

Shelter from the Storm

2nd Grade

Science Unit 2: Earth's Systems: Processes that Shape the Earth

ELA Unit 5 Text Connection: *Houses and Homes* by Ann Morris

Design Challenge Summary

Challenge: What will the students be required to do?

There are many different types of houses and they all serve a purpose. Your challenge today is to design a shelter that will protect your paper family from a rain storm. Your shelter must be at least 6 inches tall and at least 6 inches wide.

*Rain storm will involve 1 cup of water distributed over the shelter.
See ideas for the rain storm on page 3.

Standards: What standards are addressed?

Science:

2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the Earth

2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Math:

Mathematical Practice Standards

2.MD.1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes

2.MD.3. Estimate lengths using units of inches, feet, centimeters, and meters

Other:

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 effect of "rain" (water) on different materials.

Use measurements effectively.

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

Did they build a shelter that met the design challenge?

Did they follow the design loop process?

Did they work collaboratively?

Shelter from the Storm

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

Connections to the Mathematical Practices
Investigations/inquiry in Science
Experiences with measurement in standard units

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.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

Or...

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:

How could we protect our “family” from a rain storm that produced larger amounts of rain? What about protection from hail?

What if there was wind involved in our storm? How would that affect our shelter? Would we need to change our design? If so, how?

Are there other materials we could use that would strengthen our shelter?

How could we prevent our family from a “flood” during a rain storm?

How does the land surrounding our homes help protect us from wind and water related forces?

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

Straws (20)
4 sheets of paper
Cling wrap or Wax paper (12” sheet)
Tape (scotch, masking, etc)
Container/basin for the structure to sit in during the rain storm (See notes on next page)

Shelter from the Storm

Creating the rain storm:

Using a plastic cup, pour 1 cup of water into the cup. Then cover the cup with cling wrap, wax paper, or aluminum foil. Place a rubber band around the top lip of the cup, securing the wrap in place. Poke several holes in the wrap, allowing for the water to flow through in a “rain like” manner when tipped upside down.



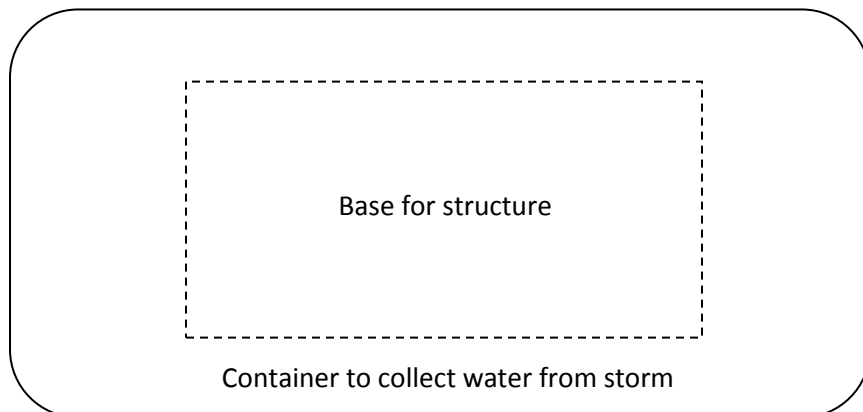
Testing your structure with the rain storm:

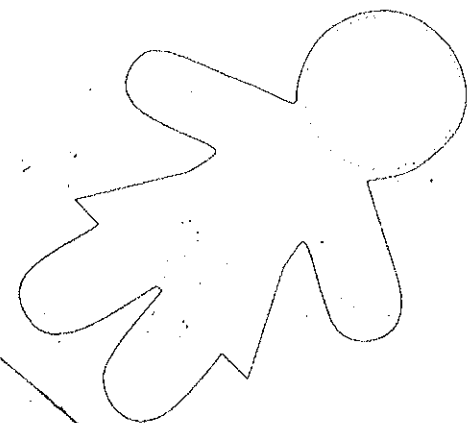
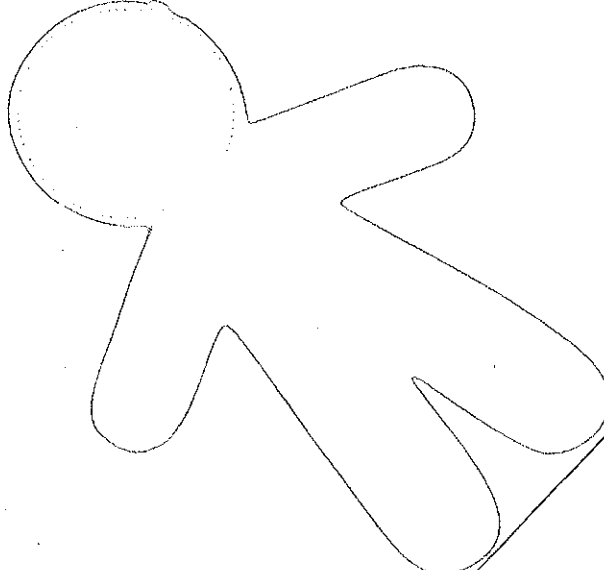
If weather permits, you could take your structures outside and test them.

If doing this indoors, you will want to have a basin or container that students use to collect the water during the storm.

In order to prevent the family and structure from being “flooded” in the basin, consider using something as a base (inside the container) for them to place their family and shelter on.

This could also be another great extension to the challenge – design a structure that will not get flooded during the storm (if not using a base inside the container).





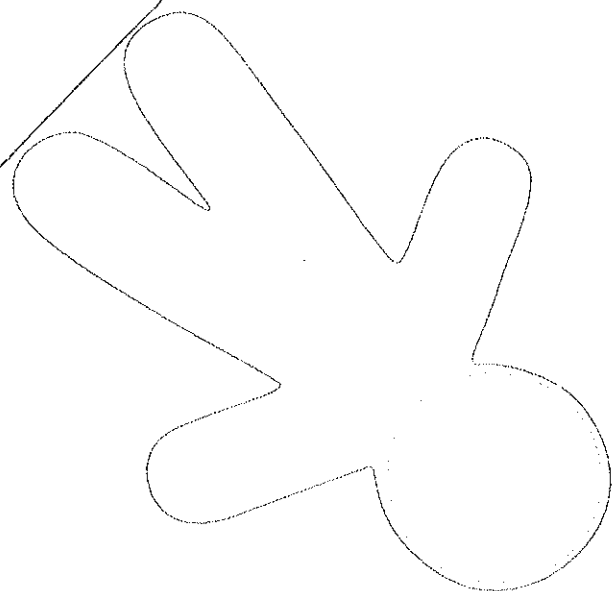
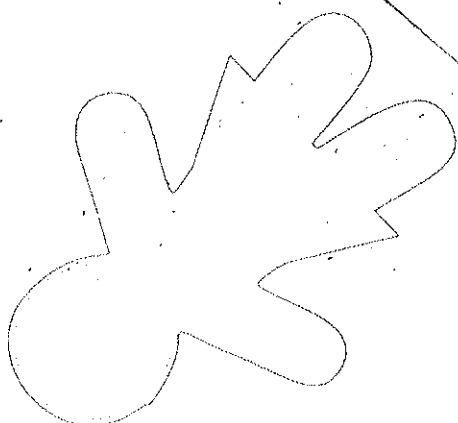
Paper Family Templates

The paper family for the STEM Design Challenge consists of two parents and two children (larger boy and smaller girl). Students will need to cut along the solid lines and shape them into a cone shaped figure, securing with tape.

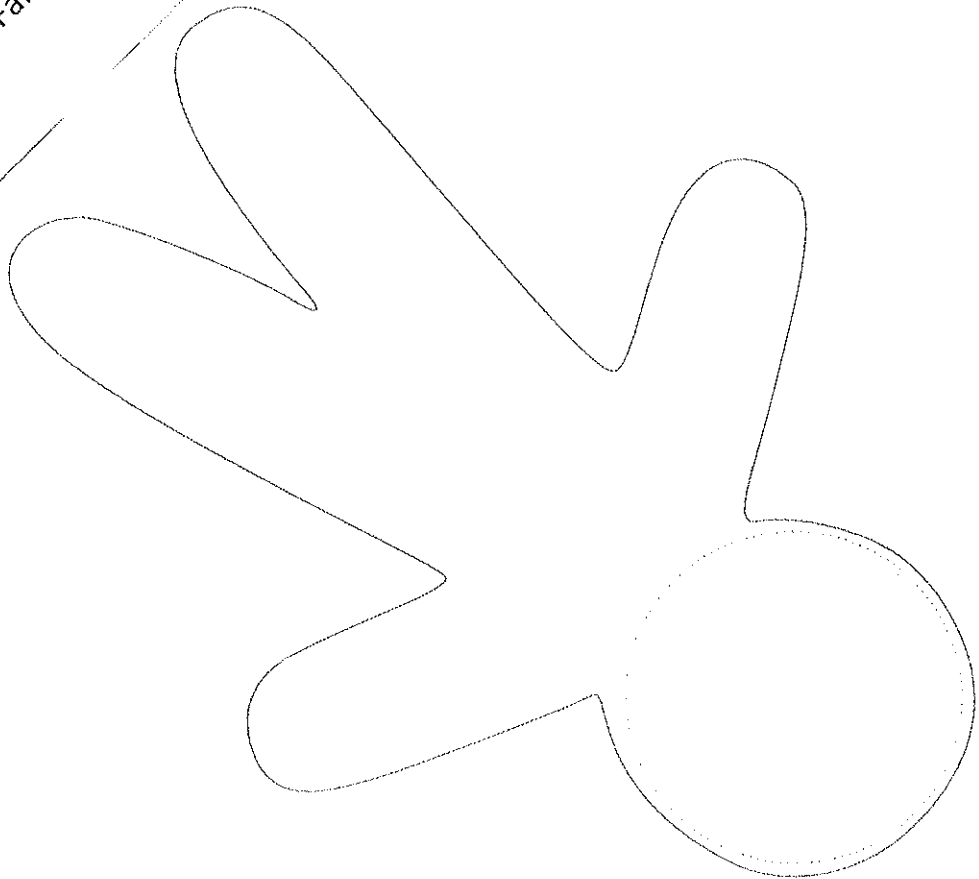
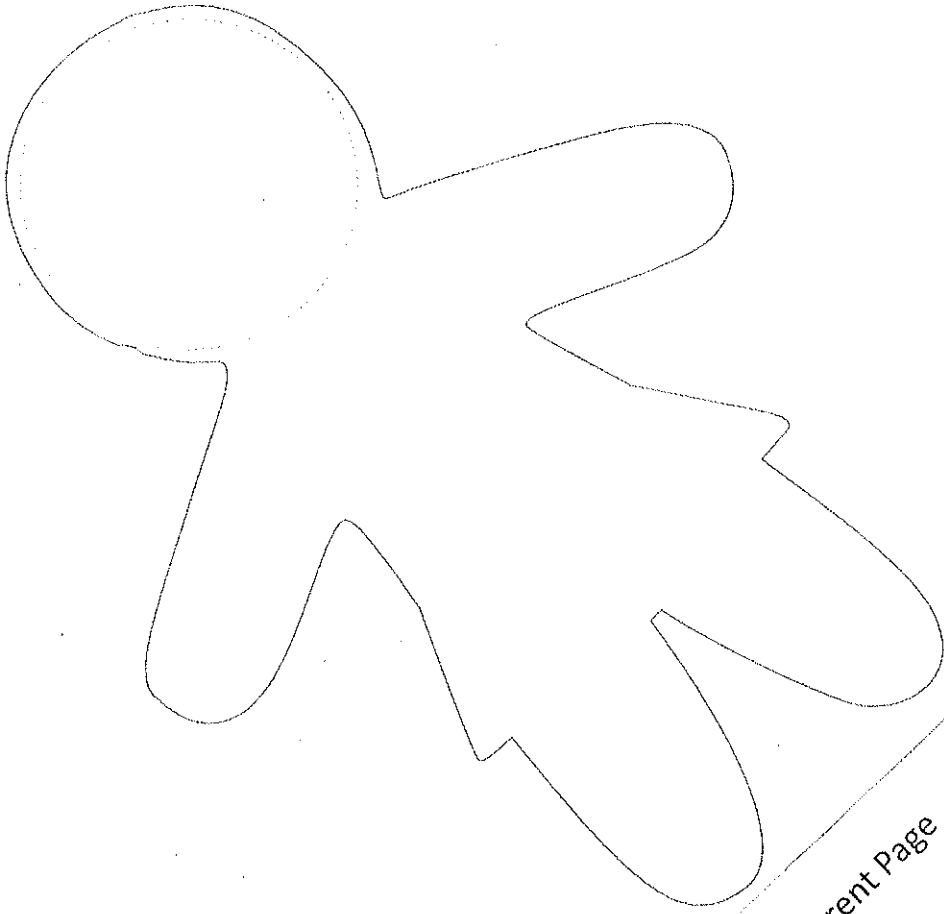
Decorating is optional. 😊

Paper Family Template – Kid Page

Contains two sets

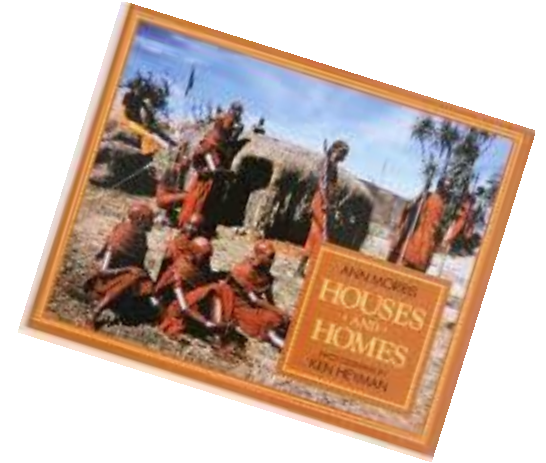


Paper Family Template – Parent Page
Contains one set





Shelter from the Storm



There are many different types of houses and they all serve a purpose. Your challenge today is to design a shelter that will protect your paper family from a rain storm. Your shelter must be at least 6 inches tall and at least 6 inches wide.

Group Supplies:

20 straws, 4 sheets of paper, cling wrap or wax paper, tape

Other supplies:

Basin (foil pan, etc.), water (rain), paper family template