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| **Standard(s) addressed:** | | |
| |  |  | | --- | --- | | **MS-PS1-4.** | **Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.** | | **MS-PS3-4.** | **Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.** | |  |  | | **MS-PS3-5.** | **Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.** | | | |
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| **Targets:** (What will students know and be able to do as a result of this lesson?) | | |
| * **Create an ice cream treat using the scientific method** * **Discuss properties & temperatures of freezing and melting points, energy transfer & thermal energy, the correlation to “real life”, and use freezing & melting point terminology** * **Practice measuring techniques to use in future scientific experimentation** | | |

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| **Assessment:** (How will you and your students know if they have successfully met the target?) |
| **Students will be assessed informally throughout the lesson. The teacher will use observation, direct conversation, and an activity/critical thinking worksheet to individually assess the abilities and understanding levels of each student. Students will also be required to take a Brainpop Quiz on Matter Changing States and earn 70% or higher.** |

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| **Instructional Activities:** (In what learning experiences will students engage? Consider higher order thinking, multiple intelligences, multimodal, and/or multimedia input.) |
| **Ice Cream Treat Activity: 30 minutes**  **Brainpop Video/Quiz: 15 minutes**  **Critical Thinking Worksheet: 20 minutes – may be completed as homework**  **Mix treat contents in the sandwich-sized resealable bag; then, seal the bag. Add the treat bag, the ice, and the salt to the gallon-sized bag; then, seal the bag. Protect your hands from the cold bag using the towel, gloves, or potholders. Shake the bag back and forth until the liquid thickens; this should take 5 to 10 minutes. 24 Remove the sandwich bag from the gallon bag. Wipe the wet salt mixture from the outside of the sandwich bag. Use the spoon to eat the treat right from the sandwich bag.**    **Discussion Complete while shaking the bag and eating the treat. What contributes to the smooth texture that you feel in your mouth when eating ice cream? (fat content) At what temperature does water freeze? (32O F) Why do we add salt to the ice? Why not just use ice? (As the ice melts, a water/salt solution results: a saline solution. The freezing point of saline is lower than the freezing point of plain water. This creates an environment cold enough to freeze the ingredients to form the frozen treat.) What is freezing point depression? (lowering the freezing point of a liquid by adding something to it) Why else might we want to lower the freezing point of water? (to melt ice from roadways and sidewalks in the winter) What other questions might we ask? What other experiments could we do? (Check the temperature of the treat mixture over time with solutions containing different concentrations of salt. Explore how other additives (e.g. sugar, epsom salt, …) affect the freezing point.)** |

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| **Resources/Materials Required:** |
| **-Treat ½ cup milk or half & half (ice cream)**  **-Optional: use fruit juice to make a sorbet)**  **-¼ t vanilla**  **- 1 T sugar**  **-Participant Activity Sheet**  **-1 resealable sandwich bag**  **-1 resealable gallon bag**  **-1 tray ice cubes**  **- 6 T salt (rock or table)**  **-Towel, gloves, or potholders**  **-1 spoon** |

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| **Student Engagement:** How will you get and hold student attention? |
| **Lesson Hook: Teacher will be eating an ice cream treat out of a bag as students enter the classroom with a youtube video of an ice cream truck (&song) going by. This will begin questions and interest of the students and will be a great way to start introducing the topic of freezing and melting point and temperature changes. (**[**https://www.youtube.com/watch?v=CZB6WXDuM1g**](https://www.youtube.com/watch?v=CZB6WXDuM1g)**)**  **Students will continue to be engaged as they are creating their own ice cream treat, following instructions, answering questions, and critically thinking about the discussion regarding matter, energy, and temperature.** |

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| **Differentiation:**  (How will you adjust the lesson to appropriately challenge ALL students?) |
| **Students will be grouped prior to the lesson by the teacher based on ability level and behavior issues. Differentiation will occur through the process. Some students will work in small groups with more assistance from a teacher or aide while others will be working on a more independent level. The information will be presented visually and orally. Students will be able to create their treat at their level of independence. Some may require assistance with measuring and others may assist another student in the creation if they have issues, disabilities, or allergies that prevent them from full participation. Answer expectations in discussion and on the worksheet will vary. There will be at least 2 versions of the worksheet to meet the varying needs of our students.** |

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| **IEP/504 Modifications/Accommodations:** (What curriculum modifications and/or classroom accommodations will you make for Students with Disabilities in your class? Be as specific as possible.) |
| **-Hear instructions orally and be given a written list of instructions**  **-Give responses in an oral/written form**  **-Work in a different setting (fewer distractions)**  **-Take more time to complete the task/frequent breaks**  **-Use an alarm to help with time management**  **-Answer fewer/different questions**  **-Individual redirection** |

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| **Suggestions for Consideration and Reflection:** |
| What went well?  What did you learn?  What adjustments will you make moving forward?  What did your assessment results indicate?  Was this lesson rigorous enough to engage all students? Explain.  Were the modifications/accommodations sufficient to facilitate meaningful participation for challenged students?  Would you be willing to share this lesson with colleagues? If no, why not? |
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