



## ALGORITHMS ARE EVERYWHERE

When most students hear the word “algorithm,” they generally think about technology. After all, as nearly everyone knows, algorithms are at work in social media, search engines, online shopping, and more. But it is important for students to understand that algorithms—a set of instructions used to solve a problem or complete a task—are everywhere! In this lesson, students will learn what an algorithm is, how one is made, and the important role that humans play in creating them. With this, they will begin to understand how algorithms, and human ingenuity, are fundamental components in artificial intelligence (AI) too.

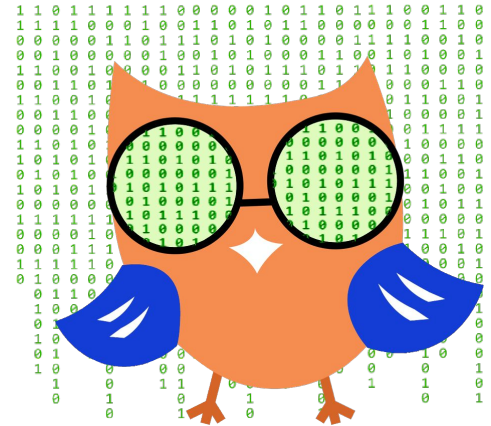
### KEY STANDARDS

ISTE Standards: Empowered Learner (1.1.d), Computational Thinker (1.5.a, c, d).  
CASEL Competencies: Relationship Skills (4.a, b), Responsible Decision-making (5.a, b, c, d, e).  
CCSS.ELA.LITERACY: 7th: RI.7.4, W.7.4, SL.7.1, L.7.1, L.7.2, L.7.3, L.7.6.

### LEARNING OBJECTIVES

Students will....

- ✓ Understand what an algorithm is.
- ✓ Write their own algorithm.
- ✓ Appreciate the significant role humans play in creating algorithms.



### INTRODUCING THE LESSON

For this lesson, the first half of the activity comes first.

Give every student two sheets of plain white paper. Ask them to make a paper airplane with one sheet, and, as they do so, to write down step-by-step instructions for making their airplane on the second sheet of paper. Give them ample time to get this done.

When finished, let them keep their paper airplanes, but collect their instructions.

## THE LESSON

1. Explain to your students that by writing down their instructions on how to make a paper airplane, they just created something called an “algorithm”! Introduce the definition (and have them record):

### ALGORITHM:

A set of step-by-step instructions used to solve a problem or complete a task.

2. Determine what your students know about algorithms. Ask: *What kind of algorithms are you familiar with?* Chances are their knowledge of algorithms will have something to do with technology. Explain that algorithms are part of everyday life too. Share these examples:

- **Brushing Your Teeth:** The routine steps of putting toothpaste on a toothbrush, brushing for two minutes, rinsing your mouth, and then rinsing your brush, is an algorithm for preventing cavities.
- **Doing Laundry:** Sorting clothes by color, loading the washing machine, adding the right detergent, setting the proper wash cycle, and starting the machine, is an algorithm for washing your clothes.
- **Getting Ready for School:** Waking up, brushing your teeth, eating breakfast, collecting your books, and packing your bag, is an algorithm for a student’s morning routine.

*Ask: Can you think of other examples of algorithms in everyday life?*

3. Screen [Video 1]. Review that computers rely on algorithms to perform specific tasks and solve problems. Algorithms operate behind the scenes in search engines, social media applications, recommendation systems, music apps, voice assistants, and more. For example, Google’s search engine algorithms retrieve information from its search index and present that information to a query. Tell students they will be learning much more about how algorithms collect personal information in future lessons.

## ACTIVITY, Part 2

Redistribute the instructions students wrote for making paper airplanes. Be sure no student gets their own instructions. Also, give each student a second piece of blank paper. Tell them to carefully follow the instructions they received to make a second paper airplane. When they are finished, have them compare their two airplanes. Then, ask:

- *Were the instructions you received clear and complete? Were any improvements or clarifications needed? If so, what were they?*
- *How important was it for the algorithm you received to be clear and complete?*

## **ACTIVITY, Part. 2, cont.**

Explain that human involvement is crucial for creating algorithms that are both clear and complete. Humans define the logical steps that can then be followed by another human, or even a computer.

### **GOAL**

Students will understand how algorithms work and that human expertise, creativity, and wisdom are indispensable to the creation of algorithms that are clear and effective.