|  |  |
| --- | --- |
| **Title: Oobleck Lesson** | **Grade Level: Pre-K to 2nd**  |
| **Big Idea:Team Building,****Collaboration** Lesson focuses on the students creating oobleck by mixing 1 part cornstarch with 1 part water green dyed water. 2nd and 1st grade will create oobleck Pr-K & K will use oobleck created by 2nd and 1st.  | **Enduring Understanding:** Students will be given an opportunity to explore the properties of oobleck and compare them to the 3 states of matter.  |

|  |  |  |  |
| --- | --- | --- | --- |
| **SCIENCE STANDARDS** | **TECHNOLOGY STANDARDS** | **ENGINEERING** **STANDARDS** | **MATH STANDARDS** |
| **Habits of the Mind****S5-1CS1. Students will be aware of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.** a. Keep records of investigations and observations and do not alter the records later. b. Carefully distinguish observations from ideas and speculation about those observations. c. Offer reasons for findings and consider reasons suggested by others. d. Take responsibility for understanding the importance of being safety conscious**.** **S5-1CS2. Students will have the computation and estimation skills necessary for analyzing data and following scientific explanations.** a. Add, subtract, multiply, and divide whole numbers mentally, on paper, and with a calculator. b. Use fractions and decimals, and translate between decimals and commonly encountered fractions – halves, thirds, fourths, fifths, tenths, and hundredths (but not sixths, sevenths, and so on) – in scientific calculations. c. Judge whether measurements and computations of quantities, such as length, area, volume, weight, or time, are reasonable answers to scientific problems by comparing them to typical values. **S5-1CS3. Students will use tools and instruments for observing, measuring, and manipulating objects in scientific activities.** a. Choose appropriate common materials for making simple mechanical constructions and repairing things. b. Measure and mix dry and liquid materials in prescribed amounts, exercising reasonable safety. c. Use computers, cameras and recording devices for capturing information. d. Identify and practice accepted safety procedures in manipulating science materials and equipment. **S5-1CS4. Students will use ideas of system, model, change, and scale in exploring scientific and technological matters.** a. Observe and describe how parts influence one another in things with many parts. b. Use geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and stories to represent corresponding features of objects, events, and processes in the real world. Identify ways in which the representations do not match their original counterparts. c. Identify patterns of change in things—such as steady, repetitive, or irregular change—using records, tables, or graphs of measurements where appropriate. d. Identify the biggest and the smallest possible values of something. **Focus Standards:****Kinder****SKP1 Students will describe objects in terms of the materials they are made of and their physical properties.** a. Compare and sort materials of different composition (common materials include clay, cloth, paper, plastic, etc.).b. Use senses to classify common materials, such as buttons or swatches of cloth, according to their physical attributes (color, size, shape, weight, texture, buoyancy, flexibility). **1st Grade** **S1E2. Students will observe and record changes in water as it relates to weather.**a. Recognize changes in water when it freezes (ice) and when it melts (water). b. Identify forms of precipitation such as rain, snow, sleet, and hail stones as either solid (ice) or liquid (water).c. Determine that the weight of water before freezing, after freezing, and after melting stays the same.**2nd Grade** **S2P1. Students will investigate the properties of matter and changes that occur in objects.** a. Identify the three common states of matter as solid, liquid, or gas. b. Investigate changes in objects by tearing, dissolving, melting, squeezing, etc.  | * Demonstrate the ability use technology for critical thinking, decision making, communication, collaboration and creativity and innovation.
* Use a variety of age-appropriate technologies (drawings, presentation software to communicate and exchange ideas.
 | **Next Generation Engineering Standards*** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials and time.
* Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
* Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
 | **8 Mathematical Practices of Math**1. Makes sense of the problem and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision.
7. Look for and make use of the structure
8. Look for and express regularity in repeated reasoning.

**National Math Standards*** Analyze data and obtained from testing different materials to determine which materials have the properties that are best suited for the intended purpose.
* Using computational strategies to solve real-world problems cooperatively.

**1st Grade Common -Core Math Standards*** **I can use the same size non-standards objects as repeating units.**
* **I can write a numeral to represent a number of objects.**
* **I can represent data in 3 categories.**
* **I can practice counting using tally marks.**
 |

|  |  |  |
| --- | --- | --- |
| **INSTRUCTIONAL STRATEGIES** | **LEARNING TARGETS** | **ESSENTIAL QUESTIONS:** |
| indirect instructionexperiential learningdemonstrationdiscussionwork-based learningjournalscooperative learning | -I can work cooperatively as a group-I can use critical thinking to solve a confronted problem.-I can learn about aeronautical engineering.-I can learn how engineering can help solve society’s challenges.  | How does oobleck act like a solid and a liquid?What are the 3 states of matter? |

|  |
| --- |
| **KEY VOCABULARY:** Velocity, Trajectory, Force, Drag, Aerodynamics, Motion |

|  |
| --- |
| **MATERIALS:** **Per Group~ 1 cup water, 1 cup cornstarch, bowl, plastic cup, 2 stir sticks, green food coloring.****Whole Groups~ 1 cookie sheet, back massager.**  |
| **OPENING- (Ask and Imagine Step) 7 minutes** | **EVIDENCE** |
| 1. The lesson will start with reviewing the Engineering Design Process Steps.
2. Students then are introduced to the problem or the challenge.
3. In the opening students will hear the Dr. Sues story Beware The Oobleck.
4. Students will then be made aware that the magical recipe of oobleck has been stolen from the magicians and we will be using it today to create our own oobleck and study its physical properties.(2nd & 1st only)
5. Students will be made aware that some oobleck has survived from the story and we are to study its physical properties. (Pre-K & Kinder only)
 | * Student Group Discussions
* Observation Worksheet Filled Out
 |
| **WORK PERIOD- (Plan and Create) 30 minutes** | **EVIDENCE** |
| 1. Students will watch demonstration of how to make oobleck. (2nd & 1st only) 1 ½ cornstarch to 1 cup of water. Add green food coloring to water before you mix it with the cornstarch.
2. As students watch the demonstration they will create their own oobleck.
3. Students will test the properties of their oobleck

> Drip test: allow oobleck to drip onto wax paper.> Smack test: strike oobleck in bowl hitting it with the heel of the hand.> Ooze test: place oobleck on a piece of cardboard that is tipped at a 45 + degree angle and let it slide down into the bowl.> Stir test: stir oobleck with a spoon fast and then very slow. | * Observation Worksheet
* Oobleck
* Photos
* Graphs
* Data Log Sheets
 |
| **CLOSING- ( Improve) 8 minutes** | **EVIDENCE** |
| 1. Students will combine oobleck onto a cookie sheet and then the teacher will take a back massage machine and place it under the cookie sheet. Once turned on the oobleck will dance and climb ontop of itself in pillars as the vibrations change it from a liquid to a solid.
2. Record this group observation
3. Students share observations of how oobleck acts and decide if it is a liquid-solid-gas or something inbetween.
 | **S**tudent Reflection Sheet with RubricTeacher Reflection SurveyMath Extension Activity |