TeachEngineering

Bright Ideas: Exploring Light Reflection and Sun Safety With Micro:Bits

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EDUCATIONAL STANDARDS

4-PS4-2 Waves and Their Applications in Technologies for Information Transfer

CCSS.Math.Content.4.G.A.1 Draw points, lines, line segments, rays, angles, and perpendicular and parallel lines.

LEARNING OBJECTIVES

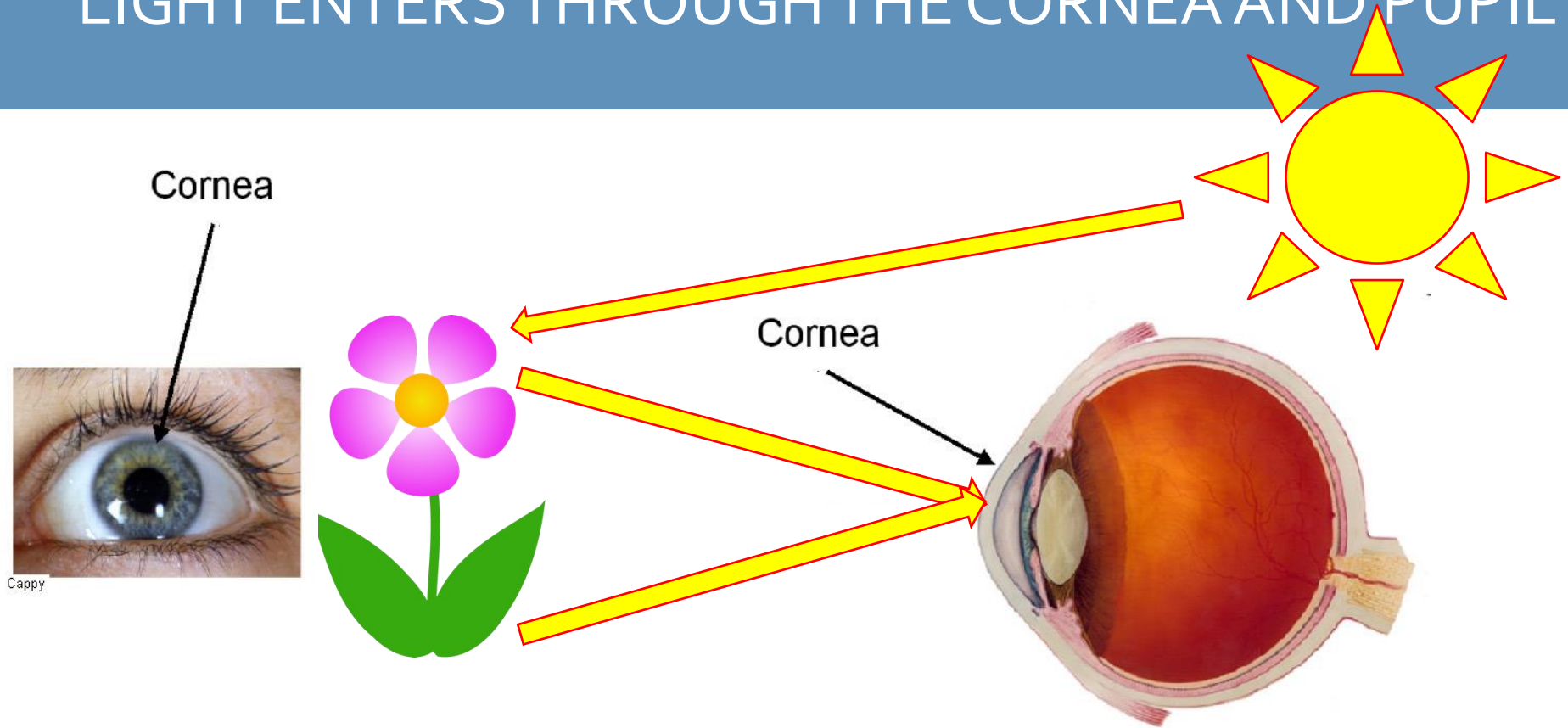
- Develop a model to describe how light reflecting from objects and entering the eye allows objects to be seen.
- Use a micro:bit to simulate the process of light reflection and vision.
- Learn basic coding and how to use a micro:bit for modeling and problem solving.

PART 1

INTRODUCTION

- How do we see things?
- What makes it possible for us to see objects, colors, and shapes?
- What happens to the light after it reflects off an object?
- How do we end up seeing it?

LIGHT ENTERS THROUGH THE CORNEA AND PUPIL



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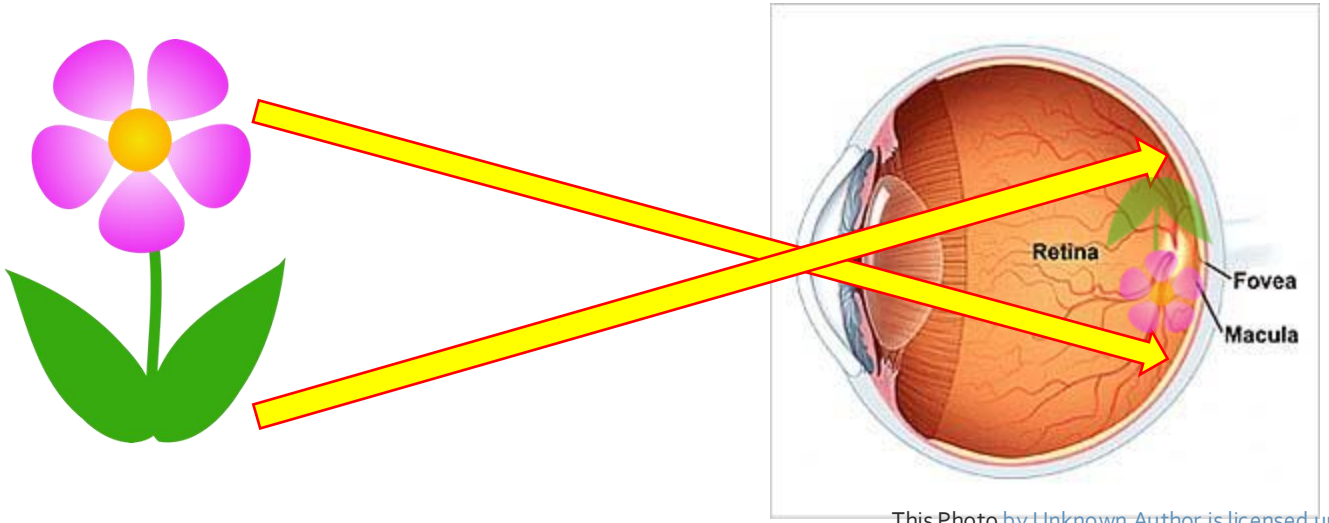
THE LENS FOCUSES THE LIGHT ONTO THE RETINA AT THE BACK OF OUR EYE



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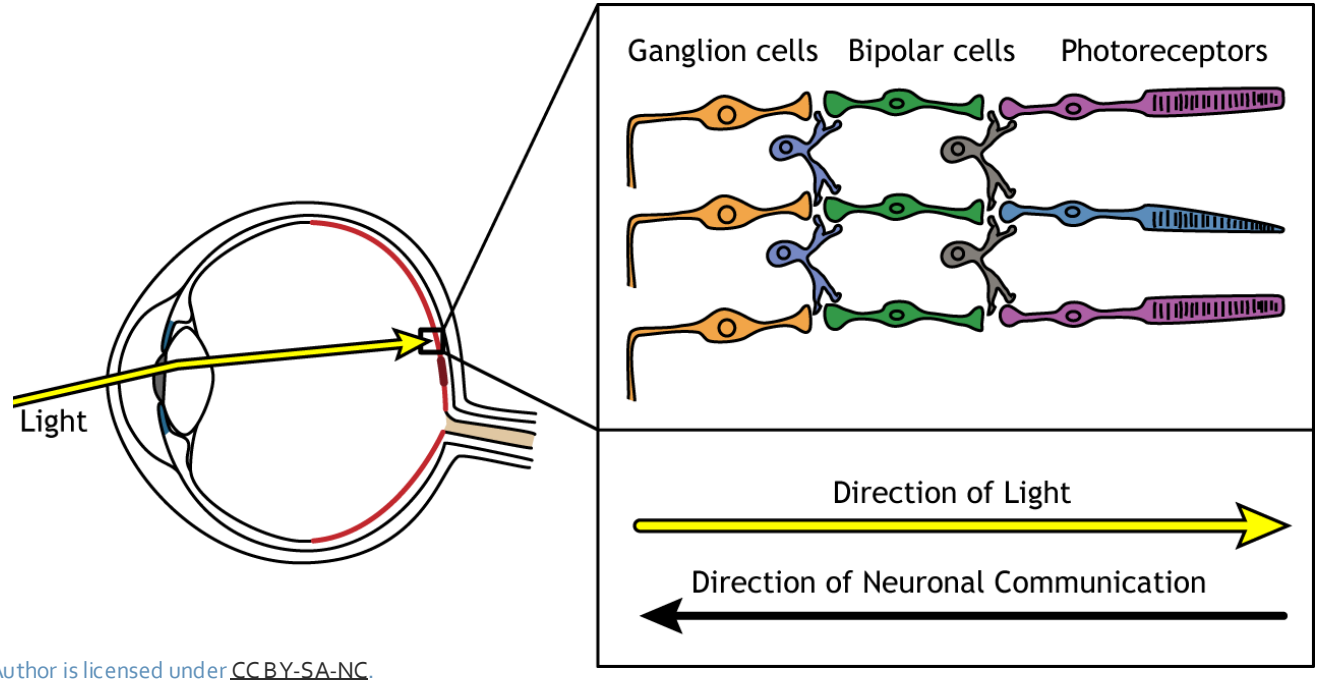
THE RETINA CONVERTS THE LIGHT INTO SIGNALS



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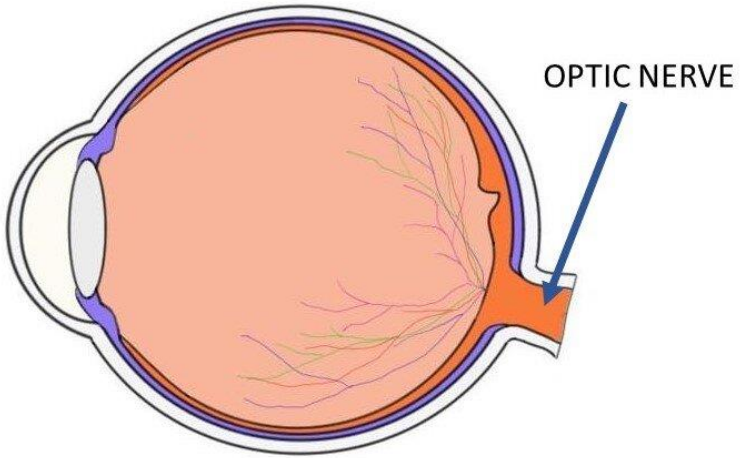
THE SIGNALS TRAVEL TO OUR BRAIN THROUGH THE OPTIC NERVE



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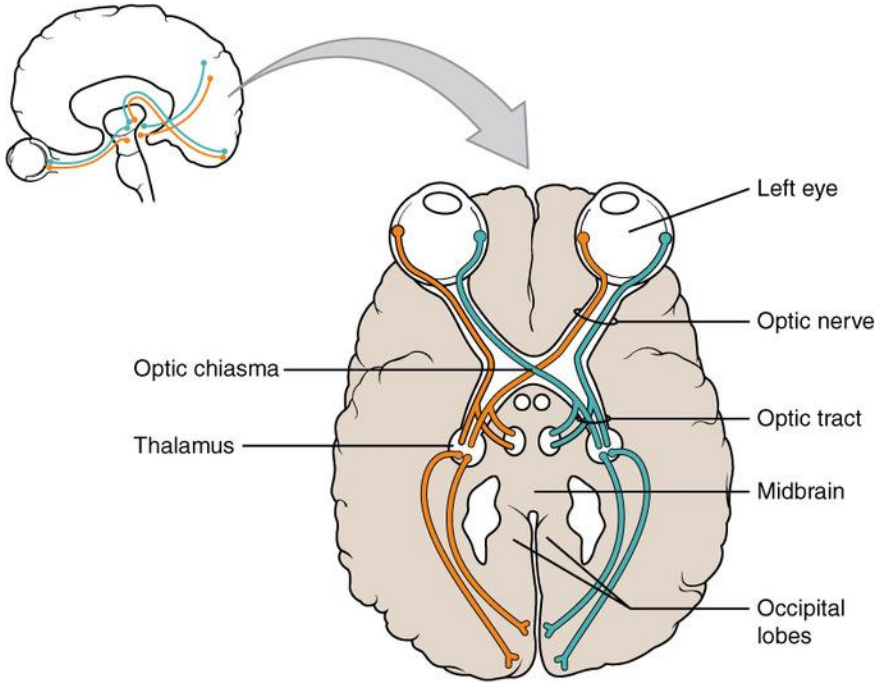

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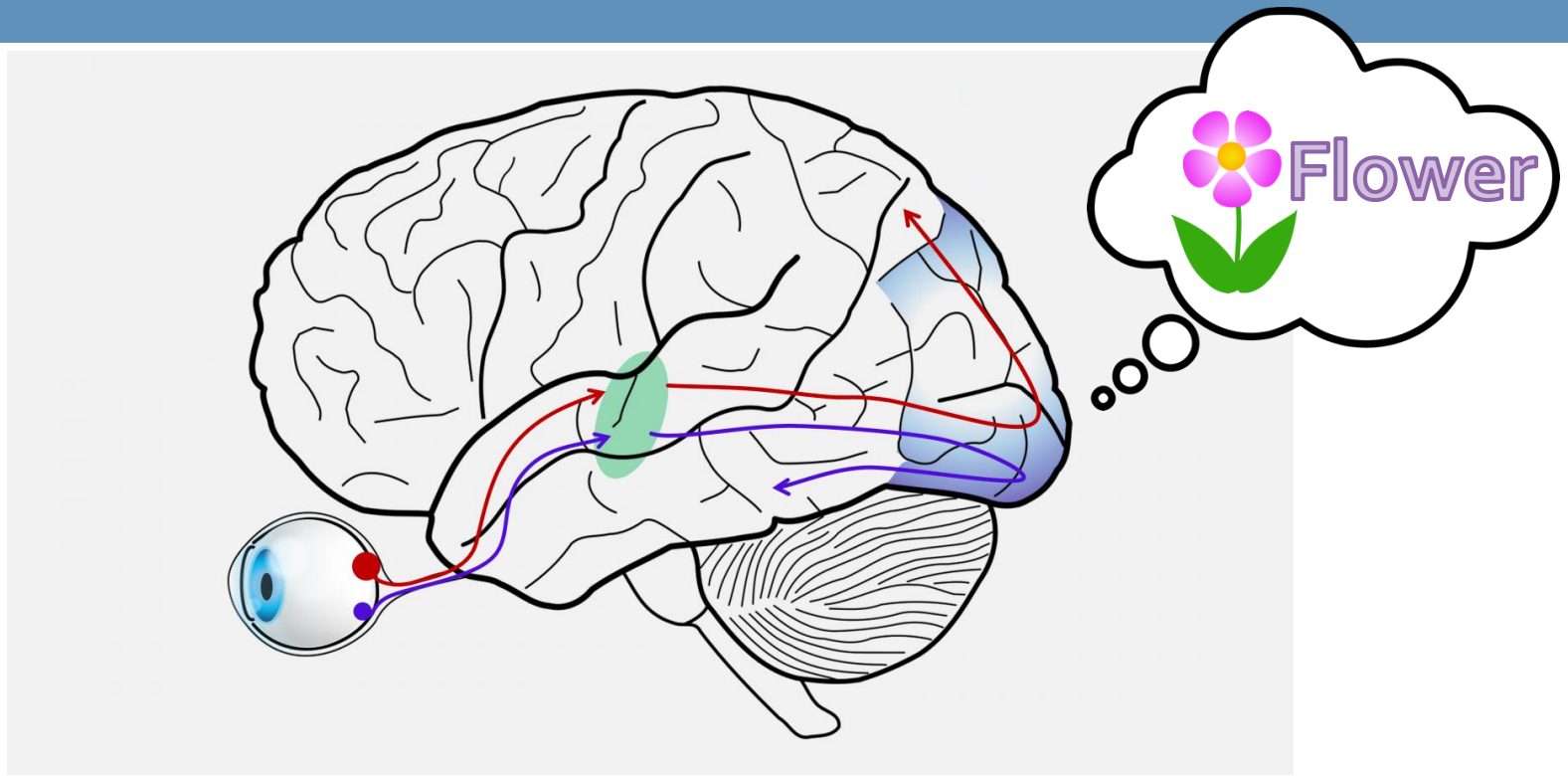
OUR BRAIN PROCESSES THESE SIGNALS AND CREATES THE IMAGE WE SEE



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INTRODUCTION

- What happens when you shine a flashlight on different objects around the room?
- What happens when you shine a flashlight on a mirror?
- Have you ever tried to see something in the dark? What did you notice?
- How did the lack of light affect what you could see?
- Why is it harder to see in a dark room?
- How does a mirror help you see yourself?

MIRROR ACTIVITY

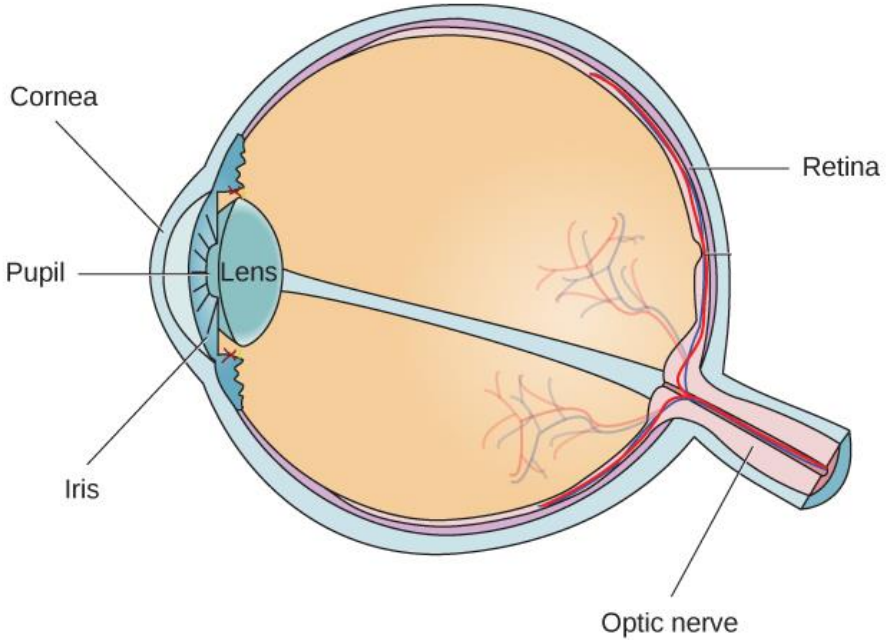
- What do you see?
- Why?
- How can the mirror show you yourself?

- On the worksheet, draw a diagram that shows how our eyes see our reflection in a mirror. Don’t forget to include labels.

BUILDING THE EYE MODEL

Using craft supplies, you are going to build a model of the eye and label the different parts. You may use the following:

- cardboard or cardstock
- paper
- markers, crayons, and/or paint
- scissors
- tape
- compass (optional)
- 3X credit card magnifier (optional)
- any other approved items



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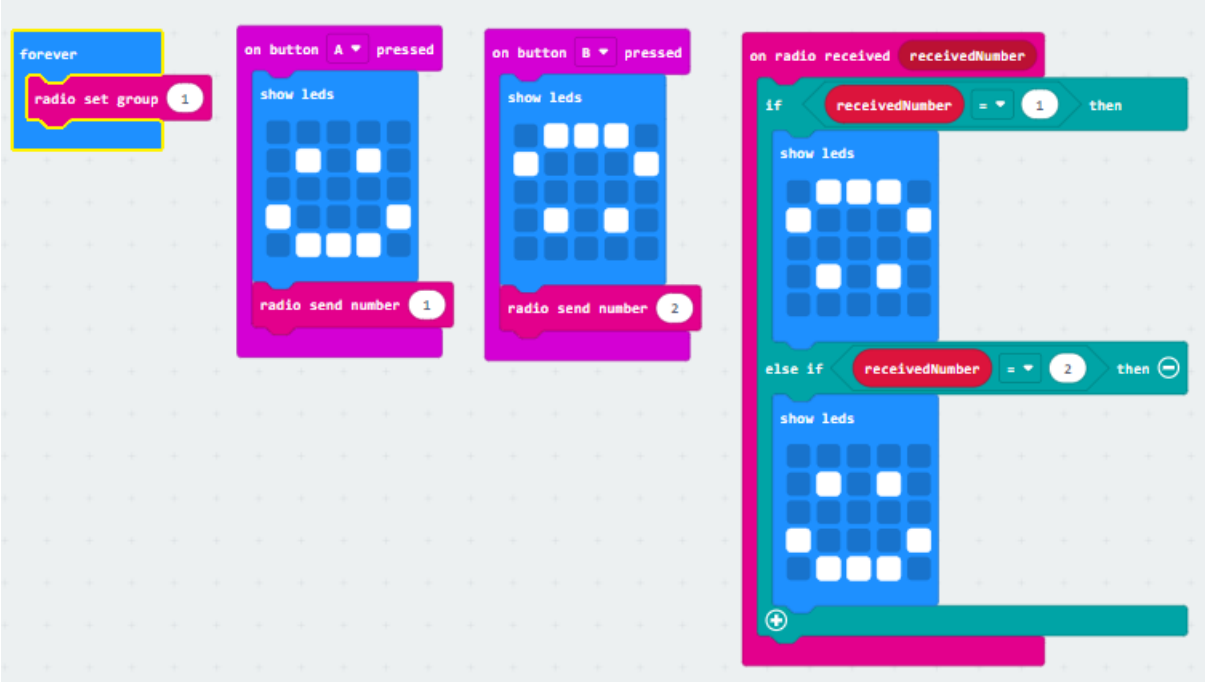
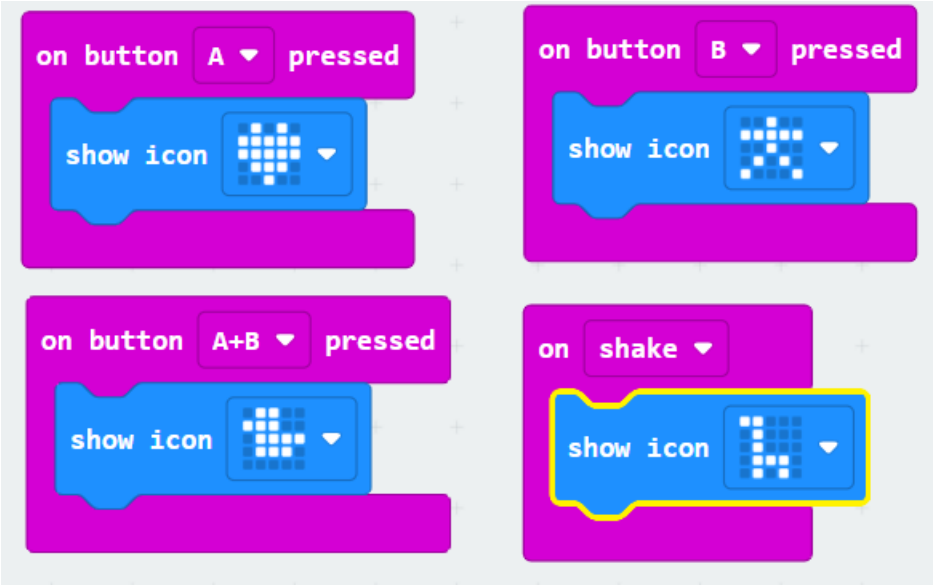
PART 2

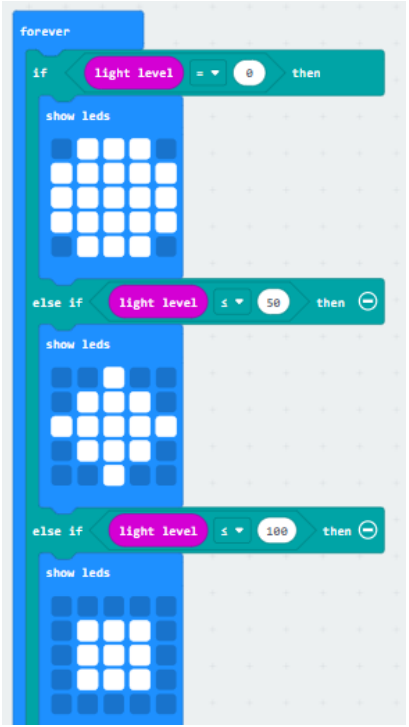
OPTION 1 - USING TWO DIFFERENT MICRO:BITS CODE EXAMPLE

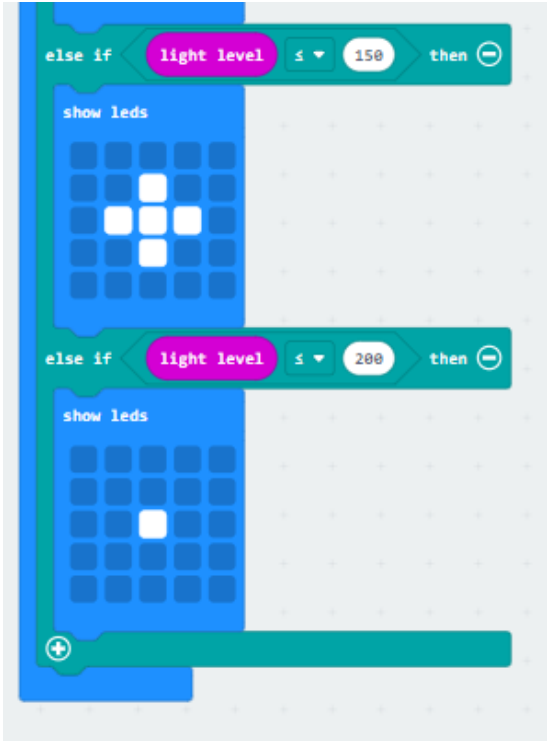


OPTION 2 - USING MAGNIFYING LENS CODE EXAMPLE



LIGHT INTENSITY CODE EXAMPLE





PART 3

CHALLENGE

- Your challenge is to solve a problem that deals with sunlight/light and/or vision using a micro:bit. You may draw a diagram, code the micro:bit, and/or make a prototype.

CHALLENGE EXAMPLE

- A reminder of when someone needs to put sunglasses or sunscreen on
- A display of how much sunlight something is receiving
- Detecting UV rays and alerting someone when they are exposed to dangerous levels
- A device that can monitor light pollution levels in different environments