A GUIDE BY

WOZ ED

STEM

SCIENCE TECHNOLOGY ENGINEERING MATH

THINKING ABOUT THINKING

ARTIFICIAL INTELLIGENCE | LEVEL II

90 MINUTES

THINKING ABOUT THINKING

OVERVIEW

Students will begin to understand artificial intelligence by understanding their own intelligence. Artificial Intelligence is any device that perceives its environment and takes actions to successfully achieve its goal. While total AI is not yet a reality, there are numerous components of AI that exist today as a result of humans trying to solve different problems. Students will analyze their thought process and recognize there are numerous approaches to solving the same problem.

OBJECTIVES

Students will

- Discover non-obvious insights.
- Create an original work.
- Work within constraints.
- Practice thinking critically about what they see.

ADVANCED PREPARATION:

Notes on what the teacher needs to complete prior to teaching the lesson to be fully prepared for the activities.

Before class, review images on the resources tab of the Number Talk Images website http://wozed.link/AI_L2_M_M1_R1 and select an appropriate image from the photos tab. The image of the golf balls stacked is a good option; however, feel free to pick one that matches the specific needs of your classroom.

NUMBER TALK IMAGE EXAMPLE

ENGAGE 10 MINUTES

MATERIALS

- pencil—1 per student
- paper—1 piece per student
- timer
- Number Talk image, selected prior to class
- computer linked to projector displaying Number Talk image from Number: http://wozed.link/AI_L2_M_M1_R1
- whiteboard and dry erase marker

PROCEDURE

1. Ask students to take out a pencil and piece of paper.
2. Project the Number Talk image and ask students "How many?"
3. Set a 5-minute timer and tell students to write out their thoughts.
4. After 5 minutes, ask the question again, "How many? Who would like to tell me how many?"
   a. Allow a student to answer, then ask, "How did you figure that out?"
   b. On the board, draw the student's thoughts.
   c. Ask, "Is there another way we could have answered the question, 'How many?'" to find out if any students figured it out a different way.
   d. Draw student's thoughts.
   e. Repeat until there are no different strategies, or you have drawn six strategies, whichever comes first.
5. Guide students in considering other ways to think about the image.
   a. "I wonder if there are other ways to think about this image."
   b. Allow students to share ways to think about the image.
   c. Possible responses: prediction of why things were set up that way, who set them up, what is just out of view, etc.
6. Tell students, "Artificial Intelligence, or AI, is intelligence demonstrated by machines. It is often thought of as when a machine copies thinking that is usually associated with human minds, like learning and problem-solving. We will come to understand AI as the study of intelligent agents—any device that is aware of its environment and takes actions to successfully achieve its goals. For example, a robot that encounters an obstacle and chooses a new route is using what it learns from its environment to adjust and still fulfill its goal. Complete AI is not a reality. But, we will explore the parts of AI that exist today and practice problem-solving so when you grow up, you can contribute to AI."

EXPLORE 20 MINUTES

MATERIALS

- Finish the Art handout: https://wozed.link/AI_L2_M_M1_H1—1 per student
- colored pencils—1 set shared per table (4 students)
- special tipped pens—1 set shared per table (4 students)
- timer
- masking tape/painter's tape—1 roll per class
- whiteboard and dry erase marker

PROCEDURE

1. Distribute handouts, colored pencils, and special tipped pens.
2. Explain the activity, "An artist started this picture, but had to stop before completing it. Now, it's up to you to finish the art. Feel free to turn the picture any way you like."
3. Tell students, "You will have 5 minutes to continue the picture. You may use colored pencils or these special pens."

NOTE: Be careful not to provide additional instructions because this is meant to be completely from the mind of the student and not influenced by your suggestion.

4. Set timer for 5 minutes.
5. When timer goes off, students will most likely still be working. That is okay, tell them to stop.
6. Using the masking tape, tape students' work on the walls around the room.
7. Tell students, "You are going to do a silent gallery walk. You see that I have taped all your work on the walls. I know some of your work is not complete and that is okay. We are going to walk around the room silently and make sure to look at every image taped to the wall."
8. After most students have looked at all the work, invite students to return to their seats.
9. Ask students to identify things that were the same and different in the images.
    a. Write "Same" and "Different" on the whiteboard.
    b. Write down student responses under the appropriate headings.
10. Pose the following questions for group discussion:
    a. Which art was surprising to you?
    b. What are examples that are closer to what you expected to see?
    c. If you had a chance to do this again, what would you do differently?

EXPLAIN 25 MINUTES

MATERIALS

- Finish the Art handout: https://wozed.link/AI_L2_M_M1_H1—1 per student
- computer linked to projector displaying TED Ed video, "The Power of Creative Constraints": http://wozed.link/AI_L2_M_M1_R2
- colored pencils—1 set shared per table (4 students)
- special tipped pens—1 set shared per table (4 students)
- timer
- masking tape/painter's tape—1 roll per class
- whiteboard and dry erase marker

PROCEDURE

1. Tell students, "We are going to do this exercise again but this time, I will give you more direction."
2. Distribute handouts and guide a quick discussion about what they are reminded of when they look at the line.
3. Tell students, "This time I will give you a constraint, you will create an image or design that disguises the squiggle so when you're finished someone would never know it was already there."
4. Play the TED Ed video, "The Power of Creative Constraints."
5. Ask students, "What is a creative constraint? Why are they important?"
6. Tell students, "Let's look again at our Finish the Art handout. What are some ideas of what this squiggle line might become?"
    a. Students will likely say river, mountain, puddle, root, etc.
    b. Write down whatever students say on the whiteboard.
7. Hold up the handout and rotate the paper so it is landscape instead of portrait.
8. Tell students, "Do you have any new ideas when you look at it this way?"
    a. If they do, write those ideas on the board with the others.
    b. Continue to rotate the page—upside down, slanted—and add to the list.
9. Tell students, "I gave you one constraint, create an image to disguise the squiggle. When everyone works with the same squiggle, this not only creates a constant, but it is also our second constraint. Are there any additional ideas you have to add to our list? I want you to use an idea we posted on the board to create an image using this identical squiggle and disguising it to look like it is part of your own work."
10. Distribute pencils and pens.
11. Provide students 15 to 20 minutes to create their images.

EVALUATE 5 MINUTES

MATERIALS

- student images—1 per student, created during EXPLAIN section

PROCEDURE

Once students have finished their images, pose the following questions to guide a group discussion:

a. How was this different from the first time?
b. Did the constraint make it easier or more difficult?
c. If you were to do this again, what would you change?s

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