Lesson 10: Ocean Scene with Loops

45 minutes

Overview

In this **skill-building** lesson, students learn to draw images by looping simple sequences of instructions. Here, loops are creating patterns. At the end of this lesson, students will create their own images.

Purpose

This lesson gives a different perspective on how loops can create things in programming. Students can also reflect on the inefficiency of programming without loops here because of how many blocks the program would require without the help of `repeat` loops.

Standards

Full Course Alignment

CSTA K-12 Computer Science Standards (2017)

- ▶ **AP** - Algorithms & Programming

Agenda

Warm Up (10 minutes)
- **Vocabulary**
- **Introduction**

Main Activity (30 minutes)
- **Ocean Scene with Loops**

Wrap Up (5 minutes)
- **Reflection**

Cross-Curricular Opportunity

Objectives

Students will be able to:

- Count the number of times an action should be repeated and represent it as a loop.
- Create a program that draws complex shapes by repeating simple sequences.
- Decompose a shape into its largest repeatable sequence.

Preparation

- Play through the puzzles to find any potential problem areas for your class.
- Review ***CSF Lesson Recommendations**.
- Make sure each student has a reflection journal.

Links

Heads Up! Please make a copy of any documents you plan to share with students.

For the teachers

- **CSF Course A Lesson Slides** - Slides (**Download**) ▾ Make a Copy
- **CSF Lesson Recommendations** - Resource ▾ Make a Copy
- **Pause and Think Online** - Video

For the students

- **Feeling Faces Emotion Image** - Resource ▾ Make a Copy

Vocabulary

- **Algorithm** - A list of steps to finish a task.
- **Loop** - The action of doing something over and over again.
- **Repeat** - To do something again.

Teaching Guide

Warm Up (10 minutes)

Vocabulary

Display: Show "Vocabulary" slide

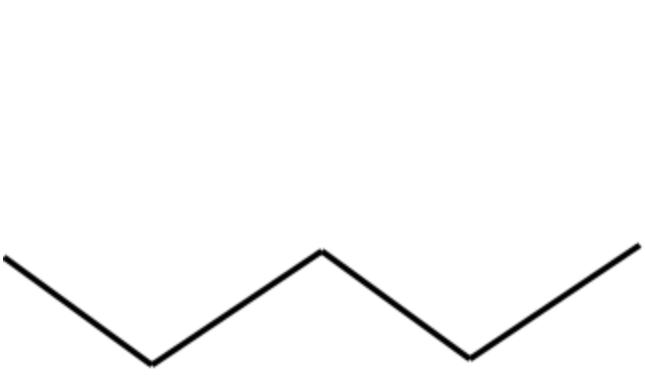
Say:

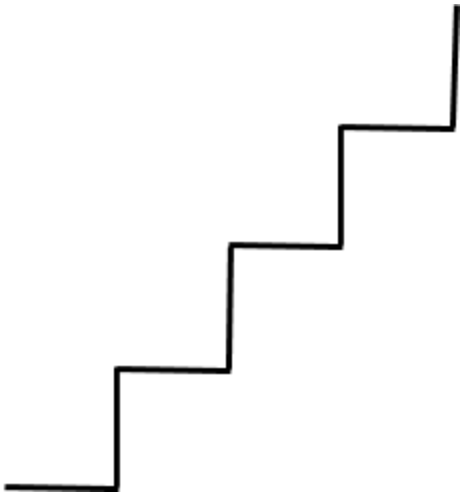
- **Loop** - The action of doing something over and over again.
- **Repeat** - To do something again.

Introduction

Display: Show "Patterns" slides

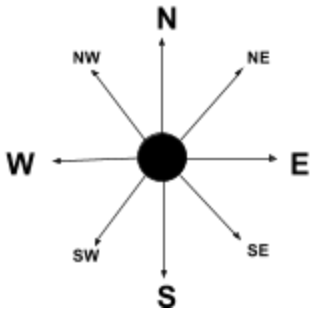
- Quickly review the definition of a loop, the action of doing something over and over again.
- Discuss different patterns like zigzags and stairsteps.
  - *How would you explain to someone how to draw that pattern?*
  - *How could you draw this using a loop?*





Display: Show "Northwest, Northeast, Southwest, Southeast" slides

In the Artist levels, students will be using 45 degree angles described as northwest, northeast, southwest, southeast. We recommend briefly discussing these directions with the class and drawing an image for students to refer back to.



Main Activity (30 minutes)

Ocean Scene with Loops

Teacher Demonstration

We've included some multiple choice prediction levels that are difficult for non-readers. These levels are optional for you to review with your class to help prepare for the puzzles to come. Alternatively, these could be used after finishing the stage as a review for the class.

Prediction Levels:

- **Course A, Loops in Artist**

Display: Show “Decompose it!” slide

Remind students to break each puzzle down into smaller steps.

Display: Show “Video: The Artist in Code Studio” slide

1 **Video: The Artist in Code Studio**

Display: Show “Levels 2-4: Skill Building” slide

2-4 **Skill Building**

2 3 4

Display: Show “Video: Loops in Artist” slide

5 **Video: Loops in Artist**

Display: Show “Levels 6-10: Skill Building” slide

6-10 **Skill Building**

6 7 8 9 10

Display: Show “Levels 11: Challenge” slide

11 **Challenge**

Display: Show “Levels 12-13: Practice” slide

12-13 **Practice**

12 13

Display: Show “Levels 14: Free Play” slide

14 **Free Play**

Teaching Tip

Remind the students to only share their work with their close friends or family. For more information watch or show the class ***Pause and Think Online - Video**

Display: Show “Lesson Extras” slide

15-16 **Lesson Extras**

Wrap Up (5 minutes)

Reflection

Display: Show "Reflection” slide

Prompts:

- What was today’s lesson about?
- Draw a face that shows how you felt about today's lesson in the corner of your journal page.
- Draw some stairs. Imagine the loop needed to draw this.
- Draw something else in your life that uses loops.

Cross-Curricular Opportunity

Code My Drawing (30-45 minutes)

Computer Science + English Language Arts

Code My Drawing is an optional activity aligned to Common Core ELA standards, written by our teacher community. In pairs or groups of three, students will practice clear communication in order to code each other's drawings in Artist.

Standards Addressed:

- **CCSS.ELA-Literacy.SL.K.2**: Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
- **CCSS.ELA-Literacy.SL.K.3**: Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
- **CCSS.ELA-Literacy.SL.K.6**: Speak audibly and express thoughts, feelings, and ideas clearly.



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