

Freedom Raft

2nd Grade

Freedom Raft

Unit 4– Journey To Freedom

Text Connection: *Friend on Freedom River by Gloria Whelan*

Design Challenge Summary

Challenge: What will the students be required to do?

Louis has lost his boat and must design a survival raft that will carry the family of 3 and himself safely across the icy Detroit River without capsizing. Use the supplies to help Louis design his survival freedom raft and get everyone there safely.

Standards: What standards are addressed?

Science:

NS.1.2.1 Communicate observations orally, in writing and in graphic organizers

NS.1.2.2 Develop questions that guide scientific inquiry

NS.1.2.3 Conduct scientific investigations as individually and in teams

NS.1.2.5 Collect measurable empirical evidence in teams and as individuals

NS.1.2.6 Make predictions in teams and as individuals based upon empirical evidence

NS.1.2.7 Use age-appropriate equipment and tools in scientific investigations

NS.1.2.8 Apply lab safety rules as they relate to specific science lab activities

Math:

Mathematical Practice Standards

2.MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

2.MD.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

Other:

W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points and provide a concluding statement or section

W.2.3 Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts and feelings, use temporal words to signal event order, and provide a sense of closure

SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups

SL.2.3 Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information or deepen understanding of a topic or issue

SL.2.4 Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences

SL.2.6 Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification

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 ability to modify designs based on observations and predictions.

Work collaboratively on solving a problem.

Experiment with the stability of a raft in icy water and the integrity of the raft to travel a given distance.

Freedom Raft

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

Did they construct a raft that met the design challenge?
Did they follow the design loop process?
Did they work collaboratively?

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

Experience with the Engineering Design Loop process
Connections to the Mathematical Practices
Investigations/inquiry in Science
Experiences with the effects of the force of gravity on objects (sink/float). (PS. 6.K.3)

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 students the opportunity to transfer and apply skills from various content areas within one task.

As a summary activity, you could engage students in:

W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points and provide a concluding statement or section

W.2.3 Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts and feelings, use temporal words to signal event order, and provide a sense of closure

Extensions:

What would happen if the water temperature was warmer?

What would happen if there was a rain storm during travel?

Would boat size affect the distance or ability to travel?

Measure and compare the distances the boats travel. **(2.MD.4)**

Create a class line plot to show which raft travels the fastest. **(2.MD.9)**

Place pennies on the raft to determine how many pennies (people) could travel on the raft safely across the river.

How do the pennies (people) affect the integrity of the raft and its ability to travel?

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

20 Straws, 5 rubber bands, 20 popsicle sticks, 2 sheets of paper, 12" yarn, 2-12" pieces of masking tape, 4 pipe cleaners, paper family of 3 and Louis, container (Sterilite container 34 7/8" x 16 5/8" x 6 1/8") filled with water and ice.

Optional mini fan or students can blow their raft across the river.

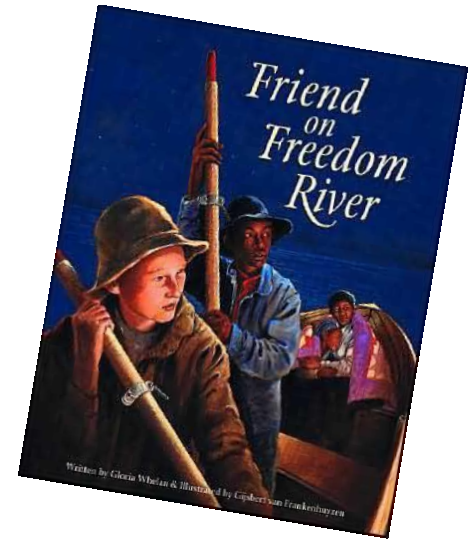
ADDITIONAL INFORMATION

This is an example of what the finished boats might look like – for your information...
Wouldn't necessarily show it to the students.



Freedom Raft

Louis has lost his boat and must design a survival raft that will carry the family of 3 and himself safely across the icy Detroit River without capsizing. Use the supplies to help Louis design his survival freedom raft and get everyone there safely.



Group Supplies:

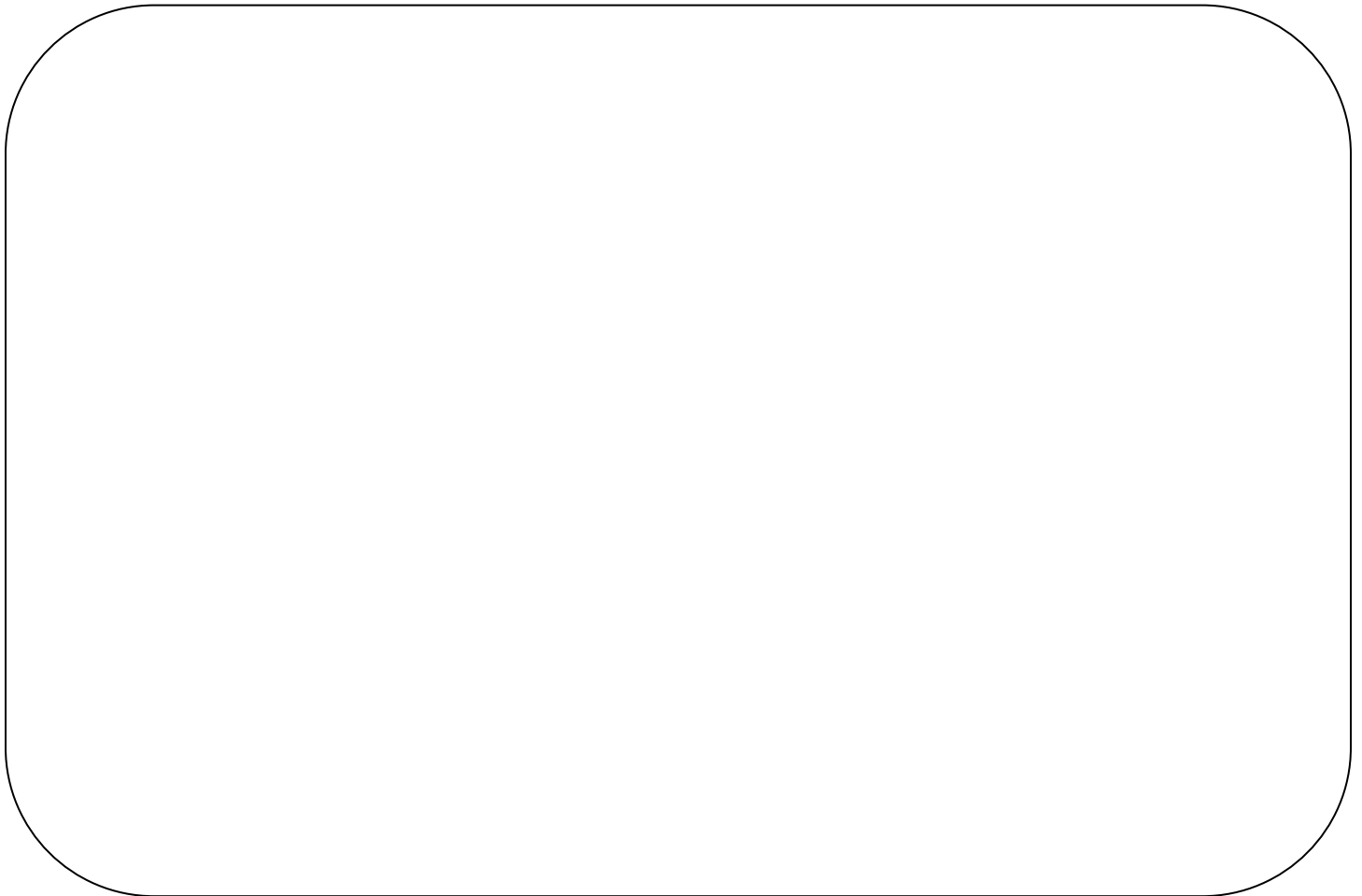
20 straws, 5 rubber bands, 20 popsicle sticks, 2 sheets of paper, 12" yarn, 2-12" pieces of masking tape, 4 pipe cleaners, paper family of 3 and Louis, container (Sterilite container 34 7/8" X 16 5/8" X 6 1/8") filled with water and ice

Optional: mini fan or students can blow their raft across the river.

FREEDOM RAFT

Louis has lost his boat and must design a survival raft that will carry the family of 3 and himself safely across the icy Detroit River without capsizing. Use the supplies to help Louis design his survival freedom raft and get everyone there safely.

My raft design:



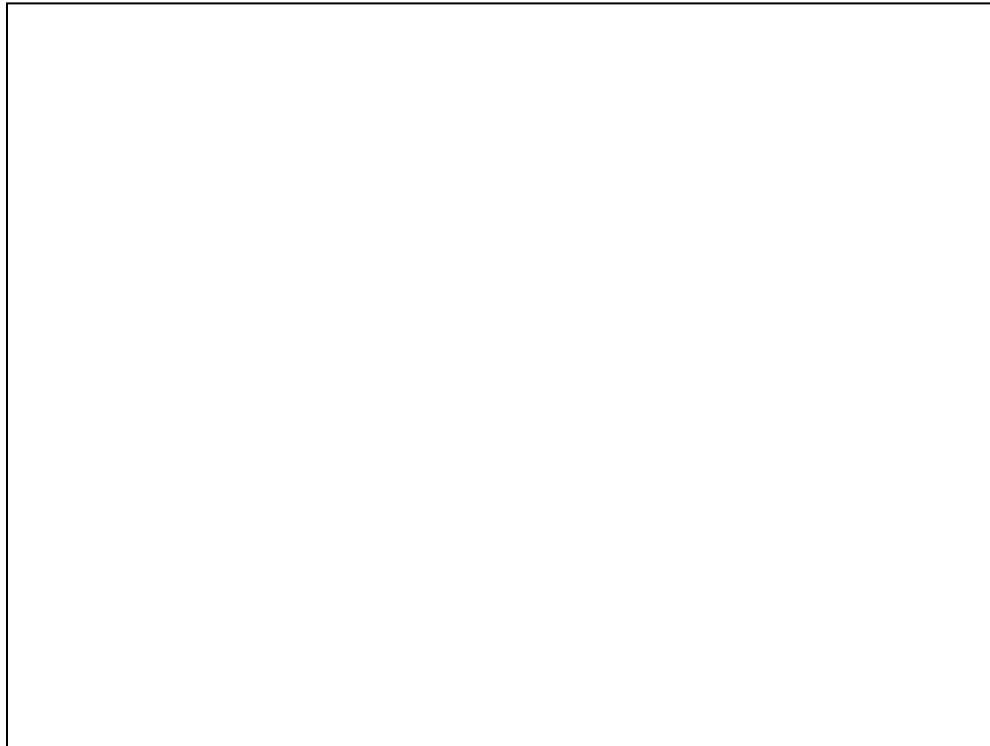
Supplies:

20 straws, 5 rubber bands, 20 popsicle sticks, 2 sheets of paper, 12" yarn, 2-12" pieces of masking tape, 4 pipe cleaners, paper family of 3 and Louis, container (Sterilite container 34 7/8" X 16 5/8" X 6 1/8") filled with water and ice

Optional: mini fan or students can blow their raft across the river.

FREEDOM RAFT

Our group's chosen raft design:



Build the raft - create and test your raft in the river:

Record observations from the building process, testing, evaluation, and redesign of your raft.

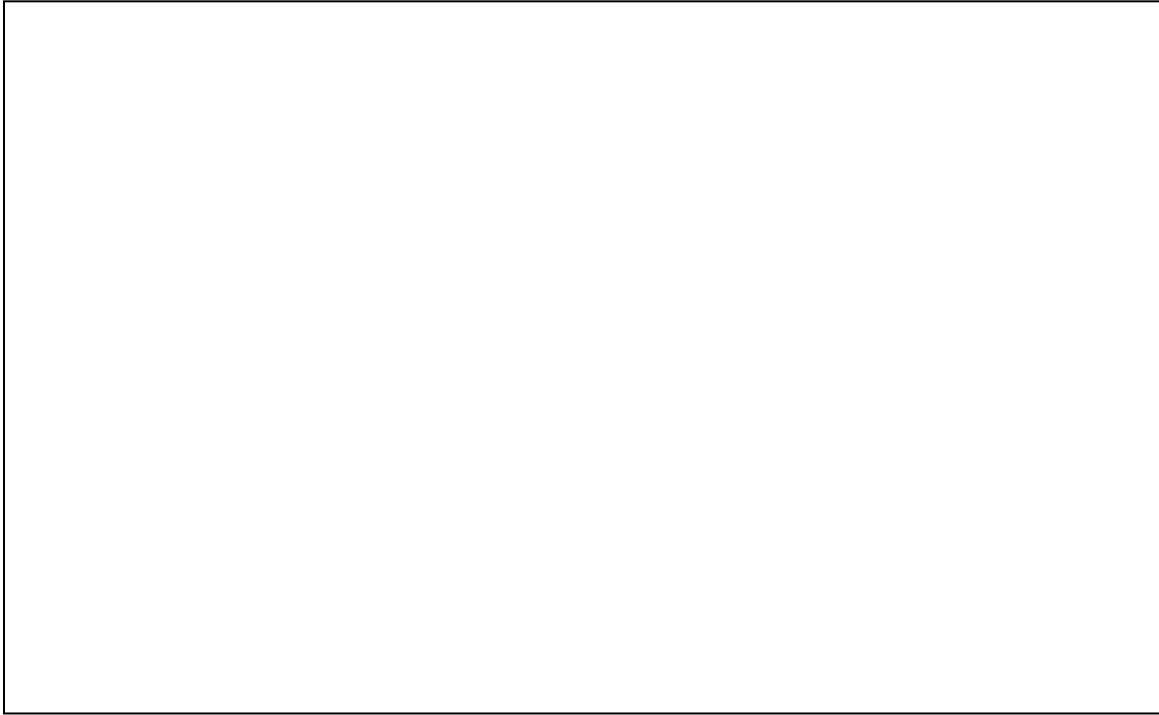
Successful

Unsuccessful

Explain:

FREEDOM RAFT

Redesign-What would you do different to your raft?



4



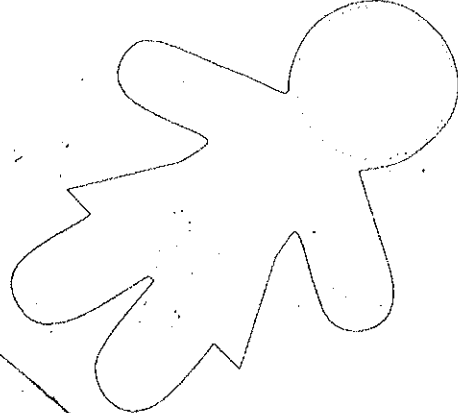
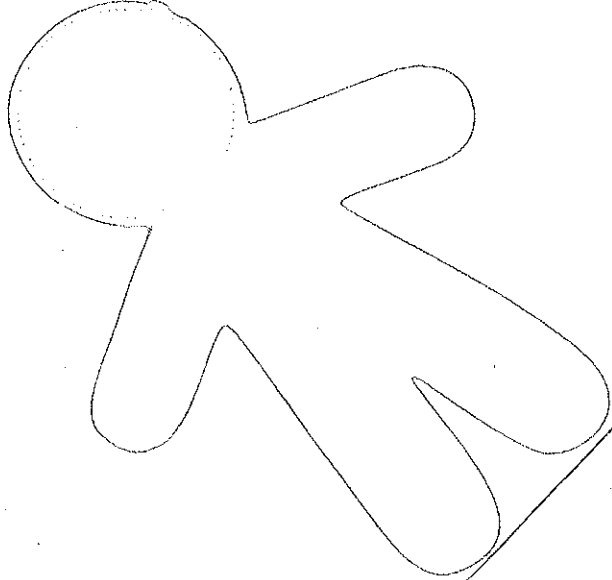
3



2



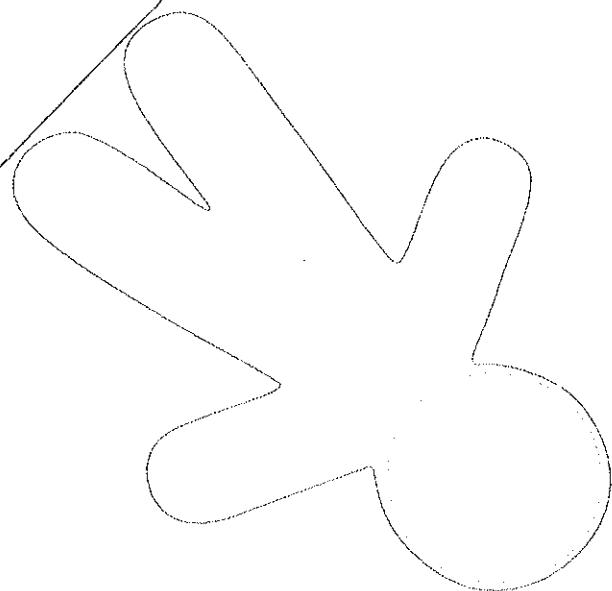
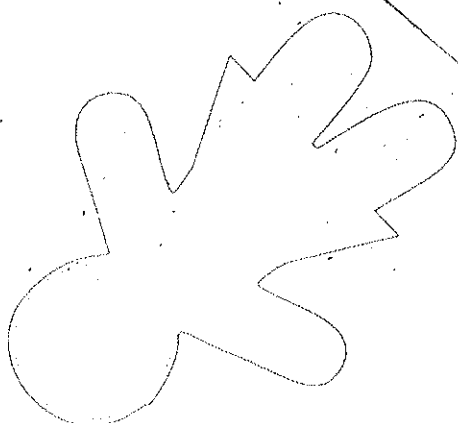
1



Students will need to cut along the solid lines and shape them into a cone shaped figure, securing with tape.

Decorating is optional. 😊

Paper Family Template – Kid Page
Contains two sets



Paper Family Template – Parent Page
Contains one set

