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STEM Club

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Camden Jones, Amber Gadeken and Erica Gesner

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NEBRASKA HONORS PROGRAM
CLC EXPANDED LEARNING OPPORTUNITY CLUBS
INFORMATION SHEET

Name of Club: STEM Club

Age/Grade Level: 3rd-5th Grade

Number of Attendees: 10-15

Goal of the Club: *(learning objectives/outcomes)*

The goal of this club is to introduce various topics stemming from different fields in science. We hope to make the students excited about science and show them how important it is to their everyday lives.

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?)*

We aim to have our students have a better understanding of basic scientific topics such as physics, chemistry, and anatomy.

Introducing your Club/Activities:

We planned various lessons that included: Monster Genetics, Balancing Marshmallow Models, Electric Cornstarch, Anatomy Day, Making Lava Lamps, and Make Ice Cream in a Bag

General Directions:

While science is very important, it was more important that the kids were having fun while learning! If they are having a good time, they will retain the information they learn in club much easier. What they learn in this club can help them understand how to go about learning in their future classes.

Tips/Tricks:

We found that the best way to keep the student's attention was to have more hands-on activities. We found that general discussion did not work very well and resulted in more behavioral issues since the students were not as engaged.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Monster Genetics

Name:

Length of Activity: 1-1.5 hrs

Supplies: Paper, Monster Genetics Worksheet, Colored Pencils, Crayons, Coin

Directions:

Begin the lesson by introducing the general topic, genetics, to the students. Open the floor to see what the students already know. This can help you gauge how much you will need to explain to them. Once you get a general idea, begin to describe how alleles work in relation to genes. To help the students, understand at their young age, try to use smaller words and analogies to explain terms such as homozygous, heterozygous, dominant alleles, recessive alleles, and traits. When the students are ready, hand out a worksheet and coin to each one. Explain that when they flip a heads, that is one dominant allele. When they flip a tails, that is one recessive allele. Continuing down the worksheet in this fashion, the students will establish traits for their monsters. Once they have completed the worksheet, have them draw their monster with the traits that they got from their worksheets. Encourage the students to share their monsters to their peers and create backstories for them!

Conclusion of the activity:

While this activity proved to teach some of the kids, there were a lot of students who were confused or distracted. This activity seemed to be too complicated for some of the younger students. As a result, many of them needed a lot of guidance to get through the worksheet. Other students got bored very easily with the activity which resulted in some behavioral problems.

Parts of activity that worked:

The students really enjoyed drawing and describing their monsters. This part of the activity allowed for more creativity from each individual student.

Parts of activity that did not work:

The students did not enjoy the worksheet for this activity. While it was more simplified, many of the students were confused on the terminology and the concepts of how traits are inherited from parents. Since there was a lot of confusion involved, many of the students either gave up or began to act out.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Building Marshmallow Structures

Name:

Length of Activity: 1-1.5 hrs

Supplies: Large marshmallows, skewers, toothpicks

Directions:

Begin the lesson by introducing the science field that this activity is related to. For our club, we wrote the word “physics” on the board and then asked the students to share their thoughts on what that means. We then gave them examples of how we use physics in our everyday lives. Then, hand each student some skewers and large marshmallows. To start the activity, build an example model with the students. We made sure to walk around the room to show them each step of the process. Once the models have been built, ask the students to find the best spot in which they can balance their models on one finger. Then, ask the students why they think balancing the model can occur. Explain the concept of center of mass to show them the physics at work. To make the lesson more interesting, ask the students to build more complicated models and try to balance them as well. If there is extra time, allow the students to create their own structures to balance and share with their peers. They can then eat their marshmallows!

Conclusion of the activity:

This activity was well-liked by the students. They were able to grasp the concepts explored very well and had a lot of fun doing the activity. Many of them had interesting insights to share and were curious to learn more about the topic. Additionally, there were very little distractions or behavioral outbursts which allowed for a more conducive learning environment.

Parts of activity that worked:

Since this activity was very hands on and required some creativity, the students greatly enjoyed it. They also were more interested since the activity involved treats that they could eat at the end. Even though they were focused on the activity, it helped to use the marshmallows as incentives as well.

Parts of activity that did not work:

Since they were very excited about the marshmallows, we did have some impatience from the students to eat them which resulted in some interruptions.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name:	Electric Cornstarch
Length of Activity:	1-1.5 hrs
Supplies:	Cornstarch, vegetable oil, balloons, spoon, plastic cups, tablecloth, painter's tape. For demonstration: plastic bottle, balloon, baking soda, vinegar

Directions:

Set up the classroom ahead of time so that the students can begin the activity right away. Place the tablecloth on the floor and tape it down. This will be useful for any spills that may occur since you can just pick up the tablecloth and throw it out. When the students get into the classroom, have them sit in a horseshoe formation on the tablecloth. Begin the lesson by explaining the baking soda and vinegar demonstration. Allow the students to make hypotheses on what will happen to the balloon when the baking soda is added to the vinegar. Then, do the demonstration. After the demonstration, hand each of the students a plastic cup and a spoon. Go around and put 3 tablespoons of cornstarch into each of the student's cups. Slowly add vegetable oil to each cup until the mixture has a pancake-like consistency. Help each of the students blow up their balloons and tie them off. Then, show the students how to build static electricity on their balloons by rubbing it on their head or on their clothes. Have the students get some of their mixture on their spoons and bring it up to the charged balloon. The mixture should be attracted to the balloon and move toward it! Ask the student's why this could be occurring and explain the concept of attractive forces. At the end of the activity, clean up the classroom.

Conclusion of the activity:

While this activity was enjoyable for the students, there were some minor issues that had to be dealt with. This activity is very messy as well. The students did come out with a better understanding of how electrical charge can cause attractive forces.

Parts of activity that worked:

The students enjoyed making their predictions about the demonstration. They also had fun with the balloons in this activity which helped keep them engaged. Since this was more hands-on, the students were more focused on the activity.

Parts of activity that did not work:

This activity did become difficult since it was hard for all the students to get the right consistency for their mixtures. They required a lot of assistance and since there were only three of us to help, some of the students did get impatient. This activity was also messy despite having the tablecloth as a way to keep the mess to a minimum.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name:	Making Lava Lamps
Length of Activity:	1-1.5 hrs
Supplies:	Food dye, vegetable oil, plastic water bottle for each student, Alka Seltzer tablets, funnel

Directions:

Start the activity by introducing the concept of non-homogeneous mixtures and density. Use real-world examples to help the students understand the larger words. Have the students come up with some examples of mixtures that have different densities. Once you have facilitated a great discussion, hand a cleaned plastic water bottle to each of the students. Then, use a funnel to fill each of the plastic bottles about $\frac{3}{4}$ of the way full. Instruct the students to fill their bottles with water about 1-2 inches from the top. Then, allow the students to choose a food coloring to add to their bottle. Add about 5 drops to each bottle. Break up the Alka Seltzer tablets into thirds and hand a piece to the students. Instruct them to add the tablets to their lava lamp and to watch the chemical reaction that occurs! Ask the students what they think could be occurring in their lava lamps. The students were allowed to bring their water bottles home.

Conclusion of the activity:

This activity was a hit with the students. Since it had a lot of engaging visuals and was hands-on, the students were interested understand what was going on in their lava lamps. They left this activity having fun and with a better understanding of basic chemistry concepts. Many of the students voiced that they wanted to describe what they learned to their parents when they got home.

Parts of activity that worked:

This activity was engaging for the students which prevented any distractions. Since it was fun for everyone, there was a lot of collaboration between the students. They asked many questions and voiced how much they enjoyed this activity.

Parts of activity that did not work:

The food coloring did become a problem since we ran out of some colors. This caused some of the students to become upset. Additionally, there were a few incidences in which a student kept shaking other students' bottles which caused some arguments to occur that needed to be handled.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name:	Anatomy Day
Length of Activity:	1-1.5 hrs
Supplies:	Anatomy Bingo cards, markers, candy. For demonstration: long balloons, small balloons, three water bottles, modeling clay, bendy straws, tape, water

Directions:

Before the lesson, construct the heart model (directions through this link: <https://www.steampoweredfamily.com/heart-model-heart-stem/>) and the small intestines model. When the students get into the classroom, ask them what they think the topic anatomy is about and why it is important. Once a good discussion is created, bring out the heart model. Ask the students what the heart does in our bodies. Then, demonstrate how the heart pumps blood throughout the body using the model. When the students have asked all their questions, open the topic about the small intestines and their importance to the body. Have the students guess how long our small intestines are. When they have made their guesses, take out the small intestine model you made to demonstrate that small intestines can be up to 22 feet long! After the demonstrations, hand each student a marker and a bingo board. After each organ of the body was called, one of us explained the importance of that organ and what it does in our bodies. Candy was used as the prizes for getting bingos. We played normal bingo with the students and then did a round for blackout.

Conclusion of the activity:

The students were enthusiastic to share their knowledge on this activity. They were also very interested to learn more facts about our bodies.

Parts of activity that worked:

The students enjoyed playing bingo since they got prizes if they won. They asked several follow-up questions when we described what each organ on their bingo sheet does in the body. They also enjoyed guessing how long small intestines are and were amazed to hear the actual answer.

Parts of activity that did not work:

Since this lesson is about body parts and organs, some of the student got grossed out or made some jokes. This did cause a little distraction which required us to use some methods of maintaining their focus on the lesson. The heart model did work at first, but it stopped working after using it a few times for the demonstration.

LESSON PLAN WORKSHEET

(copy table as needed)

Lesson Activity Name:	Make Ice Cream in a Bag
Length of Activity:	1-1.5 hrs
Supplies:	Rock salt, ice, gallon size baggies, sandwich size baggies, half and half, sugar, vanilla extract, toppings (chocolate syrup, whipped cream, etc.)

Directions:

Hand each of the students one of each size of the baggies. With the help of the club leaders have the students mix all the following ingredients into their quart sized Ziploc bag: $\frac{1}{2}$ cup of half and half, 1 tbs of sugar, and $\frac{1}{4}$ tbs of vanilla extract. Fill the gallon sized Ziploc bags $\frac{1}{3}$ of the way full of ice. Add $\frac{1}{2}$ cup of the rock salt to the ice bag and then placed the well-sealed quart sized Ziploc bag inside the gallon bag. Have the students mix their bags for 10 minutes or until the ice cream forms. While they are making their ice cream, open the floor to the students to explain what they think could be happening in the bag to allow the ice cream to form. Then, explain in simple terms how ice and salt can react together to create a reaction where the ice becomes colder. Be careful when removing the bag with the ice cream from the gallon bag to not get salt into the ice cream. Give the students various toppings to enjoy their ice cream with!

Conclusion of the activity:

Overall, this activity was a favorite for the students. They got to make a treat using chemistry! Many of the students were fascinated by the concept of freezing point and how they can utilize this to form ice cream.

Parts of activity that worked:

Since the activity was hands on and involved eating a treat, the students were focused on the tasks given to them. They were respectful and followed directions to allow for the experiment to go well.

Parts of activity that did not work:

We found out that if you are not careful when taking your ice cream out of the gallon sized bag, you can get salt into your bag. This resulted in a couple of students having salty tasting ice cream that was not as enjoyable to eat. In future, we would suggest making sure you have extra ingredients in case this occurs and to emphasize being careful when removing the ice cream from the gallon-sized bag.