

WEIGHTED WARSHIPS

A STEM PERFORMANCE TASK

OBJECTIVE

Design/Construct a boat that will float the *most* mass without sinking.



Materials Needed:

- **Rolls of aluminum foil**
- **Pennies**
- **A sink or large tub to hold water**



Task Card 1

You and your partners will **CONSTRUCT (Level 3)** a craft that will float on water and carry the most mass possible.

You will be given 2 pieces of foil to create your ship.

CREATE (level 3) a name for your ship.

Task Card 2

One sheet of foil is to test your design ideas and the other sheet is for their final “boat”.

Your challenge is to create a “boat” that will hold the most pennies, without sinking.

You are not allowed to use anything to build the boat other than one .5m x .5m sheet of foil.

Task Card 3

DESIGN (Level 4) your boat with your group, on paper.

Take the aluminum foil and measure it to 12 inches by 18 inches.

CONSTRUCT (level 3) your boat.

Task Card 4

Answer these questions on paper:

- **How much does your ship weigh?**
- **How much does a single penny weigh?**
- **How many pennies do you think your ship will hold?**
- **How much weight would that equal?**
- **Explain why you think your ship will hold that much weight.**

Task Card 5

Your boat will now be placed in a tub of water, and you will add pennies to your boat until it sinks. When it sinks, the pennies will be removed and weighed. Write this penny weight down on your paper.

Task Card 6

Answer on your paper:

Would you change the design of your boat if you did this activity over again?

If so what would you change?

If not, what would you leave the same?

How many kilograms would your boat hold?

Making Connections

Anyone that has ever lifted an object out of water has noticed that the object gets heavier as more of the object is lifted above the surface of the water. The reason for this effect is that the water is exerting an upward force upon the object. This upward force is called the buoyant force. So, when the weight of an object is greater than the water's buoyant force, the object sinks. When the weight is less than the buoyant force, the object floats, and when the weight and buoyant force are equal, the object will remain at any level in the water. Fish are a familiar example of this last characteristic. Therefore, the greater the surface area of the object being placed in water, the more buoyant force it has being applied to it to help it float.