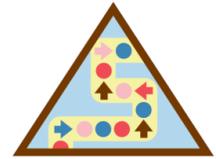


Brownie – Coding Basics



Material list:

Step 1: For this step you have two options, you only need to complete one choice.

Option 1: (craft)

- **Build a Virtual Indoor Fire Algorithm** pdf
- Packing peanuts
- Toilet paper rolls (5-6)
- Tissue paper (red, yellow and orange)
- Marker
- Battery powered tealight
- Scissors
- Glue/tape
- Small fan (optional)

Option 2: (edible)

- **Build an Edible Fire IRL (in Real Life) Algorithm** pdf
- Set of ingredients (use your imagination to make substitutions, if needed)

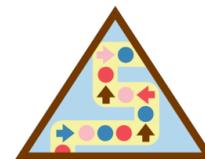
	Edible Fire
Cleared area for fire	plate or paper towel
Fire Circle	mini marshmallows
Rake/Shovel	fork or spoon
Fire Bucket	3 oz. cup of water
Wood Pile	napkin/paper towel to stack your “wood” on
Fuel Wood	rod pretzels, large tootsie rolls or cheese puffs
Kindling Wood	pretzel sticks or small tootsie rolls
Tinder Wood	shredded coconut or cheese
Match	red licorice whip or stick
Flame	red-hots or candy corn
Emergency Fire Starter	chocolate chips

Step 2:

- **Code a Family Fitness Workout** and **Code Blocks Template** pdfs
- Scissors
- Pen/pencil

Step 3:

- **Coded Concentration** pdf
- Scissors
- Optional: index cards and glue



Step 5:

- Pen/pencil
- Index cards
- Music
- **Code a Dance**

Step 1: Create algorithms for a computer that follow a sequence

How is writing a computer program like building a campfire? When you build a campfire, you must follow a set of steps in a certain order. For example, you can't start by just lighting big fuel logs, you must first light smaller pieces of wood (your tinder and kindling). Once your smaller pieces of wood are going, the bigger fuel logs will light and keep it going. When a computer programmer is building a program for a computer, they will write a set of directions called an **algorithm**. They will then need to check and make sure the directions are in the right order or **sequence**. This way the computer can successfully complete the task.

Let's give it a try can you follow these directions exactly... (choose 1)

Option 1: [Build a Virtual Indoor Fire](#)

Option 2: [Build an Edible Fire IRL \(in Real Life\)](#)

Use the algorithm for the option you choose and follow the directions to create a fire. Now, can you think of something you know how to do and write an algorithm for someone else to follow?

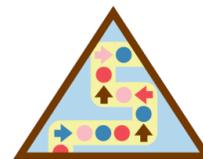
Step 2: Use loops to improve your algorithm

In step 1, we looked at how computer programmers write an algorithm, or a set of directions, for a computer to follow to complete a task. Since computers need to be told exactly what to do, algorithms, or the code, can get very long especially if there are steps that need to be repeated. To help shorten the code, computer programmers will often use **loops**, or a set of directions that are repeated in the algorithm.

For this activity, use the [Code a Family Fitness Workout](#) directions to code a quick five-minute workout for you and your family to follow.

Step 3: [Use events to make things happen](#)

In step 2, we learned how to add loops into the code for our algorithm or program to tell our computer to repeat a sequence of steps before moving on. Sometimes as a computer is running a program, an action will occur that causes something different to happen. This is called an **event**. For example, if you are watching a video and you press the pause button, the video stops. Or, if you click the button on your computer mouse, the computer will open your game.

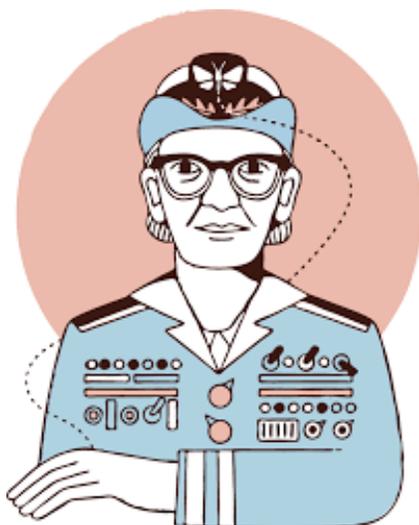


Brownie – Coding Basics

Sometimes events will interrupt the program for a moment and then the computer can go back to where it was in the computer program. Let's say you are planning on going for a walk outside. You (the computer) are following the steps (your algorithm) to go on your walk, you've put on your shoe and head to the door. Next, you open the door to find that it is raining (the event), so you put on your raincoat before heading outside on your walk.

For this activity, use the [Coded Concentration](#) materials to play a quick game.

Step 4: Learn about women in computer science



Part of being a leader is thinking about the problems that might happen and then figuring out what to do if those problems do arise. In the 1960's, Margaret Hamilton worked with a team at NASA to create computer programs for the astronauts to use during the Apollo 11 mission to land on the moon.

Here are a few books you could check out to learn more about Grace Hopper.

- *Grace Hopper: Queen of Computer Code* by Laurie Wallmark
- *STEM trailblazer BIOS: Mathematician and Computer Scientist Grace Hopper* by Andrea Pelleschi
- *Grace Hopper: The Woman Behind Computer Programming* by Nancy Loewen

How would you use computers to change the world?

Step 5: Create your own set of commands that use events

As you've worked on this badge, you've already learned about writing an algorithm to create a program for someone to follow. Then we looked at adding in loops to repeat a sequence of steps, and finally coming up with an event to make thing happen in our program. Now it's your chance to put it all together.

For this activity, use the [Code a Dance](#) handout to create an algorithm with events to choreography some moves to your favorite song.

Now that you've earned this badge, you could give service by:

- Creating a step-by-step algorithm for an everyday task and share it with others.
- Sharing what I've learned about Grace Hopper to inspire others.
- Encouraging others to stick with it when projects get tough.

What are you inspired to do with your new knowledge?