NEXT LEVEL TECH
ACTIVITY BUNDLE

For Grades 6-8

Use the three activities below to introduce youth grades 6–8 to the world of artificial intelligence (AI) through a combination of unplugged and technology-based activities.



STEM NEXT
OPPORTUNITY FUND

STEM Next

Next Level Tech Activity Bundle

(Grades 6–8)

Welcome to the Next Level Tech Activity Bundle!

Use the three activities below to introduce youth grades 6–8 to the world of artificial intelligence (AI) through a combination of unplugged and technology-based activities. Youth will explore how AI works, discover how AI recognizes patterns and makes predictions, and experience firsthand how humans and AI interact.

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Lesson 1: AI Detective (Unplugged)

In this lesson, youth will be able to:

- Define artificial intelligence in simple language.
- Identify the differences between inputs and outputs.
- Explain the difference between a rule-based system and a data-driven AI system.
- Use evidence to explain and defend their thinking.
- Recognize that AI systems use data and patterns to make predictions or decisions.



Time needed: 60 minutes

Preparation

Materials	• Mystery Cards
	• Three signs or areas labeled:
	  ○ Data-Driven AI
	  ○ Rule-Based
	  ○ Unsure
	• Markers, pen, pencil
	• Index cards

Setup	• Copy a set of Mystery Cards. • Review the slide deck and discussion prompts.
Presentation	Slides

Facilitation

Overview

In this activity, youth become AI detectives as they investigate familiar technologies and determine whether they are data-driven AI or rule-based.

Through mystery cards, teamwork, movement, and discussion, youth identify inputs and outputs, use evidence to support their thinking, and practice questioning how technology makes decisions.

Engage

1. Tell youth: "Today you're AI detectives. Your job is to figure out what is happening behind the screen." Show two common technologies, a calculator and YouTube recommendations (Slide 2). Ask: "Both technologies take information in (input) and give something back (output). But do they work the same way? What is the calculator's input? What is its output? Does someone have to tell a calculator exactly what to do every time? Now think about YouTube. What is its input? What is its output? How do you think YouTube decides what to recommend? Could it learn from examples instead of following only fixed instructions?"

2. Introduce the two ways systems can produce an output: rule-based or data-driven AI (Slide 3). Give the following example (Slide 4): "If the temperature is below 32°F, display a freezing warning." Ask: "Is the machine following a rule or doing something else?" Explain that the machine is following a rule. Give another example: "A video platform looks at patterns in videos you've watched and other information to predict what you want to watch next." Ask: "Is the video platform following a rule or doing something else?" Explain that the video platform is doing something else; it's using data to make a recommendation.

Investigate

1. Using large paper, label three areas of the room with the following: Data-Driven AI, Rule-Based, and Unsure.

2. Have one youth choose a Mystery Card without looking at it. Read the card aloud or have the youth who chose it read it. After the card has been read, have youth physically move to one of the marked areas that represents their answer.

3. Once everyone has moved to an area, choose one or two youth from different areas and ask: "What is the input? What is the output? Is the machine following a rule? Is it making a data-based decision? What is your evidence?"

4. After the discussion, allow youth to change their position if their thinking has changed. Remind youth: "Changing your answer after hearing new evidence isn't getting it wrong. That's what scientists, engineers, and AI researchers do."

5. Repeat the process for 3-5 Mystery Cards.

Wrap-up

1. Divide the whole group into pairs and distribute a pen and an index card to each. Assign each pair one of the technologies listed below. Have the pairs create a Mystery Card for their assigned technology, similar to the cards used in the previous activity. The card should include the input and output.

   Examples:
   - Phone
   - Video game
   - Smart speaker
   - Camera
   - Car
   - Social media
   - Streaming service
   - Robot
   - GPS
   - Fitness tracker
   - School technology

2. Once each pair has created a card, have them read it aloud to the whole group. Discuss which category best fits the technology: Data-Driven AI, Rule-Based, or Unsure.

Implementation

Career Connection

- Share the career profiles for an **artificial intelligence engineer** and a **mechatronics technician.**

Lesson 2: Train the Bot (Unplugged)

In this lesson, youth will be able to:

- Build a decision tree that uses questions and data to make decisions.
- Explain that AI uses data and patterns to make predictions and decisions.
- Test and improve a decision tree by finding mistakes and changing the questions or categories to make better decisions.



Time needed: 60 minutes

Preparation

Materials	• Emoji Sheet • Sticky notes in two different colors • Tape • Pencil or pen • Scissors
Setup	• Copy one Emoji Sheet per pair. • Set up work space so that each pair has enough room to create a decision tree using the emoji cards and sticky notes. • Review the slide deck and discussion prompts.
Presentation	Slides

Facilitation

Overview

In this activity, youth explore how artificial intelligence learns to make decisions using data. Youth create and train a decision tree by sorting information, asking questions, identifying patterns, and using those patterns to make predictions. As they test and refine their decision trees, youth

experience how AI systems can improve their decisions through training and iteration.

Engage

1. Ask youth to share their favorite emoji and why. Allow several youth to share.

2. Separate youth into pairs and distribute the Emoji Sheet to each small group. Have youth cut apart the emojis. Instruct youth to sort the emojis into at least two groups. After youth have sorted the emojis, direct pairs to write the name of each category on a sticky note.

3. After pairs have sorted their emojis, ask: “How did you sort your emojis? Why did you categorize them that way? What features helped you decide which categories to create?”

4. Explain: “The features or characteristics you used to sort the emojis can be considered data. AI systems use collected data and a decision tree to make predictions and recommendations.”

5. Demonstrate how a decision tree is used (Slides 2–3).

Investigate

1. Explain the challenge: “You are an AI engineer that works for EmojiWorks, a company that designs emojis. You are working with a team of other AI engineers to develop a new feature for the company's app that will sort emojis quickly to make it easier for a user to find the emoji they are looking for by typing a simple phrase such as, “happy,” “red,” or “animal.” Your job is to develop a rule-based decision tree that sorts the emojis into the correct categories.” (Slide 4)

2. Share the criteria for the project (Slide 5):
    a. Each emoji must have at least three pieces of data.
    b. The decision tree must have at least two yes-or-no questions.
    c. The decision tree must have a minimum of two categories.

3. Share the constraints (Slide 5):
    a. Use only the material provided.
    b. You have 15 minutes to make your tree.

4. Instruct youth to begin by writing the characteristics of each emoji on the back of the cards. For each emoji, youth should highlight at least one piece of data that allows each emoji to be sorted into the categories they created (Slide 6). Youth should write their yes-or-no questions on the

sticky notes. Direct youth to construct their tree on the desk, wall, or floor in the room using the emoji cards and sticky notes (Slide 7).

5. After 15 minutes, instruct youth to test their decision tree by putting all of the emoji cards at the top of the tree. Youth will run each emoji through the tree, following the questions until the emoji has been classified. The decision tree is successful if each emoji falls under the category that the youth assigned it to during the sorting process. Consider demonstrating the process using one group's tree.

   Some groups may have decision trees that result in emojis being misclassified. Inform youth that this is OK and to leave the misclassification for now. Youth will have an opportunity to redesign their decision tree (Slide 8).

6. Have each group discuss: "Were any emojis misclassified? If so, why were they misclassified? What questions on the decision tree can be changed or added to improve its accuracy or make it better?"

7. Allow time for youth to redesign their decision tree by adding new yes-or-no questions or creating new categories. After the tree has been modified, youth should test their redesigned decision tree.

Wrap-up

1. Ask: "After redesigning, did your decision tree become more accurate? Did your decision tree have any misclassifications? What did you learn about how AI uses decision trees to make decisions?"

Implementation

Alternative

1. For a technology-based alternative activity, have youth complete this Science Buddies activity: Happy or Sad? Use Artificial Intelligence to Classify Faces.

Career Connection

- Share the career profiles for **artificial intelligence engineer, natural language processing (NLP) engineer,** and **AI data annotator.**

Lesson 3: Picture Perfect or AI?



In this lesson, youth will be able to:

- Identify clues that may indicate whether an image was created by AI.
- Explain how AI-generated images can mislead or fool people.
- Recognize and describe bias in AI and explain how training data can influence AI-generated results.

Time needed: 60 minutes

Preparation

Materials	• Computer with internet access • Access to Chat GPT, Google Gemini, Canva or another image generator
Setup	• Review the slide deck and discussion prompts.
Presentation	Slides

Facilitation

Overview

In this activity, youth examine real and AI-generated images to identify clues that can reveal when an image may have been created or altered by AI. Youth also explore how AI can reflect bias and stereotypes found in the data used to train it, helping them develop critical-thinking skills for evaluating AI-generated content.

Engage

1. Tell youth: "Your job is to figure out which pictures are real and which were created by AI."

2. Show youth one image at a time without telling them whether the image is real or AI-generated (Slides 2–9). For each image, have youth make an initial prediction as to whether the image is real or AI. Have youth explain

what clues lead them to their decision. Before revealing if the image is real or AI, allow youth the opportunity to change their classification. Reveal the classification:

a. Slide 2: real
b. Slide 3: AI
c. Slide 4: AI
d. Slide 5: real
e. Slide 6: AI
f. Slide 7: AI
g. Slide 8: real
h. Slide 9: AI

3. After discussing the first image, share some of the clues that could be used to tell if it is real or AI (Slide 10).

   Hands and fingers: extra, missing, or oddly shaped
   Eyes: unusual pupils, reflections, or mismatched eyes
   Teeth: strange shapes or unrealistic arrangements
   Text: nonsense words, strange letters, or distorted signs
   Ears: unusual shapes or mismatched details
   Body proportions: unusual arms, legs, or body positions
   Lighting and shadows: shadows that don't match the objects
   Repeated patterns: identical faces, objects, or backgrounds
   Background details: objects that don't quite make sense

4. After reviewing all the images, ask: "If you couldn't find an obvious mistake, does that mean the picture is real?" Lead youth toward the idea that not finding a clue doesn't prove that an image is real.

5. Add: “Not only is AI difficult to detect in images, sometimes AI is not fair to all people. AI doesn't think like a person. It learns patterns from huge amounts of information created by people. What happens if those patterns contain stereotypes or don't represent everyone equally?"

Investigate

1. Divide the whole group into pairs. Give each group a career or role (Slide 11):
   - Engineer
   - Doctor
   - Scientist
   - Teacher
   - Pilot
   - Computer programmer
   - Construction worker
   - CEO

- Nurse
- Astronaut

2. Ask youth: "Imagine you asked an AI image generator to create a picture of this person at work. What do you think the AI would create?" Before showing any images, have youth draw what they think the AI might produce.

3. If technology is available, use an image generator to create images from identical prompts, such as:
   - "A scientist working in a laboratory."
   - "An engineer designing a robot."
   - "A pilot flying an airplane."
   - "A computer programmer working at a computer."

4. Have youth examine the results. Ask some or all of the following: "Who is represented? What ages do you see? What genders do you see? What skin tones or ethnicities do you see? Are people with disabilities represented? Does the person look the way you expected? Does the image reinforce a stereotype? Who is missing? Does the image show only one type of person doing the job?"

5. Explain: "If the data used to train an AI system contains more images of certain groups than others, or reflects stereotypes, those patterns can influence what the AI produces. For example, if an AI system has seen many images connecting the word *engineer* with men, it may be more likely to generate a man when asked for an engineer. This doesn't mean the AI is intentionally being unfair. The bias can come from the data and choices made by people who created and trained the system." (Slide 12)

6. Have each pair redesign the prompt that was used to generate the image for the career or role they drew earlier. The prompt should be redesigned to create an image that is more inclusive and limits the bias that the system demonstrated.

7. If possible, enter the new prompts into the image generator and see the difference in the images.

Wrap-up

1. As a group, discuss the new images created: "What changed? Did the revised prompt produce a more diverse image? Did it introduce any new stereotypes? Can changing the prompt completely eliminate bias? Who is responsible for making AI systems fair?" (Slide 13)

Implementation

Career Connection

- Share the career profiles for an **artificial intelligence engineer, an AI ethics and compliance engineer,** and an **AI data annotator.**