All Jumbled Up

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 will learn about indexes and how computers use lists to solve problems.

- ### Prerequisite Knowledge
  Students should have completed the Put On a Show activity, which introduces the concept of functions.
- ### Lesson Details
  At Abstractopia, students will learn to remove unnecessary details using abstraction with Alon. Students will learn about indexes and how computers use lists to solve problems.

  This lesson was developed for students ages 6 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 use lists to keep track of items?
- ### Key Terms
  List: A sequence of ordered items.
  Index: The numeric value of an item's placement in a list
- ### Curriculum Standards
  Students should be able to...
  - Explain the importance of lists (Abstraction)
  - Read, write, and interpret lists (Literacy)
  - Explain how computers index lists (Numeracy)

  View standards addressed here

Lesson Plan

- ## Materials
  - Observation Station worksheet (per student)
- ## Setup
  - Hand out an 'All Jumbled Up' worksheet to each student
  - Set up your classroom to form students in groups of 2

ANSWER KEY & LESSON ANNOTATIONS

Abstractopia
Mission 2

Name: _____ Date: _____

All Jumbled Up

Hello from Abstractopia!

Ready to dive into loads of lists? Here at Abstractopia, Alon will guide you through the different ways computers use lists to solve problems.

Lots of lists!

To-do lists, packing lists, and bucket lists are just a few examples of lists we use every day! Just like these examples, **lists** in computer science are also used to **store information in an organized way**.

What are indexes?

Each item in a list is ordered with numbers called **indexes**. By assigning each item to an index (a number), it becomes easier to search and sort through the list.

Geography Time!

Let's explore indexes further with a Geography lesson from Alon:

How we've been counting:

We count **starting from the number 1**. Here are the planets in our galaxy listed from largest to smallest. Abstractopia's index is 1, and Logicland's index is 4.

Planet Size List

1. Abstractopia
2. Decomposphere
3. Algorithopoly
4. Logicland
5. Patteron
6. Evaluatus

How computers count:

Computers count **starting from the number 0**. As a result, each planet's index shifts down by 1. Now, Abstractopia's index is 0, and Logicland's index is 3.

Planet Size List

0. Abstractopia
1. Decomposphere
2. Algorithopoly
3. Logicland
4. Patteron
5. Evaluatus

CS Hands-On All Jumbled Up 1

Reflect

Students are likely to be familiar with lists in their everyday life. Under what circumstances would lists be helpful to use?

Lists are helpful to use when we need to keep track of various items, group certain pieces of information together, etc.!

Answer Key

Alon's Bicycle Fun

0. Alon wakes up in the morning.
1. Alon ties his shoes and takes his bicycle.
2. Alon walks to the Abstractopia Bike Park.
3. Alon arrives at the park and meets his friend Lex.
4. Alon rides his bicycle around the park with Lex.
5. Alon walks back home, just in time for lunch.
6. Uh-oh! Alon realizes he left his bike at the park.
7. Alon heads back to the Abstractopia Bike Park.
8. Alon picks up his bike and walks back home.
9. Whew! Alon finally returns back home to relax.

Abstractopia
Mission 2

All Jumbled Up: Bicycle Fun!

At Abstractopia, Alon's loves sharing stories with his friends. But sometimes he forge
order of events, and accidentally jumbles up the story. Can you help Alon unscramb
story to match each event with their correct indexes?

Directions

If you read the Alon's Bicycle Fun story below, the lines seem to be out of place and
story doesn't make a whole lot of sense. It looks like the events have been mixed up
out of order. Reorder the indexes of each sentence to un-jumble the story.

In your 'My Storyline List' on the next page, help Alon reorder his story to make logi
sense. Happy un-jumbling!

Alon's Bicycle Fun

0. Alon rides his bicycle around the park with Lex.
1. Alon walks to the Abstractopia Bike Park.
2. Whew! Alon finally returns back home for lunch.
3. Alon arrives at the park and meets his friend Lex.
4. Alon walks back home, forgetting about his bike.
5. Alon ties his shoes and takes his bicycle.
6. Alon heads back to the Abstractopia Bike Park.
7. Alon picks up his bike and walks back home.
8. Alon wakes up in the morning.
9. Uh-oh! Alon realizes he left his bike at the park.

CS Hands-On All Jumbled Up 2

Abstractopia
Mission 2

My Unjumbled Story

0. _____
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

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Extension

If your students have extra time, they can create their own jumbled storyline lists with extra copies of the page. Have them choose a partner to exchange jumbled stories, and quiz them on which line belongs on which index.

Educator Note

Have your students compare compared their lists with a partner. Then, regroup as a class and debrief with the following questions:

- What line belonged at index _? How did you know?
- How many indexes away was (line) from (other line)?

After debriefing, provide students with the answer key on the previous page.

Wrap up & reflect

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

- Why is it useful to have indexes on our lists?

  Ex.

  - Indexes help us quickly locate specific items and compare the order of items in a list. For example, Alon's Planet Size List orders planets from largest to smallest. By identifying two planet's indexes, we can tell which is bigger than the other!