Melting Crayons

Time Frame: 1 session 45 minutes

Materials:

- Crayon shavings
- Cupcake pan with paper cupcake holders
- Attached worksheet
- Pencils

Learning Standards:

Physical Science

- Identify objects and materials as solid, liquid, or gas. Recognize that solids have a definite shape and that liquids and gases take the shape of their container.

Skills of Inquiry:

- Ask questions about objects, organisms, and events in the environment.
- Tell about *why and what would happen if*?
- Name and use simple equipment and tools (e.g., rulers, meter sticks, thermometers, hand lenses, and balances) to gather data and extend the senses.

Student will be able to:

- Identify the three states of matter (solid, liquid and gas)
- Explain what causes substances to move between the three stages.

Vocabulary:

Anticipatory set:

Ask the students if they can tell you what the three states of matter are. Show them the three states of water: an ice cube, liquid and then put some water over a burner to show them steam. Ask the students what they think determines

the state of matter of a substance. Every substance has different temperatures for which they are solids, liquids and gas. Ask the students if they wanted to melt some crayons whether they should heat the crayons up or cool them down; how hot would the crayons have to get?

Activity:

1. Allow student to pick out different shavings of crayons. Have them put these shavings in paper cupcake holder, which in turn goes into a metal cupcake pan.
2. The oven should be heated to 350 degrees F, then put the cupcake pan in the oven for 5-10 minutes.
3. While the students are waiting for the crayons to melt have them fill out the attached worksheet.
4. Once the crayons have melted take the sheet out and put the paper with melted crayon in the freezer. Make sure the crayons have cooled before you return them to the students.

Closure: Ask the students what is different about their crayons? How did the crayons change when they were in the oven and then how did they change again when they were in the freezer. What do you think would have happened if you turned up the heat on the oven and let the crayons sit in their longer?

Assessment: Participation in class discussion, worksheet and activities.

What Makes Popcorn Pop?

Time Frame: 1 session 45 minutes

Materials:

- Flask
- Burner
- Popcorn kernels
- Pot and oil or air-popper
- Balloon and ice.
- Computer
- *Popcorn! by Elaine Landau ISBN13: 978-1-57091-443-0*
- Popcorn poem
- Thermometer

Learning Standards:

Physical Science

- Identify objects and materials as solid, liquid, or gas. Recognize that solids have a definite shape and that liquids and gases take the shape of their container.

Skills of Inquiry:

- Ask questions about objects, organisms, and events in the environment.
- Tell about *why and what would happen if*?

Student will be able to:

- Explain why popcorn "pops" when cooked.

Vocabulary: matter, states of matter

Anticipatory set (at rug):

See if any students can name the states of matter (liquid, solid, gas). Ask students what the similarities are between ice, water and steam. They are all the same compound (made of the same molecules) but they are in different

states. The reason they change states is due to change in temperature.

Recommended reading:

1. *"Popcorn!" by Elaine Landau ISBN13: 978-1-57091-443-0 don't read straight through*
2. *Poem*

Activity (still at rug):

1. Demonstrate three states of matter. Put some ice in a flask and hold the ice over a burner. Allow the students to see that as the ice heats up it turns into water. When H2O is below 32 degrees F it is ice and when it is above 32 it is water. However when water gets too hot it turns to steam.
2. Keep the water in the flask and put a balloon over the top of the flask. Now put the flask over the fire again. As the water heats up it turns to steam which takes up more room than the water. The kids can then see the balloon expand. Explain that if there is enough water the balloon will eventually get so big that it will pop. Inform the students that water must be 212 degrees F to turn into steam. Ask the students if they know of any foods that pop.
3. See if the students can come up with some answers as to why popcorn pops. Explain that around 14% of a popcorn kernel is made of water. This water is surrounded by a hard covering, which doesn't let any moisture out (just like the balloon). When the popcorn kernel is heated what do you think happens to the water? When the water turns to vapor it also expands and it is too big to fit inside of the kernel. There is enough water inside the kernel so that the kernel pops when the water turns to steam. Show this short clip of popcorn popping in slow motion: www.youtube.com/watch?v=CXDstfD9eJ0&feature=related
4. Use either an air-popper or a pot with oil, and pop popcorn in front of students. As the popcorn pops make sure the students understand why it is happening.

Closure: Hand out popcorn and allow students to eat. The following video is a 1:30 clip about interesting properties of water.
http://www.youtube.com/watch?v=QH1yphfgfFI
Emphasize that popcorn pops because water changes states from liquid to vapor and vapor takes up more space than liquid.
Or you could read to the class as they eat the popcorn.

Assessment: Participation in class discussion and activities.

What Takes the Color Off an M&M?

Time Frame: 1 session 45 minutes

Materials:

- 16 Beakers labeled with different substances
- Water
- Vinegar
- Seltzer
- Worksheet
- M&Ms
- Pencils

Learning Standards:

Physical Science

- Sort objects by observable properties such as size, shape, color, weight, and texture.

Skills of Inquiry:

- Ask questions about objects, organisms, and events in the environment.
- Tell about *why and what would happen if*?
- Make predictions based on observed patterns.
- Record observations and data with pictures, numbers, or written statements.
- Discuss observations with others.

Student will be able to:

- Identify what substances can take the color off an M&M.
- Make predictions and compare these predictions to their actual results.

Vocabulary: substances, chemical reaction

Anticipatory set:

Show the students an M&M and ask them what's inside.
What happens when you suck on an M&M (let them try)?
What happens to the colored shell? Why does this happen?
Do the students think that other substances will be able to take the color off an M&M?

Activity:

1. At each table there should be sets of three labeled beakers filled with vinegar, seltzer and water (probably best to have two sets at each table although this depends on the number of beakers available).
2. Have the students make predictions about what substances will take the color off of the M&Ms. See if they can explain why they think the different substances will affect the M&Ms differently. Make sure that the students write down their predictions on the attached worksheet.
3. Once the students have made predictions allow them to put M&M's in the different beakers.
4. Allow the students to examine their M&Ms and observe what substances take the color off.
5. The students should record their results in both writing and pictures.
6. After they have recorded their data allow the students to eat some M&Ms as they discuss their results with their table.

Closure: As a group, discuss what chemicals were and were not successful in taking the color off the M&Ms, was this what the students expected? Why were some chemicals able to take the color off while others were not?

Assessment: Participation in activates and class discussion.

Alka Seltzer Rockets

Time Frame: 1 session 45 minutes

Materials:

- Film canisters for each student (clear film canisters work much better)
- Alka Seltzer
- Water
- Measuring tape
- Worksheet and beaker to measure amount of water
- Markers

Learning Standards:

- Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.
- Demonstrate that the way to change the motion of an object is to apply a force (give it a push or a pull). The greater the force, the greater the change in the motion of the object.

Skills of Inquiry:

- Ask questions about objects, organisms, and events in the environment.
- Tell about *why and what would happen if*?
- Make predictions based on observed patterns.
- Name and use simple equipment and tools (e.g., rulers, meter sticks, thermometers, hand lenses, and balances) to gather data and extend the senses.
- Record observations and data with pictures, numbers, or written statements.
- Discuss observations with others.

Student will be able to:

- Determine what combination of water and Alka Selzter creates the reaction with their best rocket.
- Adjust their ratios in an attempt to improve their rockets.

Vocabulary: chemical reaction, pressure

Anticipatory set (at rug):

Demonstrate how the rockets work in front of the classroom. Get the kids to start thinking about why and how the rockets work. Tell them that their goal is to make the cap shoot up in the air as high as possible.

Activity (go to tables):

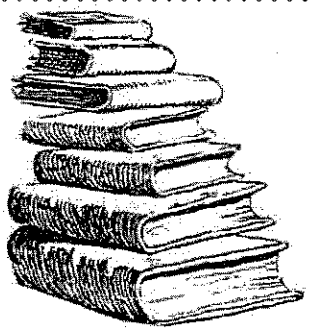
1. Each student should have a film canister. At each table there should be Alka Seltzer tablets (best to cut them in half). There should also be beakers filled with water.
2. First the students should decorate their rockets with markers (do this step before lab).
3. After their rockets are decorated, the students should then be able to decide how much water and how much Alka-Seltzer they want to put into the film canister. The students should put the amount of water they want inside the film canister and put the cap on (make sure the students do not put the Alka-Seltzer tablet in yet. It might be better to hold on to the Alka-Seltzer tablets and simply allow the students to tell you how much to put in).
4. Have students gather round in a circle to begin testing the rockets. The students should all have the worksheet that goes with this lesson. For each experiment the students should record the: scientist (you might want to put all the names down before class and hand out a copy of this to save time), amount of Alka-Seltzer tablets, amount of water (the teacher can measure this in a beaker right before mixing Alka-Seltzer in), and the result. To measure the result you can have a measuring tape behind the experiment and get an estimate of how many inches the cap flew.

5. Begin testing each rocket. To make sure the rocket works, first put the water in, then drop in Alka-Seltzer. Quickly put the cap on and shake the film canister for a second or two. Then put the canister down and step back. Clear film canisters work much better.
6. The students should be recording all of their results on their worksheets.
7. After each rocket has been tested the students should go back to their tables, discuss what they saw and come up with new ratios for another trial.
8. Test their new ratios and have them record their results again.

Closure: Ask the students who was able to improve their rocket. Who had the most effective rocket? What do they notice about the ratios of water to Alka Seltzer. Explain to the students that when Alka Seltzer and Water combine they release a gas called carbon dioxide. The carbon dioxide needs room to build inside the contained. Thus more water and Alka Seltzer does not result in the largest explosion.

Assessment: Participation in activities, worksheet and class discussion.

Physical Science Reading!



List of suggested reading for Physical Science Unit:

- If you decide to go to the moon by Faith Mcnulty ISBN 0-590-48359-5
    - This book could be a good book to read before the Alka-Seltzer rocket lesson. It's about a young boy who goes into space.
- Team Moon: by Catherine Thimmesh ISBN: 10: 0-618-50757-4
    - This book has great pictures about space and rocket ships. It is too long to read the entire thing but would be usefully to flip through the pictures. The book also focuses on the immense amount of teamwork that goes into putting people into space. Thus this could be a great book to read before the Alka-Seltzer rocket lesson.
- Popcorn by Tommy Depaula
- Popcorn! by Elaine Landau
- Step-by-step science series: Water
- The Magic school Bus: at the waterwoks by Joanna Cole ISBN 0-590-40360-5
- Follow the water from brook to ocean by Arthur Dorros. ISBN 0-06-445115-1
- Water's Journey by Eleanor Schmid ISBN 1-5585-013-1

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Crayons--Solid or Liquid???

Name _____

Date _____

What colors were your pieces of crayons?

_____

_____

_____

_____

How did your crayons change after heating them in a 400 degree oven for 5-10 minutes??

_____

_____

_____

Name:

The M&M Challenge Experiment

Can you take the color off of an M&M without using your mouth?

Choose any materials on the science table to help you remove the color from an M&M.

Explain your best method of removing the color. How did you figure out what to do? What were you thinking? What materials did you use?

Draw a picture of your experiment.

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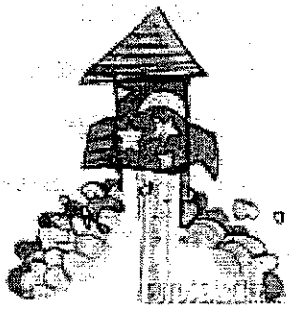

Let's Make a Rocket!

Materials:

film container
Alka-Seltzer
water
permanent makers (for decorating the rockets)

We will put some Alka-Seltzer and water into rocket-decorated film containers. Let's see what happens!!

Things to think about:

~ How much water and how much Alka-Seltzer make the best rockets?

~ How else could you make a rocket go like this one did?

Alka-Seltzer contains dry acid and baking soda. When combined with water, these substances form carbon dioxide gas. The gas forces the film container open.

Rocket Data

Scientist	Alka-Seltzer	Water	Result

Name _____

Melting Crayons Lab

In today's lab you experimented with different states of matter. Below list the 3 states of matter:

_____ _____ _____

List the colors you used to create your crayon:

_____

Briefly describe the steps used to create your crayons. (Use the back if you need more room.)

First we _____.

Then we _____.

Next we _____.

Finally we _____.

Below list some other things that change from **solid** to **liquid**.

_____

Now list some other things that change from **liquid** to **solid**.

_____

Write a sentence to share your feelings or thoughts about today's lab.

_____

_____

Name_____ Your Partner's Name_____

Pop! Pop! Pop! Popcorn!

A Crunchy investigation

Let's get a good look at popcorn! With your partner, use your loupe to observe a kernel of popped popcorn. Make a list of everything you notice.

_____ _____

_____ _____

Make a drawing of the kernel.

_____

Using your sense of taste, make a list of words that describe how the popcorn tastes. That's right, you get to eat some popcorn right now!

_____ _____

_____ _____

What is your favorite way to eat popcorn? Do you like to put anything on it? If so, what do you put on it?

_____

Every piece of popcorn has a brown part. What do you think that part really is?

_____