Micro:bit – Rock Paper Scissors

Introduction:

This activity allows students to explore the basic, input, logic, variable and math tools while creating a version of the rock paper scissors game.
An extension to creating the game is to have the students design and create a wrist band that the micro:bit will attach to for their game.

Learning Standards:

Applied Design, Skills and Technologies

- ✓ Understanding Context
  - Gathering information about or from potential users.
- ✓ Defining
  - Choose a design opportunity
  - Identify the main objective for the design and any constraints
- ✓ Ideating
  - Generate potential ideas and add to others' ideas
  - Screen ideas against the objective and constraints
  - Choose an idea to pursue
- ✓ Prototyping
  - Outline a general plan, identifying tools and materials
  - Construct a first version of the product, making changes to tools, materials and procedures as needed
- ✓ Testing
  - Test the product
  - Make changes and test again, repeating until satisfied with the product
- ✓ Making
  - Construct the final product incorporating planned changes
- ✓ Sharing
  - Demonstrate their product and describe their process
  - Reflect on their design thinking processes, and their ability to work effectively both as individuals and collaboratively in a group, including their ability to share and maintain a co-operative work space
- ✓ Use materials, tools and technologies in a safe manner and with an awareness of the safety of others, in both physical and digital environments.

Communication – Collaborate to plan, carry out and review a common goal and activities

- ✓ I can work with others to achieve a common goal; I do my share.
- ✓ I can take on roles and responsibilities in a group.

Critical Thinking – analyze and critique, and develop and design.

- ✓ I can reflect on and evaluate my thinking, products and actions
- ✓ I can experiment with different ways of doing things
- ✓ I can monitor my progress and adjust my actions to make sure I achieve what I want

Creative Thinking – novelty and value, generating ideas and developing ideas.

- ✓ I build on others' ideas and add new ideas of my own, or combine other people's ideas in new ways to create new things or solve straightforward problems
- ✓ I can usually make my ideas work within the constraints of a given form, problem and materials if I keep playing with them

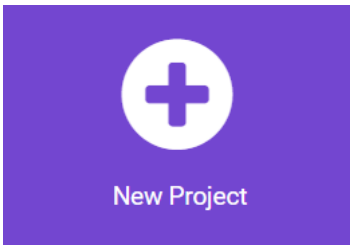
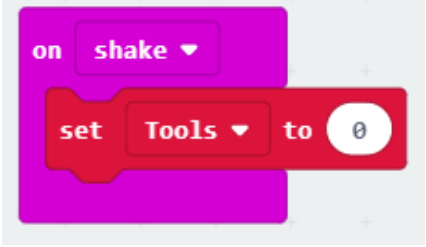
Prior Knowledge:

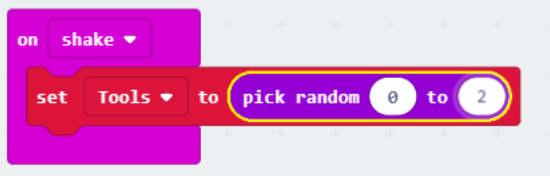
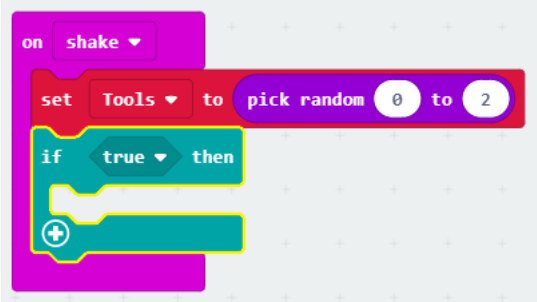
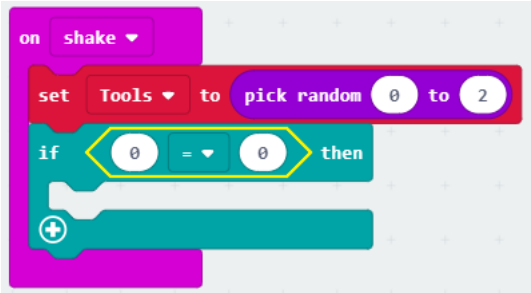
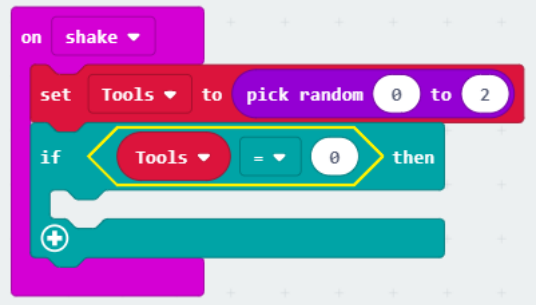
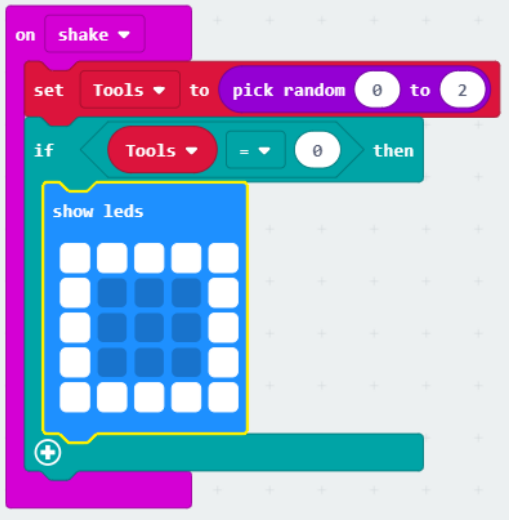
The class should have an understanding of:

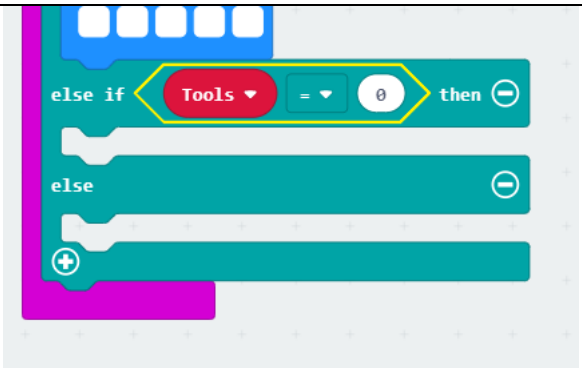
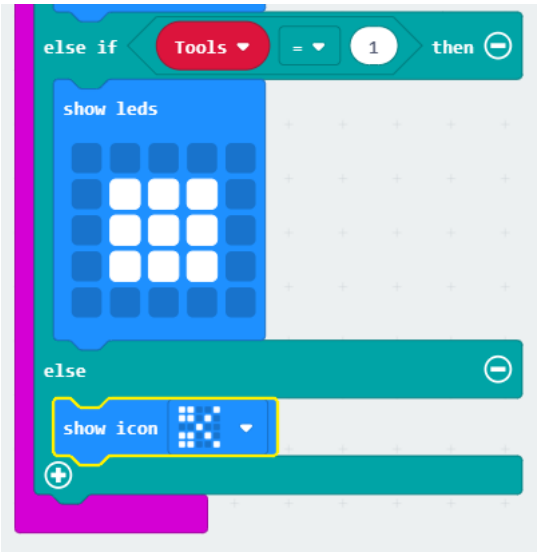
- ✓ Block coding
- ✓ Downloading projects on PC or iPad
- ✓ Syncing micro:bit to iPad

Materials:

- ✓ Micro-bit lit
- ✓ iPads
- ✓ Assorted materials for making wrist band

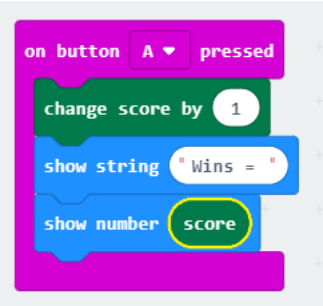
Lesson steps:		
1	Open MakeCode online: Makecode.microbit.org Click on New Project to start.	
2	Start the game with a **Shake:** Go to Input and drag the on Shake block to the right.	
3	Create a variable that will be the tool that is selected (rock, paper or scissors) a. Click on **Variables** b. Click on **Make a Variable** c. Name it **Tools** d. Put a **Set Tools to 0** block into the **Shake** block	

4	Make the microbit choose a random variable: a. Click on **Math** and then drag a **pick random 0-10** block b. Place it on top of the circle after to that has a 0 in it: c. change the 10 to a 2 (this will give 3 choices a 0, a 1 or a 2	
5	Click on **Logic** and drag an **If True then** block out.	
6	Click on **Logic** and drag a **0=0** block out a. Place the block on top of **True.**	
7	Click on **Variable** and drag a **tool** block out and put it on top of the first 0.	
8	Click on **Basic** and drag a **Show Leds** block into the **If then**. Click on the boxes to make an outer square (paper)	

9	Now you need to expand the **If then** block to include an **else if then and an else**: Click on the + at the bottom left **two** times	
10	Place another 0=0 block in the empty space and then a tools variable. Change the 0 to a 1	
11	Place another How Led block with the middle coloured in to be the rock.	
12	In the bottom **Else**, place the **Show Icon** block from basic with the scissors	
13	Now transfer it to your microbit.	

Extension:

- ✓ Have the students see if they can figure out the code for a scorekeeper:



- ✓ Making the Wrist Band - For this part of the activity students create wrist bands using various materials to attach the micro:bit to.

Assessment:
Have students write a reflection addressing the any of the following points:

- • Summarize what it was like to work together with others to design the rock, paper scissors game.
- • What was it like to design and create the code for the rock, paper scissors game?
- • What was something that was surprising to you about the process of designing and coding the rock, paper scissors game?
- • Describe a difficult point in the process of designing and coding the rock, paper scissors game.

For creative projects such as these, we normally don't use a qualitative rubric to grade the creativity or the match with their partner's needs. We just check to make sure that the micro:pet meets the required specifications:

- • Program properly downloaded to micro:bit
- • micro:bit signals easy to read
- • Written reflection (prompt is above)