



Ag TransPORtation

Explore how to create a scale model of a shipping container and learn about agricultural commodities that are shipped around the world!

The Facts

A port is a location where ships, trucks, and trains come to load and unload cargo. Cargo ships carry shipping containers that hold many products, including California agricultural commodities such as almonds, walnuts, grapes, raisins, tomatoes, rice and citrus. The Port of Oakland exports these commodities to China, Japan, South Korea, Hong Kong, Taiwan, and Europe. Check out the *What's in the Box?* video at LearnAboutAg.org/AgBites.

The Challenge (Part 1)

- Cargo ships can hold as many as 18,000 shipping containers, with the most common size of container measuring 8' x 8' x 40'. Create a scale model shipping container based on an actual 8' x 8' x 40' shipping container's dimensions.
- Discuss the different meanings of scale – for instance the scale used for a map. Show the world map and point out ports in California, the West Coast, Asia, and Europe. Discuss distances and what scale is used.
- Clarify what scale means in math – the ratio of a model in comparison to a life-size object. The first number represents the model, the second is the life-size object.
- Challenge students to create a scale model container that fits on graph paper. Allow students time to create and find solutions that would be proportional.
- As a class, determine the scale to use for the 8' x 8' x 40' container (Let 1 in = 8 ft). Find the scale factor: $1 \text{ in}/8 \text{ ft} \times 1 \text{ ft}/12 \text{ in} = 1/96$. The size of the scale model is $1/96$ the size of the actual container or the container is 96 times larger than the scale model! ($8/96 = .083 \text{ ft}$, $.083 \text{ ft} \times 12 \text{ in}/\text{ft} = 1 \text{ in}$ and $40/96 = .4167 \text{ ft}$, $.4167 \text{ ft} \times 12 \text{ in}/\text{ft} = 5 \text{ in}$) It works well to use 1" x 1" x 5" (1 in = 8 ft and 5 in = 40 ft) as the scale model size to draw a net of the container on graph paper. Ask students what shape is this? (A rectangular prism)
- Cut out the net. Fold and tape all sides except one. You can also measure and cut out a net on thicker paper such as construction paper. Decorate your scale model container. Save for part 2.

The Competition (Part 2)

- Test out your scale model in the **Aluminum Ship Competition**. Build a cargo ship out of aluminum foil that will carry agricultural commodities and stay afloat. Compete with others in your class! Visit LearnAboutAg.org/AgBites for instructions and extension ideas.

Materials

The Challenge (Part 1)

- World Map to show export countries and to use as an example of scale
- ¼- or ½-inch graph paper; construction paper or heavy paper
- Pencil, Scissors, Tape

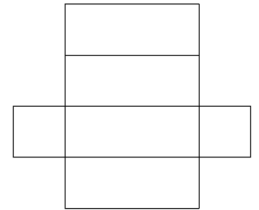
The Competition (Part 2)

- Aluminum foil (pre-cut sheets are best)
- Dish pan, sink, or kiddie pool
- Various agricultural commodities

Tips

For more information about ports visit www.portofoakland.com.

For information about California commodities visit LearnAboutAg.org/factsheets.



Classroom Activities

Science:

- Exporting fresh fruits and vegetables requires special care. Develop an experiment to measure the best way to preserve fresh produce – consider drying, refrigerating, or canning.

Technology:

- Cranes load container boxes onto ships. Using classroom supplies, build a machine that will load a box. Create a video to show how it works. Check out Simple Machines at LearnAboutAg.org/resources/lesson/simple.pdf for lessons about simple machines.

Engineering:

- Design a container that will safely transport an egg, pear, or avocado. Test your container by dropping it from different heights.

Math:

- Exports and imports travel to and from ports all over the world. Visit ports.com to find the distance from the Port of Oakland to ports in China, Japan, South Korea, Hong Kong, and Taiwan. Calculate round trips and convert to nautical miles.

California Standards

Grade 5

Math CC: 5.NF.5b, 6, 5.MD.1, 3, 5b

NGSS: 5-ETS-1, 2, 3

Grade 6-8

Math CC: 6.RP.1, 2, 3, 6.G.1, 3, 4;

7.RP.2, 7.G.1, 6

NGSS: MS-ETS1, 2, 3, 4



PORT OF OAKLAND

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