



## Classroom Teacher Preparation

### Technology 3: Conditionals in Code

Please use the following to prepare for the next SfS lesson.

#### Description:

This foundational lesson introduces the concept of a conditional statement, relating it initially to students' everyday decision-making processes, and then using a game to allow students to observe the execution of conditional statements as they would occur within the context of running a computer program.

#### Lesson Objectives – SWBAT (“Students Will Be Able To...”):

5<sup>th</sup>-8<sup>th</sup>

- Model receiving inputs, evaluating conditional statements (code), and executing an output as a computer would
- Design and test their own conditional statement codes to achieve specific outputs

#### Disciplinary Core Idea (DCI):

ETS1: Engineering Design

- (3<sup>rd</sup>-5<sup>th</sup>) ETS1.A: Defining and Delimiting an Engineering Problem – The success of a designed solution is determined by considering the desired features of a solution (criteria).
- (3<sup>rd</sup>-5<sup>th</sup>) ETS1.B: Developing Possible Solutions – Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.

#### Science & Engineering Practice (SEP):

Developing and Using Models

- (3<sup>rd</sup>-5<sup>th</sup>) Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system

Using Mathematics and Computational Thinking

- (6<sup>th</sup>-8<sup>th</sup>) Create algorithms to solve a problem

#### Crosscutting Concept (CCC)

Systems and System Models

- (3<sup>rd</sup>-5<sup>th</sup>) A system can be described in terms of its components and their interactions
- (6<sup>th</sup>-8<sup>th</sup>) Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.

#### Preparation:

This lesson is introductory and assumes no prior preparation.

#### Room Set Up for Activities:

Students will work in pairs at their desks.



## Safety:

There are no safety concerns with this lesson.

## Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Technology & Coding**. Modules include:

*Technology 1: Binary Code, or How to Speak Computer* – Students get their first taste of binary through a series of activities focusing on encoding and decoding.

*Technology 4: Cryptography* – A module full of fun activities introducing the basics of encryption, which has evolved into a critical element in modern data storage and Internet transactions.

*Scientific Practices 1: Procedural Thinking* – Students learn the importance of creating and following clear and ordered plans. Students create simple Lego designs, write instructions, and then try to replicate the creation of a classmate using only the other student's written instructions.

For other module sequences and groups, look here: [www.sciencefromscientists.org/sequences](http://www.sciencefromscientists.org/sequences)

## Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: <http://www.sciencefromscientists.org/standards/>

Lessons are matched to both national NGSS and local state standards.

## After Our Visit:

*Extend this lesson by making your own self-driving car maze.*

Access this Extension activity by visiting the Classroom Post found on our website at [sciencefromscientists.org/cohorts](http://sciencefromscientists.org/cohorts). Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at [sciencefromscientists.org/open-response-questions](http://sciencefromscientists.org/open-response-questions). They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

## Additional Resources:

- Programming is a great career for women, too: <http://www.today.com/video/today/53924117>
- A short introductory video for younger students - What is Computer Coding? <https://www.youtube.com/watch?v=THOEQ5soVpY>
- Another short introductory video for younger students - How do Computer Programs Work? <https://www.youtube.com/watch?v=Nc31NAujTka>
- The Code.org website has resources aimed at students, teachers, and parents: <https://code.org/>
- Codecademy offers a broad range of free interactive tutorials: <https://www.codecademy.com/>
- Khan Academy has many computer programming lessons, covering several coding languages: <https://www.khanacademy.org/computing/computer-programming>