



# Vivid Variables

## Educator's Guide

### Overview

CS Hands-On is a 501(c)(3) nonprofit teaching computational thinking skills through technology-free lessons and activities. This curriculum is built to teach fundamental computer science concepts in an engaging, hands-on way. In this mission, students use variables to create a silly paragraph.

### Prerequisite Knowledge

There are no prerequisites to this lesson.

### Lesson Details

At Decomposphere, students will learn to break problems down into smaller parts with Dot. Students will first learn the structure of a variable, then explore different variable categories. Using their new knowledge of variables, students will play a Snowball Fight game to create their own silly paragraphs!

This lesson was developed for students ages 8 to 13, and can be modified for students of all skills and ages. This lesson takes around 30 minutes.

### Learning Objectives

#### Key Question

How can we store information using variables?

#### Key Terms

**Variable:** A container used to to store information.

### Curriculum Standards

Students should be able to...

- Explain how variables are created and used (Decomposition)
- Read, write, and interpret for variables (Literacy)
- Use variables to create a silly paragraph (Creative Arts)

[View standards addressed here](#)

## Lesson Plan

### Materials

- Vivid Variables worksheet (per student)

### Setup

- Hand out a Vivid Variables worksheet to each student
- Set up your classroom to form students in a circle

## ANSWER KEY & LESSON ANNOTATIONS

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

## Vivid Variables

### Welcome to Decomposphere!

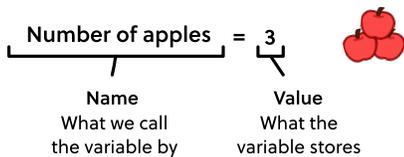
Ready, set, learn! Dive into the bright green grasses of Decomposphere with Dot and learn how to break down problems into smaller parts. Today, we'll be starting our journey on Decomposphere with variables!

### What are variables?

In computer science, we use **variables** to **store information**. Variables have a **name** that we call it by and a **value** it stores. Let's take a look at how Dot's favorite fruit, apples, can be represented by a variable!

#### This morning...

Dot has 3 red apples, freshly bought from the Decomposphere Market.



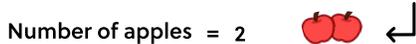
#### 1 hour later...

Time for a snack!



After eating an apple, Dot has 2 apples left...

By definition, **all variables can be changed!** Since Dot ate an apple for snack and now has one apple less, we can update our "Number of apples" variable to reflect the change.



### Reflect

What are other examples of real-life applications for variables? We can use variables to model all kinds of objects and scenarios that experience changes. For instance, variables can represent a team's points during a baseball game, the weather, and one's age.



### More Variables!

In addition to numbers, variables can also store words, names, etc!  
Here are several variables used to describe Dot:

#### All About Dot!



#### Dot's Variables

- Name = Dot
- Home = Decomposphere
- Favorite color = Green
- Favorite fruit = Apples
- Number of siblings = 2
- Lucky number = 35

In our next example, we'll explore how these variables can be split into different categories.

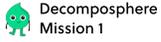
### Trash Sort

In computer science, variables are split into categories based on their value. To explain this, let's take a look at how we separate waste into three bins: Trash, Compost, and Recycle.

All of our waste either belongs in the Trash, Compost, or Recycle bin.  
Below each bin are a couple examples of what belongs where!

Trash		Compost		Recycle	
Straws	Plastic bags	Apple core	Banana peel	Paper	Newspaper

**Educator Note**  
To reinforce the concept of variable categories within trash, propose several other examples for students to sort.  
Ex. Plastic water bottles, carrot tops, and aluminum cans.



Similar to how we sorted waste into the Trash, Compost, and Recycle bins in our trash sort example, we also sort variables into different categories.

### Vast Variety of Variables

There are many different variables used in computer science, from words to numbers to everything in between! To sort these numbers and words, we can categorize them into the word or number variable category.

Variables in the **word category** store words and sentences:  
"Cheetahs run very fast.", "What's up?"

Variables in the **number category** store any kind of number:  
1, 3, 100

Below, each bucket represents the **word** and **number** categories. Inside each bucket are variable values to describe Dot's 2 apples from our previous example.

To store the **color** of apples, we use a variable with the value of the word "Red". To store the price of two apples, we use a variable with the number \$1.50.



### Snowball Fight!

Using your knowledge of variables and variable types, you will be filling in your own silly paragraph!

#### Setup

- On your 'Silly Paragraph Variables' page, you will find ten rectangles. **Each rectangle will represent a variable** from the Variable Names List below (You will have ten variables in total).

### Reflect

Are there instances when we need to use one data type over another? For example, a string can store text like "happy" and "funny", while integers and doubles cannot. It would be the most ideal to describe the number of pets someone has as an integer, rather than using a string or double. A double would best describe something as a fraction.



- Assign each variable a **name** from the Variable Names List, a **value**, and a **category** (word or number) based on its value. The order of the 'Variables Names List' should match with the numbers on each rectangle found on the next page. (Ex. The sport variable belongs on the 2nd rectangle.) When finished, carefully cut out the rectangles along dotted lines.

### Variable Names List

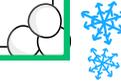
(Assign each variable a **name** from this list)

- |                    |                           |
|--------------------|---------------------------|
| 1. Weather         | 6. Past-tense action verb |
| 2. Sport           | 7. Price                  |
| 3. Outdoor place   | 8. Adverb                 |
| 4. Plural animal   | 9. Plural animal 2        |
| 5. Favorite number | 10. Adjective             |

### Categories

(Assign each variable a **category**)

- Word
- Number



### Extension

Make sure to review these categories before starting the activity. Run through different examples (Book title, number of siblings, etc.) to sort into either words or numbers.

### How to Play

- Sit in a circle with a group of 4-10 people.
- Crumple and ball up the first variable from your stack to form a "snowball". (Check the number on your snowball—This should be the same for everyone!) When everyone has their snowballs ready, throw them into the center of your circle.
- Take one snowball from the center of your circle. (Don't open it up yet!)
- Repeat the process of throwing and taking snowballs with your other nine pieces of paper. After this, everyone should have ten snowballs each!
- It's finally time to open all of your snowballs! On the 'Silly Paragraph' page, use your snowballs to fill in the missing variables in the paragraph. When you finish, read aloud your silly paragraph to your group!



<p><b>1</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>	<p><b>2</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>
<p><b>3</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>	<p><b>4</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>
<p><b>5</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>	<p><b>6</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>
<p><b>7</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>	<p><b>8</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>
<p><b>9</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>	<p><b>10</b></p> <p>_____ =</p> <p>Category      Name</p> <p>_____</p> <p>Value</p>

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Decomposphere  
Mission 1

### Silly Paragraph: A Day in Decomposphere

To complete your silly paragraph, use your snowballs to write in the value of each variable (the variable names are below the missing blanks)!

It was a nice, \_\_\_\_\_ day in Decomposphere—the perfect weather  
Weather

for outdoor sports! I quickly gathered my friends to play some  
Sport

\_\_\_\_\_ and enjoy the summer breeze. But when we finally arrived at  
Outdoor Place

the \_\_\_\_\_ to play, it started to rain \_\_\_\_\_ . It  
Plural Animal

was crazy, to say the least, not even a minute has passed and I had already seen  
Favorite Number

\_\_\_\_\_ of them! Since it was raining so heavily, I  
Past-tense Action Verb

\_\_\_\_\_ to the nearest store to buy a sturdy umbrella for a striking  
Price

price of \_\_\_\_\_ . With my new umbrella, I  
Adverb

\_\_\_\_\_ returned home, only to find that it was now raining  
Plural Animal 2

\_\_\_\_\_ . What a(n) \_\_\_\_\_ day!  
Adjective

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## Wrap up & reflect

Group students into pairs and have them discuss the following reflection questions. Afterwards, have students share their ideas as a class.

- Take a look around the room. What are three things that we can model using variables? Which categories would each of these variables belong in?  
Number of chairs (number), message on whiteboard (words)
- Why is it useful that variables can change their values?  
If we stored information that frequently changes, like a message on a whiteboard, we could easily update our variable to reflect that change.