

## A Series of Unfortunate Events



### Overview:

We all react to events that happen around us, be it cheering when the school team wins, crying at a sad movie, or dancing when we hear music. In this lesson, students will learn how to teach Dash and Dot to respond to events that happen around them!

Curriculum: CS, Science, ELA

Group Size: 2 per Dash	Target Grades: 3 - 5	Time Required: 1.5 - 2 hours
------------------------	----------------------	------------------------------

### Content Standards:

#### NGSS:

- 4-LS1-2: Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

#### ELA:

- W.4.3 : Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
- SL.4.4: Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
- SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.

**Materials Needed:**

- 1 Dash per 2 - 4 students
- Dot is optional, but preferable
- 1 Blockly compatible device per 2 students
- “Senses and Events” presentation
- Computer with projector for presentation
- Boxes of Senses (compiled from classroom objects)\*
- Brain Event Handling Sheet

\*See “Unplugged Activity - Event Handling Relay Race” for details.

**Lesson Objectives:**

- Learn the process by which living creatures sense, process, and react to information.
- Connect the sensors on robots to human senses.
- Connect computer programs to the way the brain handles information, and learn that those programs are called “event handlers.”
- Write a short story involving a descriptive flow of events.
- Write a blockly program involving events and event handling.

**Lesson Procedure:**

This lesson can be broken into three classes or sections.

Class 1: Senses and Sensors (30 minutes)

Class 2: Event Handling With Dash and Dot (30-40 minutes)

Class 3: Class Presentations (20 - 30 minutes)

**Class 1: Senses and Sensors**

Start the lesson by making a silly face or a loud noise and watching the students react. Ask students why they had that reaction. They heard a loud noise so they jumped? Saw something funny so they laughed?

How did they know that something happened? Living beings have senses that allow us to experience things that happen around us.

- What senses can the students think of?

- Students will typically think of smell, sight, taste, touch, and hearing. However, help students thinking about other senses that living beings can have, like a sense of temperature, pressure, pain, and balance.

Many living beings have only some of these senses, and some have all of the senses but at different levels from humans.

- Can students think of animals that have very good vision (e.g. birds, cats)? Bad vision (e.g. underground animals, deep sea creatures)? What about no eyes at all (worms)?
  - Bats, despite the popular saying, have average eyesight.
- Repeat these questions with some of the other senses. For example, snakes have an excellent sense of taste and bats have excellent hearing.

What does the word “event” mean to students? Most students will probably connect the word “event” to a large gathering, like a social event or sporting event. Talk with students to generalize the definition of an event to “something happening.”

- What are some small events in students’ everyday lives?
- How do they react to each event?

Open the presentation “Senses and Events.” Use the first part of the presentation to talk to students about how living creates events that your body handles: the senses pick up information, they send it to the brain, the brain processes it and decides how to act, and then it tells the body how to respond.

### *Unplugged activity - Event Handling Relay Race*

The class will then complete an activity in teams of 3 (or 2).

1. In each team there is a **sensor**, a **brain**, and a **body**. If there is a team of two, one student can be both the **sensor** and the “brain.”
2. The **sensor** from each group will be at the front of the room. In front of them will be a series of covered objects, the “Box of Senses.” These objects could be anything from around your classroom plus a few fun objects that perhaps smell funny or make sounds.
  - a. These could be covered with boxes or be under paper.
  - b. The box or paper will have instructions on it, such as “smell me,” “look at me,” or “listen to me.” Each box contains one item that the sensor will interact with. The instructions tell the student how they need to interact with it.
  - c. This activity works best if there are 3 different sets of sensor boxes. 2 - 3 groups of students could be working with each set of boxes at any given time. After completing a relay with one set of boxes the groups rotate to the next set of boxes while rotating roles. This way each student has an

opportunity to play each role in the relay.

3. The **sensor** will follow the directions on the first box and get some information (e.g. “I saw a pencil”). The **sensor** then runs to the **brain**.
4. The **brain** sits facing away from the sensor area to avoid peeking. The sensor tells the **brain** of their event (what they sensed).
5. Each **brain** has a copy of the Brain Event Handling Sheet. This sheet lists all of the possible events and what to tell the **body** to do if each event happens. The **brain** reads the action associated with the event to the **body**.
  - a. Use the example Brain Event Handling Sheet or create your own to suit the personality of your class. Responses that involve the **body** writing down something allow students to build an association between handling an event and writing a response, which may be helpful when writing code.
6. The **body** then performs this action.
7. The cycle should be completed 4 times, with the **sensors** passing on 3 or more different types of events.

After the activity is complete, review with students what the responsibility of each role was and how the parts work together:

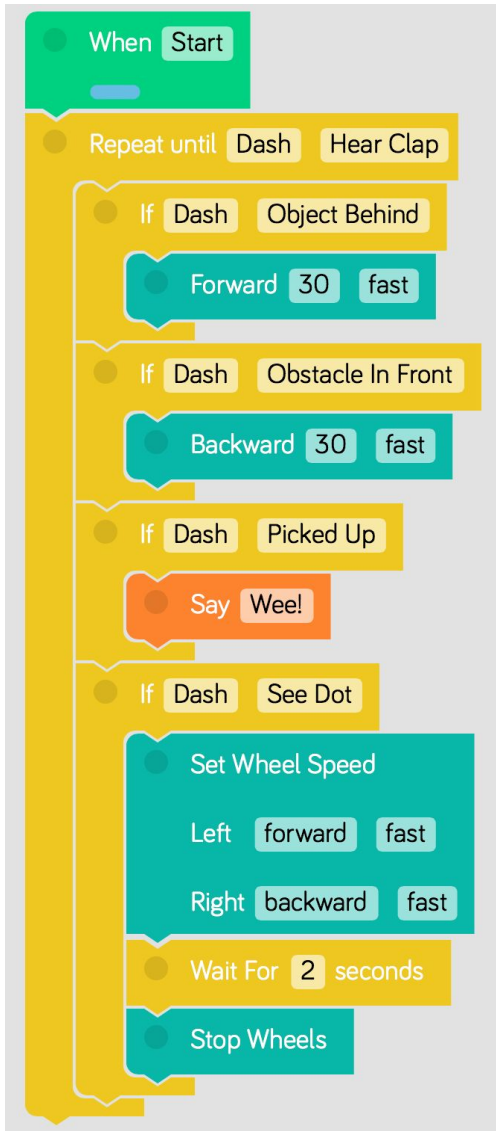
- The senses observe events and pass them on to the brain.
- The brain processes events and instructs the body on how to act.
- The body performs the actions given by the brain.

## Class 2: Event Handling With Dash and Dot

Reopen the “Senses and Events” presentation. Use the second portion of the presentation to talk to students about the connection between the functions of robotics and the functions of living creatures. At the end of the presentation there is a bit of example code. This code will help Dash do the hokey-pokey. Before class, enter the code into Blockly. Speak or sing along the song along with triggering the events.

[Start by placing Dash on the floor or sizeable desk. Place Dot, also on and connected, off to Dash’s left or right, a reasonable distance away.

1. Put your Dashes in (*put foot behind Dash, Dash moves forward*)
2. Pull your Dashes out (*put foot in front of Dash, Dash moves backward*)
3. Put your Dashes in (*put foot behind Dash, Dash moves forward*)
4. And you shake them all about (*pick up Dash and wiggle yourself, Dash makes sounds*)
5. You do the Dashy pokey and make Dash turn around, that’s what it’s all about! (*put Dash down facing Dot then clap, Dash will spin in a circle and then the program will stop*)



This program starts when the Start button is pressed.

“Repeat Until” means that the program will continue to loop down through all of the code inside that block until the end condition is met. In this case, it is when Dash hears a clap.

This loop is necessary because otherwise the program will only check the if statements *once*, meaning that Dash will only perform one of those events, instead of continuously checking for all of them.

There are then a series of if statements with actions that will trigger each behaviour in Dash.

- Object behind: Dash moves forward
- Object in front: Dash moves backwards
- Dash picked up: Make sound
- Dash see Dot: spin around for 2 seconds then stop.

Alternatively, you could put each cue to start an action as a separate When block. For example, “when object behind” and “when object in front”.

Introduce to students the writing and programming challenge: write a short story (around half a page) of a day in the life of Dash and/or Dot with the theme “A Series of Unfortunate Events!” They need to react to at least 5 events happening around them/to them in the course of the story. Students can use classroom objects to create the setting for their story.

Allow students at least 25 minutes to write the short story and program the robots to follow the story. Challenge students to time their program so that they can read the story out loud as the robot acts out the story. They can use their partners to trigger events.

### **Class 3: Presentation and Evaluation**

In the final portion of the lesson, students will present their short stories and programs to the class.

*Extension:* For older students, they could be given a longer writing period and be asked to write a much longer story involving more events. In this case, break students into groups of 4 - 6 and have them present their longer stories to each other instead of to the whole class.

Have a final debrief with the class:

- What was the most interesting thing they learned today?
- What challenges did they face while programming and how did they overcome them?

If desired, complete the Student Evaluation Rubric for your own records.

## Event Handling Relay information

Here are some example items that could be put in the Boxes of Senses.

Sight	Hearing	Touch	Taste	Smell
paper clips pencils clips fruit glasses	bells buzzers	paper clips pencils clips fruit glasses	jelly beans (or any particularly flavoured candy) grapes	scented markers scented candles

Here is an example Brain Event Handler Sheet filled in with some of the above.

Event	Action
A. See paperclips	Write “Dot”
B. Taste strawberry (jelly bean)	Write “great”
C. Smell blueberries (marker)	Write “and”
D. Hear bells	Write “is”
E. Smell vanilla	Write “silly”
F. Touch glasses	Write “Dash”
G. Hear buzzer	Write “fast”
H. Taste lemon.	Write “are”

Some possible box combinations yielding different action sequences:

Boxes	Action
A, C, F, H, B	Write: “Dash and Dot are great”
F, D, E	Write: “Dash is fast”
A, D, G	Write: “Dot is silly”
G, F, D, B	Write “fast Dash is great”





## Evaluation Rubric

	Excellent	Competent	Needs work
Participation and Teamwork  20%	The student actively participates in classroom discussions, answering questions and cooperating with group member(s) during the activity.	The student occasionally participates in classroom discussions and cooperates somewhat with group member(s).	The student does not participate in classroom discussion. The student does not cooperate with their group member(s) during the activity.
Creative Writing  30%	The student writes a narrative to develop events using effective technique, descriptive details, and clear event sequences.	The student writes a narrative to develop events using acceptable effective technique, but it lacks clarity in some descriptive details and event sequences.	The student writes a narrative that does not develop clear or descriptive events.
Programming 35%	The student correctly applies a variety of events and event handlers in solving the programming challenge.	The student correctly applies events and event handlers in solving the problem, but requires some help and prompting the choose correct handling methods.	The student applies events and event handlers only with consistent help from the teacher or groupmates.
Presentation 15%	The student speaks clearly at an understandable pace and volume when reading their story. The student clearly describes their narrative and solution to the programming challenge.	The student speaks, but quickly and/or too quietly. The student describes their narrative and	The student does not present their story or programming solution.

