



# Engaging 21<sup>st</sup> Century Learners using Digital & Physical Technologies

Association of Science Teachers (AST)  
October 24, 2025

Presented By: Matthew T. Ngo | [mngo@hrce.ca](mailto: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    Pickers:** 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



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

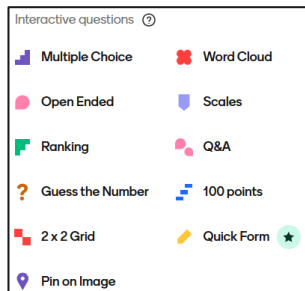
A 'free' Mentimeter account has 50 participants per month

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



miro

Team Meeting



12



Present



Share

## Project brief

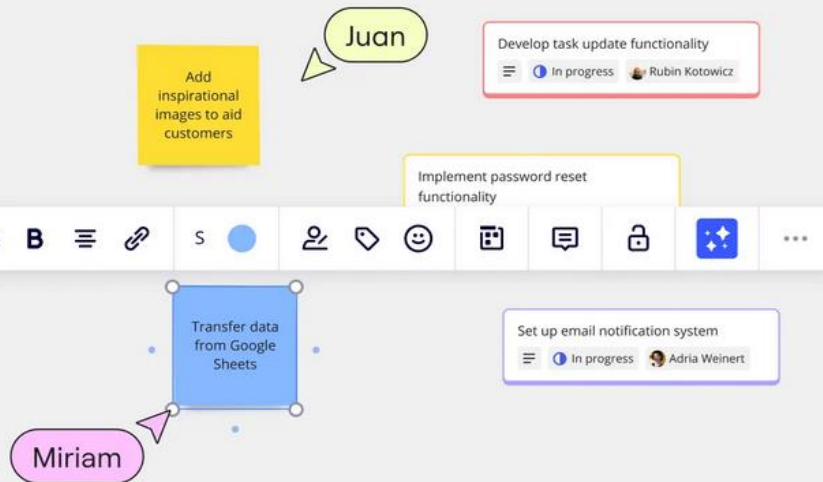
## Brainstorm ideas

## Action items

## Project plan

**Design Manager Sync Agenda**

Google Docs · Updated 10 minutes ago



Timeline	Q1	
Releases	Release 1	
Desired Experience	Describe user experience and emotions	Collaborate with the team
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 term To do

# 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](#)



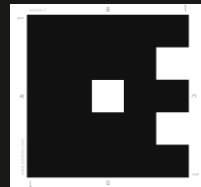
# PLICKERS



# 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



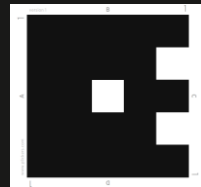
### Ideas to Support Learning

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 picklers

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)

### picklers 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

### picklers 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 Picklers Pro Trial

# PADLET (New for 2025)



## AI recipes

BETA



Discussion board

New



Class activity creator

New



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

Padlet

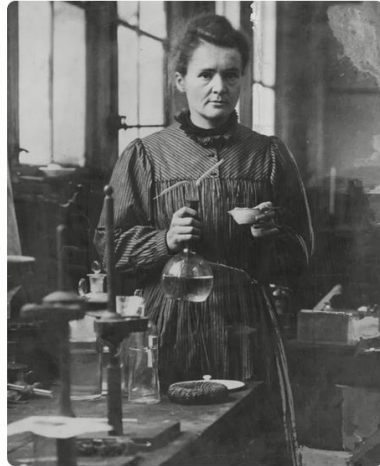
matthewngo1 • 7m

## Art showcase

Post your art!

matthewngo1  
6 minutes from now

### Marie Curie



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

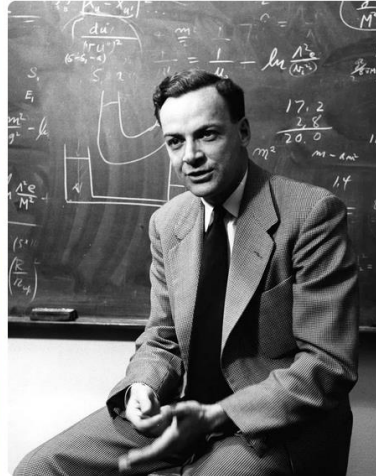
♡ 0

💬 0

+ Add comment

matthewngo1  
4 minutes from now

### Richard Feynman



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

♡ 0

💬 0

+ Add comment

matthewngo1  
2 minutes from now

### Chien-Shiung Wu



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

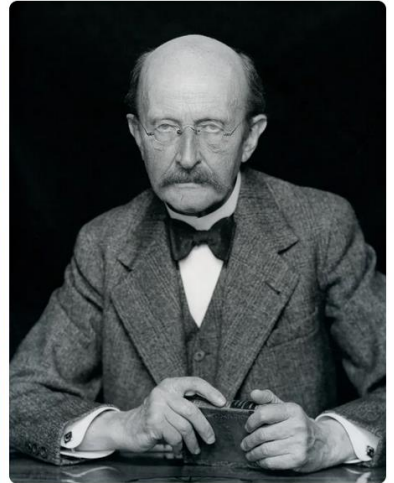
♡ 0

💬 0

+ Add comment

matthewngo1  
less than a minute ago

### Max Planck



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

♡ 0

💬 0

+ Add comment



# PADLET BRAINSTORMING



Padlet

matthewngo1 • 18m

**What do we know about atoms?**

Share what you know!



# PADLET RESEARCH NOTES



Padlet

matthewngo1 • 8m

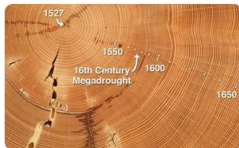
## Climate Change Research Resources and Notes



### Research Topic



#### Tree Rings



What are the relationships between tree rings and climate change?

#### Sea Level Rise



How much has sea levels risen

### Sources



#### United Nations Resource



un.org

?  
url=https%3A%2F%2Fwww.un.org%2Fen%2Fclimatechange%2Fwhat-is-climate-change

#### NASA Science



### Key Findings



#### Climate Change Impacts



noaa.gov

?  
url=https%3A%2F%2Fwww.noaa.gov%2Feducation%2Fresource-collections%2Fclimate%2Fclimate-change-impacts

### Quotes



#### James Cameron, Film Director



"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."

#### Al Gore, Former USA Vice-President



### Additional Notes

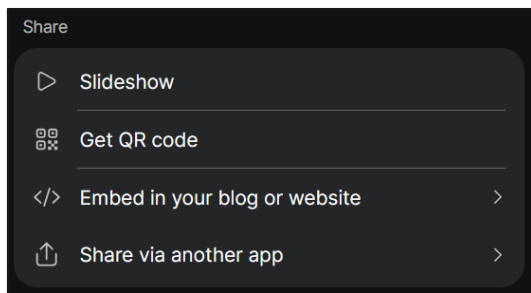
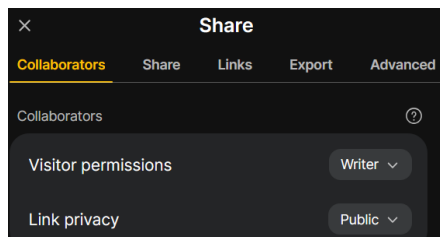


Add section



# What can we say about ?

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



## Free

Forever

Get started



For a single user.

3  
padlets

20MB  
file uploads

1  
user

2 minute  
video recordings

5 minute  
audio recordings

-

## Platinum

CA\$14.99 /month  
CA\$99.99 /year

Save 44%

Subscribe



For a single user.

Unlimited  
padlets

500MB  
file uploads

1  
user

15 minute  
video recordings

30 minute  
audio recordings

API  
access

## Classroom

CA\$199 /year  
2 teachers

Start trial

Subscribe



For classroom  
collaboration and  
sharing.

Unlimited  
padlets

1GB  
file uploads

200  
free student  
accounts

30 minute  
video recordings

60 minute  
audio recordings

API  
access

## Team

CA\$19.99 /month  
CA\$149.99 /year

Save 37%

per Maker

Start trial

Subscribe



For teams working  
together.

Unlimited  
padlets

1GB  
file uploads

-

30 minute  
video recordings

60 minute  
audio recordings

API  
access

# PODCASTS

Sept 30 Phys 11

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](mailto: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!

Physics 11 Exam Review Podcas...

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

# Podcasts for Supporting Learning

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

## Review of Major Concepts

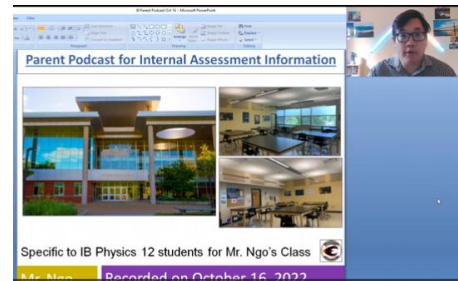
You can do a video recording of major examples done in class. That way, students who miss class or require review have another avenue to review.

## 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 “Smatree 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)



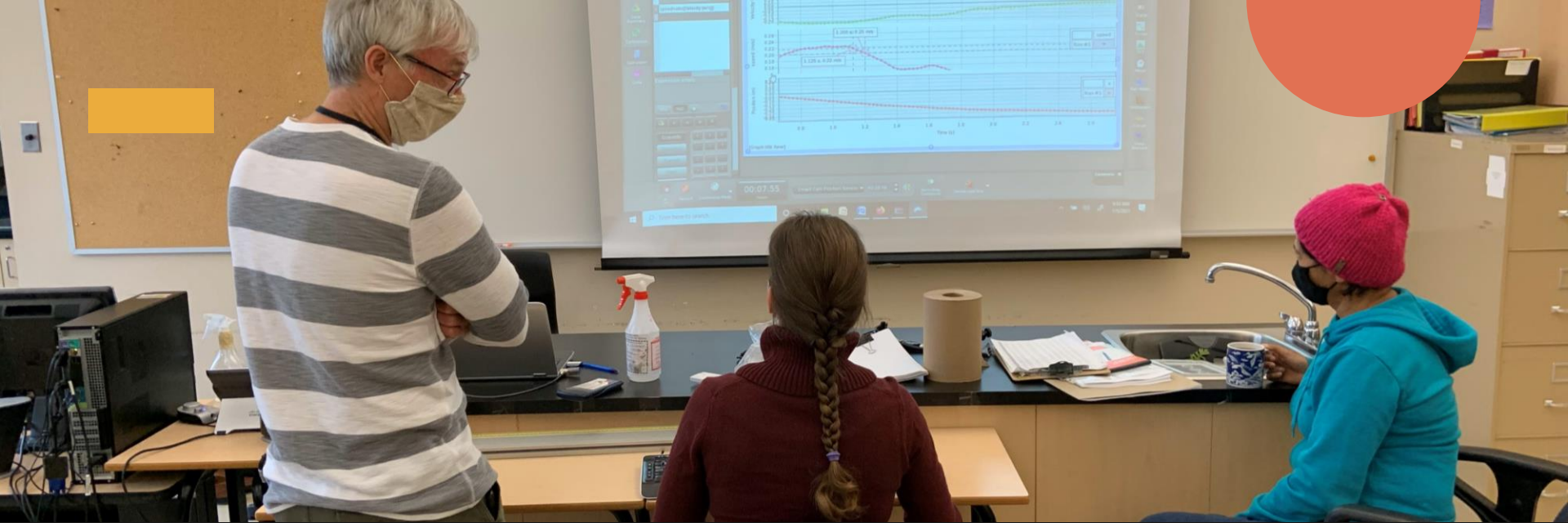
# QUESTIONS SO FAR?

Feel free to reach out to me at any time

In addition to my email, my web site is [www.mrngolearning.com](http://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](mailto:mngo@hrce.ca)

Hope you have a great PD Day!

