

Princess and the Pea Challenge

2nd Grade

Unit 2 – The Wild West

Text Connection: *The Princess and the Pea* by Hans Christian Anderson

Design Challenge Summary

Challenge: What will the students be required to do?

The Princess is getting ready for bed. She always complains about her bed not being comfortable. Using the materials provided, can you help her sleep through the night without feeling the pea?

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
- PS.6.2.1 Investigate the relationship between *force* and motion

2-PS1-2 Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

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

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
- W.2.7 Participate in shared research and writing projects
- 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.
- Discover which materials make the best protection against the weight

Princess and the Pea Challenge

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

Did they protect the princess from the pea?
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 mass and weight (PS.6.1.2)
Experiences with the force of gravity on objects (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 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

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:

Compare the different amounts of materials and how that affects the princess.
Change the weight of the object placed on the princess. Would your materials still work?
Change the size of the pea. Would your materials still work?

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

Supplies: Play-doh (Princess), Bead or marble (Pea), a variety of materials to use may include; tissue paper, paper, cotton balls, cardboard, popsicle sticks (Bedding)
Tape, Heavy Book

Students will work together to make a bed out of materials for the princess to lie on. The pea will be placed under the bed with the princess on top. A book or other heavy object will be placed on the princess. Students are successful if there is no indentation in the princess.



Princess Mattress Challenge



The Princess is getting ready for bed. She always complains about her bed not being comfortable. Using the materials provided, can you help her sleep through the night without feeling the pea?

Group Supplies:

Play-doh (Princess)

Bead or marble (Pea)

Tissue paper, paper, cotton balls, cardboard, popsicle sticks (Bedding)

Tape

Heavy Book