Lesson 6: Creating Art with Code

50 minutes

Overview

In this **skill-building** lesson, students will take control of the Artist to complete drawings on the screen.

Purpose

Building off of the students' previous experience with sequencing, this lesson will work to inspire more creativity with coding. The purpose of this lesson is to solidify knowledge on sequencing by introducing new blocks and goals. In this case, students learn more about pixels and angles using the new blocks, while still practicing their sequencing skills. Also, students will be able to visualize new goals such as coding the Artist to draw a square.

Standards

Full Course Alignment

CSTA K-12 Computer Science Standards (2017)

- ▶ **AP** - Algorithms & Programming

Agenda

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

Main Activity (30 minutes)
- **Creating Art with Code**

Wrap Up (10 minutes)
- **Reflection**

Extended Learning

Cross-Curricular Opportunity

Objectives

Students will be able to:

- Break complex shapes into simple parts.
- Create a program to complete an image using sequential steps.

Preparation

- Play through the puzzles to find any potential problem areas for your class.
- (Optional) Obtain protractors for your class to visualize the angles they must use to complete the puzzles.
- Print one ***Student Handout** for each student.

Links

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

For the teachers

- **CSF - Course C - Slides 2022-2023** - Slides (**Download**)

For the students

- **Artist Introduction** - Student Video
- **Turns & Angles** - Student Video
- **Turns & Angles** - Student Handout

Vocabulary

- **Angle** - Where two sides of a shape come together, measured in degrees.

Teaching Guide

Warm Up (10 minutes)

Reflect

🖼 **Display**: Show “Reflect” slide

Reflect: *Why is it important to go through your code, block by block, when debugging?*

Vocabulary

- **Angle** - Where two sides of a shape come together, measured in degrees.

Introduction

Show the students the following video as an introduction to angles:

🖼 **Display**: Show “Turns & Angles: Drawing with Degrees” video

Turns and Angles - student video (2 minutes long)

🖼 **Display**: Show “Student Handout” slide

Use ***student handout** to show the students interior versus exterior angles for different shapes. This document can be used as a hand out or you can choose to print it out as a poster for students to refer to.

Discuss the shapes from the document.

- *How would you code a computer to draw that shape?*
- *What order do the instructions need to be in?*

Tell the students that in these puzzles they will be moving a character who leaves a line everywhere he goes. The students will be writing code that gets the character to draw various shapes.

Main Activity (30 minutes)

Creating Art with Code

In this set of puzzles, the artist will no longer be constrained to 90 degree angles. Having physical protractors available can help students better visualize the angles they need. Otherwise, the stage provides images of the angles as the student selects which angle to use. (Please note: Angle choices are limited to two inside of the dropdown menu, reducing the number of options students have to work through.)

🖼 **Display**: Show “Protractor Online” slide

Before sending the students to the computers to work on the puzzles, it might be beneficial to give a brief presentation of how to use the tools in this level. We recommend puzzle 5 as a good puzzle to show how to use the protractor online.

🖼 **Display**: Show “Artist Intro with JR Hildebrand” video

1 **Video: Artist Intro with JR Hildebrand**

Display: Show “Level 2-7 - Skill Building” slide

2-7 **Skill Building**

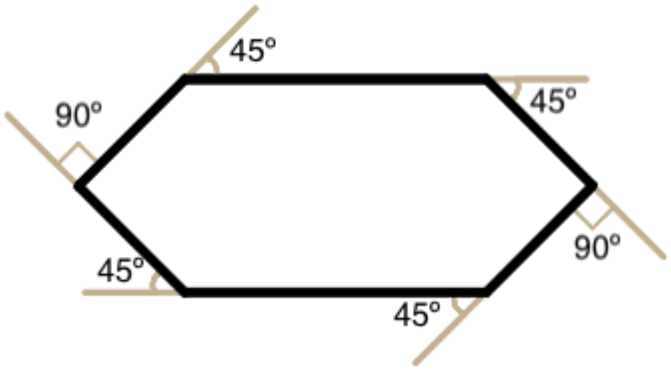
2 3 4 5 6 7

Display: Show “Level 8 - Challenge” slide

8 **Challenge**

Teaching Tip

The eighth puzzle asks the students to draw a 6 sided polygon. This might be challenging for some students. We recommend getting the students to try a few times, ask a peer, then ask the teacher for help. Below is an image that might be helpful for the students.



Display: Show “Level 9 - Practice” slide

9 **Practice**

Display: Show “Level 10 - Prediction” slide

10 **Prediction**

Display: Show “Lesson Extras” slide

11-12 **Lesson Extras**

Wrap Up (10 minutes)

Reflection

Display: Show “Reflect” slide

Reflect: *Sketch a simple shape on your paper and imagine the code used to draw it. Can you write that code out next to the shape?*

Extended Learning

Use this activity to enhance student learning. It can be used as an outside of class activity or other enrichment.

The Copy Machine

- Give students two pieces of paper
- On one sheet draw a simple image, using straight lines only.
- On the second sheet draw instructions for recreating that image commands to move straight and turn at various angles.
- Trade instruction sheets and attempt to recreate the image using only the provided instructions.

Cross-Curricular Opportunity

Shapes & Landscapes (45-60 minutes)

Computer Science + English Language Arts + Math + Science

Shapes & Landscapes is an optional activity aligned to Common Core ELA, Common Core Math and Next Generation Science Standards, written by our teacher community. Students are asked to design a dam to prevent future flooding. Using code, you will create a blueprint to show the local town council how your dam will look.

Standards Addressed:

- **CCSS.ELA-LITERACY.W.2.8:** Recall information from experiences or gather information from provided sources to answer a question.
- **CCSS.MATH.CONTENT.2.MD.A.3:** Estimate lengths using units of inches, feet, centimeters, and meters.
- **NGSS.2-ESS2-1:** Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.