

Program Your Family



15-20
min.

Overview

Families playfully learn about algorithms by programming each other. Coders will decide what action to have their human robot perform and program them. They are paying attention to details and sequencing, while debugging any problems that arise. This shows that simple tasks which humans hardly have to think about require detailed instructions for a computer!

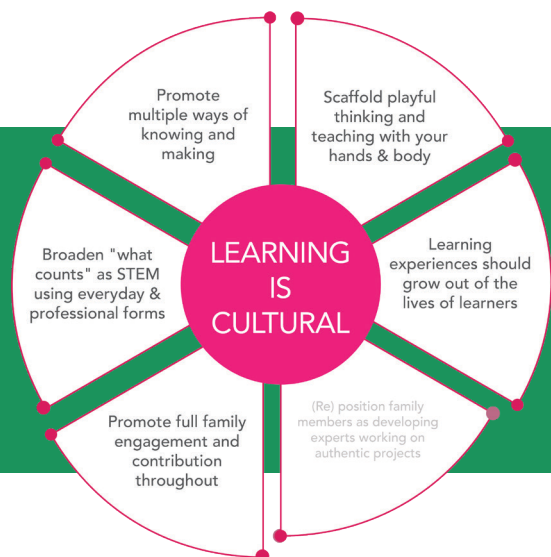


Materials

- Paper and pencils
- *Optional:* Masking tape
- *Optional:* Blindfolds - 1 per family

This activity:

- Provides an opportunity to learn by doing
- Encourages experimentation & spontaneity
- Makes room for families to playfully and intuitively test their understanding of algorithms
- Invites iterative, collaborative problem-solving
- Connects to family-specific routines & practices



Family Sketch

A boy, the older of two sons, programmed his mom to do a "happy dance" and was delighted to see her interpret that bit of code by jumping and waving her hands. His younger brother then went on to program him, and included the happy dance in his algorithm too!

Step-by-step

1

Invite everyone to gather in their families.

2

Explain that when you program a computer or robot, you must give it a list of steps, also called an algorithm. The robot will read that list of steps and do exactly what it is told to do.

3

Ask everyone, "How would you tell a robot how to accomplish something?" Responses may include breaking it down into steps and being as literal as possible

4

Tell families that we are going to practice building algorithms with human robots: our family members! Adults can start as the robots and youth as the coders, and then they should switch roles. Coders should work together.

Families can create a non-linear path with tape on the floor for their human robots to follow (with or without a blindfold). They can also put one or two obstacles in the way. They may also come up with their own (safe!) challenge for their robots.

Remind robots that they must carry out instructions exactly as they hear them!

Encourage coders to plan their algorithms before uploading. They can write, speak, or gesture their algorithms and debug at any point until it works!

5

Give families at least 15 minutes for this activity. Discuss together how it went.

Background Info

Algorithm

A set of very specific instructions for a computer to do something. It's a little bit like a cookie recipe, which includes all the ingredients, amounts, tools, and instructions that need to be completed in order to bake cookies.

Upload

Sending data (in this case, your program) from one computer to another. The second computer is the robot.

Troubleshoot

Locating the cause of a problem and treating it.

Debug

Tweaking the setup of a project (in this case the code) to fix errors (bugs) and work toward getting an expected outcome.





Other ideas

How can this activity fit into your setting?

This is a good introduction for any coding or robotics activity!

Simplify the activity by asking coders to program their robot to walk around a table or chair.

Add complexity to this activity by having coders write out their code before executing, debugging only at the end, adding additional obstacles to the path, or creating more complex tasks for the robot.

Put down props or stickers for robots to walk to the different markers. Allow for different ways of interpreting directions.

Many of the actions that families come up for their code will be repetitive. This makes an excellent transition into learning about loops.

What worked for us

We use this after "Toothbrush Robot."

It was important to us that people used their preferred language when doing this activity.

We tried to leave enough time for everyone to try out the role of coder and robot.

When families felt free to improvise what tasks to have their robots perform, they had a lot of fun carrying out their codes!

We asked the human robots to think through how they might literally interpret the code they receive.

It was fascinating to see how the human robot playfully pushed-back on the instructions given. Were they specific and literal enough? This is where it can get really funny!

We noticed that younger children tended to debug in real time by changing up their codes or physically moving their robots into place.

Alternatively, you can encourage coders to plan out their program in advance before uploading it to the robot.

More tools like these available on techtales.online
Robotics Backpacks for Family Learning | NSF DRL - 1516562



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