ACTIVITY 3: ENGINEER A CARGO BOAT

Image Credit: Gary Abud, Jr.

The purpose of this activity is for students to create a boat out of aluminum foil and tape that will hold the most cargo without sinking.

First, inform students that they will be working with their groups to create a boat out of one square foot of aluminum foil and one linear foot of office tape to hold a minimum amount* of cargo (e.g., 500g).

Show them the "cargo" that their boat will need to hold (e.g., pennies, small candies such as M&Ms, dry rice or beans, etc.) and provide them 500g of cargo.

Then, provide students with the supplies to construct their cargo boats (e.g., tape, foil, scissors) with their groups and monitor group activity as students work.

***Teaching Tip*: Encourage students to plan their design according to the principles learned earlier in this lesson before beginning their builds.**

Next, fill a water tank (using a plastic bin, disposable bakeware pan, etc.) for groups to test their boats in. Have students launch their boats on the water and begin adding cargo to them. Students should continue adding cargo until they either reach the minimum amount (e.g., 500g) required for the challenge or their boat sinks. If their boat holds the minimum amount without sinking, they can continue adding more cargo until the boat sinks to see which boat holds the most cargo. Make sure groups measure the maximum amount of cargo that their boat was able to hold before sinking.

Last, engage students in a whole-group discussion about the various designs of boats, how each one fared, and what features of the boat design made for more or less successful cargo holding.

Create a list of the features that the group agrees contributed to a more successful boat design and the ability to hold more cargo. Invite students to make connections between what they learned in this engineering design challenge and how wooden boats and freighters have to be built.

**Inform students that for an added element of challenge, if they pass the minimum cargo test, they may test their boats to failure, measuring the maximum cargo they can hold before sinking to see which boat designs fares best.*