



Hour of Code 2021 – Activity Guide

Archery

Workshop Outline

Build a basic archery game in Scratch.

Learning Objectives:

- Familiarity with the Scratch environment: sprite, stage and scripts
- Creating a costume
- Motion: Using the move and glide to x:/y: blocks
- Interaction: Sensing a specific colour

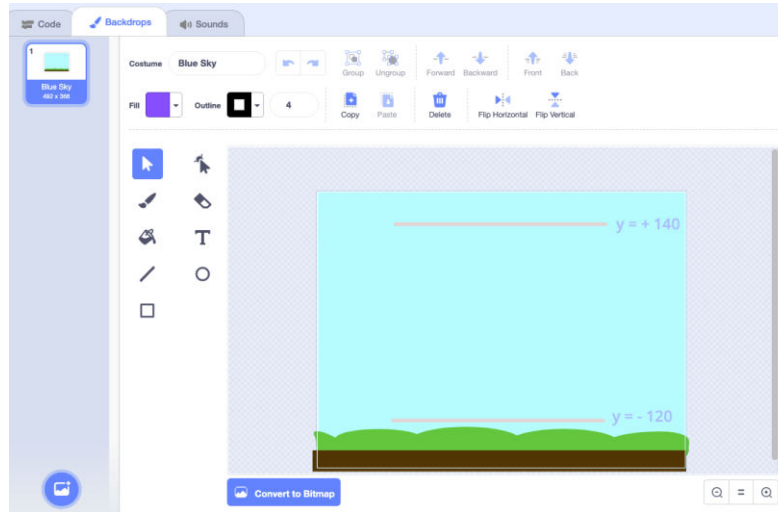
Materials and resources:

- Scratch Account (Recommended)– Scratch info [link](#) – Account info [link](#)
- Scratch starter project OPTIONAL – [LINK](#)
- Scratch completed project – [LINK](#)

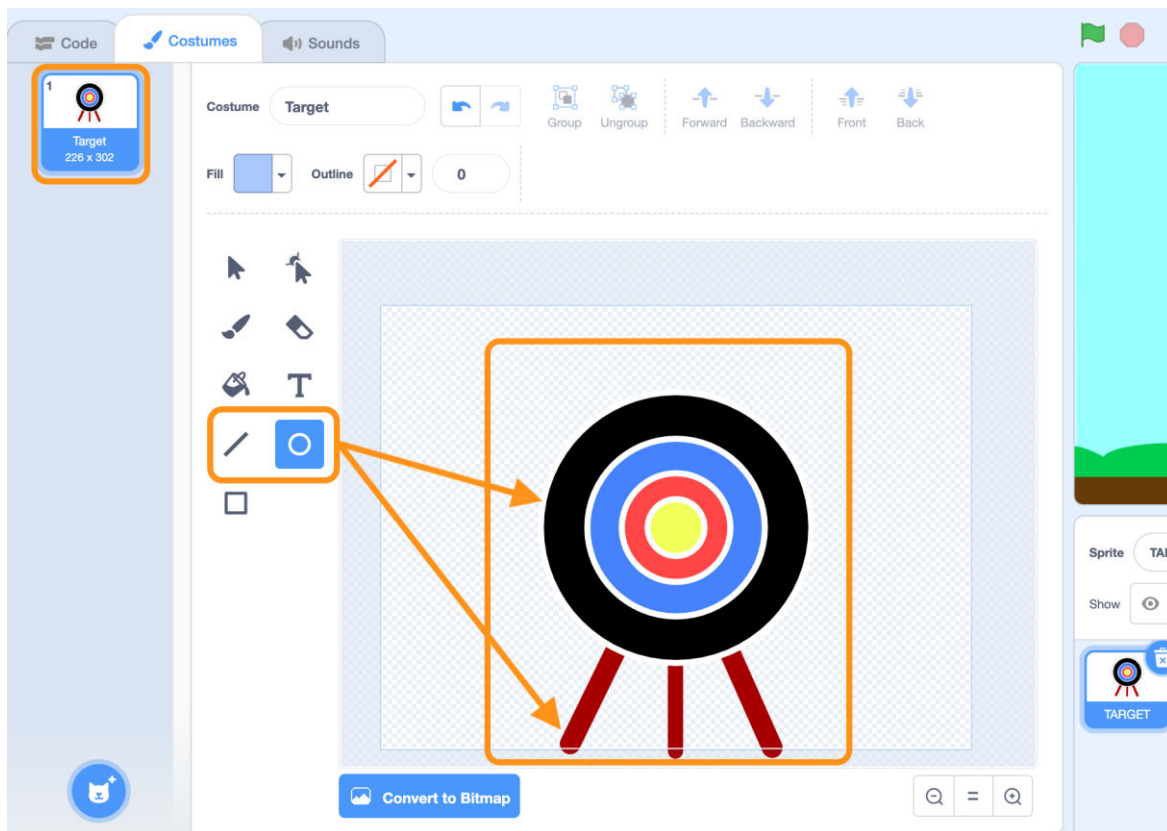
Let's Code

Defining your Background

Choose one of the provided Backgrounds for the game. This is the environment where the action will happen.



Creating the Target Sprite



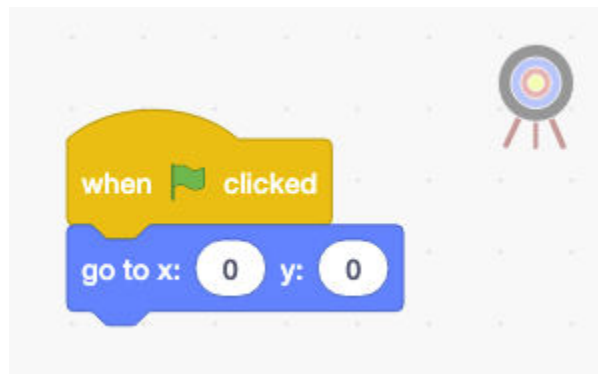
To create the Target paint 4 concentric circles of different colors with the paint tool.

1. Select the **Circle Tool** to create Circles, tweak the **fill** and **outline** parameters to your needs. Use the **shift** key while dragging to achieve a perfect circle
2. Select the **Line Tool** to create lines, tweak the **fill** and **outline** parameters to your needs.

Note: Make sure to align all the circles with the center. You can move the object until it snaps with the center. That way the circles will be perfectly concentrical

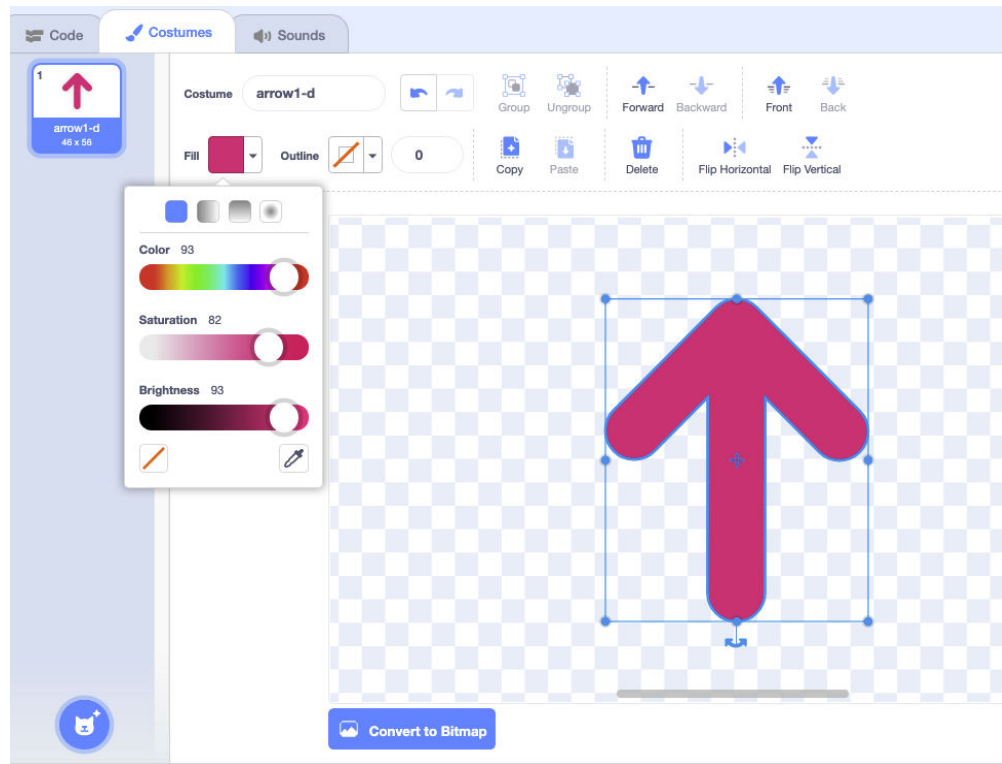
Coding the Target Sprite

The code for the Target is simple. The Goal of the code is to be sure every time we start the project we will start from the same place. In this case at position x: 0, y: 0.



With the Target position set, now move to the **Arrow** Sprite.

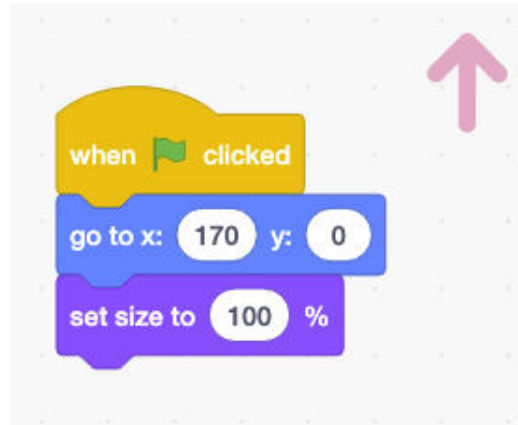
Drawing the Arrow



Make sure the arrow has no outline applied. We want clean colors for the color detection we will be using later in the exercise.

Coding the Arrow

Define the initial position and size of the Arrow as described in the image below



In this case the arrow starts at x: 170, y: 0 and its size is 100%.

Arrow movement

Add the code below to have the arrow react to the player pressing the up arrow key by setting the start at position x: 170, y: 0, with a size of 100% and then move randomly on the screen



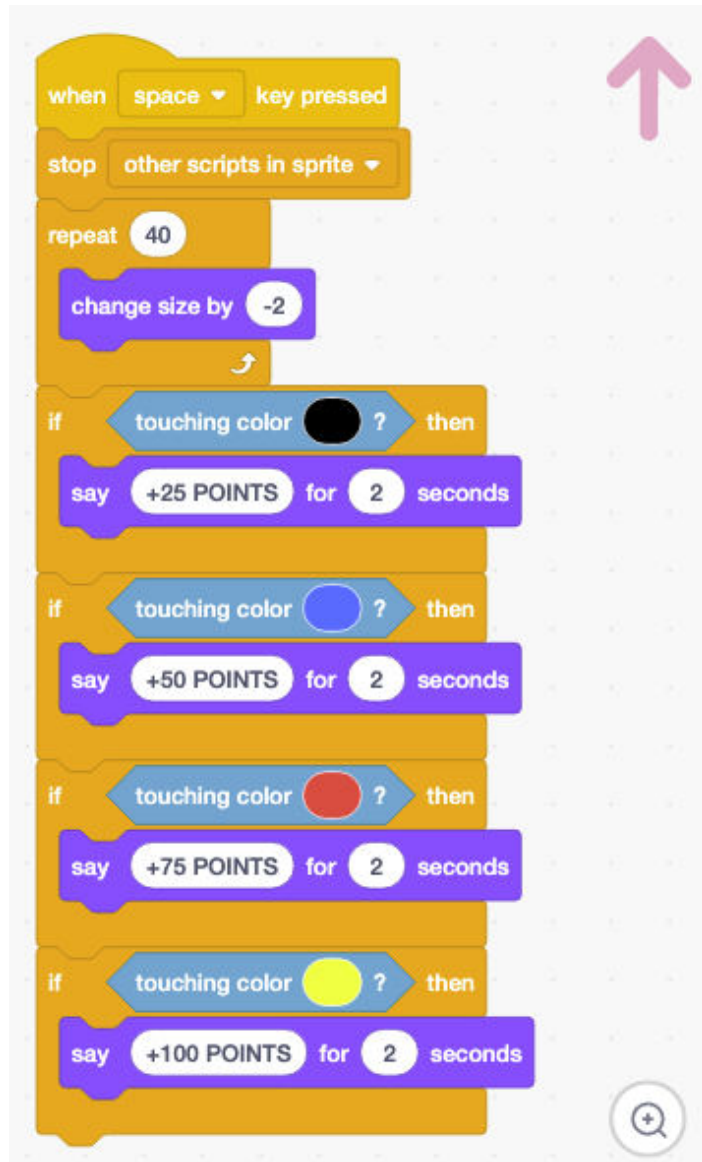
The blocks you need are found in the following sections: Events, Motion, Looks, Control and Operators.

Note: If you want to make it really easy, just use the **glide in 1 sec to random position** block.

Arrow to Target Action

In this section the goal is to have the game know what colour the target arrow hit it and to allow the player to shoot an arrow by pressing the spacebar.

Don't be intimidated by this code, as it is mostly the same idea repeated a few times. Each piece uses a different colour and message representing each target area.



```
when space key pressed
  stop other scripts in sprite
  repeat 40
    change size by -2
  if touching color black then
    say +25 POINTS for 2 seconds
  if touching color blue then
    say +50 POINTS for 2 seconds
  if touching color red then
    say +75 POINTS for 2 seconds
  if touching color yellow then
    say +100 POINTS for 2 seconds
```

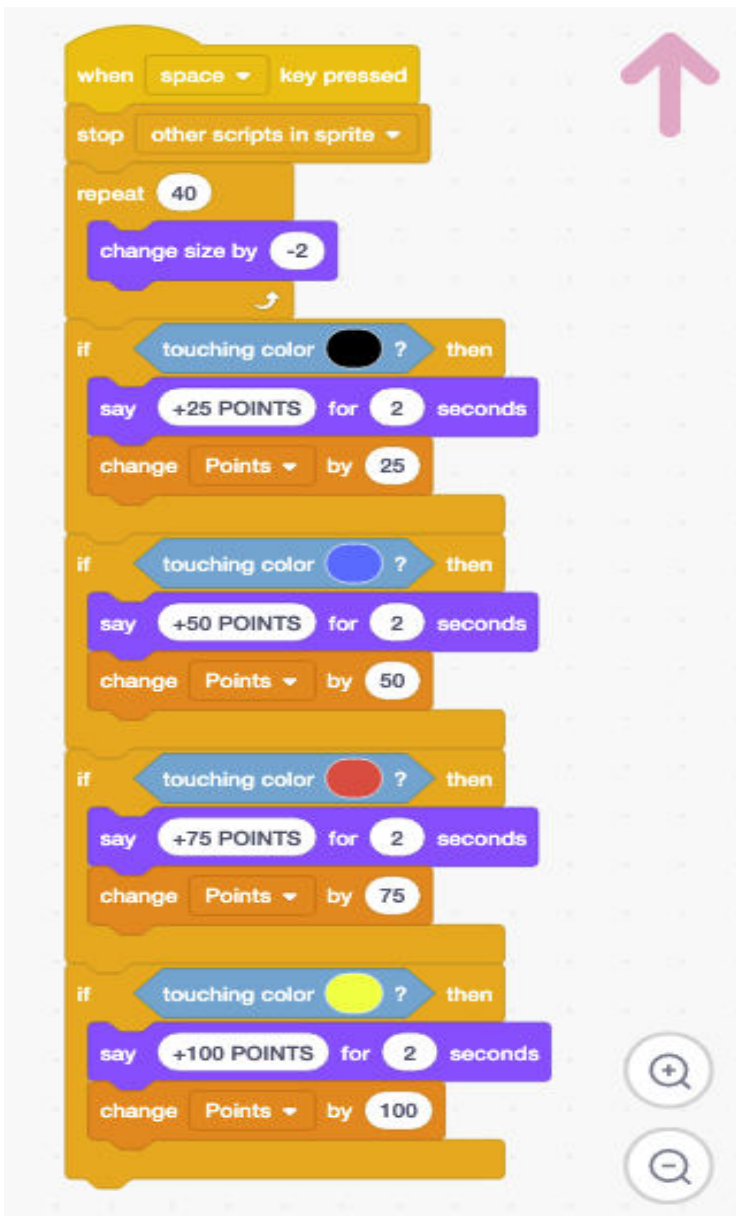
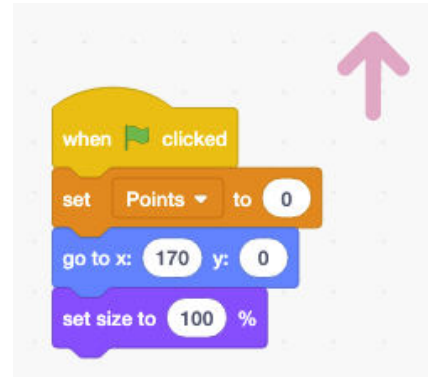
The image shows a Scratch script for an arrow to target action. The script starts with a 'when space key pressed' event block, followed by a 'stop other scripts in sprite' block. A 'repeat 40' loop contains a 'change size by -2' block. After the loop, there are four 'if touching color' blocks, each with a different color (black, blue, red, yellow) and a corresponding 'say' block for 2 seconds. A pink arrow icon is visible in the top right corner of the code area.

The first part of the code stops the user from pressing the spacebar over and over and makes the Arrow look smaller as it travels to the Target. The second part detects the area hit by the Arrow and tells the player the number of points earned.

Keeping Score

Adding a score involves two steps. First, there needs to be a place to store the numbers. Create a variable **Points** and add it to the start Arrow code you created before. Set the value it contains to zero, as you can see on the image on the right.

Second, modify the code that detects the Arrow hitting different parts on the Target, adding each time the right value to the **Points** variable as seen in the image below.



Note: To see the Points on the stage use the checkbox on the variables section.



Extensions

The project is ready, but you can make it even better. Here are some ideas you may try:

1. Add sound when:
 - The Arrow is released. When the player pressed the space key..
 - The Arrow hits the target.
 - The game is playing.
2. Changing the arrow:
 - Once the arrow hits the target, change the arrow to a cross.
3. Create a timer that forces the player to shoot within a certain time.