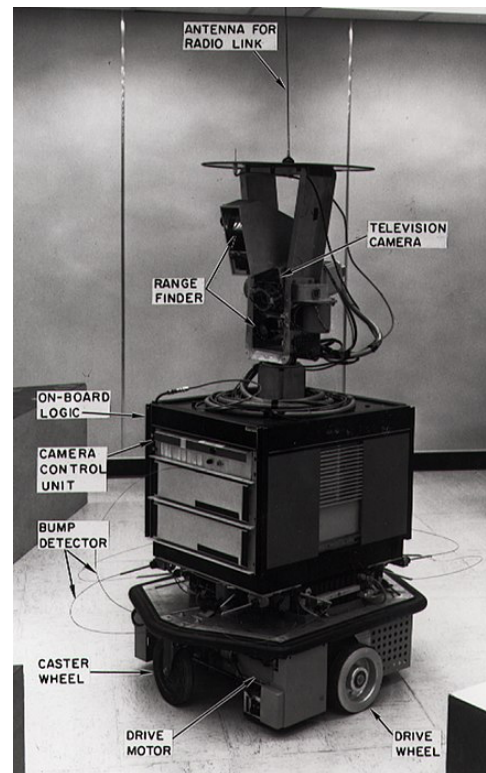# Artificial Intelligence

Name: _____

Artificial intelligence (AI) may sound like something from a science fiction movie, but it's actually something you probably interact with more than you think. When you talk to a voice assistant like Siri, Alexa, or Google, you're communicating with AI. The suggestions for shows and movies that you see on Netflix and Youtube are all generated by AI. When you use a chatbot on a website for customer service, those responses are all generated by AI.

Artificial intelligence is a method of making a computer think like a human mind. This means that it studies data, finds patterns, and problem solves. The key here is that a computer alone can follow directions very easily, but it often doesn't have the capability to write and follow its own directions for a specific goal. For example, Shakey the Robot was the first mobile robot able to do things with a purpose instead of being given a list of instructions. When the operator told the robot to push a block off the platform, Shakey could look around, identify the platform with a block on it, and locate a ramp in order to reach the platform. Shakey could then push the ramp over to the platform, roll up the ramp onto the platform, and push the block off the platform. Though this looks like a set of directions it was completely generated by Shakey based on the visual data it acquired and interpreted.

This depicts Shakey the Robot.

Artificial intelligence can be applied in a variety of fields including video games, banking, and health care. The Department of Defense uses AI for programs like unmanned vehicles and even augmented visual systems. The Integrated Visual Augmentation System (IVAS) is an augmented reality headset that uses sensors for low-light and thermal night vision to create a mixed reality interface for a soldier. With enough image recognition, the system can help identify terrain and mark targets. These systems will most likely make their way to the commercial sphere in the field of VR/AR headsets. With more data to identify terrain or even hand positions, we might find that controllers for these headsets are no longer necessary.

In today's activity, you'll learn what it means for a computer to be intelligent and how AI software uses data to identify different things.

Quick start: Do you interact with AI? If so, how?

PART I: The Intelligent Piece of Paper

Today you'll be exploring what it means for something to be intelligent and will decide whether a piece of paper can be considered intelligent.

Quick Check:
What makes something intelligent?

To test your hypothesis, the Intelligent Piece of Paper will play a game of Nim against a human.

Roles:
Human- must play with no tools beside their brain
User of the Intelligent Piece of Paper- must play by the directions outlined on the Intelligent Piece of Paper

Goal of the Game:
To not take the last counter from the bag.

Rules:
The game starts with 21 counters in the bag. Each player alternates taking one turn at a time. On a turn, a player can take 1, 2, or 3 counters from the bag. The human always starts the game.

Play 2-3 games of Nim with your partner then answer the questions below.

Quick Check:
How does the Intelligent Piece of Paper always win?

Quick Check:
Do instructions make things intelligent? What is needed in order to make the instructions?

PART II: Machine Learning and Algorithm Bias

Using Teachable Machine, you will train an algorithm to determine whether an image contains a cat or a dog then assess its success.

Instructions:
1. Go to: https://teachablemachine.withgoogle.com/
2. Select "Get Started".
3. Select "Image Project", then "Standard image model".
4. Rename "Class 1" to "Dogs".
5. Under Class 1, select "Upload" and "Choose images from your files".
6. From the Documents folder, navigate to the Artificial Intelligence folder, then the Dogs folder, and select all of the images.
7. Rename "Class 2" to "Cats"
8. Under Class 2, select "Upload" and "Choose images from your files"
9. From the Documents folder, navigate to the Artificial Intelligence folder, then the Cats folder, and select all of the images.
10. Complete Table 1 below before continuing.

Table 1			
	How many images are included?	How are the images in the class similar?	How are the images in the class different?
Cats			
Dogs			

11. Click "Train your model"
12. Once your classifier is finished, test your classifier with the provided laminated cards by placing them in front of the provided web camera and fill in table 2 under Trial 1: Random.

Table 2	Trial 1: Random			Trial 2: Curated		
Image Number	Classification	Confidence Score	Correct?	Classification	Confidence Score	Correct?
1						
2						
3						
4						
5						
6						
7						

Quick Check:
Did your classifier work better on dogs or cats? Why?

13. Delete all files by selected the three dots on the right side of the class box and selecting "Remove all samples". Repeat for other class.
14. Under Dogs, select "Upload" and "Choose images from your files"
15. From the Documents folder, navigate to the Artificial Intelligence folder, then the Curated Dogs folder and select all of the images.
16. Under Cats, select "Upload" and "Choose images from your files"
17. From the Documents folder, navigate to the Artificial Intelligence folder, then the Curated Cats folder and select all of the images.
18. Click "Train your model"
19. Once your classifier is finished, test your classifier with the provided laminated cards by placing them in front of the provided web camera and fill in table 2 under Trial 2: Curated.

Quick Check:
If a company is trying to train AI to identify faces, it is cheapest to use public access images, like mugshots. What biases/ issues do you foresee in using that data set?

PART III: Applying Machine Learning

Using Teachable Machine and MBlock you will code an interactive game of Red Light, Green Light. The classic game only allows a player to move when "It" has their eyes closed/covered. The goal is to get to the finish line without moving when "It" is looking at you.

Train Teachable Machine to identify between eyes that are covered or not then use the provided coding blocks to make your game!

Training Your AI:

1. Click on the teal box on the left labeled "TM".
2. Select "Training Model".
3. In the Category "EyesVisible", hover over the box on the left to reset and clear the images.
4. Select the "Learn" button to collect images of you and your teammates with your eyes uncovered. Collect at least 20 samples.
5. In the Category "EyesCovered", hover over the box on the left to reset and clear the images.
6. Select the "Learn" button to collect images of you and your teammates with your eyes covered with your hand. Collect at least 20 samples.
7. Select "Use Model".

Now that you've trained your AI, you can use the following blocks in your code!