

4.2

Exploring Variables: TIPP&SEE (Use->Modify->Create)

[unit table](#)

Students will be able to:

1. Use the TIPP&SEE strategy to explore how variables are used in Scratch.
2. Explore how the set and change variable blocks are used in Scratch.

Learning Activity Summary

1. [Review Variables](#) (8 minutes)
 - a. Optional: How to Create a Variable in Scratch (4 minutes)
 - b. Variables Video (4 minutes)
2.  [Optional: Turn & Talk \(4 minutes\)](#)
3. [TIPP&SEE: Robot Space Snacker](#)
 - a. Examine the “outside” of the project (5 minutes)
 - b. Explore the “inside” of the project (10 minutes)
 - c. Go over the answers together as a class (5 minutes)
4. [Example Game Projects](#): Students will play 3 Scratch games which are examples of the unit's project (5 minutes)



[Optional Turn & Talk \(4 minutes\)](#)

Student Materials

- [A2:U4 Student Workbook](#)
- Computer with Internet

Teacher Preparation

- [A2:U4.2 Teacher Slide Deck](#) - projected
(*Speakers turned on*)
- Robot Space Snacker project: bit.ly/robotinsnacker



A2:U4.2 Variables Engage Video: bit.ly/variablesvid
(*Optional - present or assign to class*)



A2:U4.2 How to create variables Video:
bit.ly/Scratchvariables (*Optional - present or assign to class*)



[A2:U4.2 Variables TIPP&SEE Google Form Version](#)

(*Optional*) Links to example projects:

- bit.ly/A2U4game1
- bit.ly/A2U4game2
- bit.ly/A2U4game3

4.2 Lesson Presentation



ENGAGE EXPLORE
(Use->Modify->Create)

Variables: Review

VARIABLES

Store a value that **can change**.
The value can be used in other parts of a program.

What's your name?





Who remembers what a variable is?

ANSWER: *It stores a value that can change and that can be used in many parts of a computer program. A variable holds one value at a time.*

in Student Workbook

VARIABLES

A **variable**
can be used as a value in a conditional block

 or an argument in an action block


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Variables can be used in programs in different ways. When a variable is used in a conditional block, certain actions can be programmed to happen when the variable is equal to a certain number. For example, a game can be programmed to end when the variable score is equal to 10.

A variable can be used as an argument in an action block. The variable value stored in the action block can determine how many times an action should happen: the number of steps a sprite takes, the degrees a sprite should turn, what a sprite says, and how much a sprite should change its size.

REMINDER: An **argument** is a computer science term that describes the part of the block that you can change. An argument value can be a number, text, color, or variable.

in Student Workbook

VARIABLES

In this script, the program will say "Game over, you win!" and stop all actions when the variable **Score** equals **10**.



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Look at this script. Can anyone tell me what condition needs to be true for the game to end and all the actions to stop?

Answers:

<press space> **Score** <press space> **10**

in Student Workbook\

VARIABLES

When the **green flag** is clicked, the **Steps** variable has a starting value of **3**. How many total steps will the soccer ball sprite move? **9** steps

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Look at this script. When the green flag is clicked, when the green flag is clicked, what is the starting value of the **Steps** variable?

Answer: <press space> **3**

How many steps will the soccer ball sprite move in this script?

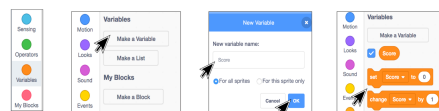
Answer: <press space> **9**

Who can explain why 9 is the correct answer?

Answer: The Steps variable tells the sprite to move 3 steps, and the move block is in a repeat loop that repeats 3 times.

How to create a variable in Scratch

In Scratch, you create the variables that are used in your project.



WB Page 69

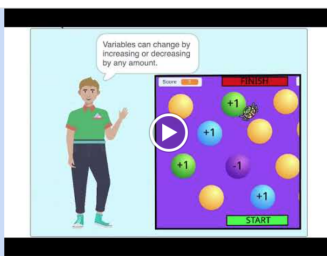
These images are in the Student Workbook on page 69. Students will need to know how to create a variable in the Quest next lesson. You can model this process in Scratch, if you'd like, or show the video:



bit.ly/Scratchvariables.

VARIABLES Concept Video

bit.ly/variablesvid



(optional) Show this video to students for more clarification of what variables are, or assign it for students to refer to asynchronously.



A2:U4.2 Variables Engage Video

bit.ly/variablesvid

(Optional) Turn and Talk



TURN AND TALK

With a partner, brainstorm ways that variables can make a program more interesting.

variable

This task gives students the chance to apply the information they have just received.

Possible answers:

Most will likely say to keep score. Other ways may be a timer that counts down the time or that counts how long you have played, keep track of the number of lives left in a game.

TIPP&SEE: Robot Space Snacker

in Student Workbook

TIPP & SEE ACTIVITY: Robot Snacker

1. Click or Type: bit.ly/robotsnacker

2. Read the following:

Title (of project)
Instructions (how to use project)
Purpose (skills to learn)



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Allow students time to complete the TIPP&SEE process on their own in their workbooks (and on the computer) **before** you discuss the answers together.

Note: You will want students to use headphones if possible.



[U4 TIPP&SEE Google Form](#)

Then go through the answers on the slides together.

in Student Workbook

TIPP & SEE ACTIVITY: Robot Snacker

3. Play. Follow the instructions below and put a ✓ next to **ALL** the actions you see.

When ...	Actions
I click the [green flag]	☒ Sprites 1 ☒ Sprites 2 ☒ Sprites 3
When the [robot] touches the [apple]	☒ Make a sound ☒ Jump up ☒ Change color ☒ Change volume
The Score = 5	☒ Make a sound ☒ Jump up ☒ Change color ☒ Change volume

What happens?
☒ Sprites 1
☒ Sprites 2
☒ Sprites 3
☒ Make a sound
☒ Jump up
☒ Change color
☒ Change volume

Encourage the students to tinker (Explore). Make sure students click on the [See inside](#) button, so they can see the scripts. Give students a few minutes to answer the Explore questions.

Answers in RED

in Student Workbook

TIPP & SEE ACTIVITY: Robot Snacker

4. Click [See inside](#). Click on the **Sprite** and find the **Event**. Put the letter of the block in the appropriate blank.

A  B  C 

a. Predict which script will increase the score value when the Robot touches the Apple: **C**
 b. Predict which script will set the score to 0 when the game starts: **A**
 c. Predict which script will stop the game when the score equals 5: **B**

Students might choose “2” as the answer to the second Explore question. Remind them that in the first Explore question they set the starting Score to be “-1” which would result in the score to be “1” after eating one apple.

in Student Workbook

Example Game Projects

Play Some Games!

Check out these three games made in Scratch. Examine how they have used variables.

bit.ly/A2U4game1
bit.ly/A2U4game2
bit.ly/A2U4game3

Which game do you like the best?

If time allows, give students 5 minutes to play with these three games.

These games are examples of the Games with Variables that students will create in this unit.

Ask students how variables are used in each of them.

Answer: All 3 games use the variables to keep the score in the game.

(Optional) Turn and Talk



TURN AND TALK

If you could create a game in Scratch where you could keep score, what kind of game would you like to create?

Try to save a couple of minutes to give students a chance to think about what kind of game they would like to create. They will plan their game in the next lesson!