Lesson 5.4: 13 Colonies - Keep Score and Fun Facts

Objectives

In this lesson, students will:

- Learn to approach a more complex project with planned tasks and algorithms
- Practice assessing the status and next steps of a larger programming project
- Practice iteratively building upon smaller programming steps to create a large program

Preparation

- ❑ Projector for class demonstration and instruction
- ❑ Print student activity worksheet

Agenda

1. Status and Coding Plan	10 mins
2. Keep Score and Display Fun Facts for Massachusetts	20 mins
3. Keep Score and Display Fun Facts for All Colonies	15 mins
4. Wrap Up and Reflections	5 mins

Resources & Links

- ❑ Lesson 4 starter project (in case students were absent or could not finish the prior lesson): https://scratch.mit.edu/projects/545827968

1. Status and Coding Plan

Display your screen and discuss the status of the program and next steps using the Colonies Coding Plan.

Colonies Coding Plan:	
Task	**Next Steps Algorithm:**
Game Setup: Create the Game Instructions	Done
Game Setup: Create the Colony Labels	Done
Create needed variables: score and the list of colonies	Done
Initializations	Done
Display Colony Name	Done
Check if the user clicked the correct colony	Done
Keep Score and Display Fun Facts for Massachusetts	If the colony number is 1 which corresponds to Massachusetts, then ● Increase score by 1, ● Tell the label to hide ● Tell FunFacts sprite to display a fun fact about Massachusetts ● Tell the player to press spacebar for the next label to be displayed.
Keep Score and Display Fun Facts for All Colonies	1. Add the Massachusetts script to the backpack 2. For each colony sprite, drag the script from the backpack. 3. Change the colony number, the broadcast message and the text corresponding to the correct colony

2. Keep Score and Display Fun Facts for Massachusetts

Note: During this exercise you will demonstrate sections of code and then ask students to catch up with you. You can choose how frequently you ask students to catch up with you. Suggested prompts are given, but the frequency will also depend on how well students are able to code independently on their own.

Display your screen and engage students in a demonstration and instruction:

When the colony label appears, the user is supposed to click on the correct colony on the map. How do we know they clicked on the correct colony?

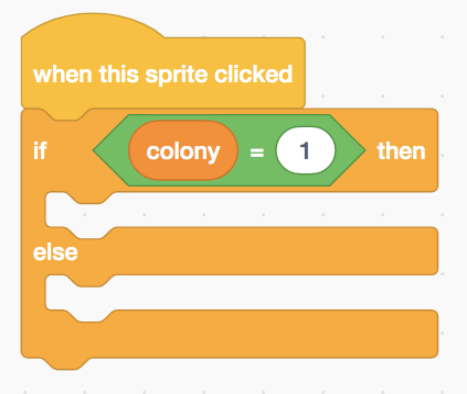
Each colony has been assigned a number, that is why when you created the costumes for each colony label they had to be in the correct order, so that costume1 is for Massachusetts, costume2 is for New Hampshire and so on.

As we can see in the following table (exhibit A), each colony has it's designated number so we can easily test if the user clicked on the correct one.

Sprite	Number	Colony name	Sprite	Number	Colony name
	1	Massachusetts		2	New Hampshire
	3	New York		4	Connecticut
	5	Rhode Island		6	Pennsylvania
	7	New Jersey		8	Maryland
	9	Delaware		10	Virginia
	11	North Carolina		12	South Carolina
	13	Georgia			

Let's say the random number assigned to **colony** is 1. This corresponds to Massachusetts. If the user clicks on Massachusetts the user identified the correct colony. Success!

For the code to check the correct colony label we will use an if-then-else statement and compare colony to the number 1.



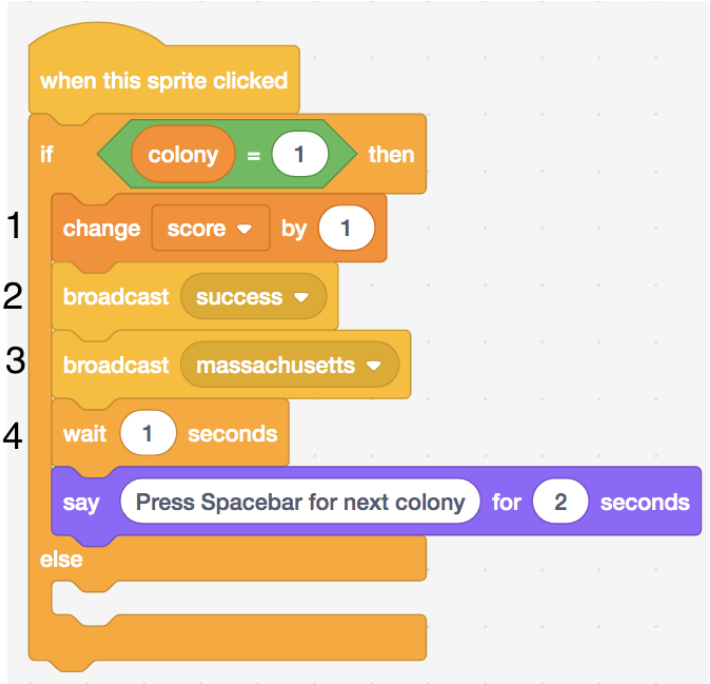
Students Turn:

Tell students to add the demonstrated code to their project.

Continue your demonstration.

If the colony number is 1, we need to do the following:

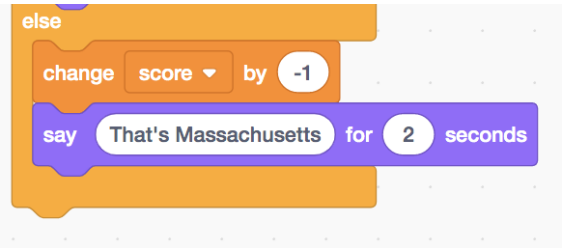
1. Increase score by 1
2. Hide the label:
   Which sprite is in charge of hiding the label? The Label sprite!
   So from our Massachusetts sprite, broadcast a success message so the sprite knows to get to work.
3. Let the FunFacts-Massachusetts sprite know it needs to display a fun fact, so we send a 'massachusetts' broadcast message.
4. Let the user know to press the spacebar. We will wait some time to give the user a chance to read a fun fact.



Students Turn:

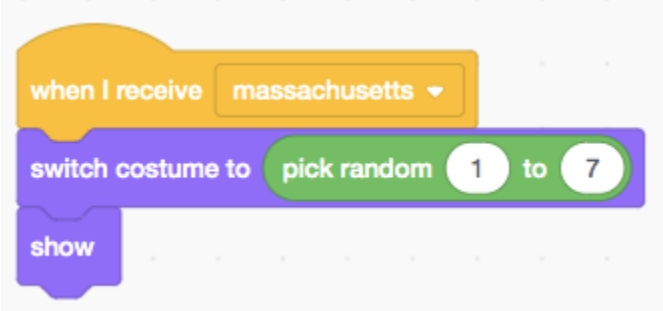
Tell students to add the demonstrated code to their project.

Continue your demonstration.



If the colony number is NOT 1, then the player clicked on the incorrect colony. Decrease the score by 1 and tell the player the colony name they clicked on, in this case we would say: "That's Massachusetts".

Next, the **FunFacts-Massachusetts** sprite must listen to the "massachusetts" message so it can display a fun fact about the colony. Each FunFacts sprite has several costumes, each shows a fun fact about the colony. So when it receives the colony name broadcast message, we want to randomly choose one of the costumes and show it.



Why do we use 7 as the upper limit of the pick random number? Because there are 7 possible costumes. Each **FunFacts** sprite has its own number of costumes, so the upper limit will be different for each of the sprites.

We also need to add scripts to hide the sprite **when the green** flag and **space** bar are clicked so they are not in the way.

Students Turn:

Tell students to add the demonstrated code to their project.

3. Student Activity: Keep Score and Display Fun Facts for All Colonies

We have written the code for Massachusetts, what about the other colonies? We need to do the same for all the other colonies. To do that, we can simply copy the code from the Massachusetts script to the other colonies and change each part that is unique to the specific colony: colony number, colony name for the broadcast and colony name in the message.

Explain the activity to students and **distribute** the student activity worksheet.

Note: It may be helpful to go through one example of copying and customizing the code for a different colony.

The *Troubleshooting and Debugging Tips* at the end can help with debugging student's code during the coding activities. You can optionally print a few copies so students can use them when debugging their code.

4. Wrap Up and Reflections

Reflection Points:

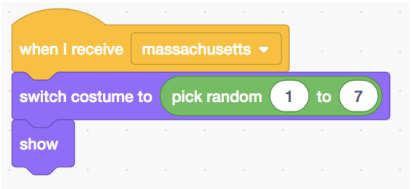
- What did you need to change for each colony sprite?
- What errors did you get as you created your program?
- How did you fix them?
- What are advantages and disadvantages of copying code to do something similar?

Student Activity: Keep Score and Fun Facts for All Colonies

What to do:

In this activity, you will copy and customize the code you wrote for Massachusetts to all other colonies. You can use the colony name table below to help you with this exercise.

1. Drag the Massachusetts script to the backpack
2. For each of the other colony sprites: (replace the **underscored** value)
   a. drag the script from the backpack
   b. change the colony = **number** to the correct number
   c. change the broadcast **colony name** to the correct broadcast message
   d. change the say **"That's colony name"** block to the corresponding colony
3. Drag the script to display a fun fact from the FunFacts-Massachusetts sprite to the backpack.



4. For each of the other FunFacts sprites do the following:
   a. Drag the script to display fun facts from the backpack into the sprites script area
   b. Change which broadcast message the sprite listens to
   c. Check to see how many fun fact costumes there are and change the pick random upper limit number to the number of costumes.
5. Test your code by clicking on the top block of each new script and by starting the game and then running through several colony names.

Sprite	Number	Colony name	Sprite	Number	Colony name
	1	Massachusetts		2	New Hampshire
	3	New York		4	Connecticut
	5	Rhode Island		6	Pennsylvania
	7	New Jersey		8	Maryland
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Troubleshooting and Debugging Tips

Error	Cause	Solution
Score does not go up when the right colony is clicked	The colony=<number> boolean condition has an incorrect number	Input the correct number in 
The fun fact of a colony won't show	The message sent corresponding to that colony was not received by the **funfact** sprite of the colony	Check if the **funfact** sprite of the colony is responding to the message received from the corresponding colony sprite. Also check the spelling and case sensitive nature of the message
Fun facts from some other colony also shows	The message is received incorrectly by the **funfact** sprite of the other colony	Correct the other **funfact** sprite to respond to the message received from its corresponding colony sprite only. For ex: Funfacts Massachusetts must respond to the Massachusetts message sent from the Massachusetts sprite, not any other sprite.

Exhibit A

Sprite	Number	Colony name	Sprite	Number	Colony name
	1	Massachusetts		2	New Hampshire
	3	New York		4	Connecticut
	5	Rhode Island		6	Pennsylvania
	7	New Jersey		8	Maryland
	9	Delaware		10	Virginia
	11	North Carolina		12	South Carolina
	13	Georgia			