Weeding the Rice

1st Grade
Unit 6 – Around the World with a Glass Slipper
Text Connection: *The Korean Cinderella* by Shirley Climo

Design Challenge Summary
Challenge: What will the students be required to do?
Pear Blossom had to weed the rice fields before she could go to the village festival. Your challenge today is to "weed the rice" most efficiently using only the materials given. "Weeding the rice" –uncooked rice and pasta (like macaroni) mixed together in a baggie that students are expected to separate and keep separated through the challenge
Standards: What standards are addressed?
Science: NS.1.1.1 Communicate observations orally, in writing and in graphic organizers NS.1.1.2 Ask questions based on observations NS.1.1.3 Conduct scientific investigations as a class and in teams NS.1.1.5 Collect measurable empirical evidence as a class NS.1.1.6 Make predictions as a class and in teams based upon empirical evidence NS.1.1.7 Use age-appropriate equipment and tools in scientific investigations PS.5.1.1 Compare and contrast objects according to the single properties of: size, color, shape, texture… **Math:** Mathematical Practice Standards 1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. **Other:** W.1.3 Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure. SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups SL.1.3 Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood. SL.1.5 Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts or feelings SL.1.6 Produce complete sentences when appropriate to task and situation.
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 idea of how to separate "mixtures" Measure efficiency of their design – fastest time, best "weeding", etc Represent and interpret data in regards to their results (graphing, line plots, etc)

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

Did they create a product that would "weed the rice"?
How efficient was their design?
How did they keep the rice and pasta separate after weeding?
Did they follow the design loop process?
Did they work collaboratively?

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

Experiences with the Engineering Design Loop process
Connections to the Mathematical Practices
Investigations/inquiry in Science
Understanding of "efficiency" and how you would "rate" efficiency (see additional information on page 3)
Organizing, Representing, and Interpreting Data

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.

After the challenges are completed, engage students in **1.MD.4** by organizing, representing and interpreting data based on the results of their "weeding". Ex: time it took to weed, rating their efficiency based on a scale you/class create, etc.

As a summary activity, you could engage students in: **W.1.3** Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.

Extensions:
Use different materials:
How would weeding be different if your materials were closer to the same size?
What if you had more than two materials to "weed"?

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

Uncooked rice
Uncooked pasta (macaroni, spirals, etc)
Baggies to hold the "mixture" of rice and pasta
4 sheets of construction paper
Scissors
Tape
Stopwatch/Timer

Additional Information:

Efficiency: describes the extent to which time, effort or cost is well used for the intended task or purpose.

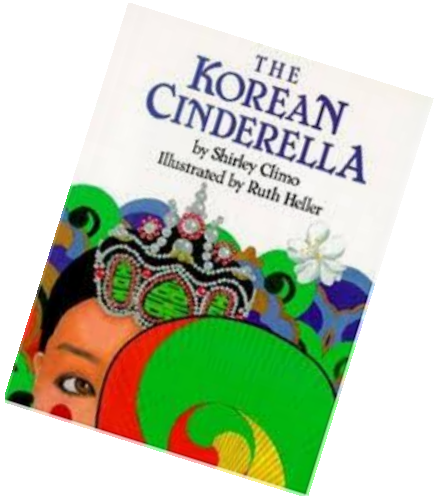
When looking at the most efficient ways to "weed the rice" you will want to factor in:

- time it took them to separate/weed the rice from the pasta
- how much of the rice was separated from the pasta
- effort used in separating the components

Here is a "sample" rubric for evaluating efficiency in this challenge. You may want to discuss this first and create a class rubric for their challenge.

Weeding the Rice	 **Excellent**	 **Good**	 **Fair**
Time to separate	Completed the task with one of the top fastest times.	Completed the task, but not the fastest time.	Completed the task, but it took a long time.
How much rice was separated	Separated all the rice from the pasta.	Separated most of the rice from the pasta.	Separated little rice from the pasta.
Effort used in process	Process to separate the rice was thought through and required less effort than other methods.	Process to separate the rice required more effort than most methods.	Process to separate the rice was not completed or took extreme effort to complete.

Weeding the Rice



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Group Supplies:
Baggie of Rice Mixture, 4 sheets of construction paper, tape

Other supplies:
Timer/Stop watch, scissors