

Summer 2019

## Mad Scientist Club | Experiments

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Husein, Nora, "Mad Scientist Club | Experiments" (2019). *Honors Expanded Learning Clubs*. 31.  
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NEBRASKA HONORS PROGRAM  
CLC EXPANDED LEARNING OPPORTUNITY CLUBS  
INFORMATION SHEET

**Name of Club:** Mad Scientist Club

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**Age/Grade Level:** Grades 1-3

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**Number of Attendees:** 12-15

**Goal of the Club:**

The goal is to expand the children's knowledge on different scientific principles through hands-on experiments.

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**Resources:**

University of Nebraska-Lincoln Honors Program

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**Content Areas:** (check all that apply)

- Arts (Visual, Music, Theater & Performance)
- Literacy
- STEM (Science, Technology, Engineering & Math)
- Social Studies
- Wellness (Physical Education, Health, Nutrition & Character Education)

**Outputs or final products:**

There was no final product. The students were allowed to take home some of their daily experiments to show to their family.

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**Introducing your Club/Activities:**

Mad Scientist club allows young students to learn the basics of different types of sciences by performing hands-on experiments.

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**General Directions:**

Every day we started with an ice breaker. I would then introduce them to the day's topic and start with our hands-on experiments. Once the experiment was completed, I explained it to the students.

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**Tips/Tricks:**

Try to perform the experiments step by step with the students or else it'll become very disorganized and hard to keep up with.

Try to have at least two club leaders to help the students because they'll have lots of questions and need help.

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# LESSON PLAN WORKSHEET

**Lesson Activity**

**Name:** Introductions & Dancing Raisins

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**Length of Activity:** 40 minutes

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**Supplies:** Clear cups, Sprite soda, raisins, water

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**Directions:**

We started with an ice breaker for the students to get to know each other. Then the students filled a cup with water and put 10 raisins in it and observed what happened. After that, the students filled a cup with Sprite and put 10 raisins in it and observed what happened again.

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**Conclusion of the activity:**

The students compared what happened with the raisins in both liquids. They learned that the raisins “dance” in the soda because of the carbon dioxide gas and the change in density.

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**Parts of activity that worked:**

The raisins “danced” for a good amount of time which kept the students interested.

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**Parts of activity that did not work:**

The students were really disappointed by what happened when they put the raisins in water.

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**Lesson Activity**

**Name:** Floating Boats

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**Length of Activity:** 45 minutes

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**Supplies:** Aluminum foil, pennies, water, large containers to hold water

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**Directions:**

Fill the containers with water. Instruct the students to build the strongest boat they can out of a square of aluminum foil. Once finished, have the students put their boats in the water and see whose boat can carry the most pennies without sinking.

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**Conclusion of the activity:**

The students learned that just because something is bigger, it doesn't necessarily mean that it's stronger. Some of the smaller boats were able to carry more pennies than the bigger boats.

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**Parts of activity that worked:**

Some students came up with really creative ways to make a strong boat.

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**Parts of activity that did not work:**

Many of the students tried to make similar boats, making the number of pennies carried by the boats similar.

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**Lesson Activity****Name:** Lava Lamps**Length of Activity:** 25 minutes**Supplies:** Vegetable oil, empty plastic water bottles, food coloring, water, Alka-Seltzer tablets**Directions:**

Fill the water bottles about  $\frac{3}{4}$  of the way with vegetable oil and about  $\frac{1}{4}$  of the way with water, leaving the neck of the bottle empty. Add 10 drops of food coloring to the bottle. Drop half of a Alka-Seltzer tablet into the bottle and put the lid back on.

**Conclusion of the activity:**

The students learned about density. The oil was denser than the water, causing it to separate and form a layer beneath the water.

**Parts of activity that worked:**

The lava lamps worked out really well. They really did resemble real lava lamps.

**Parts of activity that did not work:**

Some students used yellow and orange food coloring and it didn't really show through the oil. The ratio of oil and water needs to be as close as possible. We ran out of oil and our ratios were off in some bottles, causing them to not work as well. Also, some students shook their bottles, causing the liquids to mix, making them have to wait a while until they separated again.

**Lesson Activity****Name:** Slime**Length of Activity:** 45 minutes**Supplies:** Borax, tablespoons, measuring cups, glue, large mixing bowls, water, food coloring**Directions:**

Mix 1 tablespoon of borax with 1 cup of warm water and stir until the borax dissolves. Pour as much glue as you like into a large bowl and add water. Use the same amount of water as you did glue. Mix the glue and water together. Add a few drops of food coloring to the glue solution and mix it. Add a little bit of the borax solution at a time to the glue and knead the goo until you get the consistency that you want.

**Conclusion of the activity:**

In the end, slime of different consistencies was created depending on how they added the borax solution.

**Parts of activity that worked:**

All of the groups ended up with good slime to play with and to take home.

**Parts of activity that did not work:**

The activity was very messy. The students wanted to play with the slime all over the place, causing there to be a big mess to clean up.

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**Lesson Activity**

**Name:** Oobleck

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**Length of Activity:** 45 minutes

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**Supplies:** Cornstarch, food coloring, large mixing bowls, measuring cups, *Bartholomew and the Oobleck* book by Dr. Seuss

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**Directions:**

First, I read *Bartholomew and the Oobleck* to the students. To start, put 1 cup of cornstarch into a bowl. Add a couple drops of food coloring to a ½ cup of water. Slowly add the water to the cornstarch, mixing the solution while you add the water.

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**Conclusion of the activity:**

The students compared the consistency of the Oobleck to the consistency of the slime.

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**Parts of activity that worked:**

The consistency turned out really well. The students enjoyed it very much.

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**Parts of activity that did not work:**

This activity made a huge mess just like the slime.

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**Lesson Activity**

**Name:** Leakproof Bag

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**Length of Activity:** 30 minutes

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**Supplies:** Sharpened pencils, Ziploc bags, water, paper towels

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**Directions:**

Fill the Ziploc bag halfway with water and seal it closed. Take the bags outside or to an area that you don't mind spilling a lot of water in. Make sure the pencils are sharp. They must be sharp to a point for the experiment to work. Hold the top of the Ziploc bag and carefully push the pencil through the bag but don't pull the pencil all the way through the bag. Leave the pencils in the bag.

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**Conclusion of the activity:**

The pencils can be stabbed into the bag without any water spilling.

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**Parts of activity that worked:**

Many students were able to put several pencils in their bags without the water spilling. They were very excited about the whole experiment.

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**Parts of activity that did not work:**

Some of the students pulled the pencil completely through the bag, causing the water to spill and the experiment to not work.

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**Lesson Activity**

<b>Name:</b>	Painting with Bubbles
<b>Length of Activity:</b>	40 minutes
<b>Supplies:</b>	Cups, paint, tablespoons, water, Dawn dish soap, straws, white paper

**Directions:**

In a cup, add 2 tablespoons of paint, 1 tablespoon of water, and 2 tablespoons of dish soap. Mix the solution together. Put the straw into the cup and blow bubbles until the cup overflows. Carefully lay the paper on top of the cup for it to make prints. Continue blowing bubbles and placing the paper on the cup. Let the painting dry once finished.

**Conclusion of the activity:**

The students made their own paintings by using the paint and soap solution.

**Parts of activity that worked:**

The paintings turned out really good. The students were really excited about how they were able to paint with the bubbles.

**Parts of activity that did not work:**

Some students had difficulty understanding how to “paint” with the bubbles and flipped the cup over on top of the paper instead, causing a huge mess.

**Lesson Activity**

<b>Name:</b>	Build Your Own Bridge
<b>Length of Activity:</b>	1 hour
<b>Supplies:</b>	Paper, pencils, popsicle sticks, plastic cups, straws, pipe cleaners, tape, toothpicks, dominoes, cardboard tubes

**Directions:**

Have the students draw a design of the bridge they want to build. Once they’re done drawing, have them build their bridge with the materials provided. Once everyone is done building their bridge, have a competition to see whose bridge is the strongest by seeing which bridge can hold the most dominoes.

**Conclusion of the activity:**

The students made their own bridges and competed to see whose bridge was the strongest by seeing which bridge could hold the most dominoes without breaking. They learned the science of engineering through this activity.

**Parts of activity that worked:**

Some of the students came up with really creative bridges.

**Parts of activity that did not work:**

The students originally tried to use glue to connect the pieces which didn't work because the glue took too long to dry. We switched over to using tape instead. Many of the students had difficulty figuring out how to build their bridge with the materials. A lot of them ended up building bridges that were very similar.

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**Lesson Activity**

**Name:** pH of Cabbage Juice

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**Length of Activity:** 20 minutes

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**Supplies:** Red cabbage leaves, a blender, a strainer, clear cups, water, vinegar, laundry detergent, tablespoons

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**Directions:**

Peel a couple of big leaves of the red cabbage and put them in a blender that's half filled with water. Blend on high until the mixture is a consistency of juice. Pour the cabbage juice in a strainer to filter out chunks of cabbage and pour the juice into 3 cups. In 1 cup, add a little vinegar and stir. In another cup, add a teaspoon of laundry detergent and stir.

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**Conclusion of the activity:**

The cup with the vinegar went from dark purple in color to red due to the acidity of the vinegar. All acids turn red when mixed with cabbage juice. The cup with the laundry detergent went from dark purple in color to green due to the detergent being a base. All bases turn green when mixed with cabbage juice.

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**Parts of activity that worked:**

The color of the juice changed significantly so that it was noticeable.

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**Parts of activity that did not work:**

The students really wanted to blend the cabbage, causing them to be very rowdy when I blended it.

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**Lesson Activity**

**Name:** Capillary Action

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**Length of Activity:** 20 minutes

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**Supplies:** Clear cups, water, food coloring, white paper towels

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**Directions:**

Line up 7 cups and fill cups 1, 3, 5, and 7 <sup>3</sup>/<sub>4</sub> of the way with water. Add 10 drops of food coloring to each of the cups filled with water. Make sure to use a different color for each cup. Take a paper towel and fold it in half width wise 3 times and put 1 side of it in 1 cup and the other side in the next cup. Repeat this with the rest of the cups.

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**Conclusion of the activity:**

The colored water moved up the paper towels and into the empty cup next to the filled one. The empty cups filled up with the moving water and the colors from the 2 paper towels mixed.

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**Parts of activity that worked:**

The colored water moved up the paper towels for all the groups. The students were fascinated by how it moved.

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**Parts of activity that did not work:**

Some students had difficulty folding the paper towels and understanding how to set up the cups.

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**Lesson Activity**

**Name:** Making Volcanos

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**Length of Activity:** 30 minutes

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**Supplies:** Baking soda, tablespoons, clay or playdough, red food coloring, vinegar, measuring cups, Dawn dish soap, safety goggles

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**Directions:**

Have the students make a volcano that's about 6" tall with an opening about 4" deep and 2" wide. Put your safety goggles on. Add 1 tablespoon of baking soda, 3 drops of red food dye, 3 drops of dish soap, and  $\frac{1}{4}$  cup of vinegar into the opening.

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**Conclusion of the activity:**

The reaction between the ingredients caused the mixture to bubble up and overflow from the volcano, imitating a volcano erupting. The students learned that mixing the acidic vinegar with the basic baking soda caused them to neutralize each other, causing the reaction.

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**Parts of activity that worked:**

All of the volcanos erupted. The students also enjoyed making their own volcanos.

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**Parts of activity that did not work:**

The color of the "lava" didn't turn out exactly red. They mostly turned out pink while one was still white even though food coloring was added. Try to add more food coloring.

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**Lesson Activity**

**Name:** Crystal Snowflakes

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**Length of Activity:** 45 minutes

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**Supplies:** A microwave, heat safe mixing bowls, water, tablespoons, , liquid measuring cups, borax, pipe cleaners, yarn, large cups, scissors, pencils

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**Directions:**

Cut a pipe cleaner into 3 even pieces. Twist the pieces together to make the shape of a snowflake. Heat up enough water in the microwave to fill a large cup with. After heating up the water, add borax to it. Add 1 tablespoon of borax for every cup of water. Pour the water into the cup, filling it up about  $\frac{3}{4}$  of the way. Tie a piece of yarn to a pencil and to the snowflake. Lower the snowflake into the cup, making sure that the snowflake isn't touching the sides or bottom of the cup. Leave the cup to sit overnight.

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**Conclusion of the activity:**

The borax solution crystalized over the snowflake, causing a crystal the shape of a snowflake.

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**Parts of activity that worked:**

The borax solution crystalized very well over the pipe cleaners.

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**Parts of activity that did not work:**

The students had a little trouble making the snowflakes out of the pipe cleaners. They also had a hard time getting the string to be the right length so that the snowflake wasn't touching the cup.

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**Lesson Activity****Name:**

Egg Drop

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**Length of Activity:**

45 minutes

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**Supplies:**

Eggs, small cardboard boxes, cotton balls, bubble wrap, newspaper, straws, tape, string, scissors, plastic bags, popsicle sticks, glue, rubber bands

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**Directions:**

Instruct the students to make an egg basket that'll be strong enough to keep an egg from breaking if dropped in the basket. Once done making the baskets, place 1 egg in the basket and go to a place where you can drop the egg baskets from at least a few feet. Drop the baskets one by one and check to see if the egg broke or not.

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**Conclusion of the activity:**

The egg basket should be able to keep the egg safe when dropped. The egg shouldn't break after being dropped.

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**Parts of activity that worked:**

The students were able to come up with a wide variety of creative egg baskets.

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**Parts of activity that did not work:**

The broken eggs made a huge mess. Make sure to put something on the ground to prevent from getting the eggs everywhere.

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**Lesson Activity****Name:**

Making an Animal Diorama

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**Length of Activity:**

1 hour

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**Supplies:**

Shoebboxes, construction paper, paint, paintbrushes, crayons, markers, scissors, glue, playdough

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**Directions:**

Take the lid off the shoebox. Decorate the box to look like an animal habitat by painting the walls, adding plants, making animals out of playdough, etc. Sit out for a few hours to let dry.

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**Conclusion of the activity:**

The students made a diorama of a specific animal habitat using the materials provided. They shared their diorama with the group.

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**Parts of activity that worked:**

The students were able to come up with several different animal habitats. Each diorama was different than the other.

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**Parts of activity that did not work:**

It was hard to continue working after already gluing stuff in the box because the glue easily got all over the students.

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**Lesson Activity**

**Name:** Making a Plant Diorama

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**Length of Activity:** 1 hour

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**Supplies:** Shoeboxes, construction paper, paint, paintbrushes, crayons, markers, scissors, glue, playdough

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**Directions:**

First go outside on a scavenger hunt for different tiny plants to use in the dioramas. Then take the lid off the shoebox. Decorate the box to look like a plant habitat by painting the walls, adding the plants found outside, making other plants out of playdough, etc. Sit out for a few hours to let dry.

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**Conclusion of the activity:**

The students made a plant diorama with different types of plants to represent the diversity found in the outdoors. They shared their dioramas with the group,

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**Parts of activity that worked:**

The students understood the concept of making a plant diorama and were able to make it look very realistic.

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**Parts of activity that did not work:**

Many of the dioramas looked similar because there wasn't a wide variety of plants outside for us to pick.

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**Lesson Activity**

**Name:** Making a Solar System

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**Length of Activity:** 1 hour

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**Supplies:** Clothes hangers, small Styrofoam balls, wood BBQ skewers, paint, paintbrushes, string, glue, construction paper, scissors, plastic cups, paper plates

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**Directions:**

Stick a skewer into each of the Styrofoam balls to help you paint without making a mess. Paint a Styrofoam ball for each of the planets in the solar system. Paint them so that they resemble the planets. Let the planets dry. Remove the skewers from the balls. Cut string and attach it to each of the planets. Tie the other end of each string to the clothes hangers in the order of the planets in the solar system.

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**Conclusion of the activity:**

The students made their own mini versions of the solar system. They resembled all the planets and the order in which the planets fall. The students were very excited to take their solar systems home.

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**Parts of activity that worked:**

The solar systems turned out pretty good. All the students had at least a couple of planets to take home with them.

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**Parts of activity that did not work:**

Some students had trouble painting their planets to make them look realistic. The painting was also very messy.

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