

Lesson 1.4: Algorithm

Objectives

In this lesson, students will:

- ❖ Learn what an algorithm is
- ❖ Practice writing an algorithm
- ❖ Experience writing an algorithm using an instructional language

Agenda

1. What is an Algorithm	10 mins
2. Activity: Writing an Algorithm	10 mins
3. Inventing our own Language	5 mins
4. Student Team Activity	15 mins
5. Wrap Up and Reflections	10 mins

Preparation

- Print student activity worksheets. Cut out one image square and one blank square so there is one of each for every student pair.
- Have blank paper on hand

Resources & Links

- What is an algorithm:
<https://tinyurl.com/y3rxyz53>

1. What is an Algorithm ?

An algorithm is a list of steps to accomplish a task.

This video explains an algorithm in a fun way:



We use algorithms every day without realizing it.

For example, we follow some steps to brush our teeth:

1. Grab your toothbrush
2. Put toothpaste on it
3. Brush all teeth
4. Rinse mouth with water
5. Put toothbrush back

Steps to ride our bicycle:

1. Go to the garage to get the bike
2. Put on your helmet
3. Climb onto the bike
4. Start pedaling

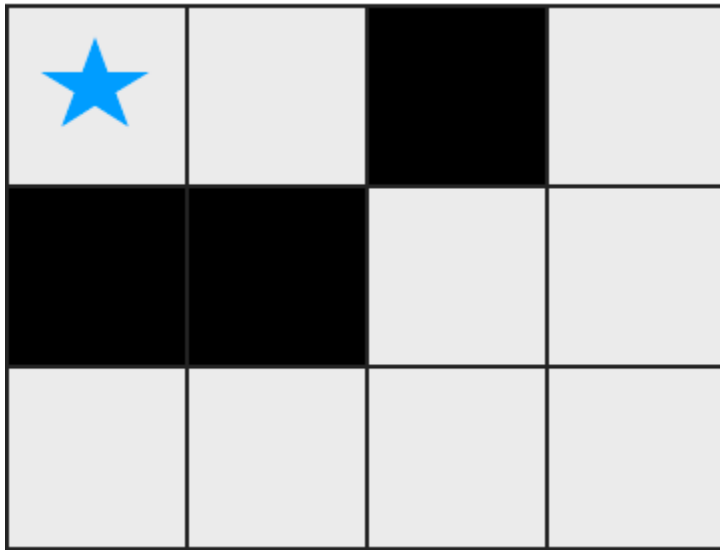
Ask students: What is your algorithm to get to school? Clean your room?

2. Activity: Writing an algorithm

Engage students in an interactive instruction and demonstration:

What is the algorithm to draw this image one square at a time starting at the star?






Ask students to pair up and write down their instructions or do it as a class exercise.



Here is one possible solution. What are others?

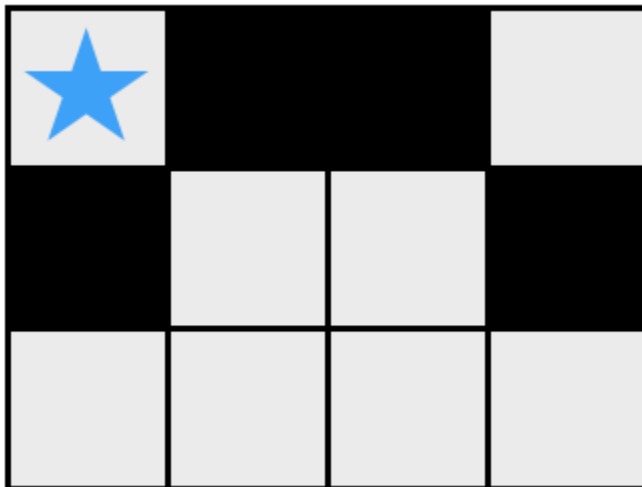
Move 1 square to the right
 Move 1 square to the right
 Fill square with black
 Move 1 square down
 Move 1 square to the left
 Fill square with black
 Move 1 square to the left
 Fill Square with black

3. Inventing our own language

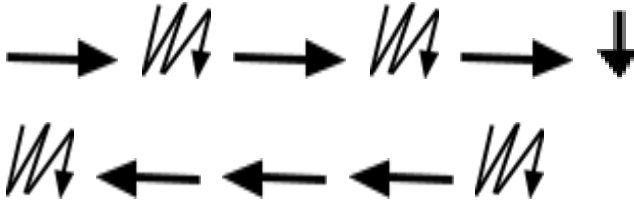
	Move 1 square to the right
	Move 1 square to the left
	Move 1 square up
	Move 1 square down
	Fill square with black

What if we invented a set of instructions to tell someone how to draw an image? These are our instructions: each symbol represents what to do.

What is our algorithm now for this next image starting with the star? It might be helpful to do it together with students or have them pair up again and do it as a team.



Solution:



Is this the only algorithm, or are there others? Is one algorithm better than the other?

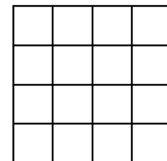
4. Student Activity: Coding an Algorithm




In this activity students work with a partner and they will use their journal or the 4 by 4 blank tables.

Instructions to give to students:

1. Choose a drawing that you want to code. You will code an algorithm with the new language.
2. Write the algorithm in your partner’s design journal.
3. Exchange journals.
4. Draw an empty table in your journal with 4 rows and 4 columns like the one on the right or use one of the blank 4 by 4 squares.
5. Decode your partner’s drawing.
6. Check if your drawing matches the drawing your partner used.



5. Wrap Up and Reflections

 Reflection Points
<ul style="list-style-type: none"> ● What did you learn today? ● What is an algorithm? ● What is an example of an algorithm? ● During the activity, did your images match the original ? If not, what happened, or could have happened?

Student Activity:

Print and cut out each square. One image square and one blank square per student pair.

Sample graphics:

