Science
Properties of Materials
2nd Grade

DAY 1

Pre-Lesson Preparation	
Standard:	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.
Objective:	The student will be able to identify the best use for an object based on the properties and material of that object with at least 80% correct answers.
Materials:	-Back of gummy worms -Bag of M&M's -Maple syrup -Cotton balls -Sandpaper -Popcorn -Hardness and texture worksheet -Advanced hardness and texture worksheet -A couple bags of medium size marshmallows -Box of spaghetti noodles -Box of toothpicks -Box of sugar cubes -Will it stand? worksheet -Properties and purpose mini lab
Accommodate: (Gear Up/Down)	**Up:** To differentiate the hardness and texture worksheet for an advanced learner, the teacher can add more properties that the student will identify and/or include objects that they are not so familiar with. This will add more of a challenge and will require more abstract thinking and solutions. **Down:** To differentiate the mini lab for struggling learners, they can explain the answers verbally to the teacher one-on-one and the teacher can fill in their answers for them rather than having the student write it in on their own. They will still be learning the same concept and completing the activity, but with some extra help. They can also get some extra time to work if needed.
Lesson Components	
Engage:	**Before deciding to use this activity in the classroom, make sure there are no allergies to any of the candies being used. If there are, change the type of candy, switch to a different kind of food, or just have no edible portion altogether.**

	Start out by asking the class if they know the difference between *hardness* and *texture*. Listen for their responses. Define the two words for the class and then give each student a small handful of gummy worms - make sure to tell them not to eat them yet, they will get to eat them in a few minutes. Ask the class what the hardness of the gummy worm is; what is the texture? Next, give each student a small handful of M&M's and ask the same two questions. After hearing their answers and having a small class discussion about the candies' properties, the students are allowed to eat their candies. Definitions: **Hardness** is how hard an object is. For example, a rock is very hard, while jello is not very hard. You can also describe something as *soft*, such as a gummy worm! Soft objects are usually easier to break than hard objects. **Texture** is how an object feels. You can touch your desk and feel that the surface is smooth! Or you can touch a dog and feel that it is furry! Some other ways to describe texture are rough, prickly, sharp, bumpy, and slimy.
Explore:	While they are eating their treat, have them examine the materials provided (maple syrup, cotton balls, sandpaper, popcorn, and table). Have the students think about the properties of each object -- the hardness and texture. Then, they will each fill out the hardness and texture worksheet. They can either work alone or with their table groups.
Explain:	Once finished with the worksheet, have the students gather on the floor in front of the white board and get ready for class discussion. Revisit the term *property* and that *hardness* and *texture* are 2 examples of a property of an object. Invite the students to shout out any other properties of an object that they might know. Write their answers on the board (some examples to add would be color, size, smell, taste, weight, if it is a liquid/solid/gas, shape, temperature). Next, have a discussion about which materials and properties would be best used in different scenarios. Examples of this would be: -If we are building a house, would we want to use solid, liquid, or gaseous materials? (solid) -What properties do traffic lights have? (color, big size, hard, solid) -If there is a leak in a water pipe, would we use a hard cover or a soft cover to patch it? (both answers could work for this, depending on the material used to patch it. Allow for discussion) -What are the best properties to use for a pillow? (soft, solid, and light) -What property of matter is apple juice? (liquid) (it also tastes sweet)
Elaborate: (with STEM or writing)	After discussing the different properties and what they can be used for, introduce the STEM activity. Each student will get 6 marshmallows, 6 sugar cubes, 6 spaghetti noodles, and 6 toothpicks. Their goal for this

	activity is to use different combinations of these items and see which ones are the best materials to be able to stand on its own while stacked 3 high (for example, 3 marshmallows stuck together with spaghetti noodles might be able to stand up on its own, but can 3 sugar cubes stacked on top of each other stand up on their own with the help of either the toothpicks or the spaghetti?). While the students are experimenting with the STEM activity, they will also be logging their results on the Will It Stand? worksheet.
Evaluate:	To close out the lesson for the day, each student will individually complete the mini lab identifying properties and purpose of different objects. The students will be choosing the correct tool to use for a specific scenario, filling in the blank with an object that would fit each problem, and identifying properties of different objects. When finished, each student will hand in their completed mini lab and get ready to move on for the day.

DAY 2

Pre-Lesson Preparation	
Standard:	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.
Objective:	The student will be able to analyze how well materials are suited for building a tower strong enough to withstand a fan's wind for at least 15 seconds.
Materials:	-Material properties and purposes video -Video review - Google Slides -The book "Three Little Pigs" retold by Alyse Sweeney -Masking tape -Box of paperclips -Lots of construction paper -PlayDoh (one tub per table group) -Box of popsicle sticks -One roll of tin foil -Box of plastic forks -Manipulating materials worksheet -Household fan/desk fan (possible extension cord needed) -Timer/stopwatch *Individually wrapped candies (OPTIONAL) -Tower building mini lab
Accommodate: (Gear Up/Down)	**Up:** To differentiate the tower building activity for advanced learners, the teacher can limit their resources even more to make it a little more challenging and will require more strategizing. **Down:** To differentiate the tower building activity for struggling learners, the teacher can allow them to use a little bit more of the provided materials.
Lesson Components	
Engage:	The teacher will begin by asking the students what they know about different materials used in building strong structures. Allow for discussion. Next, he/she will play this video about material properties and purposes (start at 1:10, stop at 4:45). Next, the class will review the key terms mentioned in the video.
Explore:	With their table groups, allow the students time to explore the different building materials by bending, twisting, stretching, and squashing them. Ask them what other properties these materials have (smell, texture, hardness, colors, etc.). Give each table group 1 of each item. While exploring the materials, the students will fill in the manipulating materials

	worksheet.
Explain:	When everyone is finished exploring the building materials and completing the worksheet, the students will gather on the floor in front of the teacher and listen to him/her read the book "Three Little Pigs." After reading the story, the class will have a guided discussion about what occurred in the book. Some questions the teacher could ask would be: -What materials worked against the wolf's breath? What materials did not work? -Why did the bricks stay standing but the straw and sticks did not? -How could the first 2 little pigs make their homes more sturdy? Allow the students to finish up and last thoughts with the class.
Elaborate: (with STEM or writing)	Just like the little pigs, the students will get a chance to build their own towers! After reading and discussing the "Three Little Pigs," the teacher will introduce the tower building activity. He/she will explain to them the rules, the materials they can use, and what their end goal is. The students will work in their table groups to build towers strong enough to withstand wind from a household fan (resembling the wolf's breath). Each team will only get to use 5 sheets of construction paper, 1 foot of tin foil, 10 popsicle sticks, 2 plastic forks, 7 paper clips, 1 meter of masking tape, and 1 tub of PlayDoh to help them build the strongest tower. **The teacher can either assign each group member to gather specific materials needed for their group OR already have the materials counted/measured out for each group to save time.
Evaluate:	Now is the time to test how well the students built their towers. Testing one group at a time, the teacher will blow the fan on the towers for 15 seconds (keeping a consistent fan speed with each tower). To add a little bit of motivation and competition to this activity, the teacher can choose to allow all participants to get a piece of candy for helping their team build the tower, but the winning team gets 2 pieces of candy. The winner is determined by the tower that is still standing after the 15 seconds. If no towers are left standing, the tower that stood for the longest amount of time is the winner. After testing each tower, the students will individually complete their mini labs. When finished, each student will hand in their completed mini lab and get ready to move on for the day.