Exploring Codeblocking in Tinkercad	Gr. 7 - Understanding Structures & Mechanisms

Codeblocks

Coding Tool	Tinkercad
Cross-curricular	Math

Big Ideas

Science
- Structures have a purpose
- Inquiry

Math
- Mathematical Process
- Number Sense - integers
- Measurement - converting units
- Geometry & Spatial Sense - location and movement

Specific Expectations

Science
- 1.1 - evaluating importance in factors to be considered
- 2.6 - use appropriate science and technology vocabulary

Math
- Number Sense
  - identify and compare integers found in real-life contexts
  - represent and order integers
- Measurement
  - solve problems that require conversion of units of area
- Geometry & Spatial Sense
  - plotting points
  - identify, perform, and describe dilatations
  - create an analyze designs

Description

This lesson uses prior knowledge about the factors and considerations necessary when designing and building a structure. Prior experience with Scratch for block coding is helpful, however not necessary. Two handouts are provided to give some background information to the teacher (e.g. building an account, attaching a classroom, and learning how to use the Codeblock feature in Tinkercad). Students will explore Tinkercad and consolidate their understanding by using Codeblock to design and build a simple structure which performs a function (e.g. chair), and uploaded as a .gif to share with one another. A chair has been suggested as a structure, however adapting the structure to what is most familiar and simple for students would assist in the design and build. Depending on their understanding, math curricular focus can be integrated; or future tasks could add math on as comfort level with Tinkercad increases.

Materials	Computational Thinking Skills
- pencils, stack of GOOS (Good On One Side) paper - prior experience on Scratch for block coding is helpful - technology device and internet access to create Tinkercad account (e.g., teacher created account and classroom built) - Website - www.tinkercad.com - anchor charts with prior learning - full 100 minute block - accommodations: variety of chairs for ease of transferring a physical object to code	Iterative Thinking - students will be experiences a new form of block coding Abstraction - understanding of using x, y, z plane to focus on which makes their design easier Decomposition - focusing on one aspects at a time Debugging - working on a plan to complete the task

Introduction

- In a circle, snowball ideas they can recall about structures (e.g., factors and considerations to keep in mind)
  - every student writes an idea on a piece of paper, crumples it up and throws it in the middle (in a box, or on the floor), then each student receives a different snowball to share the idea written
  - modification/accommodation: scribe for students as necessary (possibly ahead of time)
- Discussion about block coding and prior experiences (e.g., Scratch)
  - importance of giving detailed instructions
- Techless Activity
  - teacher draws a simple chair on a piece of paper (not shown to class)
  - teacher gives partially detailed instructions on how to draw the chair to try and have students copy that (cannot "assume", must draw exactly as it is heard)
- Connection
  - how does that example relate to coding? (e.g., importance of detailed and specific instructions)
- Purpose of the lesson
  - to Codeblock a structure that has a specific purpose (e.g., chair)
  - end product is a shared .gif of the creation of your structure (e.g., chair)
- Build success criteria together prior to beginning, as well as during their build (e.g., working document)
  - terminology used
  - factors and considerations kept in mind
  - use of computational skills

Action

- Shared learning - website to go onto (Tinkercad) and Codeblocks section of Tinkercad
  - Focus on student learning experiences - focus together only on how to get to the site, then encourage exploration for deeper understanding of the site and how to code
  - Students create own account and connect to teacher classroom
- During exploration, have brief discussions;
  - If anyone has tried something that has not worked, and how they fixed it
  - If anyone is noticing patterns, making a plan, making something easier, etc

Consolidation/Extension

- 3, 2, 1 Reflection - 3 new things learned, 2 that were interesting/made things easier, 1 question about next steps or something that is not understood
  - see handout
- Quick discussion about prior knowledge going in, and what they understand now
- Take Home
  - think about a structure to create which is important to you - may be something modified or adjusted that already exists, or something completely new
  - this structure must perform a function (e.g., has a force acting on it, supports a load, etc.)

Assessment

- anecdotal from their exploration
  - learning skills
  - computational thinking
- based on the co-created success criteria
  - descriptive feedback given to each student for lesson 2's creation

Additional Resources

- 3, 2, 1 Exit pass handout
- Websites
  - Tinkercad - https://www.tinkercad.com/learn/#/learn/codeblocks
  - Scratch - https://scratch.mit.edu/