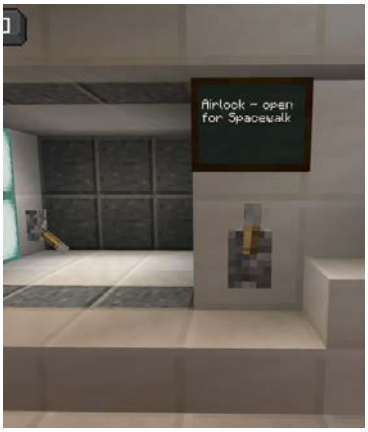
Design Brief: International Space Station Observatory
Grade: 5
Subject: Science, Math

ISS Observatory

Background: The International Space Station orbits the Earth every 90 minutes. Astronauts must exit the space station frequently to conduct experiments and observe the Earth.
Watch the first 1:15 of this video to see what astronauts face when exiting the ISS: https://safeYouTube.net/w/Znqz

Design Challenge: You and your team are new astronauts aboard the International Space Station. You've been selected to design and build an observatory that is accessible to the astronauts from the Airlock area. Spacewalk still must be conducted outside of the ISS, however, so your addition can not interfere with this area.
Before you can start to build you must know the location of the sleeping quarters, Airlock, Nasa Shuttle Hatch, and engine rooms.



Criteria:

- Must be accessible from the Airlock Area.
- Must be large enough for 8 astronauts comfortably to work in.
- Must not interfere with the area needed for Spacewalks.
- Must not damage or replace any existing ISS structure.
- Must be designed for astronauts to work in zero gravity.
- Must be designed for astronauts to work in without needing spacesuits for air and temperature protection.
- Must determine the area of the observatory and send the data back to NASA for fuel requirement calculations.

Materials:

- Paper for blue print
- Pencil
- Computer with Minecraft Education Edition

Tools:

- Minecraft Education Edition ISS World

Standards:
Target Virginia SOL Standards: Science 5.1, 4.6, Math 5.8
Supporting Virginia SOL Standards: C/T 3-5.9, C/T 3-5.10

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Student Design Work

Problem to solve:

How would you describe the problem we want to solve?

Design Criteria

How should the area be designed? What limits do we have to work within? (materials, size, time, etc.)

Brainstorm (Explore) Ideas to Meet the Design Criterial

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What ideas do we have about ways to get the product to meet the Design Criteria?

Design Drawing and Plan for Building Prototype

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Test, Evaluate (After Testing the Design), Redesign Plan (Repeat this step as often as necessary.)

Testing: What was tried? What was the result?
Evaluating: Does it meet one or more of the design criteria?
Redesigning: What changes could we make for a design that meets more of the criteria?

Design Solution for the problem

Rubric

Criteria Assessed	No Evidence 0	Attempts to meet criteria shows limited understanding 1	Meets some criteria with room for improvement 2	Meets most criteria with room from improvement 3	Meets all criteria 4
Guided Portfolio					
The student restated the problem in his/her own words.					
The student brainstormed multiple ideas					
The student included notes or sketches about problems that occurred and their solutions					
The student included notes evaluating the solution *after* it was tested?					
Project					
Large enough for eight astronauts.					
Does not interfere with Spacewalks.					
Zero gravity, temperature, and air needs have been addressed.					
Accessible from the Airlock.					
Area of the observatory has been correctly calculated.					
Oral Presentation/Group Work					

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The student uses grammatically correct language.					
The student uses clear and specific vocabulary to communicate ideas.					
The student speaks clearly.					
The student uses appropriate volume and pitch.					
The student speaks at an understandable rate.					
The student worked cooperatively with his or her group and was an effective group member.					