

Lesson Title: Let's Make Ice Cream

Lesson Overview: Students will learn that matter exists in many forms. Some changes are reversible and other changes are irreversible.

Topic(s): Physical Science

Grade or Grade Band: 2nd Grade

Lesson Objectives:

Students will experiment with solids and liquids to determine if changes are **reversible or irreversible**.

Next Generation Science Standards:

2-PS1-4 Construct an argument with evidence that some changes caused by heating and cooling can be reversed and some cannot.

North Dakota Standards:

2-PS1-4 Construct an argument with evidence that some changes caused by heating and cooling can be reversed and some cannot.

PS1.B: Chemical Reactions -Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.

Time Needed (estimate): 35 minutes

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Preparation/Materials

Background knowledge students must have to be successful: Students know the three forms of matter: solid, liquid and gas. It will also be important to know that matter takes up space.

Differentiation and accommodation to support learning for all students:

Essential terminology:

- **Reversible**- capable of being restored to its original state.
- **Irreversible**-not able to be undone or altered.

Resources: <https://youtu.be/wy81UQkfcg0>

Materials needed:

- Ice
- Cream of tartar
- Measuring spoons
- Measuring cups
- Sugar
- Vanilla
- Half & half
- Resealable gallon and quart size bags
- Rock salt
- Oven mitts

Procedure/Activities

Engage: Hold up a large rock in front of the class and ask, “What will happen if I set this rock on fire?” Allow students to discuss what will happen and write their answers on the board. Once students have had the opportunity to predict what will happen, hold an open flame (candle or lighter) up to the rock and observe for about a minute. Ask students to describe what happened. Some rocks may become slightly discolored. Ask students “Is this change reversible?” Explain to students that some changes in science are reversible while others are not. Today we are going to combine ingredients to create a new substance and determine whether cooling and heating it is reversible or irreversible.

Explore: Watch the ND EPSCoR Video-Let’s Make Ice Cream: <https://youtu.be/wy81UQkfcg0>. Assist students as they assemble the ingredients to make their ice cream. Ask the students to record the state of each ingredient on the “States of Matter” recording sheet. Once they have recorded the states of matter. Allow students time to predict what will happen if the ingredients are heated. And then predict what will happen if the ingredients are cooled.

Follow the directions in the video. After the ingredients are mixed, use the “States of Matter” sheet to record the states of matter when the ingredients are heated (at room temperature) and cooled (in the ice bath).

Remind students that it is important to ensure that science experiments are safe to eat before eating them. Then allow students to eat their experiments.

Explain: Ask students to discuss the two states of matter that the mixed ingredients can make. Can these ingredients be separated out into their original ingredients? Inform students that some ingredients can return to their original states, while others cannot.

Extensions for learning more about this topic:

Writing- State an opinion and supply reasons that support that opinion using linking words to connect opinion and reason.

Reading- Describe the connection between scientific concepts and technical procedures.

Evaluation of learning:

Assess students understanding through group discussions and the “Let’s Make Ice Cream Recording Sheet”

Let's Make Ice Cream

States of matter

Once you have recorded the state of matter for each ingredient, predict what will happen to each ingredient when mixed together and heated and then cooled.

Predictions

Ingredient	State of Matter (beginning)	State of Matter when heated	State of Matter when cooled
Cream of Tartar			
Sugar			
Vanilla			
Half & Half			

1. Predict what will happen if all ingredients are mixed and heated up.

2. Predict what will happened if all ingredients are mixed and cooled.

After all the ingredients are mixed, record their state of matter when heated and then cooled.

Ingredient	State of Matter (beginning)	State of Matter when heated	State of Matter when cooled
Cream of Tartar			
Sugar			
Vanilla			
Half & Half			

3. Describe what happened with the ingredients that were able remain in the same state of matter during heating and cooling

4. Describe what happened with the ingredients that changed states of matter during heating and cooling.

5. Do you think you can return any of the ingredients to their original state? Explain.