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Science Club

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NEBRASKA HONORS PROGRAM
CLC EXPANDED LEARNING OPPORTUNITY CLUBS
INFORMATION SHEET

Name of Club: Science Club

Age/Grade Level: 2nd- 4th grade

Number of Attendees: 8-12

Goal of the Club: (learning objectives/outcomes)

The goal of Science Club is to get students interested in science at a young age and introduce them to scientific concepts that they may not be fully familiar with in hopes that they can latch onto an idea or subject that they find themselves really passionate about. If not, the other equally important goal is for students to have fun and do hands on activities that they can be excited about!

Resources: (Information for club provided by)

<https://www.sciencebuddies.org/stem-activities?p=1>

<https://www.nationalgeographic.org/activity/simulate-oil-spill-cleanup/>

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: (Does the club have a final product/project to showcase to community?)

N/A

Introducing your Club/Activities:

Get to know students (names, grades, interests, hobbies) and get a gauge for how much they already know about science, have them share what they are excited for with the club

General Directions:

Establish rules and guidelines for being safe with the various experiments that are being done, be respectful/safe/responsible, check for allergies/dietary restrictions (some experiments have food involved)

Tips/Tricks:

Plan for more activities in a give time frame and be flexible with what there is time to accomplish! Over-plan instead of under-plan, be passionate about what is being taught because that will carry over to the students.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Introduction/Optical Illusions

Name:

Length of Activity: 30-40 minutes

Supplies: Laptop, afterimages slideshow/

Directions:

Ask each student their name, grade, hobbies, and discuss science topics that interest them. Give an introduction to the rules and expectations to be followed within the science club: be respectful, be safe, and be responsible. Ask students if they have any allergies or dietary restrictions to plan for future clubs. This is because some of the future activities involve potential hazards to certain dietary restrictions or food allergies.

Ask them what they think of when they hear: biology, chemistry, physics. How are they connected? Discuss the differences between them.

Afterimage Activity:

Display each of the afterimages, and then flip to a white background and discuss what images they see after the image is removed.

Conclusion of the activity:

Discuss what they learned, and explain the science behind afterimages. There are cones cells in the eyes of humans that tire out after staring at a particular color. Perception of white light requires all cone cells, but worn out cells cause different colors to appear.

Parts of activity that worked:

The kids really loved the afterimages/optical illusions activity and were super excited to see the colors change. There was active discussion on why afterimages occur.

Parts of activity that did not work:

Introductions took a little too long, shorten up questions (give them a few minutes to think first), possibly have them write down answers. Simplify concepts of rods and cones because that seemed to be kind of confusing to them.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Oil Spill Cleanup

Name:

Length of Activity: 45 minutes

Supplies: Two bowls filled with water (about $\frac{3}{4}$), oil, dish soap, spoons, cotton balls, string, popsicle sticks, feathers

Directions:

Fill the bowl with water until it is about half full. Depending on number of students, might have to do two separate demos. If greater than 10 students it is suggested to create two water bowls. Pour oil in the bowl of water (represents ocean or other body of water). Have students try to clean up/remove all the oil in the water with the tools below that they have.

The 4 categories of items:

- Absorbers- absorbs oil that is being contained with boom (cotton balls)
- Skimmers- spreads oil across the surface (popsicle stick)
- Booms- containment system to keep oil in one place (yarn)
- Dispersants- chemicals that make oil sink (detergent)
- Feathers- impact on birds

Have them make observations on pros and cons of the various cleaning mechanisms

After a set amount of time of approximately 15-20 minutes, show students what putting in soap does (disperses the oil)

Conclusion of the activity:

The water is difficult to clean up, and it exemplifies how hard it is to clean an oil spill. There are tools that can be used, but they don't necessarily "clean" up the oil; rather, the oil just gets moved around and placed somewhere else. Even using soap just pushes the oil to the edges of the bowl, so there is importance in taking measures to prevent oil spills.

Parts of activity that worked:

Many of the students had that "aha" moment when they realized how hard it was to clean it up. They initially thought it would be easy and were shocked to see the impact that it can have on animals. In addition, they used tools in correct ways and made good observations about effectiveness.

Parts of activity that did not work:

There was a lot of lack of attention at times with students preoccupied with playing with the water and putting in rocks and such instead of doing the activity. The activity was kind of messy but it was done outside.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name: Taste Bud Test

Length of Activity: 20-30 minutes

Supplies: Goldfish crackers, M&Ms, Lemon drops/Lemonheads, Sour Patch Kids

Directions:

Have students close their eyes and do not move until directed. There will be three different foods that were tasted. Place M&M's in the hands of each student and once they all have it, have them immediately eat it. Do not let the students touch the food too much. Ask them to guess what it

was, and how they came to the conclusion with taste buds. Repeat the same procedure as with Goldfish crackers and the lemon candy. Then with Sour Patch Kids, have them plug their noses and guess what flavor/color they had.

Conclusion of the activity:

There are different taste buds on our tongues that are activated when eating certain foods, and these help us identify what we're eating and whether it is good/safe to eat or bad/not very appetizing. Have students discuss which taste buds are most important in their opinion and why.

Parts of activity that worked:

Kids were attentive and listened to instructions overall. They really enjoyed the surprise food and had fun trying to guess what the food/candy was.

Parts of activity that did not work:

Some saw the snacks ahead of time/peeked when they weren't supposed to and ruined the surprise for others, so keep it more hidden. Remind everyone to be quiet during the taste test because some kids would eat earlier than others and blurt out what it was.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name: Senses Test

Length of Activity: 20-30 minutes

Supplies: One two-liter bottle of Sprite, food coloring (red, blue, and yellow), small cups

Directions:

Mix food coloring with sprite to create the following colors:

- red+yellow+Sprite= orange (looks like Fanta/Sunkist)
- yellow+blue+Sprite= green (looks like Mountain Dew)
- red+blue+Sprite= purple (looks like grape Fanta)
- red+blue+yellow+Sprite= brown (looks like Coke/Pepsi)

Pour into cups so that each student can taste test each colored beverage. Start with the orange colored soda as a test then have them taste test green, purple, and brown consecutively.

Conclusion of the activity:

Reveal that the soda is all the same and that food coloring was used. The sense of sight is powerful in terms of our perception and assumptions of our surroundings, so many of them may have been tricked into thinking the soda was in fact Fanta or Mountain Dew or Pepsi.

Parts of activity that worked:

The senses test definitely tricked them because very few guessed that it was just all Sprite, so they learned a lot firsthand about how senses can be misleading. They really enjoyed learning and experiencing how our brain can play tricks on us.

Parts of activity that did not work:

Overall the activity went very well, there was a lot of excitement, so we just had to make sure they were all calm and under control.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name: Ice Cream in a Bag

Length of Activity: 20-30 minutes

Supplies: Measuring spoons and cups, sugar, half and half (or milk/heavy whipping cream), vanilla extract, salt, ice cubes, small sealable bags (Ziploc), gallon-sized sealable bag (one for each student), oven mitts or towels

Directions:

In each small sealable bag, place one tablespoon of sugar, $\frac{1}{2}$ cup of half-and-half (or milk or heavy whipping cream), and $\frac{1}{4}$ teaspoon of vanilla extract. Seal both bags well. Add four cups of ice cubes to one of the large, gallon-sized bags. Then add $\frac{1}{2}$ cup of salt to the bag. Put one of the small bags you prepared into the large bag with the ice cubes. Be sure both bags are sealed shut. Put on oven mitts or wrap the bag in a small towel and then shake the bag for five minutes. Feel the smaller bag every couple of minutes while you shake it, and take a peek at it. Once it is at the right consistency, grab a spoon and enjoy!

Conclusion of the activity:

Have students discuss phases of matter, as well as how different processes can get them from one phase of matter to another (ex. freezing, boiling, etc.) The salt prevents the ice from melting, so more heat can be absorbed by the ice and allow the ingredients to freeze.

Parts of activity that worked:

The kids really enjoyed the activity, specifically shaking the bags (gets all the energy out!). In addition, they were actively engaged in the discussion after the activity because they wanted to learn about how the science behind this experiment works.

Parts of activity that did not work:

Many of the bags of ingredients did not freeze completely due to not shaking enough (running out of time) and from the ice cubes not being frozen enough. In addition, the small Ziploc bags had some leakage issues.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name: Foil Boats

Length of Activity: 15-20 minutes

Supplies: Foil, paper, writing utensils

Directions:

Have students brainstorm ideas on how they want to create their foil boat. Give 4 inches by 12 inches of foil to each student. Test the foil boats by placing the boats in water and putting coins (preferably quarters and the same type of coin) on top. Have students count out loud in unison the number of quarters that are being placed in boats. Record the results on a piece of paper or the board and have a competition among students.

Conclusion of the activity:

Reflect with students what some of the characteristics of the most effective boats were and how less efficient boats could be improved. Have them discuss why they made certain structural choices over others. Introduce concepts of density and buoyancy and have them apply those to this particular activity.

Parts of activity that worked:

The kids really enjoyed the competition of the floating boats. They were super excited to see how their boats did, and tried very hard to make a successful boat. They actively participated in counting the number of coins each boat had and did a great job explaining their ideas.

Parts of activity that did not work:

We tried to pair them up so that they could learn to work together, but there were issues with people not working together in pairs. This led some conflict among the kids because they had competing ideas. The next time we would suggest to have them create their own individual boats.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name: Coke and Mentos Reaction

Length of Activity: 10-15 minutes

Supplies: 2 two-liter Coke bottles, two rolls of Mentos, index cards, tape, safety goggles

Directions:

Roll up an index card and tape it in place to form a funnel. Remove the cap from the bottle and place an index card flat on top, covering the hole. Put on safety goggles, and place the funnel on top and load up about 5-6 Mentos. Pull the flat index card away and quickly move out of the way of the reaction.

Conclusion of the activity:

Discuss what caused the bubbling; the candy being added creates more carbon dioxide bubbles, causing an explosion. Talk to students briefly about periodic table and elements such as carbon, oxygen, and hydrogen (show them how molecules and compounds form-keep it simple).

Parts of activity that worked:

The Coke and Mentos activity went very well, and the students were very engaged. It got the excited about chemical reactions and chemical principles. They were also able to relate elements to common molecules that they are familiar with, such as water.

Parts of activity that did not work:

The students wanted to get up close and struggled to listen to our directions to stay away, so make the boundaries clearer. Have discussion about concepts before the experiment because they won't be able to focus afterward.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name:	Elephant Toothpaste
Length of Activity:	10-15 minutes
Supplies:	Dish soap, food coloring, hydrogen peroxide (3%), dry yeast, warm water, plastic bottle, ½ measuring cup, measuring spoon (tablespoon)

Directions:

Measure out ½ cup of hydrogen peroxide and pour it into the bottle. Put a big squeeze of dish soap into the bottle and mix it by swirling. Put in a few drops of food coloring of your choice. In the measuring cup, combine 1 tablespoon of yeast with 3 tablespoons of warm water and stir. Pour this into the plastic bottle, and the reaction will occur.

Conclusion of the activity:

Explain to students why this foaming occurs. Hydrogen peroxide breaks into water and oxygen gas, and the soap traps the oxygen gas, causing it to foam and erupt. Touch on periodic table/elements with this activity, similar to the previous activity (Coke and Mentos...can do them together).

Parts of activity that worked:

Students were really excited to see all the colors and generally enjoyed the reaction that occurs. They also seemed to understand where the foam comes and sort of grasped what the chemistry behind it.

Parts of activity that did not work:

Like with Coke and Mentos, crowd control was an issue because students were really excited about the reaction and really wanted to get close and touch the foam. It is important to make sure that there are boundaries and rules set that are followed.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name:	Slime Fun
Length of Activity:	15-20 minutes
Supplies:	Baking soda, contact lens solution, craft glue, food coloring, measuring cups and spoons, bags

Directions:

In a mixing bowl, thoroughly mix $\frac{1}{4}$ C water, $\frac{1}{4}$ C glue, and a few drops of food coloring. Add 1 tsp of baking soda and mix completely. Add 1 tbsp contact lens solution and stir vigorously until mixture starts pulling away from the edges of the bowl. Use your hands to knead the slime for 5–10 minutes until its texture stops changing. Do not worry if the slime is very runny and sticks to your hands at first. It will get easier to peel the slime off your hands as it gets thicker.

Conclusion of the activity:

Discuss what viscosity is and how it works. Have students think of examples that are more viscous (such as syrup or honey) or less viscous (such as water) and what the relation is between viscosity and how fast something can move.

Parts of activity that worked:

The students seemed wanting and willing to do the slime activity despite certain difficulties with it not properly forming into slime. They were really excited to make it and seemed to understand viscosity, even if the word itself was unfamiliar to them.

Parts of activity that did not work:

The slime had trouble setting if there was not enough contact solution added, as well as, if there was too much water within the slime that the students were creating. Letting the slime sit out caused it to dry out, so putting it in bags right away was important.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name:	Cell Cookies
Length of Activity:	25-30 minutes
Supplies:	White frosting, cookie, Reese's, chocolate chips, ribosomes, gummy worms, licorice, Dots, M&Ms

Directions:

Give each student a cookie and frost the cookie and explain what the cytoplasm and cell membrane do.

- Cookie- Cell membrane- Used to transport things in and out of the cell

- Frosting- Cytoplasm-Fluid inside a cell.

Discuss what the organelle does and where it is inside the cell. Use Keywords to help them remember it.

- Nucleus (Mini Reese's): stores genetic information
- Ribosomes (chocolate chips): Creates proteins that help your cell function
- Mitochondria (M&Ms): produces energy (powerhouse of the cell)
- Golgi Apparatus (gummy worms): used in packaging waste
- Vacuoles (Dots): transports waste out of the cell
- Endoplasmic Reticulum (licorice): used to create proteins and produce waste

Hand the students the candy corresponding to the cell and have them place it inside their cookie.

Conclusion of the activity:

Come up with buzzwords to remember each part (for example, nucleus= DNA, mitochondria=energy, ribosomes=protein, etc.) and have students call out the buzzwords as the parts are announced. The students can eat their cookies afterward.

Parts of activity that worked:

The students were very engaged in the activity. This allowed us to teach them about the different parts of the cell and were very interested in eating it after. Buzzwords that tied each big worded organelle to key words really helped in student understanding.

Parts of activity that did not work:

Trying to explain the organelle concepts to students was a struggle if they had not heard of the terms before. It was hard to keep the students from eating parts of the cookie before they were supposed to.
