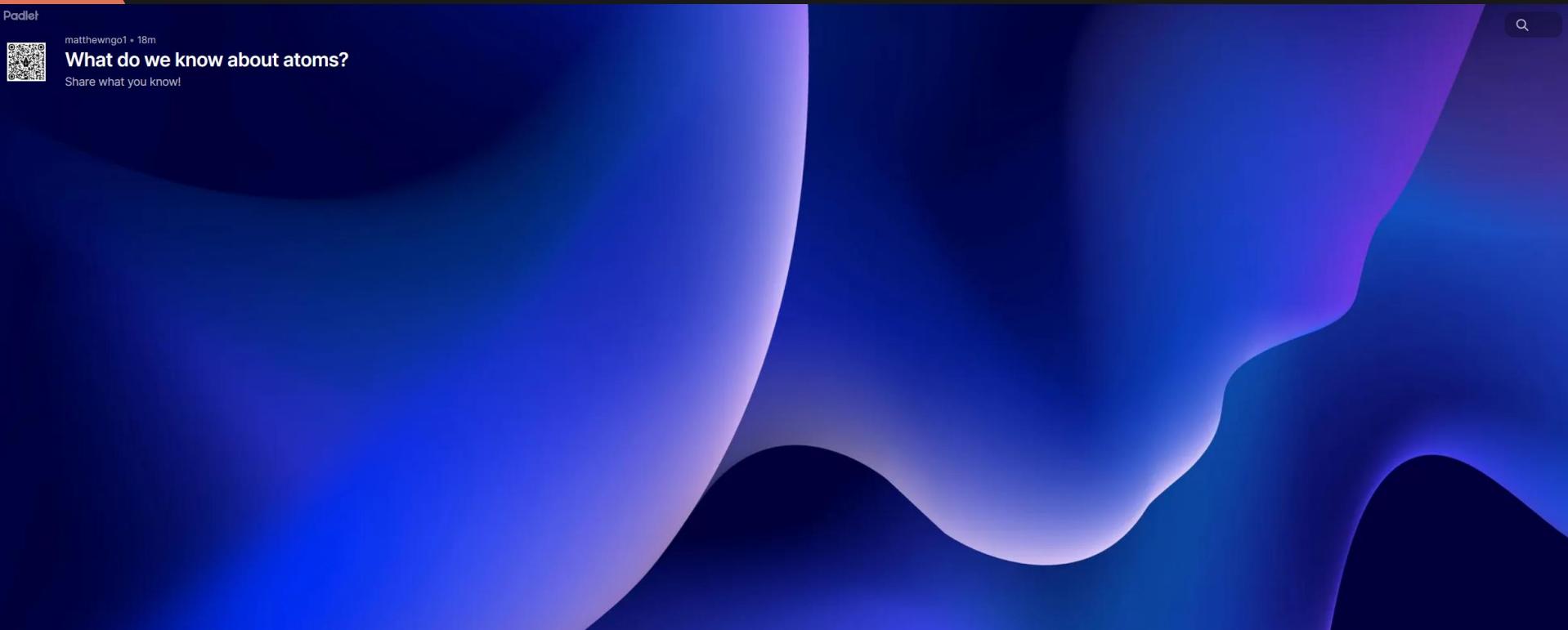


Who was Max Planck and what were his contributions in Science?

0 likes 0 comments

+ Add comment

PADLET BRAINSTORMING

A screenshot of a Padlet interface. The top navigation bar is black with the Padlet logo on the left and a search icon on the right. The main content area has a dark blue background with abstract white and light blue wavy patterns. On the left, there is a dark sidebar with the Padlet logo, a QR code, and the text "matthewngo1 • 18m" above the title "What do we know about atoms?". Below the title is the instruction "Share what you know!".

PADLET RESEARCH NOTES



Padlet

matthewng01 • 8m

Climate Change Research Resources and Notes

Research Topic

Sources

Key Findings

Quotes

Additional Notes

Add section



What are the relationships between tree rings and climate change?



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[url=https%3A%2F%2Fwww.un.org%2Fn%2Fclimatechange%2Fwhat-is-climate-change](https://www.un.org/en/climatechange/what-is-climate-change)



?
[url=https%3A%2F%2Fwww2.epa.gov%2Fclimate%2Fresource-collections%2Fclimate%2Fclimate-change-impacts](https://www2.epa.gov/climate-change-impacts/education%2Fresource-collections%2Fclimate%2Fclimate-change-impacts)



"It's important for me to have hope because that's my job as a parent, to have hope, for my kids, that we're not going to leave them in a world that's in shambles, that's a chaotic place, that's a dangerous place."



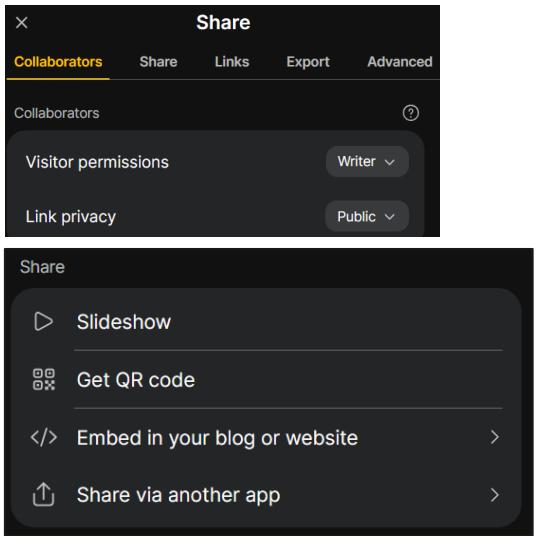
How much has sea levels risen



Al Gore, Former USA Vice-President

What can we say about ?

Good space for co-constructing knowledge with students using a digital space



The screenshot shows the 'Share' settings for a Padlet. It includes sections for 'Collaborators', 'Visitor permissions' (set to 'Writer'), and 'Link privacy' (set to 'Public'). Below this, there are sharing options: 'Slideshow', 'Get QR code', 'Embed in your blog or website', and 'Share via another app'.

Free	Platinum	Classroom	Team
Forever	CA\$14.99 /month CA\$99.99 /year <small>Save 44%</small>	CA\$199 /year 2 teachers	CA\$19.99 /month CA\$149.99 /year <small>Save 37%</small> per Maker
Get started	Subscribe	Start trial	Start trial
			
For a single user.	For a single user.	For classroom collaboration and sharing.	For teams working together.
3 padlets	Unlimited padlets	Unlimited padlets	Unlimited padlets
20MB file uploads	500MB file uploads	1GB file uploads	1GB file uploads
1 user	1 user	200 free student accounts	-
2 minute video recordings	15 minute video recordings	30 minute video recordings	30 minute video recordings
5 minute audio recordings	30 minute audio recordings	60 minute audio recordings	60 minute audio recordings
-	API access	API access	API access

PODCASTS

Physics 11 Update
Monday, September 30, 2024

Citadel High School (2023-24)
Science 10 | Physics 11 (IB/Non-IB) | Physics 12

Contact Email: mngo@hrce.ca | (avoid GNSPES)
PhD Student (Yr. 2) | MEd, BSc (Physics & Math), BEd.
Doctoral Examination Date Planned for Late Fall 2024.

Parent and Guardian Video Podcast

0:00:03 0:15:41

Sept 30 Phys 11

Physics 11 Review Podcast for Exams

Exam Review Summary Because of the Snow Day on Friday, January 20, 2023

Mr. Ngo Recorded on Friday, Jan. 20, 2023

0:00:02 0:16:57

Physics 11 Exam Review Podcas...

Podcasts for Supporting Learning

Review Learning | Pre- and Post- Activities | Engagement with Families

Review of Major Concepts

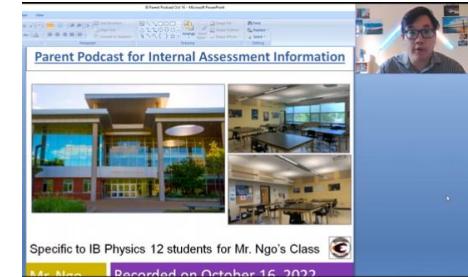
You can do a video recording of major examples done in class. That way, students who miss class or require review have another avenue to review.

Pre- or Post-Lab Activities

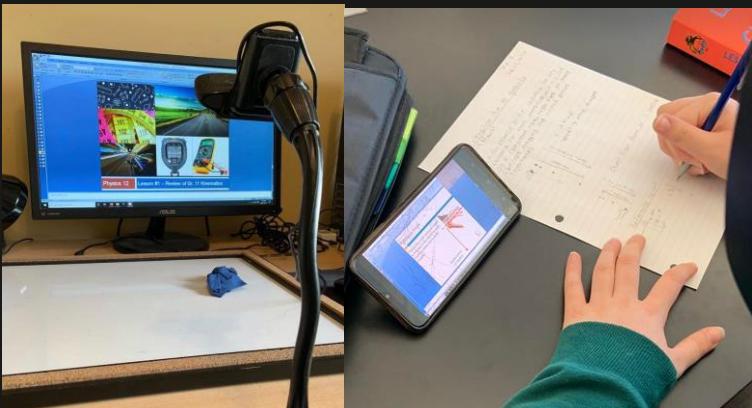
In my case, instead of repeating instructions on how to graph using Google Sheets, I recorded step-by-step instruction videos to help guide students. It helps develop self-learning and independence.

Sharing Video Messages to Parents and Guardians

I use it to convey important information to parents and guardians. That way, they are informed of certain classroom events and practices.



HOW YOU CAN ADAPT IT?



Equipment Used: Logitech C922 Pro Webcam. You can use others but for the purposes of this presentation, I'll be sharing my experiences using Logitech equipment. A 'streamer' webcam is highly advised.

Record an example with solutions using your device:

Then, upload it on Google Classroom. The students take time to attempt the problem while you walk around and engage with students.

Provide lab instructions and have students watch it:

Reduces the number of times you have to repeat instructions.

Have students make a multimedia presentation:

An alternative way to express student learning.

Short video messages to parents and guardians:

Shifts the responsibility for families to stay up-to-date.



TOOLS I USE FOR MY PODCASTS:



Recommendation #1: Ensure your Webcam Has “Camera Stand Threads”

What you are seeing is a “Smatrix Adjustable Jaws Flex Clamp Mount with 13.4” Gooseneck Extension.” It allows me to clamp the Webcam to my desk when recording video focused on the desk whiteboard or notes on paper

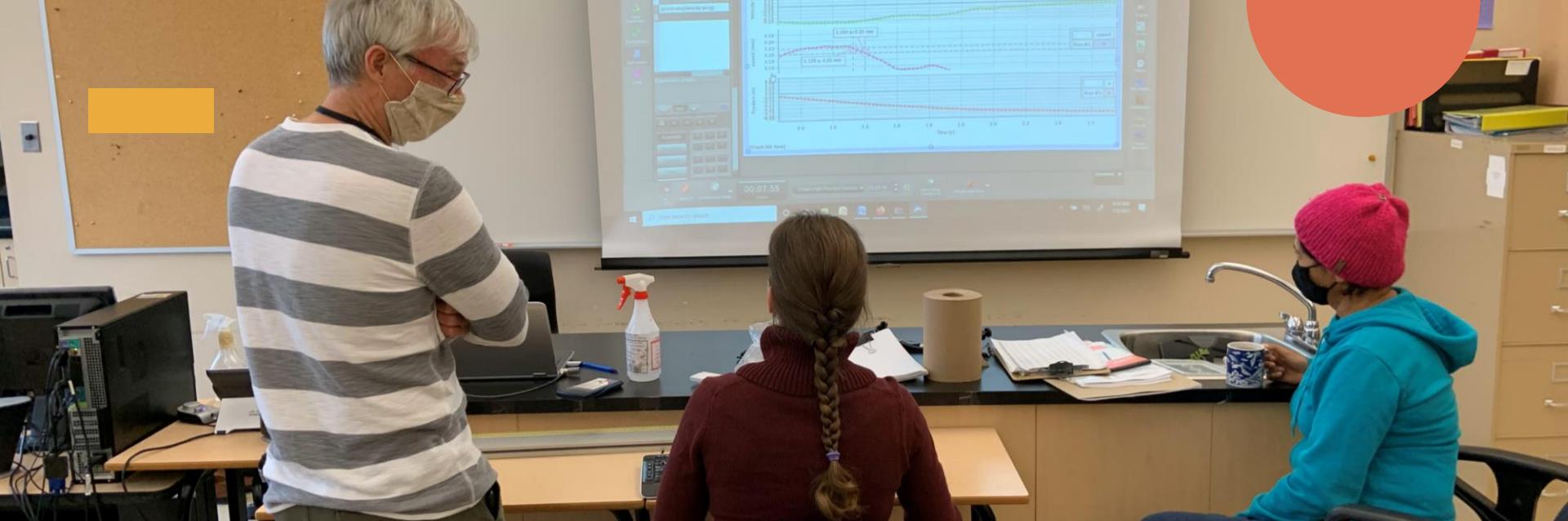
Recommendation #2: Buying a Dedicated Microphone with Diffuser

This will ensure higher sound quality in your videos. Last year I bought this and all my videos have a much more professional feel to it. Buy it on sale (usually during the holidays)

QUESTIONS SO FAR?

Feel free to reach out to me at any time

In addition to my email, my web site is www.mrngolearning.com



Final Thoughts and Reflections

I recognize that we only have one provincial PD day a year. But hopefully I offered something of value.

I also recognize that we, as a profession, do very powerful things and are often under appreciated. As a profession, we do incredible work daily and I wish to recognize that fact.

IT'S SO LOVELY TO MEET ALL OF YOU!

Thank you for listening.

Feel free to reach out at mngo@hrce.ca

Hope you have a great PD Day!

