

Teaching AI with Tangible and Generative AI Tools

April 26th, 2024

School of Education, Indiana University Bloomington



INDIANA UNIVERSITY
BLOOMINGTON

Introductions

Workshop Overview

9:30-10:00 Welcome

10:00-10:15 Introduction of the Project

10:15-10:35 Icebreaker with AI activity (Keunjae)

10:35-1:00 PM AI Classification Machine & Working Lunch Time
(Dr. Kwon and Matt)

1:00-2:00 Demonstration of lesson plan using Generative AI
(Hyojung and Vanessa)



Program Overview

- Build teacher capacity for AI Education in rural schools
- Develop integrated curricula in collaboration with middle school STEM teachers on Artificial Intelligence
- Develop learning activities students enjoy
- Apply ideas students have learned, as well as focusing on the real-world applications and ethical implications of AI





Program Activities

- Professional Development
- Co-design with teachers
- Summer camp (AI for Me) in 2022
- Summer camp (AI for Good) in 2023



**2023 SUMMER CAMP
AI FOR GOOD!**

Learn, Create, & Consider AI
Free Participation!

Middle School Students
June 5 - 9 (Register open during Apr 3-28)
School of Education, Indiana University Bloomington

ABOUT THE CAMP

- Selection limited to 20 participants. We will contact you within two weeks to confirm application status.
- We provide the option of after-care enrichment.
- Time arrangements: 8:30 - 9am for drop-off 9am - 2pm for activities 2 - 4pm for optional enrichment.

SCHOLARSHIP

A small scholarship is available to participants outside of Bloomington, Indiana to offset transportation costs.

OUR CONTACT

- Email: aeedu@iu.edu
- Website: AIgoesRural.iu.edu

DoDSTEM INDIANA UNIVERSITY

ACTIVITIES

- Learning AI concepts and familiarizing essential terms for building AI-driven applications.
- Creating AI-based solutions to authentic problems with machine learning algorithms.
- Considering AI ethical implications by relating to AI applications in real life.

What Can AI Do to Improve Life and Influence the World?



Healthcare



Farming



Manufacturing



Dealing contract

Register 2023 AI summer camp to discover this and MORE!





Program Activities

- Implementing curriculum by 6 Teachers from 6 Schools(18 classes), serving 382 students (22-23)
- 9 Teachers from 8 Schools in School Year (23-24)





Website

<https://aigoesrural.iu.edu/>

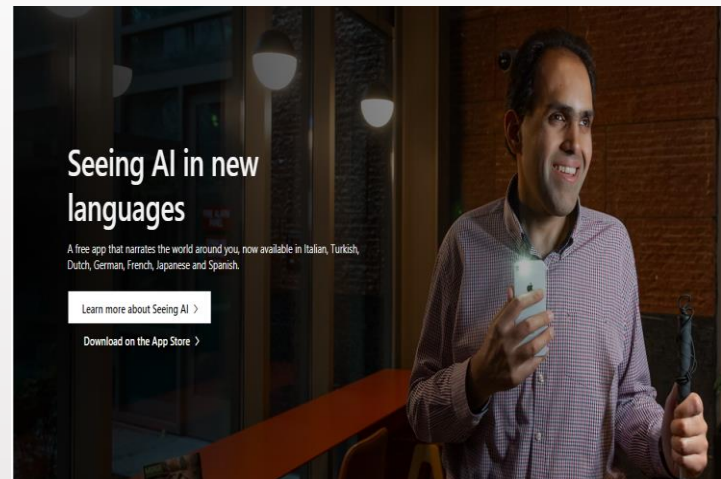
The screenshot shows the top portion of the website. At the top is a dark red navigation bar with the white Psi symbol (Ψ) and the text "INDIANA UNIVERSITY" on the left, and a white magnifying glass icon on the right. Below this is a white header area with the title "AI Goes Rural" in a bold, black, sans-serif font. Underneath the title is a horizontal menu with the following items: "ABOUT", "REGISTRATION", "DESIGN AND DEVELOPMENT", "IMPLEMENTATION & RESEARCH", "PUBLICATIONS", "TEAM", and "CONTACT". The main content area features a large, stylized graphic. It consists of a black rectangular sign with the text "AI GOES RURAL" in white, bold, uppercase letters. Above the sign are four yellow wheat stalks, a red barn with a yellow door, and two green trees. Below the sign is a series of blue circles connected by black lines, resembling a circuit board or a neural network.






Seeing AI

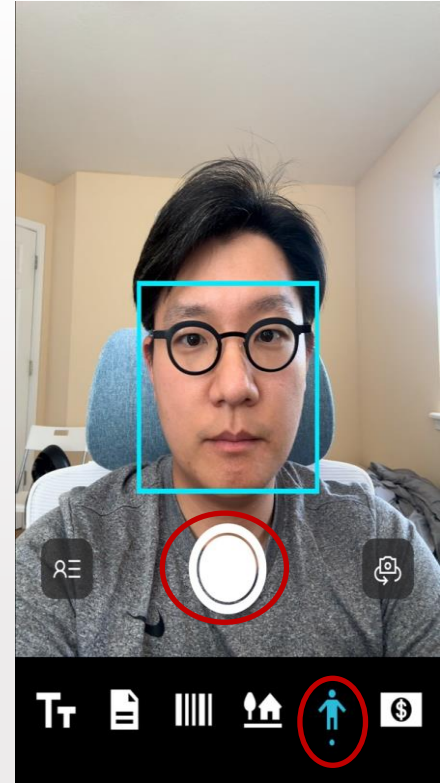
- An AI-based app designed with and for the blind and low vision community, utilizing the power of AI to open up the visual world
- Assists with daily tasks from reading, to describing photos, to identifying objects, and more





Seeing AI

- Let's use iPads to explore the Seeing AI app! 
 - Facial Recognition Exploration
 - Activate the 'Person' mode in the Seeing AI app on your iPads by choosing a man-shaped icon
 - Take photos of fellow teachers' face with the app and see what information the app provides about them





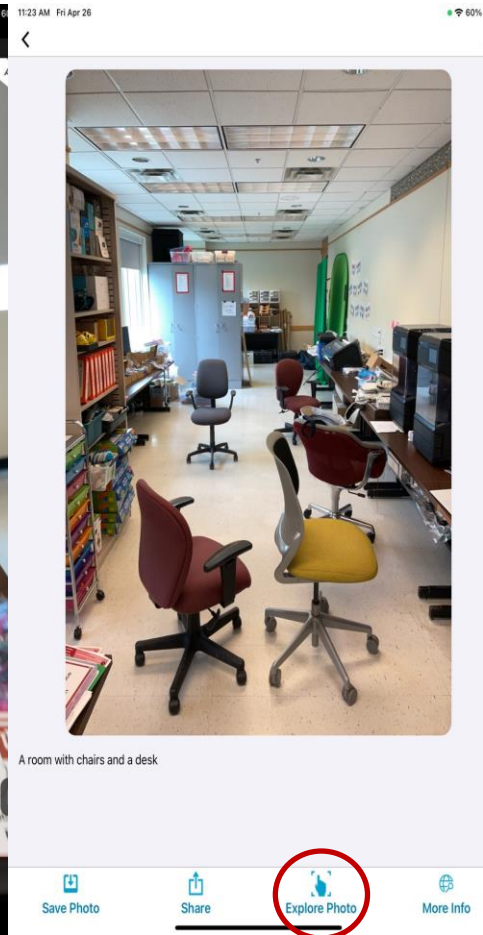
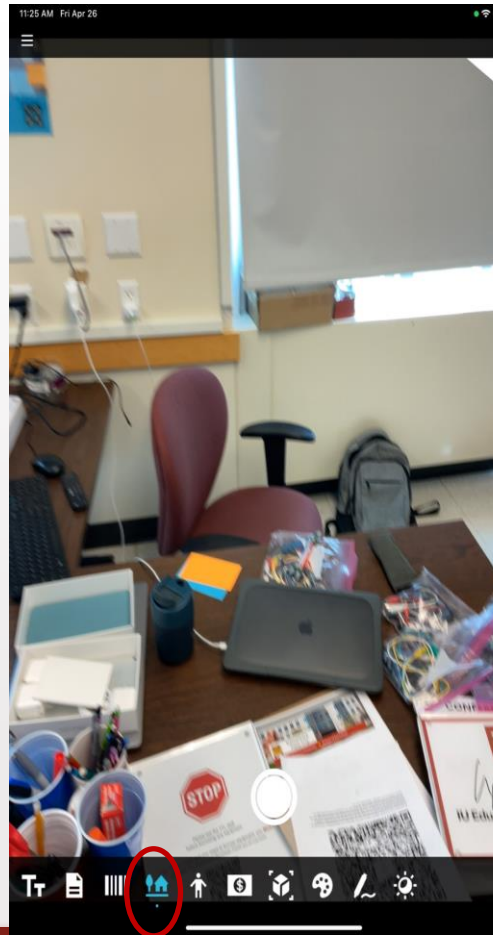
- Pw: aigr00





Seeing AI

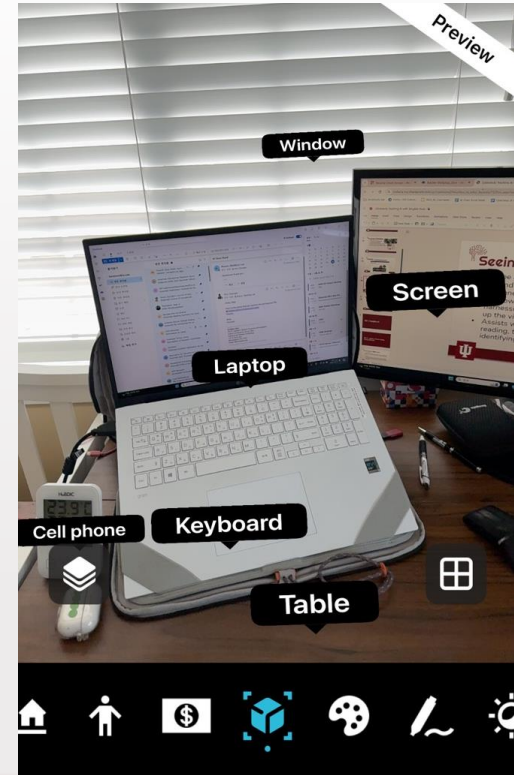
- Let's use iPads to explore the Seeing AI app!
 - Object Detection Exploration
 - Switch to 'Scene Preview' mode within the app by choosing house and tree-shaped icon
 - Scan the classroom environment by taking pictures and click "Explore Photos"
 - See what kind of information that the app provide





Seeing AI

- What types of information can the Seeing AI app provide?
 - Identify the objects or people and describe what they look like, their names, and other characteristics
- Which AI concepts does it use to do so?
 - Computer vision (CV): how AI systems learn to “see” or “detect” the world around them by using sensors.
 - Machine Learning (ML): a process when AI learns for itself through data and understand the patterns





Seeing AI

1. Computer Vision: Image Classification

- Naming everything in a picture detected by sensors (e.g., camera)
- A basic step for teaching computers to recognize objects like a "keyboard" or a "cell phone."

2. Advanced Computer Vision: Semantic Segmentation

- Understand pictures at a super detailed level—by identifying each tiny part of the image (every pixel) and what it represents, like differentiating between a "table" and a "keyboard."





Seeing AI

3. Machine Learning Models: Supervised Learning

- **Trained with Labeled Datasets**
 - Teaching the computer using lots of images (dataset) that are already tagged with the right answers
 - Crucial for the computer to learn correctly and make fewer mistakes when it sees new images
- **Object Detection**
 - Knowing what an object is + finding where it is in a picture.
 - Creates bounding boxes around objects within images





Seeing AI

- Why does it matter to "learn and understand about AI"?
 - AI All Around Us
 - Crucial to equip to understand and interact with AI-driven technologies effectively in their daily experiences where AI is commonplace
 - Broaden more opportunities not just enhance efficiency in current fields, but also unlock future career pathways
 - ➔ Exposure to learning about AI would be beneficial for both students as well as teachers



PD 1. Tangible AI: AI Classification Machine

AI Classification Machine



Download the [slides](#) and follow along!

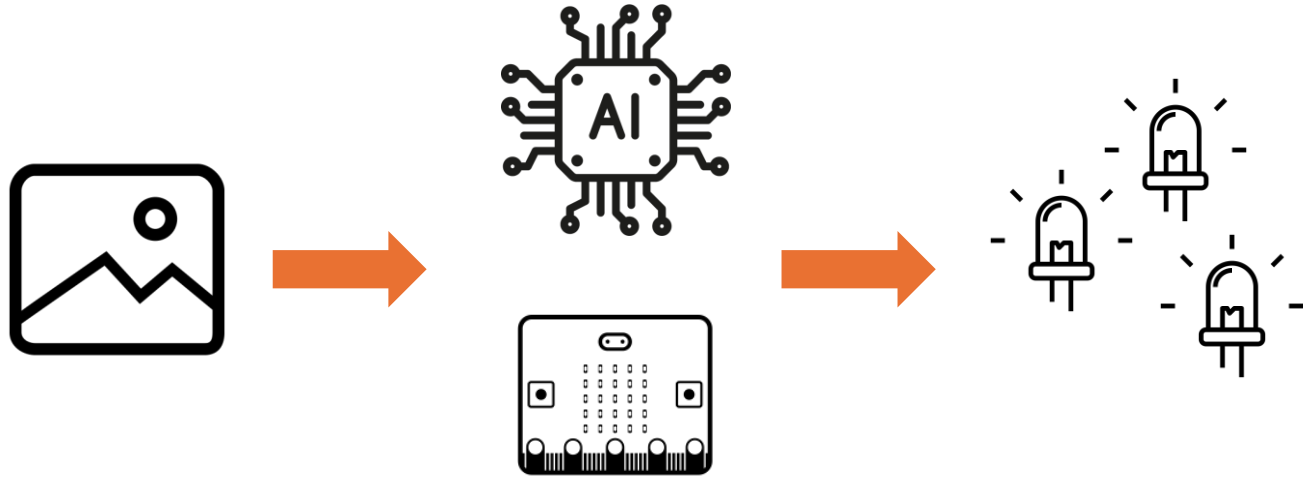
Classification

We often want to know if something belongs to one group or another. For example:

- Poisonous vs Non-poisonous
- Recyclable vs Trash
- Legal vs Illegal

Note: Somethings are easier to classify than others and not all classification problems are binary.

AI Classification Machine



Input
Image

Processing
AI + Micro:bit

Output
LED Lights

What we will do...

- Create an AI model
- Build
- Code
- Connect the AI model to the Micro:bit
- Test
- Share

Creating an AI model with Machine Learning

It starts with a...

GOAL

Understanding the goal will help to **identify the type and content of the data** needed, the analysis approach, and how to measure success.

Then comes the...

Data

Types of data:

Numerical/Categorical

Text

Images

Audio/Video

Almost anything that can be digitized

If the goal is...

To build a pet door that will only allow
your pets through.



Images of our pets.

What type of data do you need?

What should that data contain?

If the goal is...

To build a system that suggest improvements to your posture when you work out...



What type of data do you need?
What should that data contain?



Images of people working out with correct posture.

data data data...

Data!

Data is important!

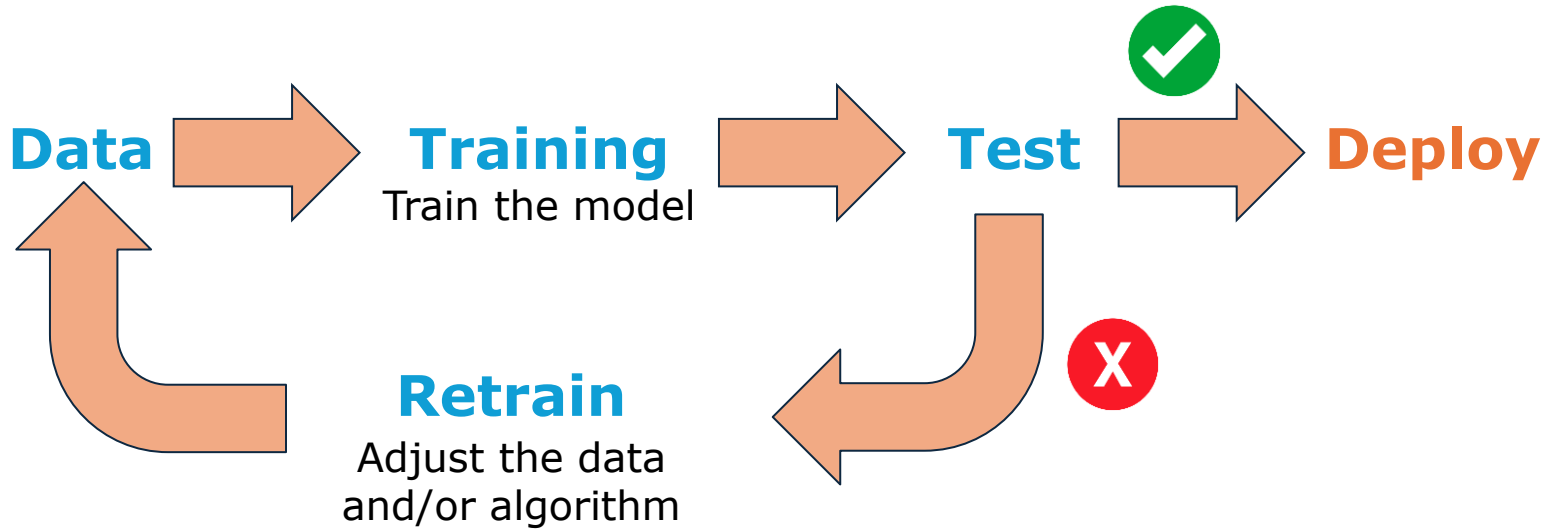
Machine learning needs a lot of **high quality, relevant** data that is **free of bias**.

Next comes the...

Training

During training an algorithm is used to learn the **patterns** and **relationships** within the data. The results of the training is a **model**.

The Machine Learning Process



Let's Create an AI Model!

We will create an AI model using Google Teachable Machines to classify two (or more) things. For example,

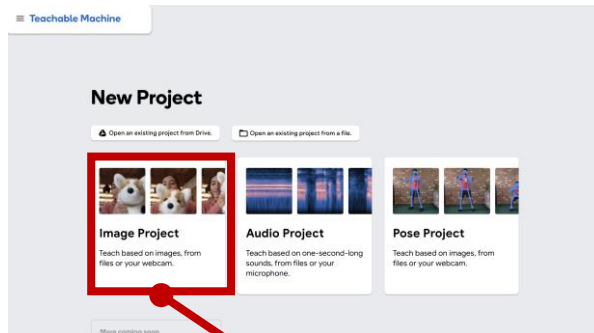
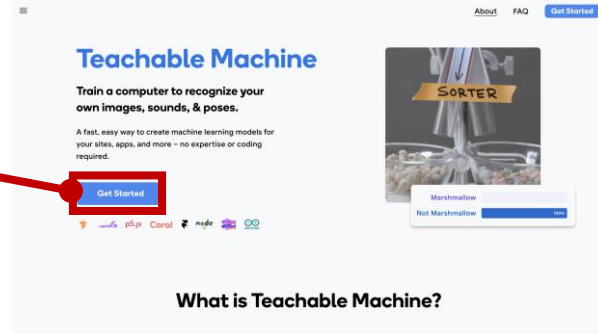
- Checked Shirt vs Plain Shirt
- Red Objects vs Green Objects
- Wearing Glasses vs Not Wearing Glasses

You can choose! In groups of 2, decide what you will classify.

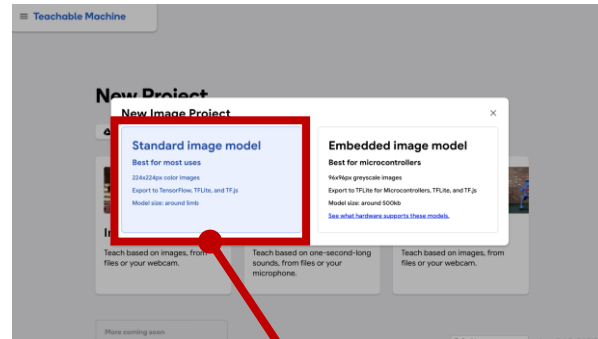
Note: it must be something that you can capture with your laptop's web camera.

Go to [Google Teachable Machine](#).

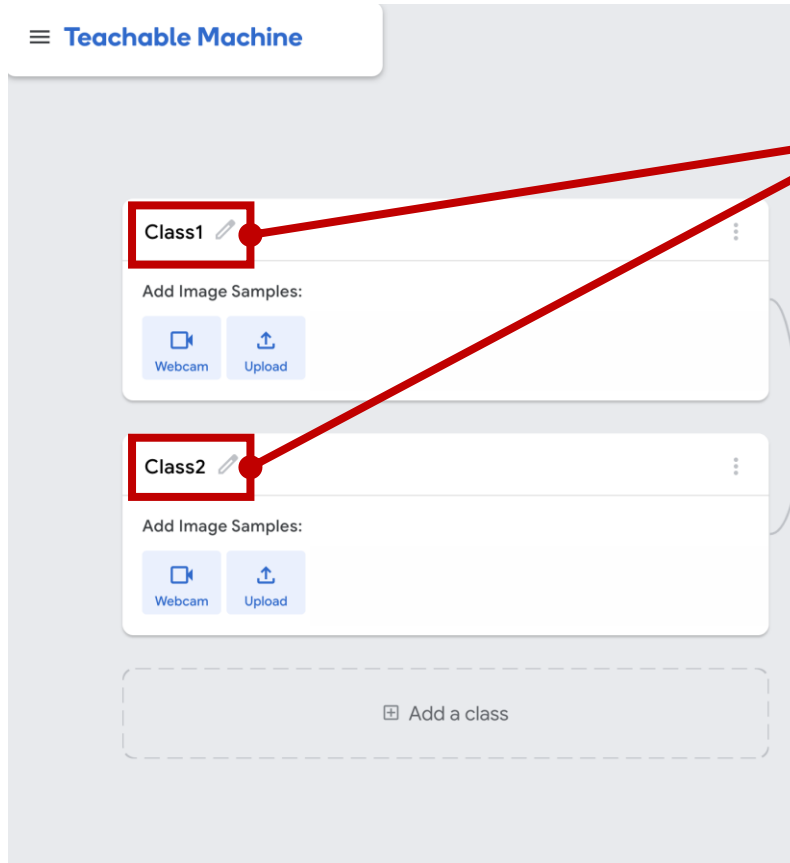
Click the Get Started button.



Click on Image Project.



Click on Standard image model.



Rename the classes. Remove the space between the word “class” and the number (e.g., 1 and 2)

Capturing images

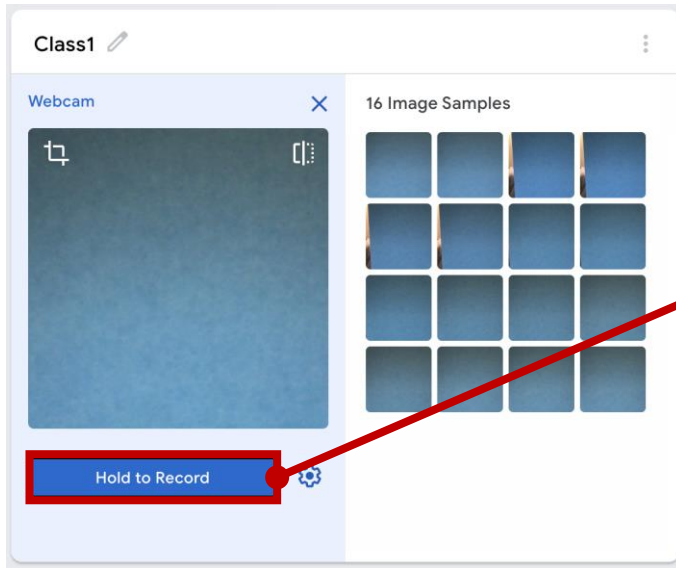
Consider...

- What is your target and what else is in the images that you are capturing. Are there a lot of other object's creating "noise" that might confuse the algorithm?
- How many images will you need to capture?



To capture images, click the webcam button.

Note: You may get an alert requesting access to your webcam. Allow access.



Hold your target item up in front of the camera and click the Hold to Record button.

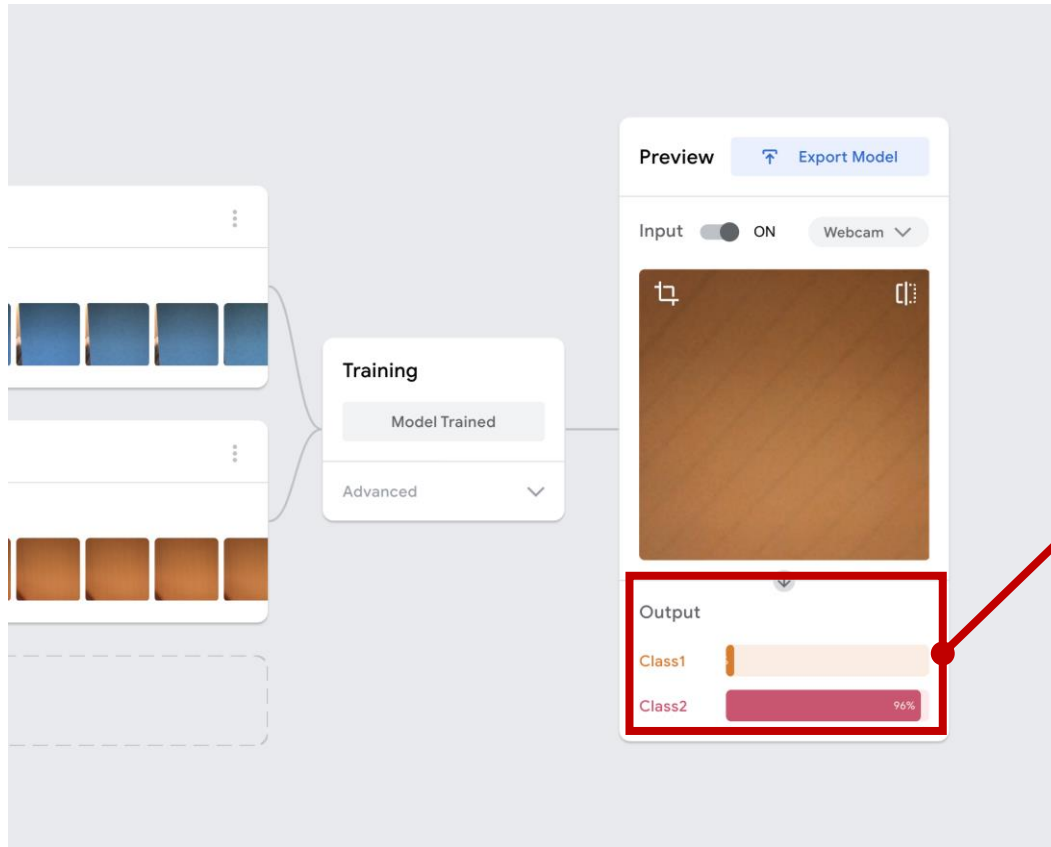
The screenshot displays the Teachable Machine interface. At the top left, there is a hamburger menu icon followed by the text "Teachable Machine". Below this, there are two class panels. The first panel, titled "Class1", shows "16 Image Samples" and includes "Webcam" and "Upload" buttons, along with a row of 16 small image thumbnails. The second panel, titled "Class2", is active and shows a "Webcam" view on the left with a "Hold to Record" button and a "16 Image Samples" view on the right with a 4x4 grid of 16 image thumbnails. To the right of the Class2 panel, a "Training" panel is open, featuring a "Train Model" button highlighted with a red box and a red arrow pointing to it. Below the "Train Model" button is a dropdown menu currently set to "Advanced".

Once you have captured images (data) for both classes...

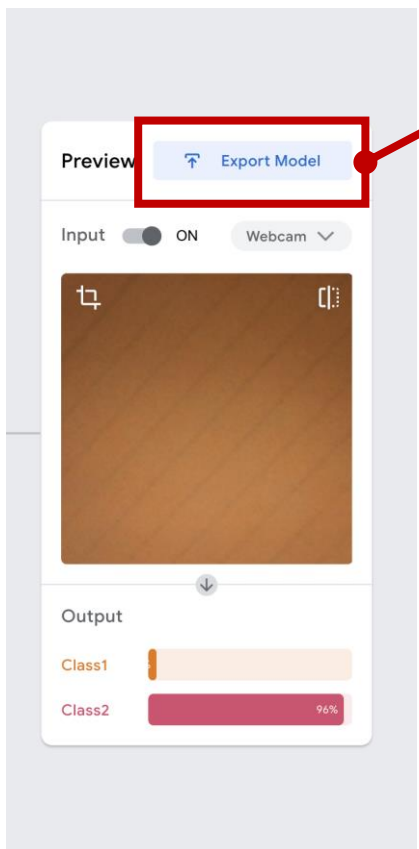
Click the Train Model button.

Note: Do not switch tabs while it is training.

CREATE AI

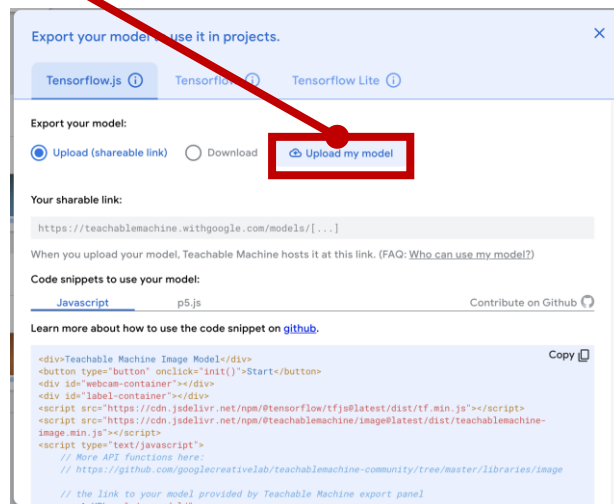


After the model is trained, check to make sure it can predict the class correctly (approx. > 95%)



If the predictions are good, click the Export Model button.

Then click the Upload my model button.



Export your model to use it in projects. ✕

Tensorflow.js ⓘ TensorFlow ⓘ TensorFlow Lite ⓘ

Export your model:

Upload (shareable link) Download

Your sharable link:

<https://teachablemachine.withgoogle.com/models/1D...iR6a5/> Copy

When you upload your model, Teachable Machine hosts it at this link. (FAQ: [Who can use my model?](#))

✓ Your cloud model is up to date.

Code snippets to use your model:

Javascript p5.js [Contribute on Github](#)

Learn more about how to use the code snippet on [github](#).

```
<div>Teachable Machine Image Model</div>
<button type="button" onclick="init()">Start</button>
<div id="webcam-container"></div>
<div id="label-container"></div>
<script src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@latest/dist/tf.min.js"></script>
<script src="https://cdn.jsdelivr.net/npm/@teachablemachine/image@latest/dist/teachablemachine-image.min.js"></script>
<script type="text/javascript">
  // More API functions here
```

After the model is uploaded there will be a green checkmark.

Pause here.

Leave this browser tab open, we will use the shared URL for the model later.

Connect Neopixel to Micro:bit

Connect the Neopixel to the Micro:bit with alligator clips. Use the following mapping:

<u>Micro:bit</u>		<u>Neopixel</u>
0	↔	White Wire
3V	↔	Red Wire
GND	↔	Blue Wire

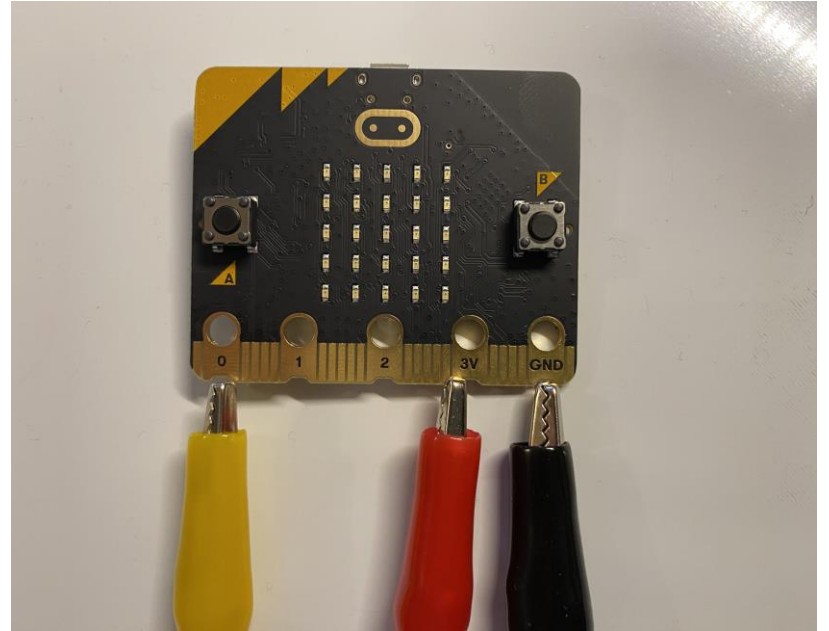
Note: Many other microelectronics can be used in place of the Neopixel (e.g., servos, motors, oLED displays, etc.)

Connect Neopixel to Micro:bit

Connect alligator clips to the Micro:bit at:

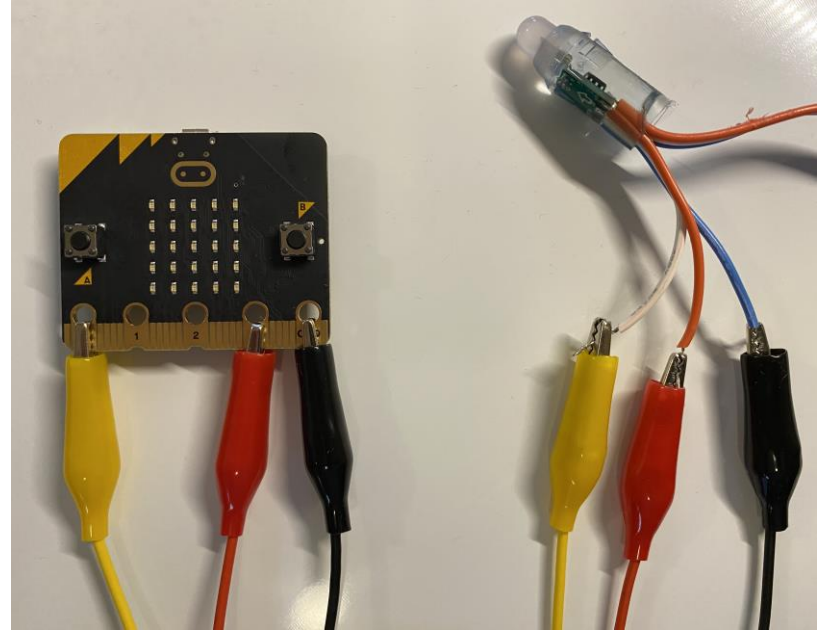
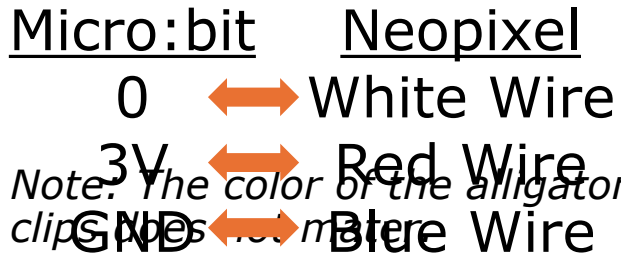
- 0
- 3V
- GND

Note: The color of the alligator clips does not matter.



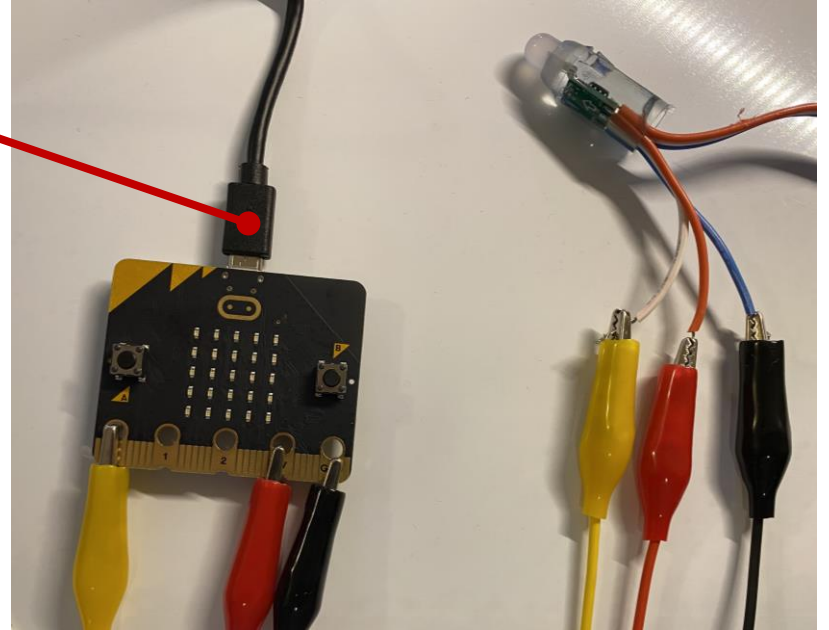
Connect Neopixel to Micro:bit

Connect the other end of the alligator clips to the Neopixel.



Connect Micro:bit to Computer

Connect the Micro:bit to the computer with a USB cable.



C O D E

```
on start
  set strip to NeoPixel at pin P0 with 5 leds as RGB (RGB format)
  strip clear
  strip show

  serial
  redirect to
  TX USB_TX
  RX USB_RX
  at baud rate 9600

forever
  set Predicted to serial read string
  if Predicted = "Class1" then
    strip show color red
  else if Predicted = "Class2" then
    strip show color green

on button A pressed
  strip clear
  strip show

on button B pressed
  strip show color violet
```

The image displays a Scratch code editor with several blocks. The 'on start' block contains a 'set strip to NeoPixel at pin P0 with 5 leds as RGB (RGB format)' block, followed by 'strip clear' and 'strip show' blocks. Below these is a 'serial' block with 'redirect to' set to 'TX USB_TX' and 'RX USB_RX', and 'at baud rate 9600'. The 'forever' loop contains a 'set Predicted to serial read string' block, followed by an 'if' block with 'Predicted = "Class1"' and a 'strip show color red' block, and an 'else if' block with 'Predicted = "Class2"' and a 'strip show color green' block. At the bottom, there are two 'on button pressed' blocks: 'on button A pressed' with 'strip clear' and 'strip show' blocks, and 'on button B pressed' with a 'strip show color violet' block.

Open the code:

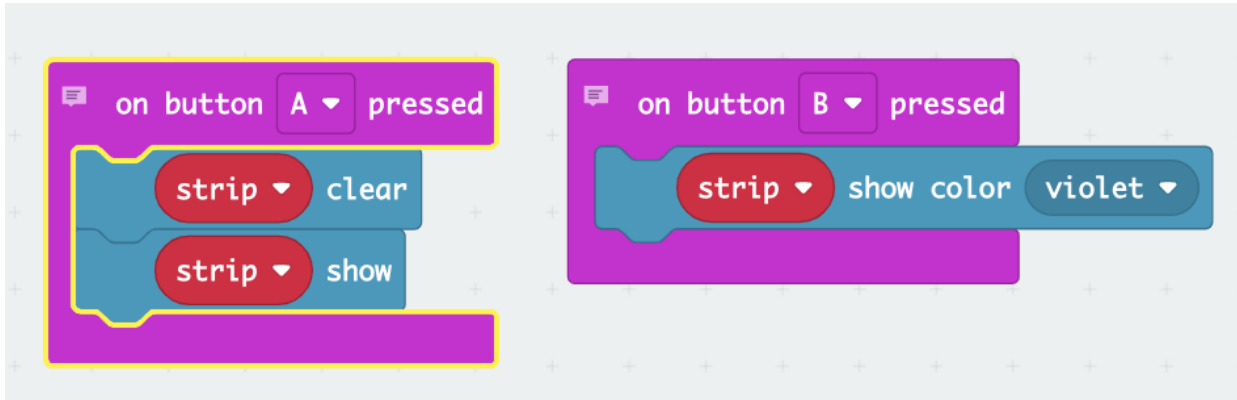
<https://bit.ly/micro-classifier>

C O D E

```
on start
  set strip to NeoPixel at pin P0 with 5 leds as RGB (RGB format)
  strip clear
  strip show
  serial
  redirect to
  TX USB_TX
  RX USB_RX
  at baud rate 9600
```

The image shows a Scratch code editor with a blue 'on start' block. Inside this block, there are three sub-blocks: a 'set strip to NeoPixel at pin P0 with 5 leds as RGB (RGB format)' block, a 'strip clear' block, and a 'strip show' block. Below these is a dark blue 'serial' block containing 'redirect to', 'TX USB_TX', 'RX USB_RX', and 'at baud rate 9600'.

This block of code initializes the Neopixel and a serial connection that will receive data via the USB connection.



These blocks of code can be used to verify the Neopixel is connected correctly. Press B and the Neopixel will light up violet. Press A and the Neopixel will shut off.

Note: These blocks are not needed but are helpful for debugging.

C O D E

```
forever
  set Predicted to serial read string
  if Predicted = "Class1" then
    strip show color red
  else if Predicted = "Class2" then
    strip show color green
```

Gets the prediction from the AI model.

The Neopixel lights up Red if the predication is Class1

The Neopixel lights up Green if the predication is Class2

The screenshot displays the Microsoft MakeCode IDE for a micro:bit. The top bar shows the Microsoft logo and 'micro:bit' branding, along with a 'Blocks' tab and a 'JavaScript' dropdown menu. The left sidebar contains a hardware view of the micro:bit board with a USB cable connected. The central block palette lists various categories: Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, Neopixel, and Extensions. The right pane shows a script with the following blocks: 'on start' block containing 'set strip to NeoPixel at pin P0 with 5 leds as RGB (RGB format)', 'strip clear', and 'strip show'; a 'serial' block with 'redirect to TX USB_TX', 'RX USB_RX', and 'at baud rate 9600'; 'on button A pressed' block with 'strip clear' and 'strip show'; and 'on button B pressed' block with 'strip show color violet'. A 'forever' loop contains 'set Predicted to serial read string', an 'if Predicted == Class1 then strip show color red' block, and an 'else if Predicted == Class2 then strip show color green' block. At the bottom, a red box highlights the 'Download' button.

Click the Download button

Go to A Micro:bit of AI website:

<https://ai-training.glitch.me/>

A MICRO:BIT OF AI

This site will help bridge the gap between the Teachable Machine AI and a micro:bit giving you clever new ways to shape your projects. Train an AI to make a prediction using a library of data you give it, and then code your micro bit to use those predictions to activate motors, lights, and more! Simply click on "Pair Microbit" and follow the steps to get started today!

Pair Microbit

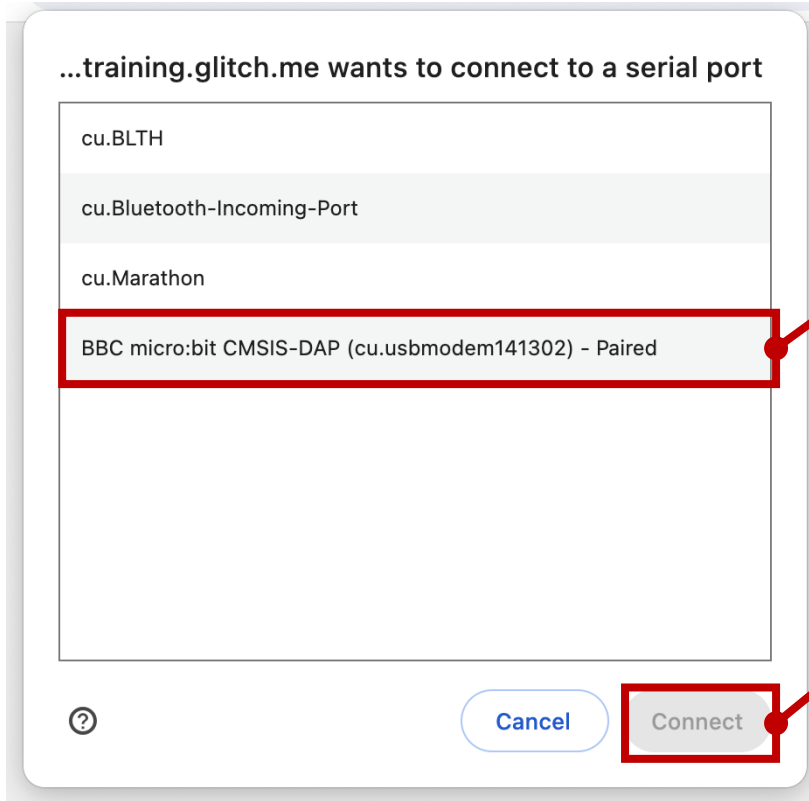
Select the Microbit in the popup screen. Psst, it might be called mbed Serial Port.

If you're arriving here first, visit Google's Teachable Machine website to create your own Machine

Never coded a micro:bit before?

'AI Robots' is also a book!

Click the Pair Microbit button.



Select the Micro:bit.

Click the
Connect
button.

Export your model to use it in projects. ✕

Tensorflow.js ⓘ Tensorflow ⓘ Tensorflow Lite ⓘ

Export your model:

Upload (shareable link) Download

Your sharable link:

<https://teachablemachine.withgoogle.com/models/iRmXiRGa5/> Copy

When you upload your model, Teachable Machine hosts it at this link. (FAQ: [Who can use my model?](#))

✓ Your cloud model is up to date.

Code snippets to use your model:

Javascript p5.js [Contribute on Github](#)

Learn more about how to use the code snippet on [github](#).

```
<div>Teachable Machine Image Model</div>
<button type="button" onclick="init()">Start</button>
<div id="webcam-container"></div>
<div id="label-container"></div>
<script src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@latest/dist/tf.min.js"></script>
<script src="https://cdn.jsdelivr.net/npm/@teachablemachine/image@latest/dist/teachablemachine-
image.min.js"></script>
<script type="text/javascript">
  // More API functions here
```

Copy

Go back to the Google Teachable Machines browser tab.

Copy the shareable link to your model.

Paste the shareable link for your AI model from Google Teachable Machines here.

The screenshot shows the Google Teachable Machine interface. On the left, an orange sidebar contains the text "Not sure what to do?" and "Visit the Teachable Machine to train an AI project:" with a "Google Teachable Machine" button. Below this, it says "New to Google Teachable Machine? Follow these guidelines to learn more: [Guide to Teachable Machine](#)". A white box lists "When you have finished training your model, follow these 4 simple steps:" with the first step being "1. Click 'Export Model'". The main area is light gray and contains the instruction "Paste your Google Teachable machine model link here:" followed by a text input field containing "https://teachablemachine.withgoogle.com/models/[...]". Below the input field are two dropdown menus: "Choose Camera:" set to "FaceTime HD Camera (Built-i)" and "Choose Audio:" set to "Audio 1". A "Ready!" button is located at the bottom right. Red lines with circular endpoints point to the input field and the "Ready!" button.

Click the Ready button.

The screenshot displays a web interface titled "IMAGE MODEL". At the top, there is a notification bar that says "Downloaded new code? Reconnect now" and three icons: an information icon, a gear icon, and a home icon. The main content area is divided into two sections. The left section, enclosed in a red box, contains a text block: "This is a Recognition Project - where the AI will be able to identify the classes you made based on the input you give it!". Below this is a "RESULTS!" section with two entries: "Class1" with a 99% prediction (indicated by a green bar and a checkmark) and "Class2" with a 0% prediction (indicated by a yellow bar). Below the results is a "HELP!" button. The right section, also enclosed in a red box, is a large blue square representing the image input. Below it is an "OPEN MESSAGE LOG" button. A red arrow points from the text "The image input." to the blue square. Another red arrow points from the text "The models prediction based on the image input." to the "RESULTS!" section.

The image input.

The models prediction based on the image input.

Test your Classification Machine

- Test with new data (data that you did not use to train the AI model).
- Does it classify the new data correctly?
- If not, what could you do to fix it?

**Who wants to share their
AI Classification Machine?**

Discussion

1. What were your challenges during this activity?
2. How could this activity be adapted to integrate with your curriculum?
3. What should be considered before integrating this activity into the curriculum?

PD 2. Lesson Plans Using Generative AI



Using Gen AI in Math Lesson

- **Learning Objective**

In this activity, students will...

- Solve complex algebra questions by applying a step-by-step problem-solving process
- Use Generative AI to generate an answer and the optimal solution for the problem
- Engage in self-reflection by comparing one's solution to the one generated by AI
- Refine one's answer and solution





Using Gen AI in Math Lesson

- **Generative AI sources**
 - Chat GPT: <https://chat.openai.com/>
 - Perplexity: <https://www.perplexity.ai/>
 - Anthropic Claude: <https://claude.ai/login?returnTo=%2F>
- **Assumptions**
 - Generative AI provides a model performance of the math solution
 - Students learn through the process of comparing their work to the model performance, finding discrepancies, and modeling the optimal performance





Using Gen AI in Math Lesson

Lesson Plan

45 minutes	<p>Step1: The teacher delivers a lesson on algebra according to the curriculum (equations and inequalities, linear and exponential relationships).</p> <p>Strategies:</p> <ul style="list-style-type: none">• Go through worked questions with the class• Demonstrate how to use a step-by-step problem-solving process to do a math equation• Engage with students by asking them what they have learned at the end of the lesson.
3 minutes	<p>Step 2:</p> <ul style="list-style-type: none">• The teacher puts students into groups of three or four and provides each team with a complex algebra question to solve. Each group of students will be working on different questions.• Teacher encourages students to apply what they have learned in the previous lesson• Teacher goes around the room and facilitates students to use the step-by-step problem-solving process.





Using Gen AI in Math Lesson

Lesson Plan

<p>20 minutes</p>	<p>Step 3:</p> <ul style="list-style-type: none"> • Students are given time to solve the problem using the ratios and mathematical principles learned during the previous steps. • Students document the problem-solving process in a step-by-step sequence <p>Strategies:</p> <ul style="list-style-type: none"> • Assign a specific student or two students to play the role of a documenter. • Strategically group students according to their level of prior knowledge. For example, form a group so that there is at least one student who is struggling, and one student who is good at math.
<p>5 minutes</p>	<p>Step 4:</p> <ul style="list-style-type: none"> • The teacher presents the students with a prompt for generative AI. • Students use Generative AI (Chat GPT) to ask for a step-by-step solution for the same algebra question using the prompt.





Using Gen AI in Math Lesson

Lesson Plan

20 minutes	<p>Step 5:</p> <ul style="list-style-type: none"> • Students compare their solution to what Chat GPT has generated. • Students will discover different ways to tackle one question. • Students will discuss what they think the most optimal solution is and why. • Students will identify mistakes and gaps in their own solution by comparing it to the one provided by Generative AI.
20 minutes	<p>Step 6:</p> <ul style="list-style-type: none"> • Each group shares their experience with the class. • While sharing, the teacher encourages students to present if and how the solutions and answer solved by the students differed from the one from Gen AI. <p>Strategies: Facilitate the sharing session with the following questions</p> <ul style="list-style-type: none"> • What strategies did you use when solving the problem? • What is one thing you learned about Generative AI?





Let's Practice

- Sample Problem
 - Last week 24,000 fans attended a football match. This week three times as many bought tickets, but one-sixth of them canceled their tickets. How many are attending this week?
 - The average monthly rainfall for 6 months was 28.5 mm. If it had rained 1mm more each month what would the average have been?
- Sample Prompt
 - Prompt 1: Solve the equation
 - Prompt 2: Provide a step-by-step solution to the equation.





Using Gen AI in Art Lesson

- Learning Objective

In this activity, students will...

- Improve their critical thinking and reasoning skills
 - Develop one's own understanding on the idea of art and beauty
-
- Image Generating AI sources
 - Stable Diffusion: <https://platform.stability.ai>
 - Deep AI: <https://deepai.org>
 - PIXLR: <https://pixlr.com>





Using Gen AI in Art Lesson

Lesson Plan

Time	Description
15 minutes	Step 1: <ul style="list-style-type: none"> The teacher instructs the student to create a drawing of a certain subject. (for example, a cat). Students work on their drawings individually.
3 minutes	Step 2: <ul style="list-style-type: none"> The teacher put students into groups of three or four.
10 minutes	Step 3: <ul style="list-style-type: none"> In a group, students use Generative AI (Deep AI or Stable Diffusion) to create an image of a given subject. Strategies: <ul style="list-style-type: none"> Depending on the platform, students can ask for specific positive or negative prompts, lighting, composition, color, style that guides the image. Teacher facilitates students to use the different prompts and functions of the image generator.





Using Gen AI in Art Lesson

Lesson Plan

20 minutes	<p>Step 4:</p> <ul style="list-style-type: none">• With the AI generated image, students as a group compare their own drawing with the image created by Gen AI.• Then the group engage in critical thinking by asking the following questions.• Describing: What do I see?• Analyzing: How is the image organized?• Interpreting: What is happening? What is the image trying to say?• Evaluating: What do I think of the work?
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Using Gen AI in Art Lesson

Lesson Plan

20 minutes	<p>Step 5:</p> <ul style="list-style-type: none">• Students in group ask the following question for critical thinking and share their ideas• What is art? (What defines art?)• Is it (image generated by AI) art?• How does images generated by AI compare to art created by humans?
20 minutes	<p>Step 6:</p> <ul style="list-style-type: none">• Students get together as a class and share their ideas on what defines art.





Let's Practice

Sample Prompt for PIXLR

- PIXLR: <https://pixlr.com>
- Prompt: Give me an image of a cat

AI Image Generator

Generate an image using Generative AI by describing what you want to see, all images are published publicly by default.

Description prompt
Give me an image of a cat


Square Aspect Digital Art Warm Tone Dimly Lit Wide Angle

Negative prompt Make private 8 remaining Clear **Generate (4c)**

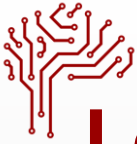




Let's Practice

 **Generate:** Give me an image of a cat (warm tone) (dimly lit) (wide angle)





Let's Practice

Debriefing Questions for Students

- What do I see in this art?
- What is the subject of this art?
- How is the composition of objects organized?
- What is the most used color in this art?
- What is the theme of this art?
- What do you feel by looking at this art?
- What do you think the message is that the art is trying to convey?
- What is art?
- What defines art? (What makes art?)
- Is it (image generated by AI) art?
- How do images generated by AI compare to art created by humans?



General Science Gen AI Activity



General Science Gen AI Activity

Objectives

In this activity, students will:

- Investigate and analyze the scientific plausibility of science fiction stories generated using Gen AI.
- Optional: Investigate and analyze the scientific plausibility of existing science fiction stories using Gen AI (or complete as an additional step for comparing and contrasting results and findings against the Gen AI generated stories).
- Gain understanding of prompt engineering using the RISEN Framework.





General Science Gen AI Activity

2 mins

Introduce the Gen AI tool to learners, and direct them to the site. Magic School AI: <https://www.magicschool.ai/> is recommended.

5-10 mins

Students are to create an environmentally-related science fiction story starring the students as characters, remaining mindful of their prompts and their relationships to the outcomes of the Gen AI responses. Instruct them to take notes on key changes in their generated stories according to prompts constructed. (See the prompt engineering steps using the RISEN framework and example).





RISEN FRAMEWORK

- **Role:** Establish the role of the AI. Set the stage for the type of response expected.
- **Instructions:** Make it clear what you want the AI to do, giving clear directions.
- **Steps:** Break the task down to steps that are manageable while ensuring a logical progression.
- **End Goal:** Define the objective of the prompt.
- **Narrowing:** Set applicable constraints or limitations to the AI response to tailor to your specific needs.





RISEN Framework Example

- **Role:** Marketing expert
- **Instructions:** Create a marketing strategy for an eco-friendly water bottle.
- **Steps:** Start with the market analysis, next outline the target demographics, then propose marketing channels and tactics.
- **End Goal:** Increase brand awareness and sales within the first quarter post-launch.
- **Narrowing:** Focus on the digital marketing strategies with a budget of \$20,000.





General Science Gen AI Activity

5mins

Have students share some of their stories with each other and/or the class.

8-10 mins

Have students analyze the scientific plausibility of the events and technology described in their stories (using approved search engines according to school or district), and the selected Gen AI tool. Students may require guidance at this stage according to their information-seeking skill levels.





General Science Gen AI Activity

8-10 mins	Discuss with students their research methods, and findings. Discuss their findings using the Gen AI tool and their findings using other online sources. Compare and contrast findings and discuss student Gen AI prompts used.
5-8 mins	Repeat the process again as an iterative cycle using the RISEN prompt engineering steps (found below in the next section). Discuss any student-observed changes in results and findings related to scientific plausibility and/or prompt construction.



Resources

[Magic School AI: https://www.magicschool.ai/](https://www.magicschool.ai/)

General Science Gen AI [activity sheet](#)

Canva Magic

Media: <https://www.canva.com/design/DAGDoZpepZs/7RdbmfcoQ9IFtIRy6dNMdQ/edit>