Fall 2021

Up and Atom

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NEBRASKA HONORS PROGRAM
CLC EXPANDED LEARNING OPPORTUNITY CLUBS
INFORMATION SHEET

Name of Club: Up and Atom

Age/Grade Level: 4th-5th graders

Number of Attendees: 10-15

Goal of the Club: (learning objectives/outcomes)

Through hands-on experiments, the goal of this club is to inspire a creative and immersive perspective of the sciences of elementary students.

Content Areas: (check all that apply)

☐ Arts (Visual, Music, Theater &Performance)

☐ Literacy

☐ **X** STEM (Science, Technology, Engineering &Math)

☐ Social Studies

☐ Wellness (Physical Education, Health, Nutrition &Character Education)

General Directions:

For this 12-week program, each day is generally its own experiment. Each club starts with a conversation about what the "materials" are and what they think the experiment could be. After this simple "hypothesis" exercise, a brief introduction into what the plan for the day is walked through. After this, follow the directions of reach lesson plan to ensure a day of learning and of fun! If done with enough preparation and patience, it is sure to be a great time for you and your students!

Tips/Tricks:

Note that science often inspires chaos. As with science in general, sometimes things can go wrong. With this, it is important to keep in mind that even failed experiments are learning opportunities. Working with the kids in exercising this virtue is imperative for peace of mind and success as a club leader. This will be a loud club and often may seem difficult to control. However, it is important to understand that discipline should be enforced when safety is compromised. It will have a lot of moving parts, but it will be fun.

1. PENNY SURFACE TENSION/MAGIC MARKER MAN

Lesson Activity Name:	The Wonderful Workings of Water
Length of Activity:	35-45 minutes (5 for introduction, 15 for penny surface tension, 20 for magic marker man)
Supplies:	• Enough glass plates/bowls/surfaces for the students • Pennies • Eyedroppers/Disposable Pipettes • Dry erase markers • Cups of water

Directions: https://www.sciencefun.org/kidszone/experiments/dry-erase/ and https://www.stevespanglerscience.com/lab/experiments/penny-drops/

Preparation

1) Prepare a PowerPoint presentation with different images of water and different properties of water. An example could be having an image of a bug on water and say that it is surface tension that does this (like all the molecules holding hands!).
2) Get 2 bowls full of water for surface tension lab. Set up 2 tables with one bowl on each.
3) Gather pipettes and pennies and place enough on each table for the number of students
4) Have 10 other small glass plates/bowls, water and enough markers for each student set aside for the magic marker man experiment. Or have enough for a team of students to work together.

1) PowerPoint

1. Run through the presentation with the students, asking questions along the way.
2. Have them hypothesis what they think will happen when we put water on a penny.

2) Penny-surface tension experiment.

1. Divide the kids into two groups (have them come up with a team name)
2. For the first round, as the instructor drops water onto the penny (slowly as to ensure the water doesn't spill over and that surface tension does its job). Have the kids count the drops. Explain that the water is "sticking together" because of surface tension. Water molecules "hold hands" to one another.
3. After a practice round, each student can do the same with their own penny and pipette. Note it may be helpful to lay down paper towel for spillage. After a little practice, they can count their drops out loud too. This can be turned into a competition to see who can hold the most drops on their penny.

3) Dry Erase Walk Man Experiment

1. Now, while the kids clean up the water they have spilled, pass out the glass bowls, cups of water and markers.

2. Have each student draw a simple picture (with THICK LINES) on the glass (As the instructor you could draw a stick figure as an example!) HAVE DRY COMPLETELY!! Sing a song or count to ten to pass the time.
3. As an instructor, pour water onto your own plate SLOWLY. This will cause the drawing to slowly lift.
4. Swirl the water around to make the picture dance and move. Each student can now do the same.

Conclusion of the activity:

The kids can learn about how water is unique and versatile in a hands-on, engaging way. In explaining why each thing is happening (hydrophobicity in the markers, hydrogen bonds/surface tension on the penny), it exhibits science in an easy and fun way!

Parts of activity that worked:

The competition aspect of the surface tension worked perfectly! It gets the kids excited and energy out after a long day at school! Additionally, having an arts and craft aspect with the white board markers was a fun thing to do for the kids who are less enthused by science and surface tension. This part was done a few times and passed the time greatly.

Parts of activity that did not work:

Ensure you have enough paper towels on standby as this can get messy!

2. Part A - Egg and Vinegar/Egg Drop Contraptions

Lesson Activity Name:	An “Egg”cellent Day for Science!
Length of Activity:	45 minutes
Supplies:	• Clear Plastic Cups w/lids • Washable Markers • Eggs (one for each student) • Any miscellaneous paper products you can muster for kids to be creative (toilet paper, cups, plastic bags, cotton balls, sticks, yarn, etc.)

Directions: https://www.kiwico.com/diy/stem/crazy-chemistry/egg-in-vinegar-experiment and https://sciencing.com/successful-drop-contraptions-science-project-8423692.html

Preparation

Gather the materials

1) Egg in Vinegar Experiment

1. Pass out an egg and one cup to each of the kids (preface HEAVILY that if they break it, they do not get another).

2. With washable markers have the kids decorate their eggs. While they are coloring their egg, pour vinegar into each of the kid's cups.
3. After this (and an optional "prize" for the most creative egg art), have the kids carefully put their egg in the cup of vinegar.
4. Have them put on the lids IMMEDIATELY (or help them with it, depending on the maturity of the group). Then go around and "predict" what will happen with the eggs and talk about what they already see happening.
5. Have the kids label their cups and set them aside.

2) Egg Drop Contraption Experiment

1. Have the kids now sit in a circle. We did this outside so that the mess/chaos this may cause could be in an open-air place.
2. Explain the rules of this experiment. Place restrictions on what they can use, how much they can, and how to share. Then, place all the miscellaneous paper products that you could find in the middle of the circle of kids. No supply is a bad supply, our kids even used mulch and grass! Allow them to get creative! As the instructor, walk around and help mitigate any arguments or suggest ideas (i.e., a parachute or extra cushioning, etc.). d
3. This could go as long as you want it to. We had it fill the time in making a contest out of who could be most "creative", and which was decorated the best, etc.
4. Have them put their names on these contraptions and set them aside for the next week.

Conclusion of the activity:

This day can get tumultuous in that it is a lot of preparation and not a lot of tangible and immediate results. It is important to, as an instructor, be excited about the egg drop contraptions such that the kids are too. This is teaching them chemical reactions and physics and so emphasizing the importance of it is important to fulfil the overall goal of this club. Walk around and have ideas ready to share and it may even be valuable to make a contraption yourself. This day prepares you for a very fun week of clubs the next time you meet.

Parts of activity that worked:

Coloring on the egg is a great way to pass the time while also asking questions about what the kids think will happen when you place it in vinegar. Allowing the kids to get messy and spread out with their contraptions was also a very valuable organizational tactic. We did this outside so that kids could gather what they wanted and remove themselves from the group to get creative. Instilling a competitive aspect ensures the kids stay engaged and motivated to create something fun!

Parts of activity that did not work:

For students with slippery fingers and a lack of listening skills, working with eggs can be challenging. Have a few extra on stand-by for the accidents that are bound to happen but be firm with discipline if the eggs are breeding chaos.

3. PART B - EGG AND VINEGAR/EGG DROP CONTRAPTIONS

Lesson Activity Name:	Another “Egg”cellent day for Science!
Length of Activity:	45 minutes
Supplies:	Refer to Part A of this two-part experiment • Egg and Vinegar experiment that has had a week to react • The contraptions the kids were working on last week • Any miscellaneous paper products you can muster for kids to be creative (toilet paper, cups, plastic bags, cotton balls, sticks, yarn, etc.)

Directions:

https://www.kiwico.com/diy/stem/crazy-chemistry/egg-in-vinegar-experiment and https://sciencing.com/successful-drop-contraptions-science-project-8423692.html

Preparation

Organize the contraptions and the vinegar/egg cups so each kid has their own space.

1) Egg in Vinegar Experiment (quick wrap up)

1. Have the kids look at their egg! Go in a circle and talk about what they see
2. If the kids are mature enough, allow them to open their cups and, with a stick or knife or even a spoon, to pop the egg! It should feel bouncy and gelatinous and, once it is popped, the membrane floats in the vinegar with the yolk.

2) Egg Drop Contraption Experiment (finishing decorating and drop the contraptions!)

1. Have the kids now sit in a circle. Again, we did this outside so that the mess/chaos this may cause could be in an open-air place.
2. If the kids need, allow them to finalize their contraptions. As a reminder, place restrictions on what they can use, how much they can, and how to share. Then, place the miscellaneous paper products in the middle of the circle. As the instructor, walk around and help mitigate any arguments or suggest ideas (i.e., a parachute or extra cushioning, etc.).
3. Now, find a high place to, as the instructor, drop the contraptions. We did this off of a playground structure.
4. Line the kids up at the base of the high place. One by one, allow them to come up with you (if a playground), or stand beside you and give you their contraption. In a chant, count down from five and drop the egg. The kid who made it and them alone should be allowed to go look at the egg. If it doesn’t break, remember their name so they can get recognition at the end!
5. Once everyone is done, have a “ceremony” to recognize the students whose eggs didn’t break. We had a certificate to send home with them.

Conclusion of the activity:

The kids loved seeing their eggs and how they changed so dramatically from the last time they saw them! A cool takeaway was how the jelly eggs often died the color their shell was from the decorating step of last week. The kids were very engaged and excited to learn about what happened. It is at this point that you can explain in Laymans terms that the calcium carbonate

(the stuff that makes up an eggshell) reacts with the acid (vinegar) in decomposing and this carbon is released in CO2 in the air.

The egg drop contraptions were a HUGE success! A great way to spend time outside and incorporate physics in an easy and fun way. The kids were very proud of the fact that they themselves built something from literal scraps to something that could successfully cradle an egg. Even the ones that weren't successful were still impressive and a worthwhile exercise in coping with disappointment.

Parts of activity that worked:

The dropping of the eggs was the most engaged I have ever seen my students! They were so excited to see if what they worked so hard on paid off! Spending the extra time this second day to finalize any details that they wanted/to decorate their contraptions was an easy and engaging way to spend time. To our delight, a few kids came up with a list of ideas they spent the week thinking of that they wanted to add before we launched them! They were thinking through the physics of this exercise without even knowing it!

Parts of activity that did not work:

As is a theme with this age range, when it comes to failing while others are succeeding, tears and tantrums are plausible and likely. It is taking a deep breath as an instructor to help talk these kids down and ensure that you are still proud of them that helps mitigate these high-tension situations.

4. Spooky Slime/Baking Soda and Vinegar Balloons

Lesson Activity Name:	Spooky Gook and Jack-O-Lantern Balloons
Length of Activity:	45 minutes
Supplies:	Slime Materials • Styrofoam/paper bowls for each kid • Liquid glue • Contact Lense solution • Warm water (4oz per student) • Spoons (for stirring) • Food coloring (optional) • Beads/glitter (optional). We used spiders to make it “spooky slime” for the holidays Baking Soda and Vinegar Balloons • Balloons • Baking Soda • Empty water bottles • Sharpies

Directions: https://www.education.com/science-fair/article/balloon-gas-chemical-reaction/ and https://www.thebestideasforkids.com/how-to-make-slime-with-contact-solution/

Preparation

1. Prepare the balloons by putting 2 tablespoons of baking soda in each and loosely tying it (so much so nothing spills and not enough where it is impossible to untie).
2. Fill the empty water bottles with roughly 4 ounces of vinegar
3. Set aside the materials so that it is one balloon per bottle of vinegar and there is enough for each kid
4. Set up an assembly line for the slime experiment. Starting with filling the bowl, next with the glue (6oz measurement), baking soda (½ tsp measurement), Contact Lense solution (1.5 tbsp measurement), water (¼ cup measurement)

1) "Its Slime for Lab"

1. Have the kids line up for the slime assembly line. Ideally, there are two or more teachers to help expedite this process. Or, if the kids are mature, they can do it if there are clear instructions for how much of each material in each.
2. As a reminder, glue (6oz), baking soda (½ tsp), Contact Lense solution (1.5 tbsp), water (¼ cup). Add spiders, glitter or food coloring for some pizzazz.
5. Have each student knead the slime with a spoon. At first it will be really wet and gooey, then stringy and sloppy, until it finally holds together. This time is also spent with the instructors ready to help the kids make a solution that is slime. *Too sticky needs more contact Lense solution, too soupy can be drained of excess water and too hard needs more glue. It's all about finding the balance.*
6. Have each kid store their slime in a sealable container or Ziploc bag. Ensure they write their name on the bag

2) Baking Soda and Vinegar Balloons

1. Now, pass out the balloons for each of the students and one sharpie.
2. As per the theme of our "spooky" science experiment week, we had the kids decorate the balloons with a jack-o-lantern face.
3. From there, pass out a bottle of vinegar and have the kids carefully untie their balloons and, keeping the baking soda at the bottom of the balloon, wrap the opening around the top of the bottle.
4. Carefully pour the contents into the bottle and, while cradling the balloon, allow it to expand. This will expand the jack-o-lantern drawing in a spooky and fun reaction!

Conclusion of the activity:

This activity is messy but a blast! The students were very excited to see a familiar experiment, slime, and have the chance to teach us a few things about it. In doing so, they were teaching us science without even really knowing it!

The baking soda balloons was also very successful, but a very quick experiment! In having them draw on their balloons it helped link the two experiments with one another under a spooky theme. We sent our students home with their slime and with their blown-up balloon

(tied tightly) and they were very excited at having a physical takeaway to show off to their parents/guardians.

Parts of activity that worked:

The jack-o-lanterns were a huge success! Because of the adequate preparation, it commenced quickly but effectively. Everyone walked away with a balloon full of gas and a smile on their face.

Parts of activity that did not work:

If we were to repeat these lesson plans, we would find a supplement to the slime aspect of this day. Slime is very messy and breeds a lot of passionate chaos. Most of the slime was not cooperating in consistency (either too hard and chunky or too goopy and messy). We spent far too much time running around trying to help the students, because of this disorder, were very frustrated. For the slime connoisseurs of our group, they were very frustrated when their slime didn't turn out and, all in all, this can all be avoided if slime is redacted from this day and replaced with another experiment.

5. Invisible Ink/Table Salt Art

Lesson Activity Name: Salty Spies

Length of Activity: 45 minutes

Supplies:

Invisible Ink Experiment

- Baking Soda + Water
- Cups
- Cardstock
- Paint brushes
- Grape Juice

Table Salt Art

- Cardstock
- Table Salt
- Squeezable bottles of glue
- Bowls
- Food Coloring + Water
- Disposable Pipettes

Directions: https://greensborosciencecenter.wordpress.com/2017/02/08/diy-science-secret-valentine-messages/#:~:text=Grape%20juice%20concentrate%20is%20an,of%20the%20%E2%80%9Cinvisible%E2%80%9D%20ink and https://artfulparent.com/raised-salt-painting/

Preparation

1. Prepare bowls of table salt

2. Cut out enough cardstock squares so that each student has two over the course of the club.
3. Prepare cups and diluted food coloring (water and food coloring). We did it so that there were two cups for each color.

1) Table Salt and Glue Art Part 1

1. Gather bowls of salt, individual pieces of cardstock, squeezable bottles of glue, cups of diluted food coloring and pipettes.
2. Pass out the pieces of cardstock and pencils. Direct the kids to lightly trace a simple, one-line drawing! We did a stick-figure and a sun example.
3. Pass out the bottle of glue and bowls of salt. Instruct the kids to trace the drawing with a thin and continuous line of glue.
4. Immediately following, with the salt, liberally cover the tracing, ensuring the salt sticks to the glue.
5. Set aside to allow it to dry.

2) Invisible Ink

1. Gather cups of baking soda slurry, quetips or paint brushes, pieces of cardstock and cups of grape juice.
2. Pass out the pieces of cardstock, baking soda slurry and paint brushes. Instruct the kids to pair up.
3. With the paint brushes, have the kids dip into the baking soda slurry (it is important to note that if it has settled to stir it. If they only paint with water, the invisible ink does not work). Have the kids write a message on their cardstock with the slurry. Have them retrace it at least 3 times.
4. Sing a song or pass the time with a quick game to allow the cardstock to dry. One instructor during this time can pass out the cups of grape juice.
5. Within the partners, switch the pieces of cardstock. With the same paintbrushes (can dry with a paper towel if necessary), have the partners decode the message by dipping their brush in the grape juice and covering the cardstock. The message should appear a grey against the purple juice.
6. If time allots, have the kids go around and read the messages out loud to the class!

1) Table Salt and Glue Part 2

1. At this point, the glue and salt should have dried. Pass out the drawings along with the cups of diluted food coloring and pipettes.
2. Instruct the kids to dip their pipettes in the food coloring and gently squeeze the color onto their lines of salt and glue. Watch as the color dissipates and spreads on the raised lines!

Conclusion of the activity:

This activity is GREAT to appease the more artistic students of your after-school club. It incorporates ideas of acids/bases with the invisible ink and concepts of the solubility of salt in a creative way.

Parts of activity that worked:

The invisible ink was a wild success! Formatting this with partners made it so that when they decoded their message, they felt like “spies” in reading the message that slowly appeared.

With this, they were very excited to learn about why this happened – which is where we dove into explaining the acid and base components of it.

Parts of activity that did not work:

An unfortunate oversight in this experience is that glue takes a while to dry. Additionally, a few students were very liberal with their glue usage and, therefore, the salt simply was absorbed into the glue, and it was a wet and soupy mess by the time we were moving onto using food coloring. Being careful in emphasizing that we must use a little amount of glue is necessary for the success of this art project.

6. MARSHMALLOW CATAPULTS

Lesson Activity Name:	Marshmallow Catapults
Length of Activity:	45 minutes
Supplies:	• Wooden skewers • Jumbo marshmallows • Mini marshmallows • Plastic spoons • Rubber bands • Duct tape

Directions:

https://www.mombrite.com/marshmallow-catapult/

Preparation

1. Organize groups of seven sticks, four jumbo marshmallows, one spoon and one rubber band for each student or enough such that a pair could work together on one.
2. Follow the directions and build your own catapult for reference before the club begins. This makes it easier to explain the steps as the kids each build their own.

1) Marshmallow Catapults

1. As the kids sit down at their tables, before passing out the materials, make it VERY clear that the first rule of the day is that they cannot eat the marshmallows. We had it such that if the kids were well behaved, they could eat one marshmallow (still in the packaging and not used for the experiment) at the end. After this, pass out the materials.
2. Following the link provided, it is easy to visualize the steps needed to build the catapults. To quote them below...
   1. Form a triangle with the marshmallows as the corners and skewer sticks as the edges. This will be the base of your tetrahedron. Reinforce the marshmallows with tape!
   2. From a tetrahedron by using one more marshmallow as the vertex (tip) of the tetrahedron and 3 more skewers as the lateral edges. Reinforce this marshmallow with

tape!

3. Tape a skewer stick to the back of the plastic spoon.
4. Place the rubber band over the tip of the tetrahedron so that it loops around all 3 skewers.
5. Feed the spoon through the rubber band and insert the other end of the skewer stick into one of the marshmallows of the base.
6. Place a mini marshmallow on the spoon, pull back the spoon, and launch the marshmallow in the air!

3. Note that these are fragile! When launching, have volunteers (at least two) to help their peer in holding the marshmallows at the base together while they pull back the spoon.
4. A competitive aspect of this is to have all the catapults line up and one at a time (as to allow other students to help hold the bases together) and have them launch 3 mini marshmallows. Choose the furthest one and mark it with a post-it with the student's name. The one who went the furthest can get an extra marshmallow to eat or bragging rights.

Conclusion of the activity:

This exercise in physics was wildly successful. The fact that we incorporated easy and fun materials made it an engaging way to learn about a simply catapult system. Additionally, having a competitive aspect was key in keeping the kids engaged with this one-experiment day.

Parts of activity that worked:

Walking the kids through building the catapult itself went surprisingly smooth. In having a reference to deconstruct and build back up was key. We underestimated the kid's abilities to follow directions before, who knew the remedy to this was building things with marshmallows! Also, in efforts to fill time, we incorporated a "decoration:" contest in providing paper and markers so they could tape a team "flag" onto their contraptions. This helped engage the artistic friends in the group.

Parts of activity that did not work:

Really emphasize the fact that these systems are fragile! There were tears from those who did not take our warning seriously and so it is important to really make a point of this.

7. Paper Airplanes

Lesson Activity Name:	Flying Artwork
Length of Activity:	45 minutes
Supplies:	• Cardstock • Markers • Crayons • Stickers

Directions:

https://www.foldnfly.com/1.html

Preparation:

1. Organize cardstock and coloring utensils on each table so the supplies are all set up for the students.
2. Follow the directions of how to make a paper airplane before the club to have an example and so you can explain each step to the students.

1) Making of the Paper Airplanes

1. As students shuffle into the classroom, direct them to their seats and instruct them not to touch the supplies until all the directions have been relayed.
2. When the class is ready, grab a piece of cardstock and have the kids work along with you (see below construction directions) until everyone has their paper airplane made. (Tip: One leader can lead the class, while the other leader spot helps students who need assistance). Wait before continuing each step until all the students are ready.

a. Fold the paper in half, hot dog style.
b. Unfold the paper and then fold the top two corners into the center line.
c. Then fold the top edges into the center line.
d. Fold the plane in half at the center line.
e. Finally fold the wings down to meet the bottom edge of the plane's body.

3. After each student has constructed their paper airplane, allow for 15 minutes for the students to decorate and design their airplanes to their taste. Maybe incorporate a contest for the most creative!
4. When the decorating is done, have the students line up at one end of the classroom and participate in a competition to see whose plane will fly the furthest.
5. As the club concludes, give each student a sticker for their participation in the competition and allow them to take their paper airplanes home.

Conclusion of the activity:

This is a great activity that includes competition and the basis of aerodynamics! Students will learn how one small thing on their paper airplane could affect the direction it flies or how far/long it will stay in the air. By walking through the steps of making the airplane with the kids, it should help them to be able to make one on their own at a later occasion!

Parts of activity that worked:

The relaying of directions for the building of the airplanes went very well. All the kids were inventively listening to the directions. Having one of us lead the instructions while the other troubleshoots by helping students as we continued was very helpful and was a skill we used for the entirety of our club.

Parts of activity that did not work:

Some kids finished decorating their airplanes much quicker than others which led to some downtime with part of the group. Downtime is where we saw most of the behavioral issues. It is advised that you gauge how much decorating time each group needs, as each group of students is different. Suggest having the faster kids build another plane or go off to practice.

8. Skittle Art

Lesson Activity Name:	Rainbows Galore!
Length of Activity:	45 minutes
Supplies:	• 2-3 Larger bags of Skittles • A pitcher of water • Paper or clear disposable plates • Disposable cups

Directions:

https://www.craftymorning.com/skittles-science-experiment-kids/

Preparation:

1. Set out a disposable plate, a cup with water, and a cup with skittles on each table so it is ready when the kids arrive.

1) Skittle Art:

1. Give very clear instructions to the kids that they are not to eat the skittles during the experiment.
2. Instruct the students to make designs with their skittles, allow about 5 minutes for them to come up with their ideas.
3. Once everyone is ready, direct them to slowly add water onto the plate till it covers the skittles.
4. Let the kids observe the changes that are occurring on their plates. While this is happening, refill each of the water and skittle cups.
5. Let the leaders dump the plates out and then return them to their groups. Then give the kids a specific design that they need to create with their skittles.
6. Allow about 5 minutes for each group to create their design again. After they are done, repeat the water steps.
7. When the color has diffused, instruct the kids to walk around the classroom to observe the other groups' work and take a class vote on which one looks the best.
8. Continue with a few more rounds of the competition. When there are about 10 minutes left, have students help clean up and dry any water spills.

Conclusion of the activity:

This is a perfect, visible example of diffusion, something that happens quite often in the world around us! Students likely know that the color of the skittles will easily show up on a surface they have touched, that is why their tongue is a different color after eating them! Seeing the

color being stripped from the skittles and slowly diffusing into the surrounding water will amaze them as it is a relatively quick process!

Parts of activity that worked:

The freedom of their designs, aside from the directed competition aspect, kept the students very engaged. They like to be able to have some control over their experiments and put their own personal twist on each step. Allowing them to express their creativity was probably the best aspect of this experiment.

Parts of activity that did not work:

Having food involved with experiments is always tricky as the students are tempted to eat it. We had some success in having students follow those directions, but as always there are a few outliers who do not like to listen.

9. Lava Lamps and Capillary Experiment

Lesson Activity Name:	Lava Lamps and Walking Water
Length of Activity:	45 minutes
Supplies:	Lava Lamps • Water Bottles • Vegetable Oil • Alka-Seltzer tablets • Food coloring Capillary Experiment • Clear, plastic cups • Water • Food coloring • Paper towels

Directions:

https://funlearningforkids.com/super-cool-lava-lamp-experiment/

https://www.123homeschool4me.com/capillary-action-science-experiment_15/

Preparation:

1. Set up 7 clear cups for the capillary experiment. Label them1-7.
2. Cups 1, 3, 5, and 7 - fill with water (¾ full). You can use the water from the water bottles for the lava lamp activity as those will only need to be about ¼ of the way full.
3. Fill enough of the water bottles so that they are ¼ full. Set aside for after the capirllary experiment.
4. Fold the paper towels in preparation of the capillary experiment; fold them vertically about 4 times and then once horizontally.

1) Capillary Experiment

1. Have the kids gather around the table and ask for volunteers to add roughly 10-15 drops of food coloring into cups. Cups 1 and 7 get red food coloring, cup 3 gets yellow, and cup 5 gets blue.
2. After color has been added, add the folded paper towels into the cups. Starting at cup 1, one end of the paper towel goes into cup 1 and the other goes into cup 2 and so on. There should be six paper towels included in total.
3. This would be a good time to explain the cohesive and adhesive properties of water; how water molecules easily stick to other water molecules and how water molecules easily stick and travel on other molecules/surfaces as well.
4. Leave experiment to settle and move onto the Lava Lamp experiment

2) Lava Lamp Activity

1. Each student will get one, ¼ full water bottle.
2. An assembly line is advised here;

a. One leader - fill the rest of the water bottles up with vegetable oil (¾ bottle with vegetable oil), as each student gets their bottle filled, they will come up to the table where the other leader is at.
b. Second leader - add 5-10 drops of their food-color of choice, break 1 Alka-Seltzer tab up into 3-4 chunks, and then drop those tablets into the water bottle and put the lid on.

3. Once the lid is on, they will be able to observe the bubbles of color being formed from the reaction between the water and Alka-Seltzer tablet that are being shot into the vegetable oil all while not mixing.

3) Capillary Experiment Part 2

1. As the students file through, be sure to have them look back at their capillary action creation! This is a great way to pass time.

Note - We let the students take their lava lamps home. Just make sure to emphasize that the water bottles' lids NEED to stay on as the food coloring will stain clothes, carpet, ect.

Conclusion of the activity:

Water's adhesive and cohesive abilities are amazing, and the capillary experiment showcases just that! The students will be able to visualize the movement of the water from cup to cup and the food coloring helps amplify the effect. The lava lamp activity is a great way to teach water's incompatibility with oil. The reaction of the Alka-Seltzer tablets in the water will be shot up into the oil where the colored bubbles refuse to mix in the oil, thus making the lava lamp effect. The fun doesn't stop when the reaction does, even though there won't be bubbles shooting up per say, the color will still stay separate from the oil and can be shaken up to prove this.

Parts of activity that worked:

The idea of the assembly line worked perfectly! It didn't leave a lot of downtime for the kids to mess around or get off task, so it kept the stress levels relatively low. Every kid got their lava lamps finished in a very timely manner; it went very smoothly!

Parts of activity that did not work:

In all honesty, this activity went very smoothly, and I don't think I would change anything about the way we had it set up! I will have to warn you that since both experiments involve food coloring, it will get a bit messy so keep that in mind when thinking of where to house the activities. Also note that downtime is possible – think ahead of little games to play with the kids as they wait for everyone else to finish their lava lamps. We passed the time with some telephone games and trivia.

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10. Volcanoes

Lesson Activity Name: Erupting Volcanoes

Length of Activity: 45 minutes

Supplies:

- Dish soap
- Water
- White vinegar
- Empty 2 Liter Bottle
- Baking soda slurry (half baking soda, half water)
- Disposable Cups
- Spoons

Directions:

https://www.sciencefun.org/kidszone/experiments/how-to-make-a-volcano/

DO THIS OUTSIDE!

Preparation:

1. Have enough empty 2-liter bottles for the group. (It works great if you partner kids up)
2. Have materials set up in an assembly line like system

a. First, the bottles
b. Vinegar (each about 1 and ½ cups)
c. Water (each about ½ cup)
d. Dish soap (each a good squeeze of soap)
e. Second, cups and spoons
f. Baking soda (½ of the cup)
g. Water (½ of the cup)

3. Delegate one leader to setting the bottles up and the actual reaction and the other leader to the making of the baking soda slurry

1) Volcanoes

1. Partner students up, (note that we found it was much more manageable supply-wise if we did this considering our group size)
2. Have the kids line up with their partners; the first partner gets to prepare the ingredients for the bottle with the help of one leader.

a. For the liquid ingredients, add about 1 and ½ cups of vinegar, ½ cup of water, and a good squeeze of dish soap gets added into the 2-liter bottles

3. Once the 2-liter bottle has its liquid ingredients, the partner group will move to where the second leader is located, and the first partner will still help prepare the ingredients
a. For the baking soda slurry, the student will fill half of the cup up with baking soda and the other half with water and mix it.
4. Once all the students have their liquid ingredients taken care of, the leader that assisted with that part of the preparation will start the volcanoes, one partner group at a time. (Visualize that the kids loop back around as everyone has been set-up with their liquids and are either waiting to erupt or for dry ingredients)
5. One partner gets to pour the baking soda slurry into the volcano to initiate the reaction.
a. Have the student quickly pour the slurry into the bottle and get out of the way. It will react fast! Be stern in the fact that they MUST back up quickly!
6. This will continue until all groups have set off their volcanoes.
7. Once the experiment is over, the kids will help clean up the bottles, cups and spoons up.

Conclusion of the activity:

The classic baking soda and vinegar reaction with a little twist... FOAM! The sodium bicarbonate that is baking soda reacts with the acetic acid that makes up the majority of vinegar to create a safe reaction, this time adding dish soap makes it a bit more interesting! This is a kid-friendly experiment to give the basic information of acids and bases!

Parts of activity that worked:

The assembly line idea worked very well, especially with the students partnered up! There was not a long waiting time and they could each participate in each step of the experiment, minimizing any distractions. It is SUPER useful to have more than one club leader, it can get very tricky when you are trying to supervise and lead individual experiments.

Parts of activity that did not work:

Partnering the students up was our best option, but they still made it somewhat difficult for us. Some students are not the biggest fans of sharing and so it took a lot of mediation to get the kids to work well together, even though we let them pick their partners.

11. Health and Exercise

Lesson Activity Name: The Science of our Bodies

Length of Activity: 45 minutes

Supplies:

- Pre-prepared activity papers
- Writing Utensils

Directions:

https://docs.google.com/document/d/13Mgr_aimlncyO5aBqvZUfM5lPgjK3OhWUP4EPAoEKh4/edit?usp=sharing

https://exrx.net/Calculators

Preparation:

1. Bring your laptop to use the exercise calculator.

1) Health and Exercise:

1. Sit in a circle, hand out the activity papers and writing utensils.
2. Have every kid share one fun way they exercise - ie do you play any sports? Do you walk your dog? Etc.
3. Show how to find your pulse whether your wrist or neck. Once everyone has found their heartbeat, instruct them to start counting the beats and start a timer for 15 seconds. After the time is up, tell kids to write down the number of pulses and then help them multiply by 4 to find their heart rate.
4. Next, have the kids run/walk for 12 minutes and have them keep track of the number of laps they completed. The number of laps completed will help you determine distance traveled, once determined have the kids write the distance on their activity sheet. Note – ask them how their pulse has changed! Is it faster? Why?
5. After the kids have a water break, have them pair up.
6. Show an example of a push-up and sit-up. Then continue to time each set of kids for one minute each. While one partner is doing the exercise, the other partner will count the number of repetitions.
7. After each exercise have the kids write the number of repetitions completed down on their activity sheet.
8. Once all exercises are completed allow the kids to play a game (ie soccer, kickball or free play on a playground) while you call each kid up to put their scores into the exercise calculator provided.

Conclusion of the activity:

Science isn't only confined to reactions; this activity allows the students to see the science of their bodies! Exercise is so important, and our understanding of exercise is all science-based! This fun activity will help kids get their end-of-the-day jitters out while also learning the basics of a healthy body!

Parts of activity that worked:

The directions were very clear with this activity and the kids responded well to each exercise's directions. We didn't have an issue with participation during this activity as all the kids were excited to get to move around.

Parts of activity that did not work:

The honor system and having the kids report their own data was a little skewed. The kids are very competitive and wanted to have the best scores so some of the students were not truthful

during the worksheet aspect of the activity. This was only a minor inconvenience as it didn't harm anything.

12. Faux Snow Experiment

Lesson Activity Name: Faux Snow is Falling

Length of Activity: 45 minutes

Supplies:

- Baking Soda
- Shaving Cream
- Disposable Bowls
- Spoons
- Baggies
- Paper towels

Directions:

https://www.makelifelovely.com/diy-snow-tutorial/

Preparation:

1. Do the experiment beforehand to find the expected ratio of baking soda and shaving cream.
2. For each student, it was about 1 cup of baking soda and ½ cup of shaving cream.

1) Faux Snow:

1. As the kids get to the classroom, hand each one a bowl and a spoon. Have them sit in a circle.
2. Going clockwise, have one leader put about 1 cup of baking soda into the bowls. Going counterclockwise, have the other leader put about ½ cup of shaving cream into the bowls.
3. Instruct the students to stir with their spoons and to let the leaders know if they need a little bit more of either baking soda or shaving cream.

a. Trouble-shooting the mixture may take some time!

4. With a little bit of stirring, the two ingredients should quickly mix to create the texture of snow. When fully combined correctly, the faux snow should not stick to your hands and should be able to be easily formed into a snowball or a snowman.
5. When all the students had their ingredients fully mixed, and their faux snow had the correct texture, we let the kids make snowmen! A competition aspect of who could build the best snowman is a possibility here.

a. If you are brave, a snowball fight could be possible. We just did not want to risk any of the faux snow getting in any of the student's eyes. An alternative solution with extra time could be to bring in marshmallows and have a "snowball" fight to match the theme of the day.

6. At the end of the club, we put the faux snow in baggies for our students so they could take it home.

FYI: the mixture will feel cold!

Conclusion of the activity:

Many students know that chemical reactions can give off heat, but did they know they could be cold to the touch as well? Mixing baking soda (sodium bicarbonate) with shaving cream creates an endothermic reaction that is cold to the touch but also creates a mixture with the texture of snow. How lucky for us! A correctly portioned mixture should have the texture and structure of snow; it should be able to be molded into a “snowball” or “snowman”!

Parts of activity that worked:

We did have to troubleshoot some of the students’ mixtures, we ended up having to add a bit more of one ingredient or the other to get the correct texture. Although this wasn’t planned, it worked out very well! We efficiently got everyone’s faux snow up to par without any major hiccups.

Parts of activity that did not work:

Overall, I think this experiment went quite smoothly and I am not sure if I would change anything about our layout for it. Although, next time I probably would pair it with another shorter activity, so we aren’t stressed about fulfilling our timeframe.