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