

Hands on Engineering Activity 1

Topic: Models and Scalability

Learning Objective: Planning and design in engineering projects. Scalability (small to large scale). Other “forms” of blueprints like computer-generated models.

Alignment with NGSS Grades 3-5

Science and Engineering Practices

Using Mathematics and Computational Thinking

- Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific questions and problems.

Developing and Using Models

- Identify limitations of models.

Performance Expectations and Disciplinary Core Ideas for Engineering Design

- 3-5 ETS 1-1 Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time, and cost.

Materials:

- Blueprint/regular/construction/poster paper
- Pencils and erasers
- Rulers
- Markers

Detailed Description

- Activity
 - Brief introductions
 - Examples of blueprints and their traditional utility in construction
 - Discuss what “scale” means in the context of engineering and why this is important
 - For example, airplanes may be drawn on a smaller scale, but since it’s dynamic, there are a lot of other factors that matter when scaling up
 - Students will brainstorm some design of a building they want to construct
 - Have students pick a reasonable scale based on how big the paper is
 - Create a key (for example, 1 inch = 20 ft)
 - Use rulers and pencil to draw the blueprint diagram

How will you conclude the lesson to enforce the learning objective:

I will ask students:

- What did you learn from the activity?
- What were the easiest and hardest parts of project?
- What could be improved on?

What science process skills will this lesson exercise?

Visual learning, Planning and designing before implementation

Safety precautions

None