LESSON PLAN

Introducing AI

This lesson is part of *USE, UNDERSTAND & ENGAGE: A Digital Media Literacy Framework for Canadian Schools*: http://mediasmarts.ca/teacher-resources/digital-literacy-framework.

LEVEL: Grade 1 to 3

DURATION: 1 hour, plus time for the assessment activity

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Overview

In this lesson, students learn that AI tools are computer programs that follow patterns instead of thinking like humans. They explore how this can lead AIs to make mistakes and importance of having humans supervise and correct them. Students practice creating "robot rules" and then design a "Trashbot" that will recognize and pick up trash in the classroom.

Learning Outcomes

Essential knowledge: In this lesson, students will learn:

- **Reading Media:** Students learn how AI tools are constructed by people and companies, discovering that these tools are computer programs rather than independent thinkers. They learn that the "intelligence" of an AI comes from its ability to look for patterns in the information its makers provide.
- **Ethics and Empathy:** Students learn about the responsibility of humans to monitor and correct AI when it makes mistakes. They explore how an AI might incorrectly categorize objects and why it is important for people to provide better examples or direct corrections to ensure the technology functions fairly and accurately.
- Key vocabulary: AI, trained, patterns, detect, t-chart.

Key concepts and big questions: After this lesson, students will understand:

- **Media are constructions:** Students come to understand that AI is a product of human choice; creators at toy or app companies choose the AI's name, its words, and the training data that shapes its behavior.
- **Media have commercial implications:** By comparing AI toys to cereal mascots, students understand that these tools are often created by companies to build brand recognition and encourage consumer behavior.
- **Digital media experiences are shaped by the tools we use:** Students understand that an AI's "decisions" are constrained by the rules and patterns it identifies within the software. They see how an AI's behavior changes depending on whether its makers provided narrow or broad examples during its training.

- Frequent misconceptions to correct: AIs think, feel and make decisions the way people do.

Performance tasks: In this lesson, students will demonstrate the ability to:

Use:

- Interact with and observe the behavior of talking AI toys or applications.

Understand:

- Identify the secret "rules" or patterns a "robot" might be following based on a set of examples.
- Analyze and explain why an AI might give a wrong answer, such as misidentifying a fox as a cat because it was only trained on orange cats.

Engage:

- **Design** a prototype for an AI robot (the "Trashbot"), including its physical parts for moving and collecting.
- **Create** a training plan for an AI using a T-chart to categorize "trash" and "not trash" to help the robot find patterns.
- **Develop** a method for users to intervene and correct the robot if it makes a mistake, such as trying to throw away a personal item.

Student-facing outcomes: **We will learn** that people build artificial intelligence and teach it how to act by showing it many different examples. **We will think about** why these tools sometimes make mistakes and why they need humans to help them learn the right way. **We will** practice being teachers for a robot by creating our own rules and patterns for it to follow.

Preparation and Materials

Prepare to show the slideshow *Introducing AI*

or

bring in to the class:

- a cereal box with a cartoon mascot (such as Frosted Flakes or Froot Loops)

- a talking AI toy or app
- four different kinds of round balls that bounce (for example, a basketball, a soccer ball, a volleyball and a superball)
- two round fruit (for example, an orange and an apple)

If you are using a cereal box and a talking toy/app, prepare to project the overheads Is *This a Cat?* and *Will This Bounce?*

If possible, have a selection of small objects (toys, learning supplies, kitchen implements, et cetera) on hand for the *Robot Training* activity.

Procedure

INTRODUCING MEDIA CHARACTERS

Start by showing **slides two and three** of *Introducing AI*, or show students a cereal box with a cartoon mascot such as Froot Loops or Frosted Flakes.

Ask students:

- Did this character choose its name? (*No.*)
- When this character speaks, can it choose what it says? (*No.*)
- Who made the character? Who chose its name? Who chooses what it says?
- Why was he made?

Point out that the character was *made* by the cereal company. They chose its name and control what it says, and he was made so that kids would recognize the cereal and want their parents to buy it.

INTRODUCING AI

Show **slide four** of *Introducing AI*, or show students the talking AI tool or app.

Tell them that this is a toy with AI, or "artificial intelligence."

Ask them what they think that means. Let them share their thoughts, but don't try to reach any sort of consensus or definition yet.

Show **slide five** and ask students:

- Did this AI toy choose its name?
- Can it choose what it says?

Students may disagree on the second point. Highlight two points: AIs seem to "decide" what to say, but they are also computer programs that were made by people.

Show **slide six** and ask:

- Who made the AI toy? (The people at the toy or app company.)
- Who gave it its name? (The people at the toy or app company.)
- Who chooses what it says?

Revisit the question from earlier about whether or not AIs can decide for themselves what to say. Ask students who they think has more control over what the AI says, the AI itself or the people who made it.

- How did they make Alvin?

Encourage students to share their ideas of how AI works and how an AI "decides" what to say or do.

HOW AI LEARNS

Show **slide seven**, or project the overhead *Is This a Cat?*

Pick a student volunteer to be the "AI robot." Tell them the secret rule: **everything that is orange is a cat**, and **anything that is not orange is not a cat**.

Tell the other students that the AI has been told the first three images are all cats.

Ask them to guess:

- Will it say the black cat is a cat?
- Will it say the fox is a cat?

Have the "AI" volunteer give the answer: the black cat is not a cat, and the fox is a cat.

Show **slide eight** if you are using the slides.

Ask:

- Is that the right answer? *(No. A black cat is a cat, and a fox is not a cat.)*
- Would a person give that answer? *(Probably not! After seeing three cats, you would almost certainly be able to tell the difference between a cat and a fox.)*

Show slide nine if you are using the slides.

Ask:

- Why do you think the "robot" said that?
- What rule was it following?

Let students discuss for a few minutes. Don't try to reach any sort of consensus or definition yet.

Show **slide ten** if you are using the slides.

Tell students that the reason AIs seem like they "think" and "decide" is because they look for patterns in what their makers show them. They test those patterns and the ones that work become rules.

Let the "AI robot" student explain what the rule was:

> Everything that is orange is a cat, and anything that is not orange is not a cat.

Show **slide eleven** if you are using the slides.

Ask students:

- How did it make this rule? *(All of the cats it was shown were orange.)*
- How would you change this rule so that it would recognize that black cats were cats, and that foxes were not cats?

Let students discuss this for a few minutes. Make sure to point out that you can *correct* an AI by telling it what answers are right or wrong.

> Explain that you can do this in two ways: by having its makers test and correct it before people start using it, or by having the AI *correct itself* each time it's wrong. (Most AIs do both!)

Show **slide twelve** if you are using the slides, or take out the bouncing balls.

> Tell the student volunteer the secret rule: **everything that is round bounces**.

Ask students: If the first three items all bounce, will the AI say that the last one will bounce?

> Have the "AI" volunteer give the answer: the last ball will bounce.

Show **slide thirteen** if you are using the slides, or take out one of the round fruit.

Ask students: Will the AI say that the fruit will bounce?

> Have the "AI" volunteer give the answer: the fruit will bounce.

Show **slide fourteen** if you are using the slides.

Ask students:

- What pattern did the AI spot?
- What rule did it make?
- Why did it give the right answer once?

Why did it give the wrong answer once?

Let the "AI robot" student explain what the rule was:

> Everything that is round bounces.

Explain that because that we don't always know when AI makes a mistake, because (as in this case) it may give the right answer for the reason.

Show **slide fifteen** if you are using the slides.

Ask students: If you showed an AI a basketball, a volleyball, and an orange, would it guess that a soccer ball would bounce? Would it guess that an apple would bounce?

Let students discuss this for a few minutes. Make sure to point out that you can make an AI give better answers by *showing it more examples* so it doesn't make rules that are too narrow (for instance, showing it cats that are not all orange, or that not all round things bounce.)

Explain that you can do this in two ways: by showing the AI more examples *before* people start using it, or by having the AI use every right or wrong guess as a new example. (Most AIs do both!)

ROBOT TRAINING

Put students in small groups and show them the collection of toys, learning supplies, kitchen implements, et cetera.

Tell them that each group is going to come up with a "robot" rule using the objects:

Pick four of the objects that are all alike in some way. Try to find a way in which they are alike that a person might not notice. The goal is to "stump" the other teams by making it hard to guess how they are alike.

> (It has to be something that other people *could* guess: it can't be "I have all of those in my house," for instance.)

Leave the objects in a central space so that more than one group can use the same ones.

When the groups are all ready, have each group point out *three* of their objects. The rest of the class now tries to guess what the fourth one is, and to identify what makes them alike.

After each group's fourth object and rule is explained, ask the class: How hard was the rule to figure out? Were there other ways the three things were alike that seemed more obvious?

ASSESSMENT ACTIVITY: TRAINING TRASHBOT

Tell students that they are now going to design their own robot. The job of the robot will be to pick up trash in the classroom.

Revisit what students have learned in the lesson so far by asking: How can the robot learn what is trash and what is not trash?

Remind students of the two ways that AIs can learn: by being *shown examples*, and by being *corrected* when they make a mistake. Both of these can be done by the AI's makers, before people start using it, or they can be done by the AI itself *after* people start using it.

Students should now design the robot's "body" and its "brain":

The "body" is the parts that let it move, collect, and store or dispose of trash. These can be drawn or described.

The "brain" is how the AI will be trained. It should include:

A list of things that *are* trash and another list of things that are *not* trash.

The rule: Something that is true of all the things that are trash, and that is not true of all the things that are not trash.

How the robot will detect or "see" that something is trash.

A way for people to correct the robot if it picks up something that is not trash.

You can have students do this either individually or in small groups as you prefer.

Suggested group roles:

- Trainers (keep the lists of trash and not-trash)
- Materials manager (makes sure everyone has paper, pencils, crayons, etc.)
- Doodler (draws people's ideas)
- Tester (looks for possible problems in the lists or in the design)
- Reporter (shares the group's prototype with the rest of the class)

If you like, you can have students share their designs with the class.

You can also have other students "test" them by trying to find things in the classroom that are not trash but that would be picked up according to the robot's rule.

REFLECTION

Show **slide sixteen** if you are using the slides.

Ask students to tell you what they've learned about how AIs "learn" and "think."

Have them write or record a short reflection that answers these questions:

If you ask an AI to help you, how will it decide what to say?

If you ask a friend to help you, how will they decide?

STUDENT HANDOUT

INTRODUCING AI

TRAINING TRASHBOT

We are going to design a robot to help keep our classroom clean!

How does a robot learn? Remember, we have to teach it!

We can **show it examples**.

We can correct it when it makes a mistake.

TRAIN THE ROBOT'S BRAIN

A robot's brain needs to be trained using patterns to see what is the same and what is different.

The T-Chart

On your paper, make a T-chart.

On the left side, draw or write 3 things that are TRASH (like a sticky juice box or a scrap of paper).

On the right side, draw or write 3 things that are NOT TRASH (like your favorite book or a math block).

The Robot's Secret Rule

The things on the T-chat should give your robots a simple rule to know what to pick up.

Look at your TRASH list. What is one thing you can say about ALL the trash?

Look at your NOT TRASH list. Would the rule make it pick up any of those things?

DRAW THE ROBOT'S BODY

Use your markers and paper to show what your robot looks like.

Move: How does it get around the room? Does it have wheels, legs, or tracks?

Pick Up: How does it grab things? Does it have big claws, a vacuum tummy, or sticky hands?

Store: Where does the trash go? Does it have a backpack or a bin inside its belly?

See: How does your robot find the trash? Draw what it uses to see if something meets the Secret Rule.

FIXING MISTAKES

Everyone makes mistakes, even robots! If your robot tries to throw away your lunchbox, how do you tell it that is NOT TRASH?

STUDENT HANDOUT

INTRODUCING AI

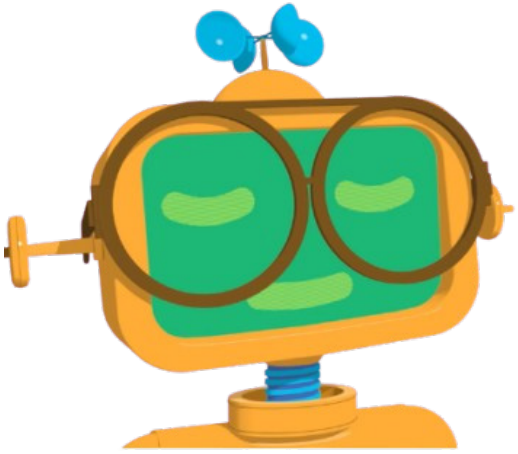
IS THIS A CAT?

Let's try to guess what an A.I. will say.

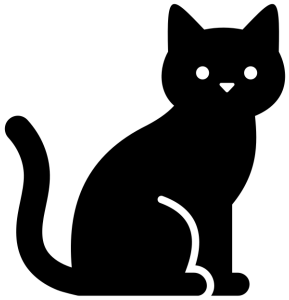
CAT

CAT

CAT



Which of these is a cat?



STUDENT HANDOUT

INTRODUCING AI

WILL THESE BOUNCE?

Let's try to guess what an A.I. will say.