CODING PUZZLES AND NUMBER PATTERNS

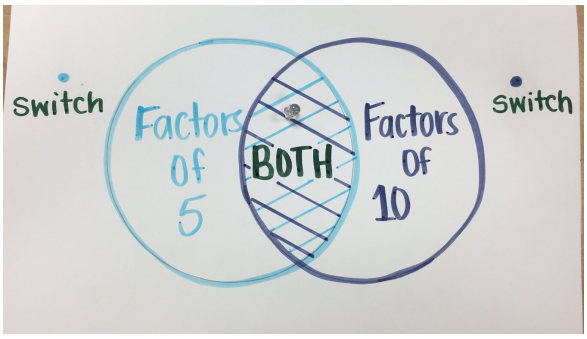
You Will Need...

- Sheet of paper, folded in half
- Coloured markers
- Conductive tape
- 1 LED
- 3V coin cell battery
- Butterfly clip
  (or paperclip to keep battery in place)

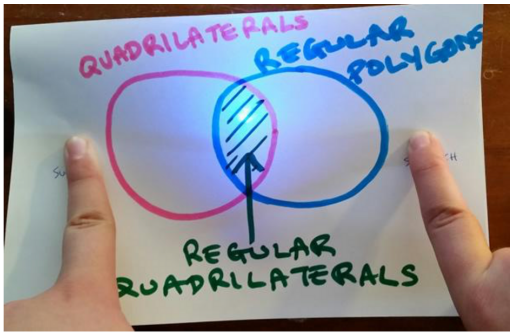
Instructions:

Use the ideas displayed in the examples below to construct a circuit that illuminates the intersection in a Venn diagram of two overlapping sets of your choice.

Factors of 5 AND Factors of 10 = Common Factors



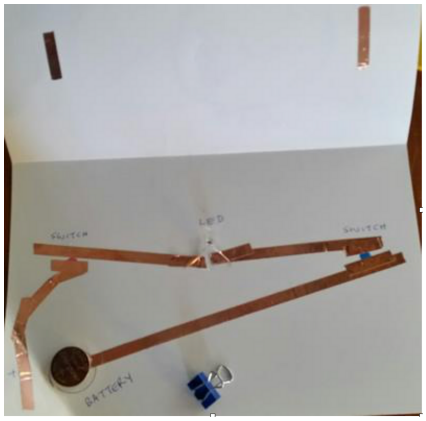
Quadrilaterals AND Regular Polygons = Regular Quadrilaterals



Create your Venn diagram on the top of the folded piece of paper.

On the inside, create a switch with your copper tape and LED (as displayed here).

Using copper tape, batteries, LED lights, and butterfly clips, we can demonstrate the **AND** command that is used in math, as well as coding.



Inside:
A copper tape circuit with two switches.

Depression of each switch activates the LED.

Click here for larger image.

Note:

For additional patterning activities with coding, visit:
Solve CODING PUZZLES with number patterns.

Mathematics Knowledge Network
Réseau de connaissances en mathématiques

STEAM-3D Maker Lab

CODING PUZZLES AND NUMBER PATTERNS

Did You Know?

Venn diagrams and **series circuits** connect to mathematics, science, and digital electronics that allows us to code.

Mathematics Connection: Boolean Algebra

Sets (like "all the quadrilaterals" or "all the regular polygons") and their relationships are an important part of math. Let's look at sets A and B:

A = {1, 2, 3, 4} B = {3, 4, 5, 6}

Here are three examples of relationships between sets:

A **AND** B = {3, 4}
A **OR** B = {1, 2, 3, 4, 5, 6}
A **NOT** B = {1, 2}

All of this is part of the branch of mathematics called Boolean Algebra.

Science Connection: Electricity & Circuits

In science, you study electricity and circuits.

In a **series** circuit, both the first switch **AND** second switch must be closed for the LED to light up. In a **parallel** circuit, either the first switch **OR** the second switch must be closed for the LED to light up.

Digital Electronics Connection: Logic Gates

What makes smartphones smart? Smartphones are smart because they can be coded to make decisions.

Let's consider the built-in alarm clock. Suppose you set it for 7:00am. In order for the alarm to sound: the alarm must be set for 7:00am **AND** the time must be 7:00am. This decision is made using an **AND logic gate.**

Boolean Algebra, circuits, and logic gates are different forms of a similar idea, which allows our devices to be coded to make decisions.