Introduction to Algorithms with Everyday Tasks

STEELS Standards

- Engineering Design (K-2): Understanding how to break down tasks and follow procedures.
- Technology Integration (K-2): Using simple tools like Scratch Jr. to sequence tasks.
- Scientific Practices (K-2): Analyzing and refining through debugging activities.

Objectives

- Introduce students to the fundamental concept of an algorithm
- Practice tracing an algorithm
- Students will understand the relationship between instructions they follow in everyday life and those followed by a computer

Materials

- Bread, peanut butter, jelly, knife, plates (for PB&J activity) AND/OR Graham crackers, marshmallows, chocolate, plates (for s'more activity)
- Whiteboard and markers
- Printed sequence cards or slips of paper to create algorithm steps
- Scratch Jr. (if technology is available)

Basic Vocab

Algorithm: A set of instructions to complete a task.

Sequence: The order in which steps are performed.

Debugging: Finding and fixing mistakes in an algorithm.

Introduction

Begin by explaining that algorithms are like instructions we follow every day. Ask the students if they have ever followed steps to complete something, like brushing their teeth or getting ready for school. These are all examples of algorithms. Explain that, just like they follow these steps, computers need instructions to complete tasks.

Class Activity

The teacher can choose between two activities: making a PB&J sandwich or making a s'more.

1. Real-life Algorithm Example: Introduce the chosen activity, explaining how it involves a series of steps (an algorithm). Have the students break down the steps in detail. For example, if making a PB&J sandwich, steps might include getting the bread, spreading peanut butter, adding jelly, and putting the slices together.

2. Instruction Following Challenge: After the students list the steps, follow their instructions literally. If they forget to mention opening the jar or using a knife, demonstrate the consequences. This will be a fun and engaging way to show the importance of detailed instructions and debugging.

3. Simple Programming Activity: Use Scratch Jr. to create a sequence that shows a character moving through steps, similar to the activity they just completed. This will help them understand how algorithms are used in coding.

Discussion

(Try to guide student discussion to touch on these)

- Algorithms are all around us! We use them every day without even realizing it. Examples include:
    - Following a recipe
    - Getting ready for school
    - Brushing teeth
    - Tying shoes
- Why is it important to follow steps in order?
    - Discuss what might happen if we do steps out of order, like putting on shoes before socks.
- Debugging in everyday life
    - What if something goes wrong? How do we fix it? Discuss examples of fixing mistakes, such as realizing you missed a step while making a sandwich and correcting it.