

## 1. Whole Numbers – Place Value (Decimal Place Value)

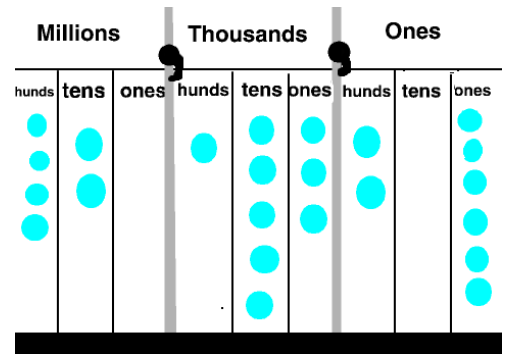
**Summary: Title:** Whole Numbers — Place Value

**Summary:** Students use a place value chart and add dots to create representations of whole numbers. They use these representations to create a quiz for others to take. There is also an extension link where students can use a place value chart that includes decimals to the thousandths place.

**Link for Teacher:** <https://scratch.mit.edu/projects/121983193/#editor>

**Link for Students:** <https://scratch.mit.edu/projects/121866558/#editor>

**Lesson:** [Click here.](#)

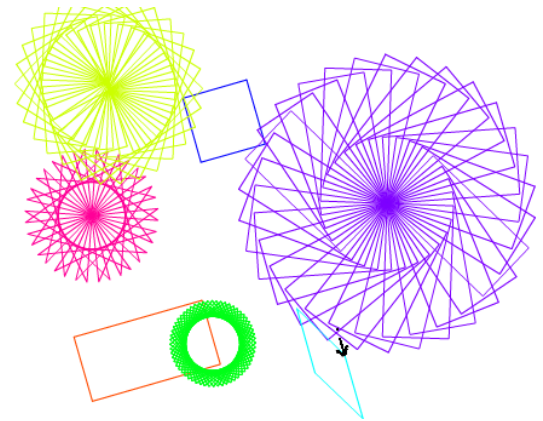


## 2. Spinning Quadrilaterals and Sequence

**Summary: Sequence—**Computers follow instructions in exact order. It is important to give the instructions in the correct order. This activity focuses on sequence. What happens when you change the sequence of instructions given to the computer? To find out, open this Scratch activity.

**Link:** <https://scratch.mit.edu/projects/182619564>

**Lesson:** [Click here.](#)



## 3. Line Plots (Length of Straw Pieces) (4th, EDM-Unit7)

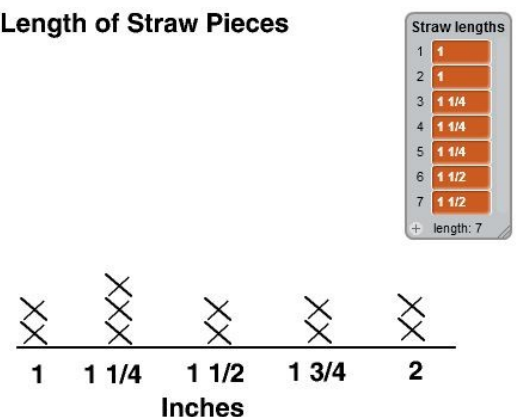
(Allow 40—50 minutes)

**Summary:** Students debug a Scratch Activity. The activity is suppose to create a line plot of straw lengths. The straws have been cut into 1, 1 1/4, 1 1/2, 1 3/4, and 2 inch pieces. The length measures are collected in a list called *Straw lengths*. But the activity has bugs. It does not create an accurate line plot based on the information in the list called *Straw lengths*. In this example, the line plot has X's above 1 3/4 and 2. But, if you notice the list, there are not lengths for 1 3/4 and 2 inches included in the list. This activity has a bug.

**Link:** <https://scratch.mit.edu/projects/145867042/>

**Lessons:** [Click here.](#)

**Length of Straw Pieces**

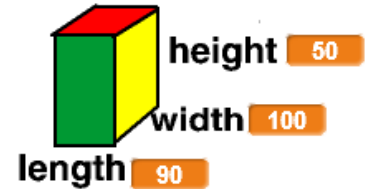


#### 4. Finding Volume, Area, or Surface Area (Debugging)

**Summary:** Students debug a program that is designed to calculate the volume of any size rectangular prism. This program uses **variables** and the **ask and wait** block to allow user input for length, width, and height of the prism. Then it should calculate the volume of any rectangular prism, but there is an error in the program. Students will find the error.

**Link:** <https://scratch.mit.edu/projects/126364395/#editor>

**Lesson plan:** [Click here.](#)

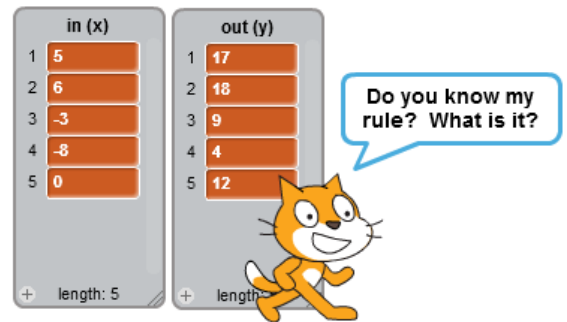


#### 5. IN/OUT Box

**Summary:** Students work with partners or individually to create a new Scratch activity which uses In and Out boxes that follow a rule such as this rule,  $x + 12$ . As an extension, student can create conversion charts between units such as pints to ounces, meters to millimeters, or U.S. dollars to British pounds.

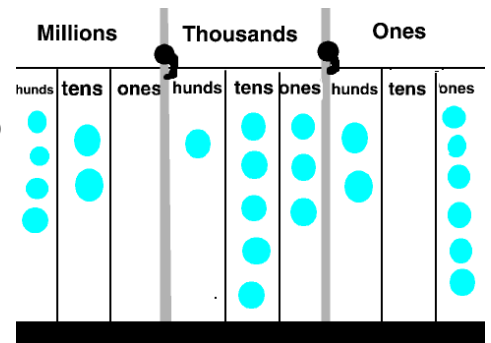
**Link:** <https://scratch.mit.edu/projects/125448095/>

**Lesson Plan:** [Click here.](#)



## Title: Whole Numbers — Place Value

**Summary:** Students use a place value chart and add dots to create representations of whole numbers. They use these representations to create a quiz for others to take. There is also an extension link where students can use a place value chart that includes decimals to the thousandths place.



### Common Core:

- (4.NBT.A.2) Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.
- (5.NBT.A.3) Read, write, and compare decimals to thousandths

### Programming Skills with Scratch:

- Use drawing tools to change backdrops
- Create and use *make a block* from [More Blocks](#) category
- Use an [answer and wait](#) block
- Use a [repeat until](#) block
- Drop blocks from [Operators](#) category into another block
- Add audio recordings to their project

**Link for Teacher:** <https://scratch.mit.edu/projects/121983193/#editor>

**Link for Students:** <https://scratch.mit.edu/projects/121866558/#editor>

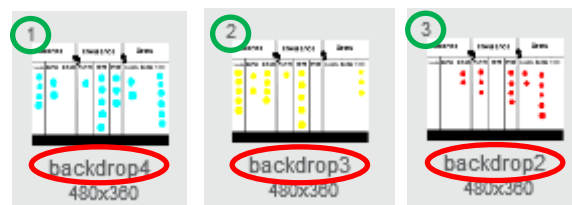
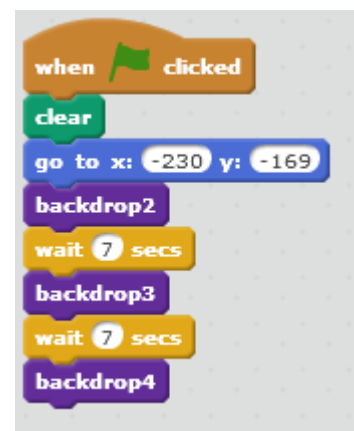
### Introduction:

1. Remind students how to read whole numbers. Point out that the word “and” is only used when saying decimal numbers. Whole numbers are not said with an “and” even though we often hear people doing that.
2. Let students create (or provide them with) a place value chart and number tiles with the digits 0 through 9 to use in the *Make a Number* game.
3. Play *Make a Number* game with a partner. The rules are:
  - Together, before the game begins, partners decide if the largest or smallest number wins.
  - Combine and mix-up both students’ number tiles. Turn the tiles over so the numbers are

- Pick a number to see who goes first. Return those tiles to the mix.
- Partners take turns drawing numbers and deciding where to put the numbers on their place value chart to create the largest or smallest number.
- The game continues until all the number tiles have been used and are placed on the place value charts.
- Students decide the winner by comparing the numbers on each of the place value charts. The winner is determined on whether or not they are making the largest or smallest number. The winner gets one point.
- Then partners take turns reading their numbers aloud. If they can read their number correctly, and they do not say, “and”, they get one point. (One student could get two points. One for the largest or smallest number and one for reading his/her number correctly.)
- Tally the points and play the game again.
- The first to get 10 points wins the game.
- As they finish the game, students find a new partner and play again with the new partner.

**Activity:**

1. Open the **Link for teacher**. Play the game. Examine how the game was created, and how dots are used to represent a number.
2. Notice how blocks created from the **Make a Block** category help organize the script. The green flag starts the script. It uses **backdrop2**, waits, uses **backdrop3**, waits, and then uses **backdrop4**. Each of these backdrop blocks are defined by their own scripts. If there is a problem with the script, this makes it easier to find the problem. When scripts are divided into chunks, students can see which parts work, and which parts do not work easier.
3. Examine the script that defines **backdrop2**. Talk about each block.
4. Examine how backdrops are numbered. Each is identified by the number name below their backdrop picture. (This number is shown circled in red.) They are not identified by the number shown on the top left. (This number is shown circled in green.)



5. Be sure students know how to use the draw tools to change a backdrop. They create the dots on the place value chart to represent a number they choose.
6. Make sure students know how to record their voices in Scratch.
7. Make sure students understand and know how to use a **repeat until** block.
8. Open **Link for Students**. Click the green flag. Answer the questions to take the quiz. Explain that this is a partially completed project. It only has one number. Ask students to complete this project so that it has more numbers.
9. Allow time for students to take quizzes other students created.

### Extensions:

1. If you think some students do not need as much support with coding, do not give them the **Link for Student**. Instead allow them to create their project from this link. It has the backdrops created so students do not have to create the place value chart, but it does not have any scripts. Students will create all of their own scripts.  
<https://scratch.mit.edu/projects/122118955/#editor>
2. Ask students to extend their quiz by asking questions like these, “What would this number be if you rounded it to the nearest ten-thousand?” Or “What would this number be if you added 2,000 to it?”
3. Let students use the link below to create a similar project using a place value chart with decimals. Remind them that they say, “and” when reading decimals. For example, 1.23 is read as, “One and twenty-three hundredths.” Point out the last word said when reading a decimal is the name of the column in which the decimal ends.  
<https://scratch.mit.edu/projects/122120248/#editor>

Name: \_\_\_\_\_

## Whole Number Place Value

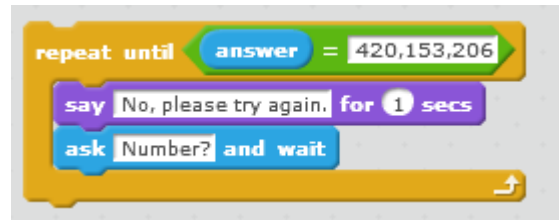
Open and remix the partially completed **Link for students** at:

<https://scratch.mit.edu/projects/121866558/#editor>

Click the green flag and take the quiz. Notice this quiz is short. It has only one number. You will create scripts and new backdrops, with dots that represent new numbers, to add to the quiz.

Answer these questions.

1. Examine the script that defines **backdrop4**.  
What does this part of the script do? What does each of these blocks do?



2. What is the differences between these two blocks? What does each do?



3. Why is it helpful to separate a long script into chunks?

4. Complete the project for other numbers. Add one or more numbers to the quiz.
  - Decide which new numbers you will represent with dots.
  - Create backdrops with dots to represent each new number.
  - Use the **Make a Block** category to create a block for each new number. Define each new block with a script.
  - Record audio for your quiz.
  - Be sure to test your scripts. Be sure they work correctly for each new number you add.

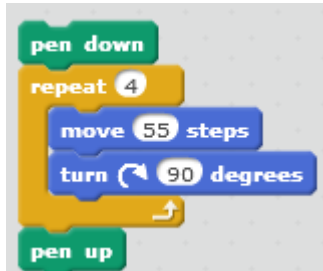
**Save your project.**

## Sequence

Computers follow instructions in exact order. It is important to give the instructions in the correct order. This activity focuses on sequence. What happens when you change the sequence of instructions given to the computer? To find out, open this Scratch activity: <https://scratch.mit.edu/projects/182619564>

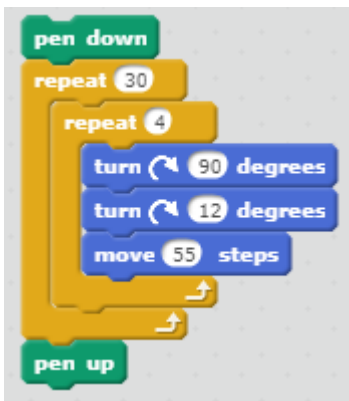
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### Step 1



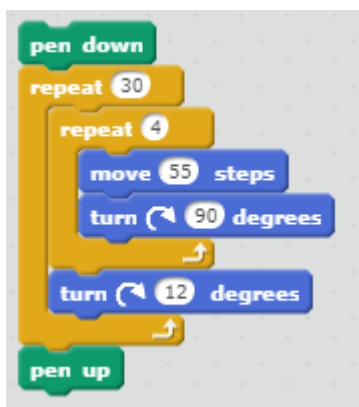
- Click this script. What does it create?

### Step 2



- Drag the arrow sprite to a new location on the stage.
- Notice this script has some of the same blocks used in the script in Step 1.
- Click this script. What does it create?

### Step 3

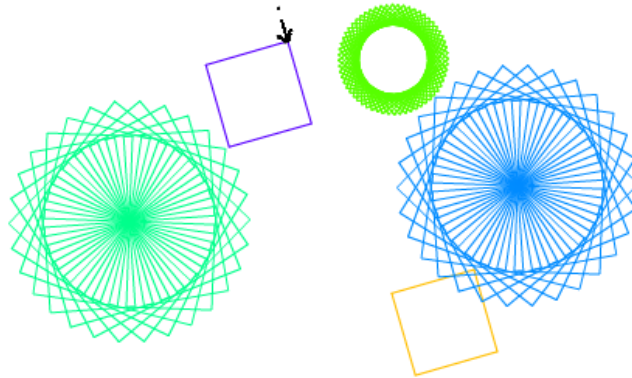


- Notice this script uses the same blocks as the script in Step 2, but the sequence of the blocks have been changed.
- Drag the arrow sprite to a new location on the stage.
- Click this script. Why does it create something different?



## Step 4

- Use the scripts from Steps 1, 2, and 3 to create a design similar to this design.

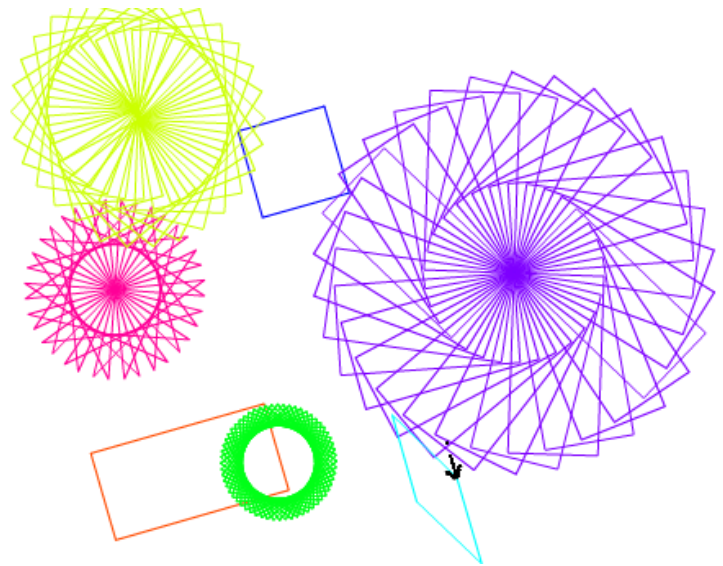


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## Challenge

In the script area you will find scripts for a rectangle, a spinning rectangle, a rhombus, and a spinning rhombus.

- Drag the arrow sprite to a new location on the stage and click on each of these scripts.
- Create 2 new scripts by changing the sequence of the blocks in the scripts for the spinning rectangle and the spinning rhombus.
- Use your scripts to create a design of your own.
- Be sure to share your designs with others.



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## Answer these questions:

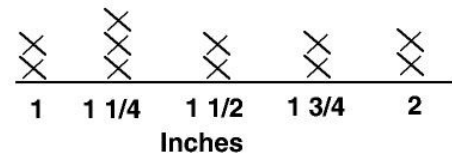
- What is sequence?
- Why is it important?

## Line Plots (Length of Straw Pieces) (4th, EDM-Unit7)

(Allow 40—50 minutes)

**Summary:** Students debug a Scratch Activity. The activity is suppose to create a line plot of straw lengths. The straws have been cut into 1, 1 1/4, 1 1/2, 1 3/4, and 2 inch pieces. The length measures are collected in a list called *Straw lengths*. But the activity has bugs. It does not create an accurate line plot based on the information in the list called *Straw lengths*. In this example, the line plot has X's above 1 3/4 and 2. But, if you notice the list, there are not lengths for 1 3/4 and 2 inches included in the list. This activity has a bug.

### Length of Straw Pieces



### Materials:

- Classroom computer and student computers
- Classroom copies of Check Scripts p. 14 (worksheet)
- Lengths of straws cut into 1, 1 1/4, 1 1/2, 1 3/4, and 2 inch lengths. Enough for each student or pair of students to have between 10 to 15 pieces.
- Link to the Scratch activity *Length of Straw Pieces* at: <https://scratch.mit.edu/projects/145867042/>

### Programing Skills with Scratch:

- Open, remix, debug, and share a Scratch Activity
- Create and use a variable that represents each line number of a list
- Create a list and insert values into a list
- Repeat an action the same number of times as the number of items in a list
- Understand how a sprite sends and receives a broadcast
- Use different Event blocks to start different scripts
- Drop blocks into a operators block
- Scratch blocks used: (When green flag clicked, when space bar pressed, when right arrow key pressed, broadcast, when I receive \_\_, clear, stamp, show, hide, move, go to x: \_ y: \_\_, point in direction 0, repeat, if \_\_ then, \_\_ = \_\_, list item #, list called *Straw lengths*, change list item # by 1, and item list item # of *Straw lengths*)

### Lesson:

1. Open the Scratch activity *Length of Straws Pieces Line Plot*. Click the green flag. Talk about the list *Straw lengths*. Ask what the line plot would look like if the items in the list were placed in the correct location on the line plot. (There would be 2 x's in row 1, 3 x's in row 1 1/4, and 2 x's in row 1 1/2.)

2. Press the space bar. Notice the line plot is incorrect. This activity has a bug. Tell students that they are going to find the bug and fix the activity so that it correctly creates a line plot from a list.
  3. To debug the activity look at each of the scripts carefully.
- ⇒ Click the DATA category to open it. Notice a list is already created for this activity called *Straw lengths*. Also notice that a variable called *list item #* has already been created.
4. Look at the other scripts.
    - Click the green flag. Ask what happens when the right arrow key is pressed? Check this script for each of the X sprites. Does it work correctly? (Yes, this is not the problem.) (Do not check the scripts for the cat yet. The cat is only there to help with understanding later in the lesson.)
    - Click the green flag. Check this script for each of the X sprites. Does it work correctly? (Yes, this is not the problem.)
    - Next look at the long script that starts when the space key is pressed. It has lots of blocks. The cat sprite can help explain these blocks.
  5. What does the variable *list item #* represent? Go to the cat's scripts.

⇒ Press 1 to start the first script. The cat shows on the stage.

⇒ Press 2 to start the second script. The cat says, "1". Why? Change the 1 in the block to another number. What does the cat say? (Notice each time the cat says the line whichever number you select. The variable *list item #* represents the line of the list. In this list it can be lines 1–7.)



6. What does the block *length of Straw lengths* do?



⇒ Press 3 to start the third script. The cat says, "7". Why? (The length of the list is 7. It has 7 items in the list.)

7. What does the block *say list item # of Straw lengths* do?



⇒ Press 4 to start the fourth script. The cat says, "1". Why? (1 is the item or number located in the first line of the list.)

⇒ Add *change list item # by 1* to the bottom of the script. It should look like this. Press 4 again, wait three seconds and press 4 again. Notice the cat says the next item or number in the list.



8. Now that you understand what these blocks do, look at the big script and go through it one block at a time to see if there is a problem. Pass out the Check scripts p. (worksheet) and complete it together.

⇒ Notice that the first three broadcasts work correctly. However, the 4th and 5th broadcast is the same. These all broadcast move 1 1/2. This is the bug in this script. Students will need to create two new broadcasts—one for move 1 3/4 and one for move 2. They will also have to change the scripts for sprites 1 3/4 and 2 to receive those broadcasts.

⇒ The new scripts should look like these.


```
when space key pressed
set list item # to 1
repeat length of Straw lengths
  if item list item # of Straw lengths = 1 then
    broadcast move 1
    change list item # by 1
  if item list item # of Straw lengths = 1 1/4 then
    broadcast move 1 1/4
    change list item # by 1
  if item list item # of Straw lengths = 1 1/2 then
    broadcast move 1 1/2
    change list item # by 1
  if item list item # of Straw lengths = 1 3/4 then
    broadcast move 1 3/4
    change list item # by 1
  if item list item # of Straw lengths = 2 then
    broadcast move 2
    change list item # by 1
```

```
when I receive move 1 3/4
show
stamp
hide
move 20 steps
```

```
when I receive move 2
show
stamp
hide
move 20 steps
```

9. Decide if you want students to work with a partner or individually.

10. Be sure students know how to delete items from a list and enter items into a list.

- To delete items use this block. 
- To add items Press the + sign in the bottom right corner of the list.

11. Allow time for each student to open, remix, and debug the activity.

12. Pass out 10—15 pre-cut straws to each student or pair of students. All the straws lengths should be either 1, 1 1/4, 1 1/2, 1 3/4, or 2 inches long.

13. Ask students to measure their straws and create a line plot using their debugged Scratch activity.

14. Allow time for students to share and talk about their activity.

**Extensions:**

- Ask students to create a line plot for “Math Journal 2, p. 266” shown on p. 730.
- Ask students to create a new line plot and let other student do the “Mystery Line Plot activity” on “Math Masters p. 291” shown on p.730 with the new line plot.
- Open the *Day of the Week Line Plot* Scratch Activity at: <https://scratch.mit.edu/projects/146771090/>
  - ⇒ Follow the directions shown on the project page.
  - ⇒ Notice this activity allows for user input by using a **ask and wait** block. It also has a variable called **total** that keeps a total of the number of inputs added to the list. Ask students to add one or both of these to their debugged activity *Length of Straw Pieces Line Plot*.

**Accommodations:**

- Provide a copy of the debugged scripts to students so they can make the changes needed to debug the script.

**Common Core:** 4.NF.3, 4.NF.3a

**CT/CS Standards:**

CS-Understand that algorithms are implemented as programs on digital devices, Understand that programs execute by following precise and unambiguous instructions, Write programs that accomplish specific goals

CT-Pattern generalization & abstraction, Decomposition, Pattern recognition, Debugging

Name: \_\_\_\_\_ Check Scripts

Look at each part of the script. Check to see if it needs to be debugged.

1. Is this part ok?

Yes \_\_\_\_\_ No \_\_\_\_\_



If not, how will you fix this part? \_\_\_\_\_

2. Which sprite moves when the list item # equals 1? Is this part ok?

Yes \_\_\_\_\_ No \_\_\_\_\_



If not how will you fix this part? \_\_\_\_\_

3. Which sprite moves when the list item # equals 1 1/4? Is this part ok?

Yes \_\_\_\_\_ No \_\_\_\_\_



If not how will you fix this part? \_\_\_\_\_

4. Which sprite moves when the list item # equals 1 1/2? Is this part ok?

Yes \_\_\_\_\_ No \_\_\_\_\_



If not how will you fix this part? \_\_\_\_\_

5. Which sprite moves when the list item number equals  $1\frac{3}{4}$ ? Is this part ok?

Yes \_\_\_\_\_ No \_\_\_\_\_

If not how will you fix this part?



6. Which sprite moves when the list item # equals 2? Is this part ok?

Yes \_\_\_\_\_ No \_\_\_\_\_

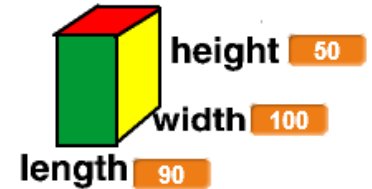
If not how will you fix this part?





## Finding Volume, Area, or Surface Area (Debugging)

**Summary:** Students debug a program that is designed to calculate the volume of any size rectangular prism. This program uses **variables** and the **ask and wait** block to allow user input for length, width, and height of the prism. Then it should calculate the volume of any rectangular prism, but there is an error in the program. Students will find the error.



### Materials:

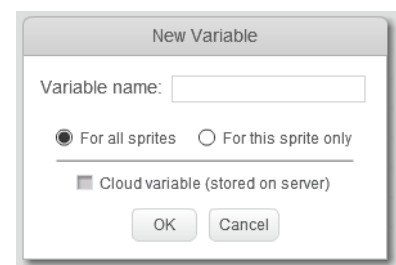
- Link to the Scratch activity *Volume L x W x H* at: <https://scratch.mit.edu/projects/126364395/#editor>
- Link to the Scratch activity *Volume L x W x H copy* at: <https://scratch.mit.edu/projects/126367898/#editor>
- If needed, link to the Scratch activity *Finding Area* at: <https://scratch.mit.edu/projects/103006553/#editor>
- If needed, link to the Scratch activity *Volume and Surface Area* at: <https://scratch.mit.edu/projects/89063107/#editor>
- If needed, link to the Scratch Activity *Missing Height of a Prism* at: <https://scratch.mit.edu/projects/89492599/#editor>
- Link to four screencast tutorials at: <https://drive.google.com/drive/u/0/folders/0BweeQQ0-pghveXBLcFhDZkN3eDg>
- Classroom computer and student computers

### Programming Skills with Scratch:

- Create, name, use, and set the values of **variables**
- Use the **ask and wait** block and the **answer** block
- Debug a script
- Nest **multiplication** blocks into a **join** block
- Scratch blocks used: (**ask and wait**, **answer**, **variables**, **set variable to**, **join**, **multiplication**, **say**)

### Lesson:

1. Open and run the Scratch activity *L x W x H copy* several times.
  2. Be sure students know how to create, name, and set a **variable**.
- Click Data category.
  - Click Make a Variable.
  - Name the variable. Make sure to use a name that clearly explains what the variable represents.
  - Click For all sprites.





- The variable will appear on the stage. Right click the variable shown on the stage. There will be a drop down menu that allows you to select the type of readout the variable will have on the stage. Try all of them. This activity uses the *large readout*.
  - Set the value of a variable by using the *set variable to* block from the Data category. Use the drop down menu to find the name of the variable you want to use.
3. Make sure students know how to nest a *join* block and *multiplication* blocks into a *say* block. (Watch the first screencast tutorial.)
  4. Open the Scratch activity *Volume L x W x H* link. Explain that this activity does not work. It does not correctly give the volume of any rectangular prism. It has bugs in it. Students need to debug it.
  5. Decide if students should work with a partner or individually.
  6. Allow time for students to open, remix and debug the script so that it works correctly.

#### **Extensions:**

1. Allow time for students to create a script that will calculate the volume of the Willis Tower shown on page 589 of the Teacher's Guide.
2. Allow time for student to make a generalized script that would solve a problem such as this:

The volume of a rectangular prism is 24,000 cubic feet.

The length of the prism is 30 feet.

The width of the prism is 20 feet.

What is the height of the prism?

An example of this can be found at this link: <https://scratch.mit.edu/projects/89492599/#editor>

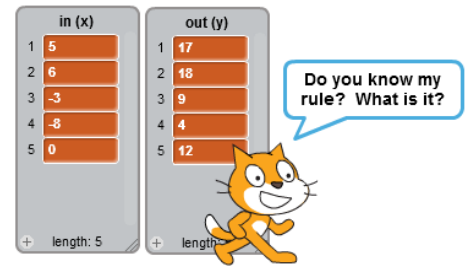
3. When students have their script working properly, ask them to add script so that the program will not only tell the volume of any rectangular prism, but will also tell the surface area of the prism. An example of this can be found at this link: <https://scratch.mit.edu/projects/89063107/#editor>
4. Let students examine *Finding Area* activity at: <https://scratch.mit.edu/projects/103006553/#editor>  
There are problems with this project. It does not correctly find the area of a square, a rectangle, or a triangle. Debug the project and fix the scripts so that it gives the correct area for each figure.

#### **Common Core:**

#### **CT Standards and Skills:**

## In Box/Out Box

**Summary:** Students work with partners or individually to create a new Scratch activity which uses In and Out boxes that follow a rule such as this rule,  $x + 12$ . As an extension, student can create conversion charts between units such as pints to ounces, meters to millimeters, or U.S. dollars to British pounds.



### Materials:

- Classroom computer and student computers
- Link to the Scratch activity *Input/Output* at: <https://scratch.mit.edu/projects/125448095/>
- Link to the Scratch activity *Meters to Centimeters* at: <https://scratch.mit.edu/projects/128526894/>
- Copies of In/Out Box and the Rule p. 21 (worksheet)
- Unplugged Activity—Mad Libs p. 22 (worksheet)

### Programing Skills with Scratch:

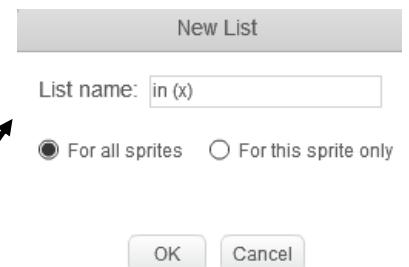
- Create and name **lists**
- Use the **ask and wait** and **answer** blocks to input data into **lists**
- Use an **answer** block with **Operators** blocks to create a rule
- Use a **repeat until** block with an **answer** block and an **operators** block
- Scratch blocks used: (**ask and wait**, **answer**, **say**, **repeat until**, **Make a List**, **add \_\_ to list**, **delete all of list**, **when this sprite clicked**, **when space key pressed**, **Operators**)

### Lesson:

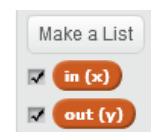
1. Review how In/Out Boxes work. Give several examples and let students find the rule for each example.
2. Open and try the Scratch activity *Input/Output* link shown above. View this activity in full screen mode by clicking the blue box above the stage. In this view students will not be able to see the rule shown in the script area. Try some negative numbers for the In Box.



3. When students have guessed the rule,  $x + 12$ , click out of full screen view by clicking the same blue box and look at the blocks in the script area.
4. Do Unplugged Activity Mad Libs p.17 (worksheet)
5. Be sure students know how to create and name a list.

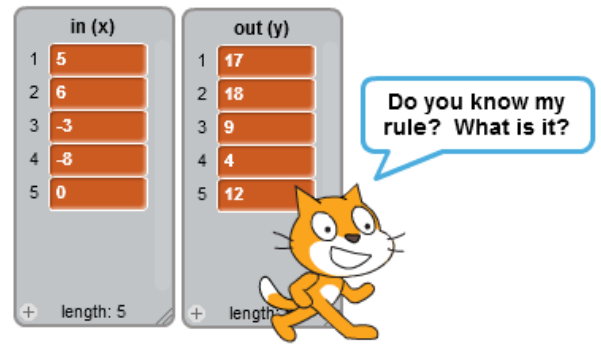


- Click the Data category.
- Click **Make a List**.
- Give the list a name. Be sure to name the list clearly so the name explains what is in the list. In this activity the first list was named *in (x)* and the second list was named *out (y)*.



## In Box/Out Box (5th, EDM-Unit 7) (allow 40—50 minutes)

**Summary:** Students work with partners or individually to create a new Scratch activity which uses In and Out boxes that follow a rule such as this rule,  $x + 12$ .



### Materials:

- Classroom computer and student computers
- Link to the Scratch activity *Input/Output* at: <https://scratch.mit.edu/projects/125448095/>
- Link to the Scratch activity *Meters to Centimeters* at: <https://scratch.mit.edu/projects/128526894/>
- Copies of In/Out Box and the Rule p. 16 (worksheet)
- Unplugged Activity—Mad Libs p. 17 (worksheet)

### Programming Skills with Scratch:

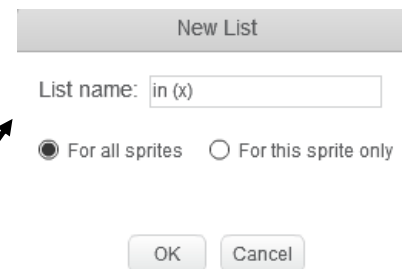
- Create and name **lists**
- Use the **ask and wait** and **answer** blocks to input data into **lists**
- Use an **answer** block with **Operators** blocks to create a rule
- Use a **repeat until** block with an **answer** block and an **operators** block
- Scratch blocks used: (**ask and wait**, **answer**, **say**, **repeat until**, **Make a List**, **add \_\_to list**, **delete all of list**, **when this sprite clicked**, **when space key pressed**, **Operators**)

### Lesson:

1. Review how In/Out Boxes work. Give several examples and let students find the rule for each example.
2. Open and try the Scratch activity *Input/Output* link shown above. View this activity in full screen mode by clicking the blue box above the stage. In this view students will not be able to see the rule shown in the script area. Try some negative numbers for the In Box.

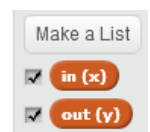


3. When students have guessed the rule,  $x + 12$ , click out of full screen view by clicking the same blue box and look at the blocks in the script area.



4. Do Unplugged Activity Mad Libs p.17 (worksheet)
5. Be sure students know how to create and name a list.

- Click the Data category.
- Click **Make a List**.
- Give the list a name. Be sure to name the list clearly so the name explains what is in the list. In this activity the first list was named *in (x)* and the second list was named *out (y)*.
- To show or hide a list on the stage, click or unclick the box in front of the list's name.



10. Decide if you want students to work with partners or alone.
11. Pass out copies of the In/Out Box and the Rule p. 16 (worksheet). Students should have two other students sign their worksheet. Those students sign if they agree that the first student's rule and chart are correct. Ask students not to sign someone's worksheet if they think the rule or the chart is incorrect. Instead, they should help the student correct the worksheet before they sign. When students have completed the worksheet and have had two other students sign the worksheet, allow time for them to open a new scratch activity and create their own In/Out Box activity.
12. Allow time for students try others' activities and to guess the rule used in others' activities.

**Extensions:**

1. Share the example of the Scratch activity *Meters to Centimeters* at:

<https://scratch.mit.edu/projects/128526894/>

Let students use Scratch to create their own conversion activity. Some suggestions students could use for their conversion activities are: yards to inches, miles to feet, grams to milligrams, US dollars to British pounds, pints to cups, years to months, hours to seconds, or pounds to ounces. Be sure to allow time for students to share the activities.

**Common Core: 5.OA.3, 5.MP.1, 5.G.1, 5.G.2**

**CT/CS Standards and Skills:**

CS-Solve problems by decomposing them into smaller parts, Write programs that accomplish specific goals, Work with various forms of input/output, functions with input/output

CT-Abstraction, Generalizing, Algorithmic Design

Name: \_\_\_\_\_

## In/Out Box and the Rule

1. Your new rule will be: \_\_\_\_\_
2. Complete the chart below for your rule:

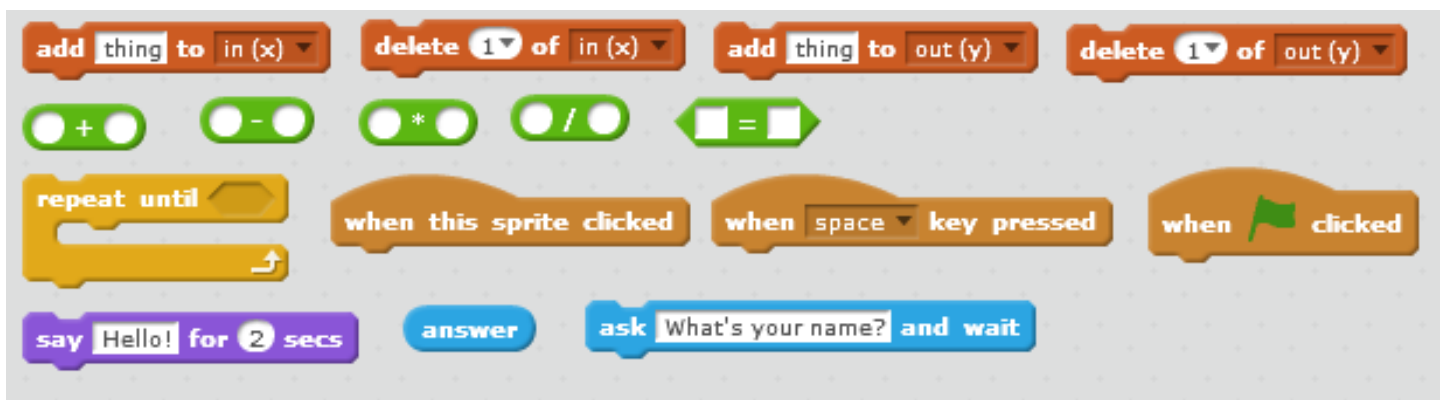
IN	OUT
5	
4	
0	
10	
9	

These people have checked my rule and chart:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. Ask two other students to check your rule and your chart. Ask them to sign their names before you continue with step # 4 shown below.
4. Open a new Scratch Activity. Use the blocks below to create an IN/OUT BOX activity for your rule shown above. Some of these blocks may not be used in your activity. Some of these blocks may be used more than once. Test your script to be sure it works correctly.



## Unplugged Activity Mad Libs:

1 What are variables?

- Variables allow you to generalize a script. This is an important concept in programming.
- Point out that the variables added to the lists in this activity are similar words placed in a list when playing a Mad Lib. Once words or variables are placed in a list, they can be used later for some outcome. For example, in Mad Libs the input words are later placed in a story. In the activity, input numbers use a rule to calculate the outcome.

2. Ask students to complete this first part of the Mad Libs. In this part, they are inputting values similar to the way they will input variables in the activity.

Name: \_\_\_\_\_

Write out one word for each of the following variables:

Verb: \_\_\_\_\_

Noun: \_\_\_\_\_

Verb: \_\_\_\_\_

Place: \_\_\_\_\_

Verb: \_\_\_\_\_

Noun: \_\_\_\_\_

Verb with -ing ending: \_\_\_\_\_

3. Use the story below. The outcome in Mad Libs is this silly story when using the input words from the list created above. The outcome in the activity are the answers to the rule when using the input numbers found in the list.

Early last year, my mom \_\_\_\_\_ me an old

verb

\_\_\_\_\_. She told me about the days when she

noun

would \_\_\_\_\_ it from her school in

verb

\_\_\_\_\_. I tried to \_\_\_\_\_ it

place verb

once but tripped over my \_\_\_\_\_. It didn't take

noun

long before I decided that it was best to leave the

\_\_\_\_\_ to my mom.

verb with -ing ending