



# Introduction to variables

Scratch lesson plan – Code Playground



# Lesson overview

To help students understand what variables are and how to use them in Scratch by creating a coin-toss counter. Students will use variables to keep track of how many times the coin lands on heads or tails.

Time	Key learning outcomes	Resources
30 mins	<ul style="list-style-type: none"><li>Understand a variable as a storage container for data that can change</li><li>Make variables for “heads” and “tails” to keep score of coin tosses</li><li>Recognise constants as values that don’t change during the program.</li></ul>	<ul style="list-style-type: none"><li>Laptops or desktop computers</li><li>Access to Scratch website - <a href="https://scratch.mit.edu">https://scratch.mit.edu</a></li><li>A coin</li></ul>

## Content

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# Lesson introduction (5 minutes)

Introduce the concept of variables

A variable is like a storage box where we keep information that can change. For example, think of a scoreboard in a game. The score changes as points are added, so the score is a variable.

Now think of something that doesn't change during a game, like the total number of players. That's a constant because it stays the same.

Open Scratch, explain that they'll create a program to keep track of heads and tails in a coin toss. The heads and tails will be variables since they'll change as we count each toss.



# Activity – Coin toss (25 minutes)

## Part 1: Physical coin toss activity

Help students experience tracking variables by flipping a coin and recording results manually.

1. Have students work in pairs and give each pair a coin
2. Ask them to toss the coin for one minute, counting each time it lands on heads or tails
3. After the minute, ask them to write down their results and compare with other pairs.

### Ask the class

- Which numbers changed during the activity? How are heads and tails like variables?
- What stayed the same during the activity? Would that be a constant?

## Part 2: Coding a Scratch project to record the results

Support the pupils to follow the scratch coding instructions in their work book to create a coded recorder for heads and tails. Then repeat the coin flip exercise and record the results electronically within scratch.

Encourage the pupils to consider how the variables are working within the project and how they record the results of the coin flip.

### Trouble shooting and additional controls

- Ensure that students blocks are connected in the correct order to ensure that they carry out the desired steps
- Explore additional options to enhance the code.



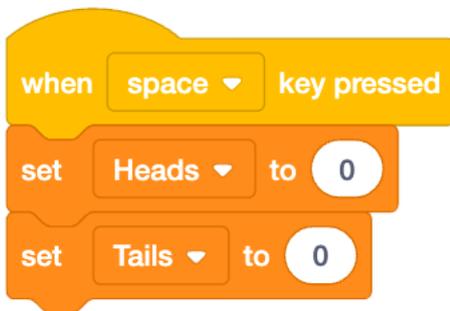
# Code snippets



```
when h key pressed
change Heads by 1
```

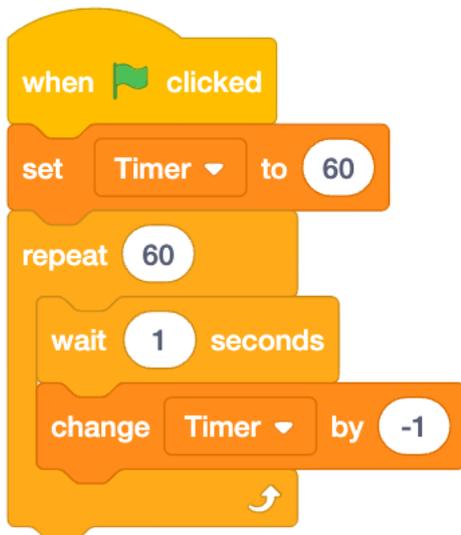


```
when t key pressed
change Tails by 1
```



```
when space key pressed
set Heads to 0
set Tails to 0
```

## Timer example



```
when flag clicked
set Timer to 60
repeat 60
  wait 1 seconds
  change Timer by -1
```

# Summary

The following information is an example of what a child at an expected level would be able to demonstrate when completing these activities with additional examples to demonstrate how this would vary for a child with emerging or exceeding achievements.

## Assessment guidance

### Differentiation – Lower ability/ASN

- Focus on creating one variable for 'heads' and show how to increase it with key presses before introducing the second variable.
- Pair lower ability students with a peer who can offer additional support, guiding them through selecting blocks and connecting them.

### Differentiation – Higher ability/extension

- Challenge students to create a variable to track one minute using a countdown or timer.
- Encourage students to add a condition that displays the final count of heads and tails after one minute.

## Plenary

- Ask students to think of other places where variables are useful, like a calculator or a game.
- Summarise that variables store information that can change, and they're essential in coding to keep track of data
- Discuss how variables helped them keep track of heads and tails without writing it down.

## Assessment questions

- Can you explain what a variable is and why it's important in coding?
- How did you use a variable in your coin toss program?
- If you wanted to add a third option for 'tails on another side of the coin,' how would you set it up?