



Spy Intelligence-Post Visit Activities

Ice Cream Freeze

Key Words:

Physical change

Freezing point

Solution

Crystallization

Materials:

2 quart size Ziploc freezer bags

1 gallon size Ziploc freezer bag

1 hand towel

½ cup milk

½ cup whipping cream

¼ cup sugar

¼ tsp vanilla

Rock Salt

Ice

1, ½, & ¼ measuring cups

2 thermometers

Cups & spoons

Instructions:

1. Depending on the number of students you may want to duplicate this experiment and have two bags freezing at once.
2. Into a one-quart Ziploc bag, place the sugar, milk, whipping cream, and vanilla and mix well. Securely seal the bag and seal into the second bag to prevent leaking.
3. Into a one-gallon Ziploc bag, place 2 cups of ice.
4. Add between 1/2 and 3/4 cups of rock salt to the gallon bag.
5. Place the sealed quart bags into the gallon bag. Close the larger bag securely.
6. Wrap the bag securely in the hand towel. Gently shake the bag, making sure not to squeeze it too hard or cause it to leak. Switch student often and do not

- hold the bag in your bare hands—it will be cold enough to cause tissue damage.
7. Continue rocking the bag for 10 to 15 minutes until the ice cream has solidified.
 8. While students are shaking the bag you can do an experiment to see the difference in temperature of plain ice and ice that has had salt mixed in with it.
 9. Take out two cups. Put about a cup of ice in each. Into one of the cups add some rock salt. Place a thermometer into each of the cups and stir gently with a plastic spoon. What is the temperature after one minute? Two minutes?
 10. Remove the frozen contents from quart bag into cups. Consume the contents of the cups.

What's Going On:

When a substance freezes, the particles arrange themselves into an orderly pattern. This arrangement is called a crystal. When salt is added to the water, a solution is formed. The forming of the solution interferes with the orderly arranging of the particles in the crystal. This results in a lower freezing point meaning that plain water will freeze at a warmer temperature than a water and salt solution. The more salt that is in the water, the lower the freezing point of the solution.

The Ice cream mixture also has a lower freezing point than water so just adding ice to the large bag will not make the ice cream freeze. You need the lower temperature from the water and salt in order to get the ice cream to freeze.

Ice melting and turning into a liquid is a physical change. The Ice is made up of H₂O molecules and when it melts into a liquid the water is also made up of H₂O molecules so there has been no chemical change.

The milk, cream, sugar, and vanilla mixture freezing into ice cream is also a physical change. As the mixture begins to crystallize it still contains milk, cream, sugar and vanilla. If the bag is not moved while the mixture was freezing it may form large solid chunks.

Science, Physical Science

4.1



The “G” and ACE Story

Key Words:

Organize
Introduction
Closure

Materials:

Chalkboard
Pencil
Paper

Instructions:

1. Copy the following six statements onto the chalkboard.
2. Right away they became good friends.
3. ACE and “G” met the very first day of college.
4. The second quarter they scheduled all of their classes together.
5. After college their friendship quickly ended.
6. The following year “G” and ACE even moved in together.
7. They were great at science and both eventually graduated with honors.
8. Have the students organize and write these sentences in the correct sequence of what happened first, second and so on.

Part Two:

Using the information above and any information they gathered in the workshop, the students will write about what ended the friendship between ACE and “G”. Then have the students pretend that they are ACE and write a journal entry that might have appeared in ACE’s diary either the day before or the day after ACE broke into the Gadgets lab. The journal should talk about what ended the friendship and why ACE broke into the lab. If it’s the day before it should have what ACE intended to do in the lab, whether ACE was looking for something in particular, and how ACE feels and how ACE hopes “G” is affected by the break in. Remind the students that they should have an organized story with a simple introduction, body, and a clear sense of closure.

English Language Arts, Writing Applications

4.5

English Language Arts, Writing Processes

3.5, 3.12, 4.12



Light combinations

Switch Position ↓ ↓ ↑ ↑

Key Words:

Combinations

Set

Possible outcomes

Switch Position ↓ ↑ ↑ ↓

Materials:

Pencils

Paper

Chalk board

Instructions:

Copy the pictures above onto the chalk board. During the workshop we found the secret codes for the chain lock and the safe. What did we need to do in order to get those codes? Yes we had to figure out how to turn all of the lights on the light box on.

On the light box there were four switches and the switches could be in either up or down position. Luckily we only had to figure out one box but what if there were more boxes? How many possible combinations would there have been?

The combinations on the chalk board are the answers that you got at the workshop. Draw all of the possible outcomes using arrows like in the pictures on the chalk board.

What if there were five switches instead of four? How many possible combinations would you have then?

Mathematics, Probability

4.13