Marshmallow Towers

Kindergarten
Unit 6 – Wonders of Nature: Plants, Bugs, and Frogs
Text Connections: *Kate and the Beanstalk* by Mary Pope Osborne
Jack and the Beanstalk by Steven Kellogg

Design Challenge Summary
Challenge: What will the students be required to do?
Kate and Jack both climbed a tall beanstalk that reached into the sky. Your challenge today is to design the tallest tower using marshmallows and spaghetti that can stand on its own.
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…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.5.K.1 List and classify objects according to the single property of: size PS.6.K.1 Demonstrate spatial relationships… 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.4 Understand the relationship between numbers and quantities; connect counting to cardinality 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. (taller/shorter) K.G.5 Model shapes in the world by building shapes from components… **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. W.K.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. 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. Understand how shapes work together to create new "shapes" or objects – how certain shapes create stronger foundations than others. Measure/compare measurable attributes of the towers – which is taller/shorter, etc. Understand how the force of gravity affects objects.

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

Did they build a tower that could stand on its own?
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 shapes and building with shapes
Experiences with measurement with non-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.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:
Change the materials: Use marshmallows and toothpicks – how did this affect building the tower and its height?
Limit the number of marshmallows to be used – a constraint on the design
Time the towers – see which tower can stand the longest by itself
Require a specific height – tower must be at least 20 cubes high, etc.
Explore different types of foundations for the towers using various shapes – square base, triangular base, etc.

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

20 pieces of spaghetti
Mini-marshmallows
Non-standard units to measure height of towers

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Group Supplies:

20 pieces of spaghetti, marshmallows