The Glowing Heart Keychain

Create your first customizable gadget: a heart-shaped keychain that beats and makes sound. Learn the basics of computational thinking by combining sequences and loops.

Courses

- Grade 5 and up (age 10).

Materials

- Mobile phone and computer
- Internet connection
- Cardboard, scissors and a couple of rubber bands to hold the phone against the cardboard

Description

This activity introduces students to the three pillars of basic programming: sequences, infinite loops, and nested loops. They will create a customizable digital object (an animated keychain) that makes an excellent first dive into computational thinking.

Educational Objectives

- Understand the concepts of sequence, infinite loop, and nested loop.
- Create an animated technological object (prototype) using a mobile phone.
- Identify how sequences and repetitions can be used to create animations.
- Evaluate their own work and propose creative modifications.

Start (10 minutes) - The Secret of Animation

1. Welcome the class and introduce the activity: **"Today we are going to create our first animated, customizable gadget: a glowing heart keychain!"**
2. Spark their curiosity: **"How do you think animations work in cartoons or video games?"**
3. After listening to their ideas, explain that it all comes down to showing images in a specific order (a sequence) very quickly. To keep the animation from ever stopping, programmers use a magical tool called a "loop". Let's explore how it works!

4. Briefly explain how LEDs and speakers work, and how they will be used in the activity.

What Is a Sequence?

In programming, a **sequence** is simply a series of instructions that run one after another, in a strict order. It's like following a recipe: first you mix the ingredients, then you bake them. You can't bake them before you mix them. The computer follows your blocks from top to bottom, exactly as you have placed them.

The Infinite Loop: Repeat Forever!

What if you want an action to repeat forever without ever stopping? That's exactly what an **infinite loop** is for! The `repeat forever` block is like the engine of our program. Everything you put inside it runs again and again, creating a non-stop cycle. It's perfect for our heartbeat animation, because we want it to keep beating for as long as the program is running!

Nested Loops: A Rhythm Inside the Rhythm

We can make our animations even more interesting by putting one loop *inside* another. We call these **nested loops**. In our project, the `repeat forever` loop creates the main, steady heartbeat. Inside each beat, we'll use a smaller, faster `repeat 4 times` loop to create a brand new beating rhythm. It's like having a fast rhythm inside a slower one!

Development (20-30 minutes) - Bringing the Heart to Life

1. Now that the key concepts are clear, it's time to program the heartbeat!
2. Make sure every student has a device ready and guide them through the **step-by-step process for creating their animated keychain**, as detailed below. Encourage them to notice how each part of the code contributes to the final effect.

Closing (5-10 minutes) - Rhythmic Reflection and Challenge

1. Excellent work! Once all the hearts are beating, it's time to look closely at what they have built.
2. Start the discussion: **"Awesome! Our heart is beating, but which part of the code keeps it beating non-stop? And which part creates the sound?"** Use the following questions to guide the conversation and reinforce the concepts of the different kinds of loops.

Reflect

You have just created your first animation. Which part of the code makes the heart beat non-stop?

And which part creates the fast rhythm effect after the main beat?

What would happen if you changed the number in the nested loop from 4 to 10? And what if you changed the time pauses?