4.3 Variables: Quest & Plan
(Use->**Modify-**>**Create**)

Students will be able to:

1. Modify, delete, and add coding blocks in an existing project.
2. Use, set, and change a variable in Scratch.
3. Collaboratively work in pairs to plan their project.
4. Discuss and decide on the theme, rules, and how their game will end.

Learning Activity Summary

1. Review how variables are used in a script (5 minutes)
2. Quest Activity (15 minutes)

   Optional: Turn and Talk (on slide) (4 minutes)
3. Introduce the Games with Variables Project (6 minutes)
4. Plan the Game with Variables with a partner (20 minutes + additional time allocated in the next lesson if necessary)

Student Materials

- A2:U4 Student Workbook
- Computer with Internet

Teacher Preparation

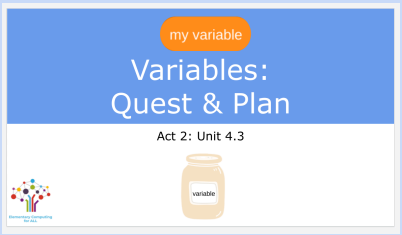
- A2:U4.3 Teacher Slide Deck projected
- Turn and Talk: Script example in Scratch
- Links to example projects:
  - bit.ly/A2U4game1
  - bit.ly/A2U4game2
  - bit.ly/A2U4game3

D.L. A2:U4.3 Variables: Quest Google Form

D.L. A2:U4.3 Planning Pages Fillable Slide

- Build your Scratch skills
  bit.ly/dragsprite
  bit.ly/Scratchvariables
  bit.ly/changebackdrop

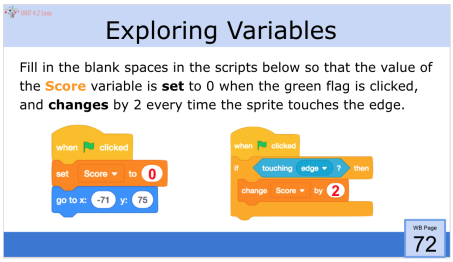
4.3 Lesson Presentation



ENGAGE

Variables Review

in Student Workbook



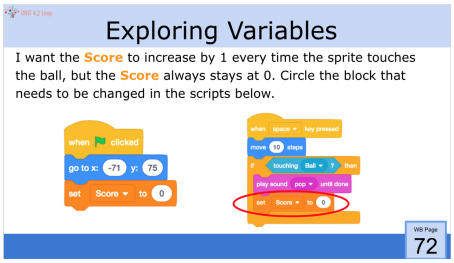
Let's look at some scripts to review how the set and change variable blocks are used in Scratch. How would you change the first script so the score is set to 0 each time the user clicks on the green flag?

Answer: Put a <press space> ***0*** in the white argument circle

How would you change the second script to make the score increase by 2 each time the sprite touches the edge?

Answer: Put a <press space> ***2*** in the white argument circle

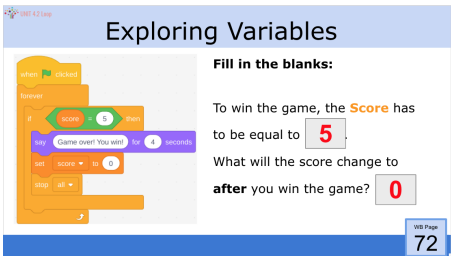
in Student Workbook



In these scripts, the score should increase by 1 every time the sprite touches the ball, but it doesn't. The score always stays at 0. Can you figure out what needs to be changed?

Answer: <press space> *the "set" block in the second script needs to be a "change" block, and there needs to be a 1 in the white argument circle.*

in Student Workbook



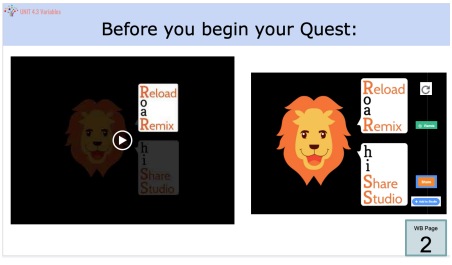
According to this script, when does a user win the game?

Answer: <press space> *when the score equals 5*

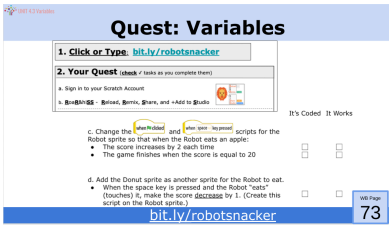
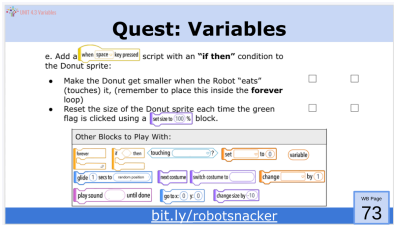
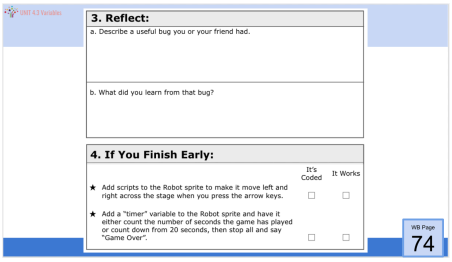
What will the score change to 4 seconds after the game is won?

Answer: <press space> *0*

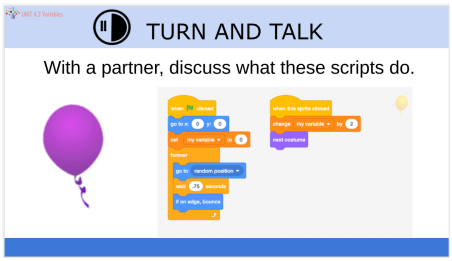
QUEST



Remind students that the "Quest" is where they get to modify the Scratch project they used in the TIPP&SEE.

	Remind students that before they begin the Quest they need to follow this procedure to save their project in their Scratch accounts: RoaR & hiSS: Reload, Remix, Share, and add to Studio Show or have students click on the **Reload** icon on the browser and then the Remix button to create a copy of the project to their account. **Have them rename the project to your liking**. Then have students click on the Share button and add their project to the class studio with Add to Studio. Then click the See inside button to start the Quest.
in Student Workbook  	Present the Quest. Read through the requirements and brainstorm ideas of how to complete the tasks. Ask students to check off the completed tasks as they code and check their code when they are finished. Remember, the Quest is designed to be challenging. Encourage the students' productive struggle! You can choose to use the workbook page or provide a link to the virtual version of this form. A2:U4.3 Variables: Quest Google Form
	Have students turn to the second page of the Quest on page 74 in their workbooks. Remember that a bug is something that happens that you did not want or expect to happen in your project. A helpful bug is one where you learn something about coding. Ask students to list their helpful bug(s) or to state that they did not experience a bug. If students finish the Quest required activities and reflection early, then can optionally work on the "If You Finish Early" tasks.

Turn and Talk

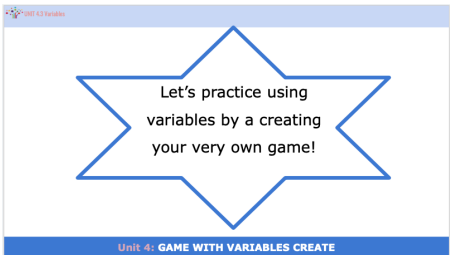


There are some new blocks in these scripts. Let's do a little exploring. What do you think the new blocks do?
Point out the new blocks and have students discuss this question for about 2 minutes. Have one student share what the pair talked about.
Discussion points:

- What does the "go to random position" block do?
  - *Answer: makes the sprite move to a different/random position on the stage*
- What does the "if on edge, bounce" block do?
  Answer: makes the sprite change directions when it touches the edge of the stage
- The coder can give a variable any name they want to. What is the name of the variable in this script?
  Answer: "my variable".
  Variables should be given a name that represents the value it stores. What would be a good name for the variable in this script? *Possible answer: "Score"*

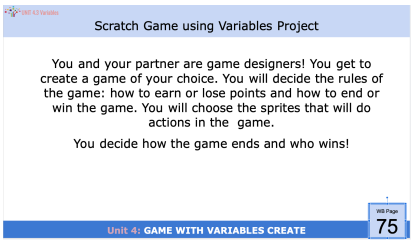
You can show the script in action by going to this link:
bit.ly/A2U4talk

Introduce Games with Variables

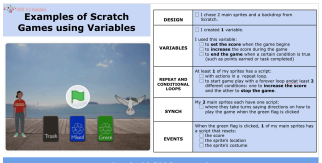


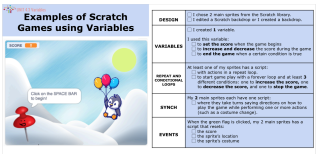
Let students know that they will experiment with variables in Scratch by planning and building a unique game of their own design!

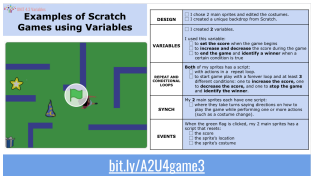
in Student Workbook



Tell students that for this project, they are game designers! In partners, they get to create a game of their choice. You and your partner will decide the rules of the game: how to earn or lose points. You and your partner will choose the sprites that will do actions in the game, how the game ends and who wins!







Teachers, feel free to share your own game that you created at this time! In the next three slides, you will provide examples of what they can do and how they correspond with the expectations on the rubric.

- Links to example projects:
  - bit.ly/A2U4game1
  - bit.ly/A2U4game2
  - bit.ly/A2U4game3

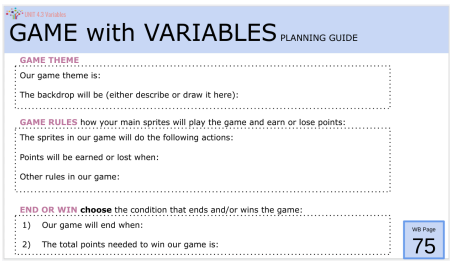
Be sure to let the class know that they will develop this project in *PARTNERS*.

Also, as you review the games, make students aware of the increasingly challenging requirements of the rubric on page 78.

Note: Each partner can fill out the planning pages in their own workbook, or partners can work together to fill out the planning pages in one workbook.

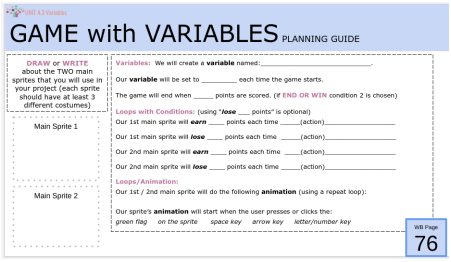
PLAN

in Student Workbook



The first three things you and your partner need to decide for your game are the **theme**, the **rules**, and **how the game ends**.
The **theme** can be the setting where your game takes place, such as on a basketball court or in space. Another possibility for a theme is to base it on a story, such as using characters from a movie or cartoon, or video game. There are many other possibilities. During this time, sketch out possible backdrops for your game. Next, you will decide **how points will be earned or lost**. These are the rules of the game: what actions will happen in your game to earn or lose points.
Lastly, decide **what condition will end the game**. Will it be a certain number of points? Or when a certain task is completed?
Give students about 10 minutes to decide on these three things and write them on their planning pages: the theme, rules, and how the game ends.

in Student Workbook



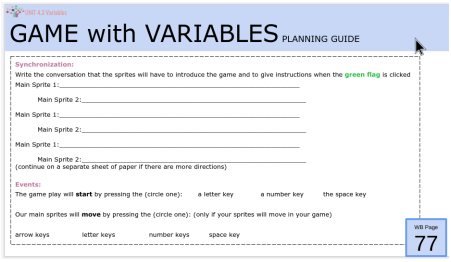
Next, based on the theme you and your partner chose, think of at least two appropriate sprites that fit your theme. Sketch out what you imagine them to look like.

Then decide what type of variable you will use in your game. Select a name that represents what the variable is.

- Decide what the variable will be initially set at. If you have chosen a certain number of points as the way to win the game, include the number of points required to win the game.
- Add in the details of how points will be earned or lost.

Lastly, for this section, decide on how you will animate your sprites in your game and decide which event block will start the animation.
Give students about 10 minutes to decide on these three things and write them on their planning pages: the sprites, the variable, and the animation.

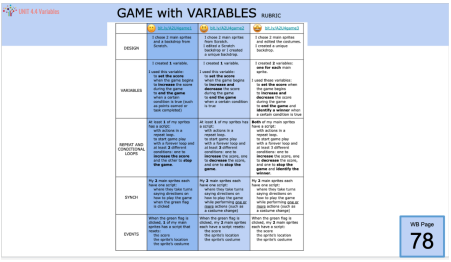
in Student Workbook



The two sprites will explain the instructions for the game and what the user has to do. You will plan out with your partner what each of the sprites will say to explain the theme, rules, and how the game ends.

Decide what event will start your game and how your sprites will move in your game.

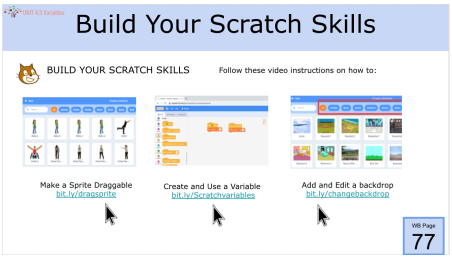
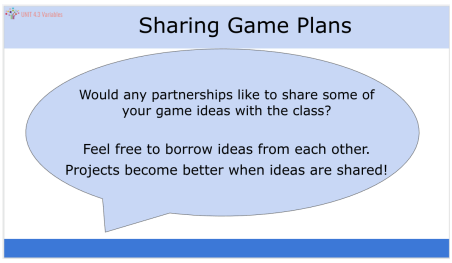
Note: Students will work on this in the following lesson. Just review this with them so they are aware that it is part of the planning pages for the project.



Direct students to page 78 in their workbook. This is a review of the criteria rubric for the project. Your main goal is to complete all the tasks in the first column. If you would like to challenge yourselves, you can also complete tasks from the 2nd and 3rd columns. Use this rubric as you plan your project.

Emphasize that the skills in the 2nd and 3rd columns are additional skills that they should try once they have completed all the requirements in the 1st column.

This rubric is in the planning section in order to give students a chance to decide in what areas they will challenge themselves.

	The rubric will be discussed again in the next “building” lesson.
in Student Workbook 	If students finish early, encourage them to review how to make sprites draggable, review how to create and use a variable, and how to change the backdrop.
	(*Optional*) If time allows at the end of the lesson, ask a few partnerships to share some ideas from their game plan.