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| **Title: Ice Cream in a Bag** |
| **Stem components** | **Science:** Changing states of matter between liquids and solids when a variable (temperature) is introduced**Technology:** Students will develop sequencing strand based on ***How to Make Ice Cream*** using Photo Story, pictures will be taken during step-by-step process**Engineering:** N/A**Math:** Collection of data & Creation of a class graph based on student’s favorite kind of ice cream |
| **Curricular Connection** | **SCIENCE****Standard 4:** Chemistry – students will use skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformationsC. States of Matter1. Provide evidence from investigations to identify solids/liquidsa,c,d,f explore, recognize, and describe properties of solids/liquids, investigate the appearance and behavior of liquids, observe/discuss creation of a mixture.D. Physical and Chemical Changes1. Provide evidence from investigations to identify processes that can be used to change physical properties of materials.b compare the observable properties of objects before and after they have been subjected to various processes**MATH****Standard 4:** Knowledge of StatisticsA. Data Displays1. Collect, organize, and display dataa. Collect data by conducting surveysc. Organize and display data to make graphs**TECHNOLOGY****Standard 4:** Technology for Communication and ExpressionA. CommunicationB . Use and explain the variety of media formats |

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| **Background** | Liquids have lots of interesting and useful properties. Observing many examples of liquids makes it possible to develop a concept of the attributes that are common to all liquids, as well as the knowledge of the variety that makes each kind of liquid unique. Students will subject a liquid to a freezing component in order to change the state of the liquid into a solid. Students will be able to identify properties of liquids and solids in this experiment. |
| **Materials/****Resources** | **Materials** |  |
| * Milk or cream (2 oz per student)
* Vanilla extract or chocolate syrup
* 1 tsp sugar per student
* Ice
* Salt
* Plastic, re-sealable bags (quart and gallon)
* Newspaper
* Spoons
* Scoop of ice cream cut-out
* Digital camera
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| **Focus Question(s)** | How does matter change states when different variables are introduced? |
| **Vocabulary** | solid |
| liquid |
| matter |
| temperature  |
| scientific method |
| observe  |
| property |
| **5 E Model** | **Time Frame** | **Activity** |
| **Engage** | 20 minutes | Give each student a cut-out “scoop” of ice cream. Tell them to color the scoop to match their favorite flavor of ice-cream. As the students are finished, call them to carpet. Allow them to turn and talk in order to share their flavor with a friend. Using pre-made, poster-size graph, have students place their scoop on the cone. After graph is complete, discuss the class’s favorite flavor. The teacher will read aloud: Milk to Ice Cream by Inez Snyder. After reading the book, the teacher will introduce the purpose and focus question. The teacher will tell the students they will be making a liquid turn to a solid by adding a variable. They will turn milk/cream into ice cream through a freezing action. |

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| **Explore** | 10 minutes | The students will be given a baby food jar filled with pre-measured cream or milk. The students will explore the liquid and observe its properties Remind the students that the glass jars can break and to please handle with care. The students will record their observations in their science notebooks. The students will illustrate the material as it’s in its liquid form. The students will make a prediction about what will happen to the milk when a variable (ice) is added. As the students wrap up their exploration, call them to the carpet to share observations and predictions. |
| **Explain****Explore** | 40 minutes | Restate focus question to set purpose. We are going to see if we can make a liquid milk turn into solid-like ice cream by lowering the temperature to the freezing point. **Procedure:**1. Give each student a small bag.
2. Add the following ingredients for each student:
	* 1 tsp of sugar
	* 2 oz of milk or cream
	* a dash of vanilla or ½ tsp of chocolate syrup
3. Seal the bag.
4. Squish or Mix everything together.
5. Place 3-4 students’ bags in a larger bag that is about half filled with ice and 5 oz. of salt.
6. Wrap the large bag up in newspaper and twist the ends.
7. Have 2 students take each end and shake the roll for about 5 minutes.
8. After about 5 minutes, the liquid cream will turn to an ice-cream like solid.

Explain to the students that pictures will be taken throughout the process. The pictures will be placed in a photo story. The students will add details about each portion of the photo story by typing in the sequential steps, including vocabulary, details, etc. |
| **Extend** | 30 minutes | The students can add another variable (heat) to the solid-like mixture in order to see the change in the matter. The ice-cream would melt. The students can record the length of time it takes for the ice cream to melt.The students can repeat the process using a metal can instead of the plastic baggies. The students kick around the metal can instead of shaking the baggie. The students can predict which material would freeze the cream faster.  |
| **Evaluate** | 5 minutes | The students can add an entry into their science notebook describing the chemical reaction that took place between the liquid and solid. The students must include vocabulary, observations, predictions, and results within their notebook entry. |