

## Designing a Cargo Container (3 Lessons)

- This lesson requires the use of a computer with Internet access, (10) 3"x5" index cards, and 10" of masking tape per student.
- This lesson is to take two class periods.
  - Day 1: Teacher will introduce the Designing a Cargo Container Activity and review instructions to groups of two. Groups will use a computer to access cargo container types, choose a container type to model, assign a scale for their container, sketch their container design, and begin construction of their container model.
  - Day 2: Teacher will review the Designing Cargo Container Activity and allow groups time to complete construction of their container model.
  - Day 3: Groups destructively test a container model and calculate its efficiency of design in front of the class. Homework: groups will then complete the conclusion and questions on the worksheet.

### Rules:

1. Do not use more than the provided materials
2. Cargo container model is to be designed after a cargo container type
3. Cargo container model is to have an assigned scale
4. Use only books provided by the teacher to test your cargo container
5. Weight both a single book and your cargo container before destructively testing record weights in grams

### Materials:

1. (10) 3"x5" index cards

### 10" masking tape

### Step 1: Research

#### Directions:

Use the following site (<http://www.seabox.com/v3/catalog/40ft/>) to help identify three types of cargo containers that can be used as a guide to help you design your cargo container model. You can look at the specific PDF descriptions of the containers to gather more information.

1. Cargo Container 1:
  - a. Purpose:
2. Cargo Container 2:
  - a. Purpose:

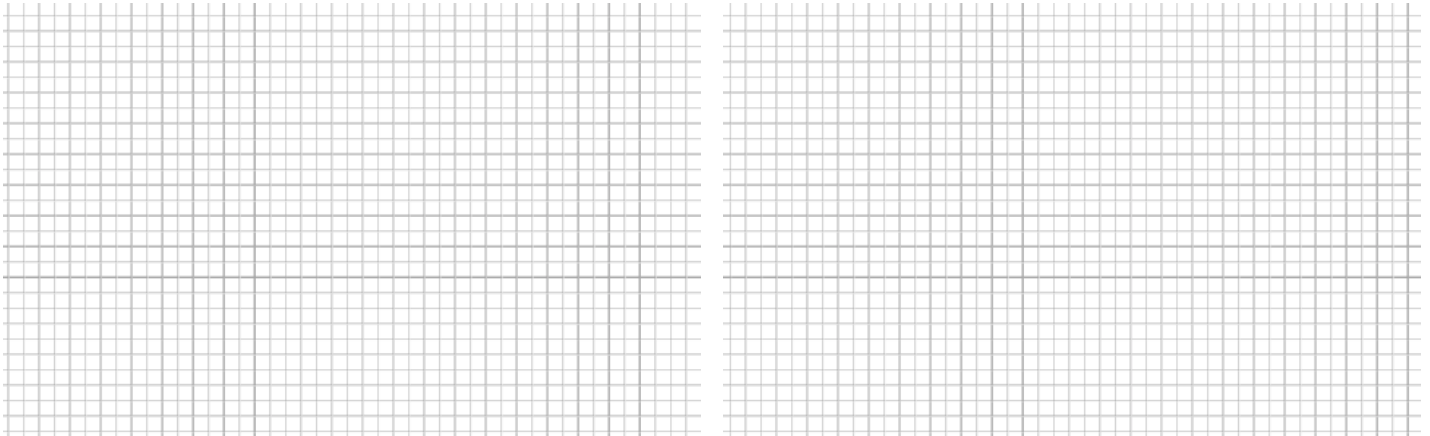
3. Cargo Container 3:

a. Purpose:

**Step 2: Brainstorming Solutions**

Directions:

Create two sketches of possible solutions. Note the scale at which the model would be constructed in the lower right hand corner of the space.



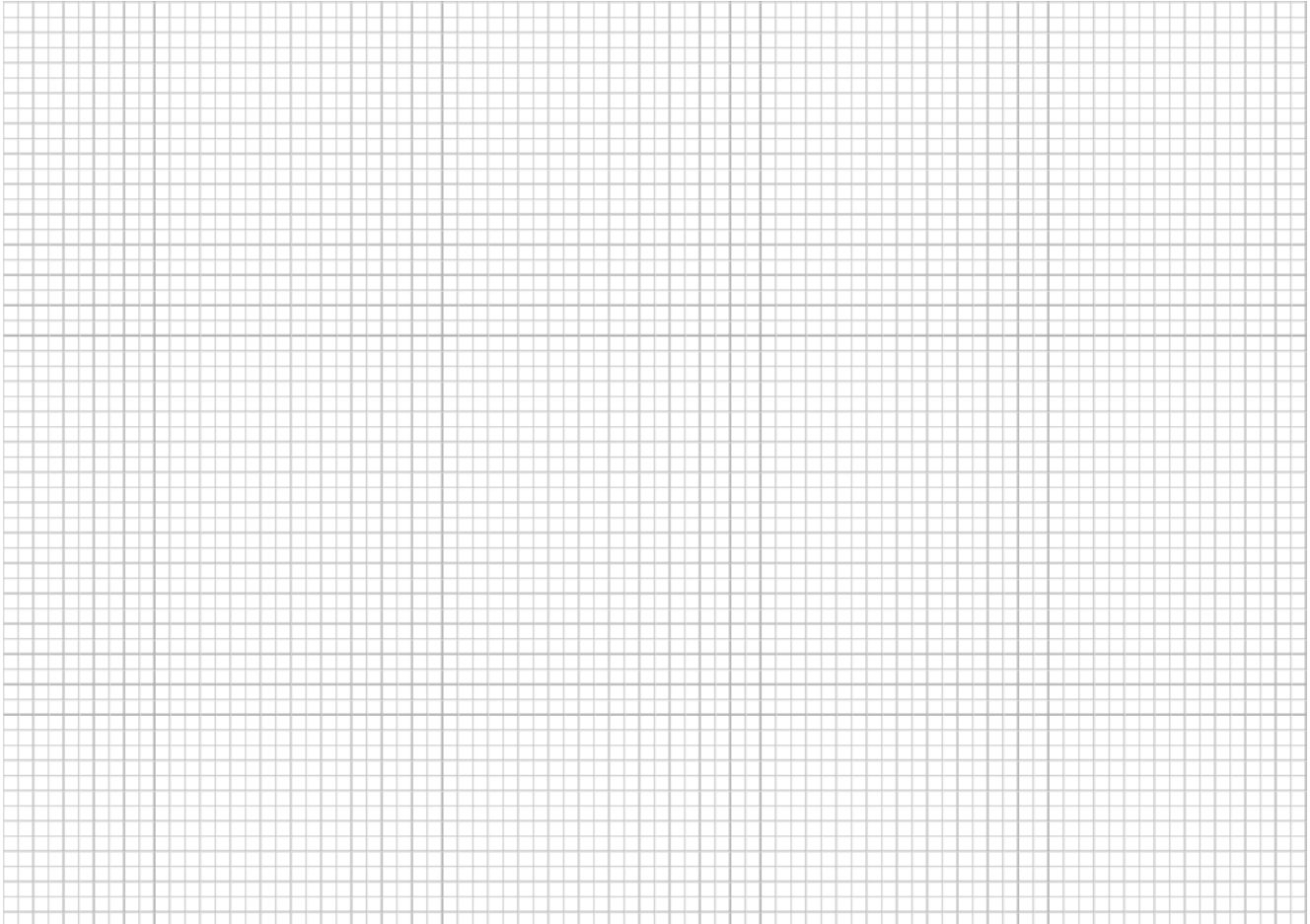
Examine both design ideas. Create a list of positives and negatives for each design. Based on your lists, choose your final design.

Design 1		Design 2	
Positives:	Negatives:	Positives:	Negatives:
1.	1.	1.	1.
2.	2.	2.	2.
3.	3.	3.	3.
4.	4.	4.	4.
5.	5.	5.	5.

**Step 4: Designing the final solution**

Directions:

Choose a final design and create a detailed sketch. Note the scale at which the model will be constructed in the lower right hand corner of the space.



Using a scale, weigh your cargo container model and a single text book. Place text books on your scale model until your scale model collapses. All measurements will be recorded in grams.

Weight of text book: \_\_\_\_\_ Number of text books held: \_\_\_\_\_

Total weight held: \_\_\_\_\_ Weight of container: \_\_\_\_\_

Calculate the efficiency of your model using the following equation:

$$\text{Efficiency} = \text{Load supported in grams} / \text{Mass of cargo container in grams}$$

Questions:

1. What was the efficiency of you cargo container?
2. What changes or adjustments did you make for your solution to be successful?
3. How would you redesign your model to be more efficient?

#### **Step 4: Designing the final solution**

Directions:

Choose a final design and create a detailed sketch. Note the scale at which the model will be constructed in the lower right hand corner of the space.