Computational Thinking
Exploring Abstraction

These unplugged activity ideas are meant to show examples of each key concept of computational thinking, in order to demonstrate its importance. You may find overlaps in the concepts presented in the activities; this is to be expected, since they are a part of a whole process that happens simultaneously.

Everyday life scenarios

We use abstraction to understand a complex task, by focusing only on its essential components. For example, abstraction comes into play to get to the heart of a conversation, or while writing an essay plan.

1. Give students a long-form definition from the dictionary, then have them find the word or term it is describing.
2. Assign participants a story, such as a fairy tale or a television episode. Ask the students to summarize the story in only three points, like a tweet or a meme.
3. Mimic an art class by asking participants to take a real-life object and reduce it to its basic geometrical shapes.

Discussion

- How did you determine what information was essential?
- Consider the information that you omitted from your abstraction. Why was this information not essential? Can you think of an example of a situation where this kind of information would be essential?
- Does everyone agree on what information is essential versus non-essential, or does this vary based on the perspective of the reader?
- Was what you considered essential the same for your partner(s)? How did this differ from person to person?
- Can you name situations where you have used abstraction in your life?
  - Example 1: Using a car, you don't need to know exactly how an engine works, except that the engine requires gas and maintenance, it can be ignited with a key, and engaged through the pedals. The same applies to most technological tools, such as a computer, phone, oven, etc.
  - Example 2: Money is an abstract concept accepted by society. It's represented by a piece of paper or metal, or even a line of code. We associate value to these things, making an abstraction that the real value of the paper or metal as a material is much *much* lower than the worth printed on it.

⧖ 5-10 *minutes*   *Grade 5 and up*   *Solo or Team*   *Beginner*

Function association: Abstraction in in computer programming

One of the ways abstraction is used in coding is through functions. Computer programming languages have regrouped similar commands under various pre-arranged functions. This allows the user to quickly write code. By using the functions, the user inputs less lines of code, making the resulting outputs more efficient.

Lesson goal

The goal is for participants to focus on the core concept (what it's meant to do).

Preparation

Print out or share the worksheet Exploring Abstraction: function association activity.

Tasks

Ask the participants to identify the function that is described in each box.

Go further

Ask participants to create their own function descriptions using sports moves.
Example: When the puck is pushed into the net = function: goal.

Solutions to Function Association Activity

2. Forever
6. Pick random true or false
4. Show string "Hello"

1. While true do
7. If-true-then
5. On buttons A-B pressed