

Design a Watercraft

Kindergarten

Unit 5 – The Great Big World

Text Connection: *The Fool of the World and the Flying Ship* retold by Arthur Ransome

Design Challenge Summary

Challenge: What will the students be required to do?

The Tsar has declared he needs a watercraft to travel the world. Using only the materials provided, you must design a watercraft that will be able to hold the greatest amount of “people” without sinking.

Standards: What standards are addressed?

Science:

- NS.1.K.1 Record observations pictorially, orally, and in writing
- NS.1.K.2 Ask questions based on observations
- NS.1.K.3 Conduct scientific investigations as a class and in teams
- NS.1.K.4 Estimate and measure length, mass and capacity/volume of familiar objects using non-standard units
- NS.1.K.6 Collect empirical evidence as a class
- NS.1.K.7 Use age-appropriate equipment and tools in scientific investigations
- PS.6.K.3 Demonstrate the effects of the force of gravity on objects

Math:

Mathematical Practice Standards

- K.CC.1 Count to 100 by ones and by tens
- K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20
- K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality
- K.CC.5 Count to answer “how many?” questions...
- K.CC.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group
- K.MD.1 Describe measurable attributes of objects, such as length or weight...
- K.MD.2 Directly compare two objects with a measurable attribute in common to see which object has “more of”/ “less of” the attribute and describe the difference.

Other:

- W.K.3 Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.
- SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups
- SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood
- SL.K.6 Speak audibly and express thoughts, feelings, and ideas clearly.

Result: What will students know, value, and be able to do as a result of the lesson? What’s the big idea?

- Know and apply the engineering design loop process.
- Demonstrate the force of gravity on an object. (teddy bears/counters on the craft)
- Understand that objects sink or float.

Design a Watercraft

Assessment: What evidence will be used to determine student learning?

Did they build a watercraft with given materials?
Did they follow the design loop process?
Did they work collaboratively?

Prior Knowledge/Experiences: What prior content knowledge and skills will the students need?

Connections to the Mathematical Practices
Investigations/inquiry in Science
Experiences with objects sinking/floating
Experiences with the force of gravity on a object

Summary/Connections: How will this design challenge connect with new/future learning, other content areas, real world experiences, etc.?

This lesson will help students develop problem solving skills and collaboration skills that are essential in succeeding in the 21st century. It will allow student the opportunity to transfer and apply skills from various content areas within one task.

As a summary activity, you could engage students in: **W.K.3** Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.

Extensions:

What would happen if we changed our objects of mass/weight? What if we used two colored counters instead of teddy bears? What if we used hexagon pattern blocks instead of teddy bears? Pennies, Etc.

What would happen if we changed our materials? What if we used Styrofoam plates instead of aluminum foil? Plastic wrap instead of aluminum foil? Etc.

Materials/Equipment/Preparation: What materials and equipment will students need to successfully complete this design challenge?

Aluminum foil (6" x 6" squares precut for the challenge)
Teddy bear counters (or other counters/objects) for the "people"
Tubs of water



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Group Supplies:

6” x 6” square of aluminum foil, teddy bear counters (people)

Other supplies:
Container of water