

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 Decomosphere, students will learn to break problems down into smaller parts with Dot. Students will learn the structure and syntax of a variable, then students will explore the different data types of a variable. Using this knowledge, students will play a Snowball Fight game to create a silly paragraph!

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

Learning Objectives

- **Key Question**

How can we store information using variables?

- **Key Terms**

Variable: A storage container used 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: _____

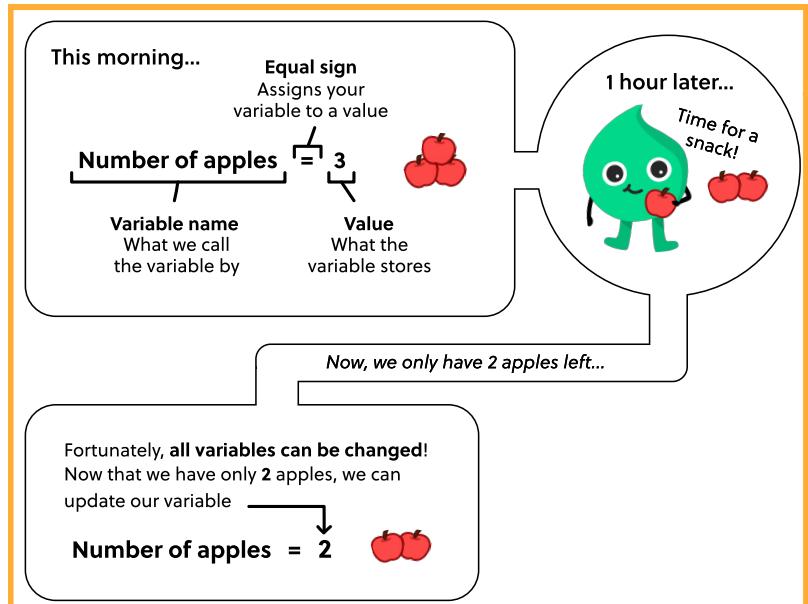
Vivid Variables

Welcome to Decomosphere!

Ready, set, learn! Dive into the grassy lands of Decomosphere with Dot and learn all about breaking down problems into smaller parts. Today, we'll be starting off our journey with variables!

What are variables?

In computer science, we use **variables** to store any type of information. Every variable has a **name** that we use to call it by, and a **value** that the variable stores. Let's take a look at how we can make our own variables!



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.

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More Variables!

Instead of just storing numbers, variables can also store words, names, etc! Let's take a look at more examples of variables:

All About Dot!



Demy's Variables

Name = Dot
Home = Decomosphere
Favorite color = Green
Favorite food = 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

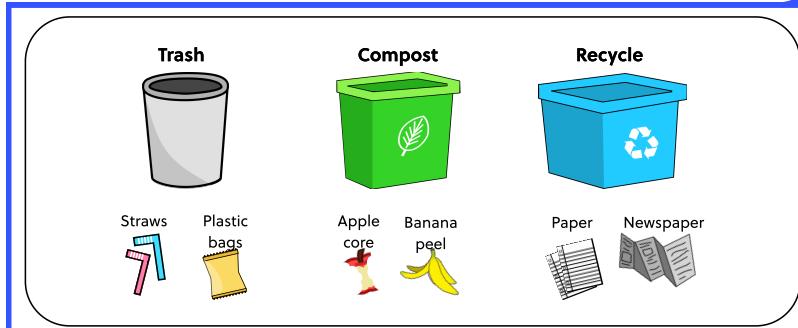
Variables are split up into different categories depending on their value. To explain this, let's take a look at how we separate trash into three bins: Trash, Compost, and Recycle.

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

Educator Note

To reinforce the concept of variable types within trash, bring up several other examples for students to sort into types.

Ex. Water bottles, carrot tops, and Ziploc bags.



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Similar to how we sorted waste into the trash, compost, and recycling bins in our trash sort example, we also sort variables into different categories called **data types**.

Vast Variety of Variables

There are many different data types in computer science, but the most common are **strings, integers, and doubles**. When programming, we define our variables using these data types to tell the computer what type of information our variable stores.

String variable: store text: ex. "Hello!", "What's up?"

Integer variable: store whole numbers: ex. 1, 3, 100

Double variables: store decimal numbers: ex. 3.14, 9.0, 0.034



Below, each bucket represents the string, integer, or double data type that could be used as variables to describe apples.

Ex. To store the number of apples we have, we can use a string "two", integer 2, or double 2.0. If we have only a bite left, we could use a double 0.1!



Snowball Fight!

Using your knowledge of variables and data types, you will be using variables to fill in a 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.

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- Assign each variable a **name** from the Variable Names List, a **value**, and a **data type** (String, Integer, or Double) depending on its value. Ensure that the number for each variable matches up with the number of its rectangle (ex. The sport variable belongs on the 2nd rectangle). When finished, cut out your pieces along the dotted lines.

Variable Names List

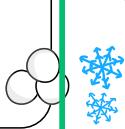
(Assign each variable a **name** from this list)

- | | |
|--------------------|---------------------------|
| 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 |

Data Types

(Assign each variable a **data type**)

- String
Integer
Double



Extension

Make sure to review these data types before starting the activity. Run through different examples (Book title, number of siblings, percentages, etc.) to sort into either strings, integers, or doubles to familiarize students with the data types.

How to Play

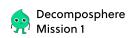
- Sit in a circle with a group of 4-10 people.
- Crumple and ball up the first variable from your stack to form a "snowball". (Check the number on your snowball—This should be the same for everyone!) When everyone has their snowballs ready, throw them into the center of your circle.
- Take one snowball 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!

1 Data type _____ Name _____ = Value _____	2 Data type _____ Name _____ = Value _____
3 Data type _____ Name _____ = Value _____	4 Data type _____ Name _____ = Value _____
5 Data type _____ Name _____ = Value _____	6 Data type _____ Name _____ = Value _____
7 Data type _____ Name _____ = Value _____	8 Data type _____ Name _____ = Value _____
9 Data type _____ Name _____ = Value _____	10 Data type _____ Name _____ = Value _____

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Silly Paragraph: A Day in Decomosphere

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 Decomosphere—the perfect weather
 Weather
 for outdoor sports! I quickly gathered my friends to play some
 Sport
 the _____ to play, it started to rain _____ . It
 Outdoor Place 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 data types would each of these variables have?
Ex. Number of chairs (integer), proportion of teachers to students (double), message on whiteboard (string)
- Why is it useful that variables can change its value?
Ex. If we stored a piece of information that changes, like text on a whiteboard, we could easily change our variable to adapt.