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Dice Race

Lesson time: 20 Minutes Basic lesson time includes activity only. Introductory and Wrap-Up suggestions can be used to delve deeper when time allows.

LESSON OVERVIEW

In this lesson, students will relate the concept of algorithms back to everyday real-life activities by playing the Dice Race game. The goal here is to start building the skills to translate real-world situations to online scenarios and vice versa.

TEACHING SUMMARY

Getting Started - 15 minutes

- 1) [Review](#)
- 2) [Vocabulary](#)
- 3) [What We Do Daily](#)

Activity: Real-Life Algorithms - 20 minutes

- 4) [Real-Life Algorithms](#): Dice Race

Wrap-up - 5 minutes

- 5) [Flash Chat](#) - What did we learn?

Assessment - 10 minutes

- 6) [Daily Algorithms](#)

LESSON OBJECTIVES

Students will:

- Name various activities that make up their day
- Decompose large activities into a series of smaller events
- Arrange sequential events into their logical order

TEACHING GUIDE

MATERIALS, RESOURCES AND PREP

For the Student

- Dice (1 per pair)
- Pens/Pencils/Markers
- [Real-Life Algorithms Worksheet](#): Dice Race
- Assessment Worksheet: [Daily Algorithms](#)

For the Teacher

- [Lesson Video](#)
- Teacher Lesson Guide
- Print one [Real-Life Algorithms Worksheet](#) per group
- Print one Assessment Worksheet: [Daily Algorithms](#) per student

GETTING STARTED (15 MIN)

1) Review

This is a great time to review the last lesson that you went through with your class. We suggest you alternate between asking questions of the whole class and having students talk about their answers in small groups.

Here are some questions that you can ask in review:

- What did we do last time?
- What do you wish we had had a chance to do?
- Did you think of any questions after the lesson that you want to ask?
- What was your favorite part of the last lesson?

LESSON TIP

Finishing the review by asking about the students' favorite things helps to leave a positive impression of the previous exercise, increasing excitement for the activity that you are about to introduce.

2) Vocabulary

This lesson has one vocabulary word that is important to review:

Let's Review:

Algorithm

Say it with me: Al-go-ri-thm

A list of steps that you can follow to finish a task

Algorithm - Say it with me: Al-go-ri-thm

A list of steps that you can follow to finish a task

3) What We Do Daily

- Ask your students what they did to get ready for school this morning.
 - Write their answers on the board.
 - If possible, put numbers next to their responses to indicate the order that they happen.
 - If students give responses out of order, have them help you put them in some kind of logical order.
 - Point out places where order matters and places where it doesn't.

- Introduce students to the idea that it is possible to create algorithms for the things that we do everyday.
 - Give them a couple of examples, such as making breakfast, brushing teeth, planting a flower, and making paper airplanes.
- Computers need algorithms and programs to show them how to do even simple things that we can do without thinking about them.
 - It can be challenging to describe something that comes naturally in enough detail for a computer to replicate.
- Let's try doing this with a new and fun activity, like playing the Dice Race Game!

ACTIVITY: (20 MIN)

4) [Real-Life Algorithm Worksheet](#): Dice Race

LESSON TIP

You know your classroom best. As the teacher, decide if students should do this in pairs or small groups.

- You can use algorithms to help describe things that people do every day. In this activity, we will create an algorithm to describe how we play the Dice Race Game.
- The hardest part about getting a problem ready for a computer can be figuring out how to describe real-life activities. We're going to get some practice by playing and describing the Dice Race game.

Directions:

1. Read the rules below.
2. Play a couple rounds of the Dice Race game.
 - As you're playing, think about how you would describe everything that you're doing.
 - What would it look like from the computer's point of view?

Rules:

1. Set each player's score to 0
2. Have the first player roll
3. Add points from that roll to player one's total score
4. Have the next player roll
5. Add points from that roll to player two's total score
6. Each player should go again two more times
7. Check each player's total score to see who has the most points
8. Declare Winner

Game 1

	Turn 1	Turn 2	Turn 3	Total	
Player 1	_____	_____	_____	_____	} Circle the Winner
Player 2	_____	_____	_____	_____	

LESSON TIP

Help the students see the game from a computer's point of view. If they need to roll the dice, then the computer needs to provide dice. If the student needs to play three turns, then the computer needs to loop through the steps multiple times.

WRAP-UP (5 MIN)

5) Flash Chat: What did we learn?

- How many of you were able to follow your classmates' algorithms to play the Dice Race Game?
- What's the difference between an algorithm and a program?
 - An algorithm is the thinking behind what needs to happen, while the program is the actual instruction set that makes it happen.
 - An algorithm has to be translated into a program before a computer can run it.
- Did the exercise leave anything out?
 - What would you have added to make the algorithm even better?
 - What if the algorithm had been only one step: "Play Dice Race"?
 - Would it have been easier or harder?
 - What if it were forty steps?
- What was your favorite part about that activity?

ASSESSMENT (15 MIN)

6) Assessment Worksheet: [Dice Race Assessment](#)

- Hand out the assessment worksheet and allow students to complete the activity independently after the instructions have been well explained.
- This should feel familiar, thanks to the previous activities.

EXTENDED LEARNING

Use these activities to enhance student learning. They can be used as outside of class activities or other enrichment.

Go Figure

- Break the class up into teams.
- Have each team come up with several steps that they can think of to complete a task.
- Gather teams back together into one big group and have one team share their steps, without letting anyone know what the activity was that they had chosen.
- Allow the rest of the class to try to guess what activity the algorithm is for.



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