Programming an Adaptation: Camouflage

Teacher Overview Video

Objectives: *Students will be able to...*
● Use events in ScratchJr to illustrate how living things survive in their environment.

CSTA Standards
● **1A-AP-10** Develop programs with sequences and simple loops, to express ideas or address a problem.
● **1A-AP-11** Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

Computer Science Explanation
In programming, events are triggers that cause something to happen. In this lesson, students use the "on tap" event block to tell their character to do something when the user taps them.

Materials & Tools
● ScratchJr platform: independent work and full-class demo
● Slides
● **Example Program:** See this completed example program (download to the ScratchJr mobile app) or sample program animation.

Lesson Preparation
● ScratchJr will need to be added to student devices in order to complete this lesson. If students are using Chromebooks, Android tablets, or iPads they can download the ScratchJr app from the app store. For Windows/MacOS devices, you will need to install this ScratchJr emulator (you may want to use this to display ScratchJr on a screen with a computer).
● If you would like to access the example program from the ScratchJr app, follow the steps in this guide. Example programs cannot be accessed using the ScratchJr emulator.
● If typing text will be too challenging for your students, plan to skip that programming block.

Vocabulary

Word	Definition
Event	Something that causes something else to happen in a program
Survival	How living things change their behavior to avoid danger and meet their needs in their environment.

Lesson Agenda

● Science Review (5 mins)
● Introduce the Program and Events (5-10 mins)
● Guided Practice: Program the Jungle Lizard (10 mins)
● (Optional) Independent Practice: Program the Desert Lizard (15 mins)
● Closing (5 mins)

Lesson Details

(Slides 2-4) Introduce the objectives and computer science vocabulary.

Science Review (5 mins)

(Slides 5-14) Use the slides to look at examples of how animals and plants have adapted their behaviors and appearances to get what they need to live. You can use the following script to review with students.

- (Slide 5) Living things need air, water, shelter, and food to survive.

- (Slide 6) Animals have different behaviors that help them to get what they need to survive. This squirrel is burying food to store it for the winter so it will not starve. Can you think of any other animals that store food for the winter?

- (Slide 7) Different physical appearances can help animals survive. Physical appearance can be different for animals based on where they live. This dog in the snow has long fur to keep it warm. The dogs on the sand have short hair to stay cooler.

- (Slide 8) Now we will look at some specific ways that plants and animals have adapted to survive.

- (Slide 9) A duck's webbed feet help them to swim. They also have one toe that is not webbed so that they can walk on land.

- (Slide 10) Plants have behavior patterns that help them survive too. They grow in the direction of sunlight and use their roots to get water and nutrients from the soil.

- (Slide 11) This cactus can hold up to 200 gallons of water. That's more than two full bathtubs of water! This will help the cactus to have enough water to survive in the dry desert.

- (Slide 12) Bears prepare for winter by eating a lot of food so they can store fat. Their bodies slow down to save energy when they hibernate.

- (Slide 13) Plants have different kinds of seeds to help them to spread and grow more plants.

- (Slide 14) Some animals are the same color as their environment, which helps them to blend in and hide. Other animals can change their color to match what is around them. We call this camouflage.

Introduce the Program and Events (5-10 mins)

(Slide 15) Explain that students will create a program that shows how lizards in different environments use the same adaptations to survive.

(Slides 16-19) Introduce the concept of events to students.
- (Slide 16) Explain that students will use events in their program and review the definition of events with students.
- (Slide 17) Discuss the example event of pressing a button to make a character jump. If time permits, give students time to brainstorm additional examples of events, either in programming or in real life. Some examples include when you click the mouse, press a key on the keyboard, or press the power button.
- (Slides 18-19) Explain that students will use the "start on tap" event block in ScratchJr for their program.

Guided Practice: Program the Jungle Lizard (10 mins)

(Slides 20-24) Complete the first page of the program with students. You can project your screen and have students follow along with you, or you can use the slides to walk through the following steps. You can use the following script to guide students in creating this program.

- (Slide 21) First, we will add the jungle background. Click the picture at the top of the screen to change the background. Click on the jungle background and then click the checkmark to add it to your page.

- (Slide 22)Now let's add the lizard. What color do we want the lizard to be in this environment? *Green so that it blends in with the environment.*

    - Click the provided character and hold down the button on the mouse. When you see an X appear, click it to delete the provided character. .

- (Slide 23) Click the plus sign to add a new character, select the blue lizard, and then click the paintbrush.

- (Slide 24) Now that we're in the drawing tools, click on the "paint can" and the color green. Then click on the lizard. Click the checkmark when you are done to add the lizard to your page.

- (Slide 25) Now let's program the lizard. We want something to happen when the user taps the lizard, so we need to add the "start on tap" block. Click the yellow button to find events, and then click and drag the "start on tap" block to the program area.

- (Slide 26) When the user taps the lizard, we want it to say something about its color and then hide to show that it blends in. Let's add a "say" block and type in what we want the character to say. You can add something like, 'My green color makes me hard to see.' [This is not required if students' literacy levels are not ready for this]

    - Then, add a "hide" block.

- Now we can run our program to make sure it does what we expect.

Independent Practice: Program the Desert Lizard (15 mins)

(Slides 27-28) Give students time to add a second page that shows a brown desert lizard. You can display slide 28 for students to reference while they work.

Common Challenges and Questions

Question/Challenge	Answer
How do I make the lizard reappear?	If a character hides in a program, you can easily make the character reappear by tapping the "reset" button next to the green flag.
How do I get from the first page to the second page?	You can move between pages by entering the full-screen mode and tapping the right and left arrows at the bottom of the screen. You can also add the red "Go to Page" block to the jungle lizard's code to program it to move to page 2.
How do I change the color of the lizard?	After you select the lizard character, click on the paintbrush instead of the checkmark. Then, tap the paint can tool and select the desired color. Click anywhere on the lizard and it will change the lizard from blue to that color. You can also change the color of the lizard after adding the lizard character. Simply tap the paintbrush next to the lizard:
Why does nothing happen when I tap the green flag?	Our code starts with the "start on tap" block, nothing will happen when we run the program until we tap on one of the characters.

Extensions
(Slide 29)
- Add blocks that make the lizard move.
- Use the red "Go To Page" block to automatically turn the page after the green jungle lizard hides.
- Add another page with a different environment.
- Add more living things and show how they survive.

Closing (5 mins)

(Slide 30) Give students time to share their programs. This is a great time to highlight any projects with added extensions to their program.

(Slide 31) Discuss the closing question: What would happen if we programmed our lizard like this? Emphasize that the order of blocks matters when we program. The computer will read our code from left to right, so if we want the lizard to say something *before* it hides, the "say" block needs to come before the "hide" block. You can show students the difference between these two sequences by running the code.

Resources

Assessment Rubric

Category	4	3	2	1
	Advanced: demonstrates superior performance	Proficiency: demonstrates consistent performance	Moving toward proficiency/expectations	Experiencing significant difficulty
Use events to illustrate and explain how living things use camouflage to survive in their environment.	Student successfully uses "start on tap" events to illustrate how two or more animals use camouflage to survive in their environment and includes at least one extension.	Student successfully uses "start on tap" events to illustrate how two animals use camouflage to survive in their environment.	Student successfully uses "start on tap" events to illustrate how one animal uses camouflage to survive in its environment.	Student needs significant support to use "start on tap" events to illustrate how one animal uses camouflage to survive in its environment.

ScratchJr Code Samples

Green lizard with block to move to page 2

Brown Lizard

CodeHS has a growing library of 150+ coding and interdisciplinary lessons just like this one! We also provide professional development and implementation support. If you're interested in bringing a comprehensive CS Curriculum to your school/district, please visit us at codehs.com/elementary