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Supplemental Materials

for

Science Alive!: Connecting with Elementary Students through Science Exploration

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Table of Contents

(Total pages 23)

Appendix 1: Forces Day Module activities and handouts

Appendix 2: Matter Day Module activities and handouts

Appendix 3: List of hands-on science activities developed and tied to Florida State Science Standards

Appendix 4: Table of sample pre and post survey responses

Appendix 5: Data figures

Appendix 6: Surveys of teachers/college students

Appendix 7: Video interviews and other resources

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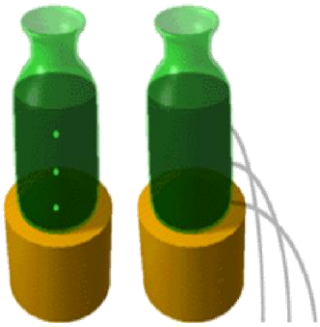
APPENDIX-1-Forces Day Module

Falling Waters!



Information for Parents

Compiled by: Megan Flora and Dr. Emily Schmitt Lavin; Nova Southeastern University (NSU)

MATERIALS:

- 2L plastic Bottles (or try it with any plastic bottles)
- Scissors
- Water
- Plastic bin or sink to work over

METHODS:

1. Make holes at different heights along the sides of a plastic bottle using the scissors
2. Fill the bottle with water
3. Watch as the water pours from the sides of the bottle
4. Keep the lid for the bottle and put it on and see what happens

HYPOTHESIS FORMATION:

How does the water pouring out of the different holes fall? How far away does the water coming from the top hole travel? How far away does the water coming from the bottom hole travel? What effect does putting the lid on the bottle have on the way the water flows?

OBSERVATIONS:

The water coming from the top holes of the bottle trickles out more slowly than the water coming out the bottom holes. The bottom holes spurt water out farther than the holes in the middle and in the top of the bottle. When you put the lid on the bottle the top hole stops allowing water to pass through it.

SCIENTIFIC PRINCIPLES:

Water has different pressures at different depths. The bottle can be compared to the ocean, with the top being the surface. Water at the bottom of the bottle has more pressure than the water at the top because of all of the water piled on top of it. The more pressure water has, the more power is behind the stream of water flowing out. This explains why the holes at the bottom spurt water farther than the hole at the top.

FURTHER INVESTIGATIONS:

More information available at: http://www.ehow.com/list_7442897_water-pressure-science-ideas.html

http://www.efluids.com/efluids/gallery_exp/exp_pages/fountain.jsp (source of image)

APPENDIX-1-Forces Day Module

Lift Off!

Information for Parents

Compiled by: Megan Flora and Dr. Emily Schmitt Lavin (NSU)

MATERIALS:

- Hair Dryer
- Balloon or Ping-Pong ball
- Tissue paper

METHODS:

1. Turn hairdryer on and turn it with the airflow facing upwards
2. Place the tissue paper above the airflow and watch as it blows away from the stream
3. Now place the ping pong ball or balloon above the airflow and watch as it steadies itself and remains there floating!

HYPOTHESIS FORMATION:

What happens when you put the light weight tissue paper over the airflow? What will happen when the heavier ping pong ball is placed there? Why does the ping pong ball move up and down when first placed over the airflow?

OBSERVATIONS:

The tissue paper just blows away without stabilizing itself over the airflow of the hairdryer. When the ball is placed near the airflow, you can feel the pressure of it being sucked back in. After being placed directly over the hairdryer, the ball moves up and down before stabilizing, but it does not blow away like the tissue paper.

SCIENTIFIC PRINCIPLES:

An area of high pressure comes up from the hairdryer and slows down when it hits the ball. The airflow then continues around the ball and causes the ball to move against gravity and float above the hairdryer. When the ball is placed halfway outside of the stream, a principle known as Newton's Law of Action and Reaction causes the pressurized air to interact with the calm air, which pushes it back into the hairdryer.

FURTHER INVESTIGATIONS:

More information available at (also source of photo):

http://www.exploratorium.edu/snacks/balancing_ball/

APPENDIX-1-Forces Day Module

Glass Harmonica!

Information for Parents

Compiled by: Megan Flora and Dr. Emily Schmitt Lavin (NSU)

MATERIALS:

- Wine glasses (made of glass); will it work with plastic?
- Water

METHODS:

1. Place water in the wine glasses in varying amounts
2. Dip one finger in the glass to get it wet
3. Rub finger along the rims of the glasses to hear sounds!

HYPOTHESIS FORMATION:

Why does the glass make sounds when a wet finger is rubbed around its rim? What happens when more water is added to the glasses? What happens when less water is added? Would the same thing happen if your finger was dry?

OBSERVATIONS:

When you move your finger around the rim, the glass makes noise coming from the vibrations of your wet finger's motion around the rim. More water decreases the pitch of the noise, while less water increases it.

SCIENTIFIC PRINCIPLES:

The movement of your wet finger around the glass rim takes turns slipping and sticking to the glass. This causes the glass to vibrate just like the strings of an instrument. What happens when instruments vibrate? They make sounds! The same thing happens with the glass.

FURTHER INVESTIGATIONS:

More information available at:

http://www.ccmr.cornell.edu/education/ask/index.html?quid=1143

http://machineproject.com/projects/lacma/glass-harmonica/ (source of image)

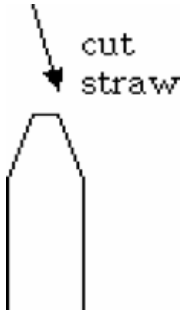
Straw Oboe!

Information for Parents

Compiled by: Megan Flora and Dr. Emily Schmitt Lavin (NSU)

MATERIALS:

- Soda straw
- Scissors



METHODS:

1. Bite down on the end of the straw to flatten it
2. Cut off the straw on both of the flattened ends, into a V-shape
3. Bite down on the straw and blow hard and soft and see what noises you can make with the straw
4. Your lips should be pressed together just at the far end of the V (far from your mouth).
5. If you want, punch holes in the straw for your fingers; also try cutting the end of the straw to see what happens to the sound

HYPOTHESIS FORMATION:

What happens when you blow on the straw hard? What happens when you blow into the straw more softly? What does the straw sound like with more pressure or with less pressure from biting down? What happens if you cut the straw from the end away from your mouth? What if you cut it again?

OBSERVATIONS:

The air inside of the straw is bouncing around and causing the vibrations. Why do you think these vibrations are able to make the sound you are hearing?

SCIENTIFIC PRINCIPLES:

When the air travels down the straw, it moves at the speed of sound and is forced to bounce off the opposite end. The sound then continues back to the flattened end of the straw where it bounces off again and again causing the vibration and noise.

FURTHER INVESTIGATIONS:

More information available at:

http://www.exploratorium.edu/snacks/straw_oboe/

http://www.instructables.com/id/Straw-horn/ (source of image)

Lightsaber Training

Information for Parents

Compiled by: Doxia Trinidad and Dr. Emily Schmitt Lavin (NSU)

MATERIALS:

- 1 inch (2.5 cm) wide PVC Pipe about 24 inches (60cm) long. You can also use a regular balloon if you do not have PVC pipe; Scissors
- Mylar tinsel for Christmas trees. There are many types of tinsel (you should look for the thinnest and narrowest possible); A head of clean, dry hair (or a piece of wool or a fuzzy polyester blanket)

METHODS:

1. Arrange 6 strands of Mylar together and tie them together in a knot at one end.
2. Tie them together again about 6 inches (15cm) from the first knot.
3. Cut the loose Mylar strands off just past each knot.
4. Charge the PVC pipe by rubbing it back and forth through your hair (blanket or wool) for 10 seconds.
5. Hold the Mylar orb (by the knot) above the charged pipe and let it drop and touch the pipe.
6. It should repel away and start floating. If the tinsel keeps sticking to the pipe, the tinsel is probably not thin enough and you will need to try another kind of tinsel. (You will usually have to "recharge" the pipe before each levitation.) You must practice, be calm, and learn to use the force for this to work!

HYPOTHESIS FORMATION:

When the electrical charge between the PVC pipe and orb is the same, the orb will repel away from the PVC pipe. What would happen if the orb was larger, made out of a different material, or if the material to charge the pvc was not dry or had a lot of oil? Could the weather affect this force attraction?

OBSERVATIONS:

When you rub the pipe in your hair you give the pipe a *negative* static charge. The orb is attracted to the pipe at first because the orb has a positive charge. As soon as the orb touches the pipe, it picks up a negative charge. Since the pipe is negative and the tinsel orb is now negative, they repel away from each other and the orb levitates! The orb will also take on more of a "ball" appearance when charged since all the tinsel strands are repelling away from each other. Did you notice the orb is attracted to other objects around you - including you? That is because most objects (including you) have a positive charge.

SCIENTIFIC PRINCIPLES:

Static electricity is an electric charge that has accumulated on an object. Static electricity is often created when two objects that are not good electrical conductors are rubbed together, and electrons from one of the objects rub off onto the other. In this experiment, the PVC pipe and the orb had the same electrical charge, therefore, they repelled each other, making it seem like it is levitating.

FURTHER INVESTIGATIONS:

More information available at:

http://www.youtube.com/watch?v=9toZ3fwzv_o

http://www.sciencebob.com/experiments/static_orb.php ; original image (above) by E. Schmitt Lavin

APPENDIX -1-Forces Day Module

Science Alive!

Pre and Post Survey: Forces, Energy, and Motion

1) **Give an example of energy:**

2) **Give an example of a force:**

3) **Can a magnet be moved by being pushed or pulled with other magnets?**
   Circle YES or NO

4) **What do you think would happen if you put a Ping-Pong ball over a hair dryer that was on?**

   _____

5) **What do you think would happen if you cut one end of a straw into a point and blew into it?**

   _____

6) **What do you think would happen if you rubbed a balloon on a fuzzy blanket and then put it near gelatin powder?**

   _____

APPENDIX -1-Forces Day Module

Science Alive!

Pre and Post Survey: Forces, Energy, and Motion

KEY

1) **Give an example of energy:** Light

2) **Give an example of a force:** Water pressure

3) **Can a magnet be moved by being pushed or pulled with other magnets?**
   Circle ***YES*** or NO

4) **What do you think would happen if you put a Ping-Pong ball over a hair dryer that was on?**
   It would stay in the air and spin

5) **What do you think would happen if you cut one end of a straw into a point and blew into it?**
   It would make a sound

6) **What do you think would happen if you rubbed a balloon on a fuzzy blanket and then put it near gelatin powder?**
   The force will bring the powder up and it would stick to the balloon

APPENDIX-2-Matter Day Module

Corn Starch Mix: A solid that melts?

Information for Parents

Compiled by: Dr. Emily Schmitt Lavin, Collette Gilbert, Megan Flora, and Patrick Cao (NSU)

MATERIALS:

One box of cornstarch (16 oz)

- Large mixing bowl
- Cookie sheet
- Pitcher of warm water
- Spoon
- Gallon size zipper-lock bag
- Paper table cloth
- Food coloring (personal preference)

METHODS:

1. NOTE: **Do NOT pour this mixture down the sink.** It must be thrown away in the trash so it does not clog the plumbing.
2. Pour approximately ¼ of the box of cornstarch (4 oz) into the mixing bowl and slowly add about ½ cup of water and stir (or use your bare hands).
3. Continue adding cornstarch and water in small amounts until the mixture reaches the consistence of honey; eventually, you will have added the box of cornstarch with roughly 1 to 2 cups of water. The mixture gets thicker with more cornstarch and thinner with more water. Add food coloring as desired.
4. Pour the mixture onto the cookie sheet. Stir it with your finger first slowly then faster and observe.
5. Skim your finger across the top and observe.
6. Sink your hand into the mixture and try to pull it up.
7. Roll the fluid between your palms (applying pressure) and make a ball.
8. Place your hand over top of the pan of liquid and slap it as hard as you can. What happens?

HYPOTHESIS FORMATION:

Why did the solution become a solid under pressure and a liquid when the pressure was released?

OBSERVATIONS:

This liquid does not behave like a normal liquid. It became more solid under some situations and appeared to melt and become more liquid under others.

SCIENTIFIC PRINCIPLES:

This cornstarch solution is something known as a Non-Newtonian liquid. It turns into a solid under pressure and a liquid in the absence of pressure. This happens due to the specific nature of the bonding between the corn starch molecules and the water.

FURTHER INVESTIGATIONS:

More information available at: http://www.stevespanglerscience.com/experiment/00000047

APPENDIX-2-Matter Day Module

Flubber: from liquid to semi solid

Information for Parents

Compiled by: Dr. Emily Schmitt Lavin, Jeff Ellis, Andre Kerr, and Jennifer Marrero (NSU)

MATERIALS:

- Glue (4 oz bottle)
- Borax (a powdered soap from grocery stores)
- Plastic cup (8 oz)
- Spoon
- Large mixing bowl
- measuring cup
- Food coloring (personal preference)
- Water
- Paper towels
- Plastic zipper-style storage bags

METHODS:

1. Empty the entire glue bottle into the mixing bowl.
2. Fill the empty glue bottle with warm water (close and shake) then empty the contents into the mixing bowl and mix well using the spoon.
3. If desired, add a few drops of food coloring to the glue and water mixture.
4. Measure ¼ cup of warm water into a plastic cup and add a one half teaspoon of Borax powder to the water. Stir the solution; dissolving as much of the powder as possible.
5. While stirring the glue in the mixing bowl, slowly add the Borax solution and you will see the glue start to polymerize into a gel-like solid.
6. Continue adding Borax solution and begin to mix with hands until the desired consistency is reached
7. Store the flubber in a plastic bag.

HYPOTHESIS FORMATION:

Why did the glue change from a liquid to a gel like solid? What effect does Borax have on glue? What do you think would happen if you kept adding more and more Borax?

OBSERVATIONS:

When the Borax solution is added to the glue, the molecules in the glue are encouraged to change states from a liquid to a gel-like solid.

SCIENTIFIC PRINCIPLES:

Borax serves a polymerizing agent. That means that it causes the glue to form a polymer (long chain of molecules). Thus, by adding the Borax the glue transitions from a liquid to a gel-like solid state.

FURTHER INVESTIGATIONS:

More information available at: http://www.stevespanglerscience.com/experiment/00000039

APPENDIX 2-Matter Day Module

Gas filled (CO_2) Smoky Bubbles

Information for Parents
Compiled by: Dr. Emily Schmitt Lavin, Kelly Parks, and Erin Nassif (NSU)

MATERIALS:

- Plastic jar with lid; fitted with a valve connected to plastic tubing with a nozzle on the end
- 1 pair of cotton gloves
- 1 (9oz.) plastic cup
- 1 bottle of dish soap
- Tongs
- Dry ice in a cooler

METHODS:

1. Fill the specially made plastic jar about 1/3 full of warm water.
2. Using gloves and tongs add several pieces of dry ice.
3. Put the lid on the plastic jar. **Never put dry ice in a jar and close the lid UNLESS there is another opening in the jar for gas to escape through.**
4. Watch the carbon dioxide (CO_2) gas release from the dry ice in the water.
5. Put the end of the tube with the hose fitting into the dish soap and watch as the bubbles fill with smoky gas.

HYPOTHESIS FORMATION:

Why was the gas cloudy? What happened to the cloudiness as time went on?

OBSERVATIONS:

At first when the dry ice is added to the warm water a lot of cloudy CO_2 gas is generated. This gas is used to blow up the soap bubbles. Over time the gas gets less cloudy.

SCIENTIFIC PRINCIPLES:

Dry ice is very cold carbon dioxide that has become a solid. As the dry ice melts carbon dioxide is released in the form of a gas. When the carbon dioxide gas is colder than the air, it has a smoky consistency like fog. When the carbon dioxide gas is warmer than the air, it becomes colorless and the fog-like quality goes away. When the bubbles pop, the cold carbon dioxide gas is released into the air in a foggy release of smoke.

FURTHER INVESTIGATIONS:

More information available at:

http://www.bubbles.org/html/solutions/formulae.htm
http://www.stevespanglerscience.com/product/boo-bubbles

APPENDIX-2-Matter Day Module

Science Alive!

Pre and Post Survey: Matter Day

1) **How many states of matter are there?**

2) **Give an example of a solid:**

3) **Give an example of a liquid:**

4) **Give an example of a gas:**

5) **What would borax powder do if it was added to glue?**

_____

6) **What is the gas that is made by dry ice and can be used to inflate bubbles?**

_____

7) **What would cause a mixture of corn starch and water to change from a liquid to a solid?**

_____

APPENDIX-2-Matter Day Module

Science Alive!

Pre and Post Survey: Matter Day

KEY

1) **How many states of matter are there?** three

2) **Give an example of a solid:** ice

3) **Give an example of a liquid:** water

4) **Give an example of a gas:** air

5) **What did the Borax do to the glue?**

Made it polymerize, turn into a solid

6) **What gas inflated the bubbles?**

Carbon dioxide

7) **What caused the corn starch and water mix to become solid?**

Applying pressure

Appendix 3: List of Hands-On Science Activities Developed and Tied to Florida State Science Standards

Demonstration	Concepts Addressed	Next Generation Science Standards, Body of Knowledge and Big Ideas (Adopted, 2008)	Summary of the concept
Forces Day Module			
Falling Waters	Potential energy, water potential	Body of Knowledge: Physical Science **Big Idea 10:** Forms of Energy **Big Idea 13:** Matter and Energy Transformation	A plastic 1 L bottle is filled with water. There are three holes at different heights drilled into the side of the bottle. Water flows farthest out of the hole on the bottom and flows the least out of the hole on the top.
Lift Off	Air pressure, laminar flow	Body of Knowledge: Physical Science **Big Idea 11:** Energy Transfer and Transformations **Big Idea 12:** Motion of Objects **Big Idea 13:** Forces and Changes in Motion	A ping pong ball is kept suspended in a stream of warm air coming from a hair dryer.
Glass Harmonica	Motion energy being converted to sound energy	Body of Knowledge: Physical Science **Big Idea 11:** Energy Transfer and Transformations	Wine glasses filled with water are used to make sound by rubbing the rim of the glass with a wet finger
Straw Oboe	Motion energy being converted to sound energy	Body of Knowledge: Physical Science **Big Idea 11:** Energy Transfer and Transformations	Cut straw ends and blow through them to generate sound
Electric Gelatin	Static electricity	Body of Knowledge: Physical Science **Big Idea 10:** Forms of Energy	Gelatin is attracted to a balloon that is rubbed against a fuzzy blanket
Lightsaber training	Static electricity	Body of Knowledge: Physical Science	Using static electricity to make a

		Big Idea 10: Forms of Energy **Big Idea 12:** Motion of Objects	ball made of tinsel magically float in the air. Use the force!!!
Straw Oboe			
Matter Day Module			
Flubber: From liquid to semi-solid	States of matter, liquid turning into a semi-solid; polymers	Body of Knowledge: Physical Science **Big Idea 8:** Properties of Matter **Big Idea 9:** Changes in Matter	Using borax, water, and white glue, turning a liquid substance into a semi-solid gel substance. Borax acts as the polymerizing agent.
Corn Starch Mix: A solid that melts	Understanding the properties of a suspension, and a solid turning into a liquid	Body of Knowledge: Physical Science **Big Idea 8:** Properties of Matter **Big Idea 9:** Changes in Matter	Using cornstarch and water to create a substance that represents a "melting solid effect." Under pressure the substance is a solid and when pressure is released, it is a liquid.
Gas Filled (CO_2) Smoky Bubbles	Understanding the properties of dry ice and its and CO_2. The gas (CO_2) fills the soap bubbles.	Body of Knowledge: Physical Science **Big Idea 8:** Properties of Matter **Big Idea 9:** Changes in Matter	Attach a hose to the side of a jar filled half way with warm water, drop a piece of dry ice into the jar, then fill another jar with soapy water, touch the end of the tube in the soapy solution and put the lid on the container with dry ice. Smoky bubbles will start forming. As the dry ice warms, the bubbles change from smoky to clear.

Appendix 4a: Forces, Motion and Energy Day Module: Typical student responses that aided in scoring the pre and post survey questions.

Question	NR	Low 1 point	Medium 2 points	High 3 points
1. Give an example of energy	No response	Random drawings	Energy is something that moves fast	Light, Movement
2. Give an example of Force	No response	Random drawings	A push	Water pressure
3. Can a magnet be moved by being pushed or pulled with other magnets?	No response	No	Not Really	Yes
4. What do you think would happen if you put a Ping-Pong ball over a hair dryer that was on?	No response	Stick on my hair Roll off It would pop It would move It will bounce off	Stay on it It will get hot It will blow away	It would stay in the air and spin Float in the air It will fly It will go high
5. What do you think would happen if you cut one end of a straw into a point and blew into it?	No response	It will become a spit ball Air will come in and out Spit will come out No noise It will fall	Air comes out the other end of the straw	It would make a sound It will make a funny noise Whistle
6. What do you think would happen if you rubbed a balloon on a fuzzy blanket and then put it near gelatin powder?	No response	It would pop Blanket would puff	It would stick on The powder sticks to the balloon	The balloon will pick up the gelatin powder The powder will come up and stick to the balloon The powder will fly onto the balloon

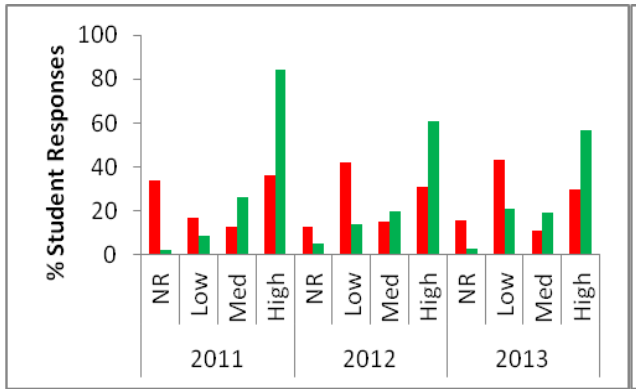
Appendix 4b: Matter Day Module: Typical student responses that aided in scoring the pre and post survey questions.

Question	NR	**Low** **1 point**	**Medium** **2 points**	**High** **3 points**
1. How many states of matter are there?	No response	0-1	2	3
2. Give an example of a solid	No response	Random drawings	Heavy It is hard	Ice Book Rock Chair
3. Give an example of a liquid	No response	Random drawings	Something that can go through River You can splash in it	Water Anything that can change shape
4. Give an example of a gas	No response	Balloon Beach ball	Bubble Sun Tire Wind	Air
5. What would borax powder do if it was added to glue?	No response	It will be slimy It will stick to glue Flubber Sticky glue It is bubbles	Solid	Made it polymerize Turned into a solid
6. What is the gas that is made by dry ice and can be used to inflate bubbles?	No response	Water vapor Bubbles Air Gas Dry ice and water	Dry ice Steam Smoke bubbles	Carbon Dioxide

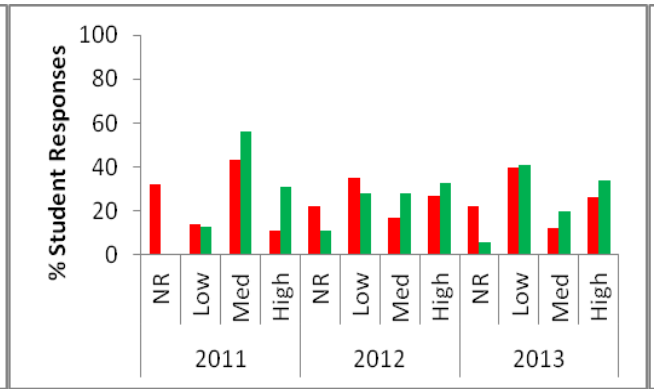
7. What would cause a mixture of corn starch and water to change from a liquid to a solid?	No response	It is in place Solid Water squash Hard solid A Gas Ice Add corn starch water to the glue Turn to a solid Sublimation Corn starch	Freeze it Put in cold place Hard	Pressure

APPENIDX 5-Figure 1a-c: The percentage of student responses (for all test questions, general test questions, and program-specific test questions) that were no response (NR), low, medium, and high quality answers for Pre (red) and Post (green) tests given as part of Forces Day at Welleby Elementary School for the years 2011, 2012, and 2013. In 2011 there were 81 pre and 90 post tests. In 2012 there were 95 pre and 97 post tests. In 2013 there were 102 pre and 81 post tests.

1a: Summary data for all six test questions for Forces Day



1b: Summary data for two general test questions for Forces Day



1c: Summary data for four program-specific test questions for Forces Day

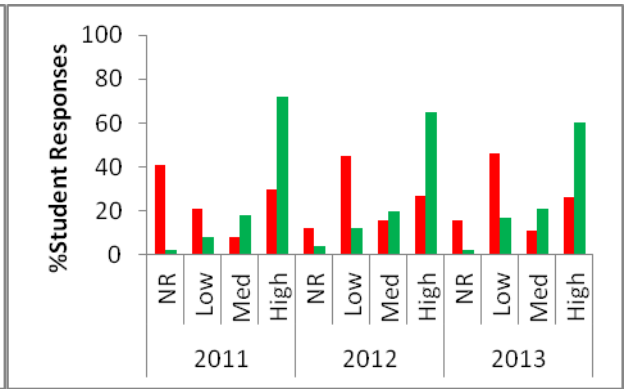
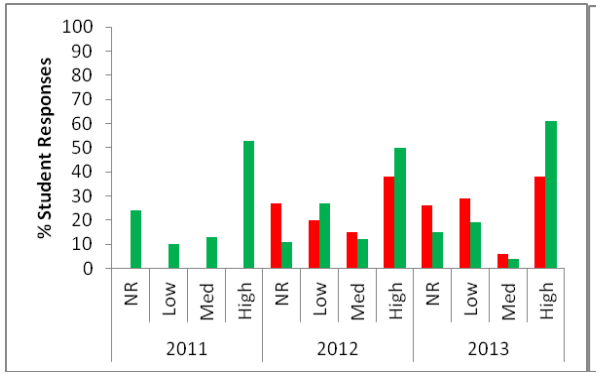
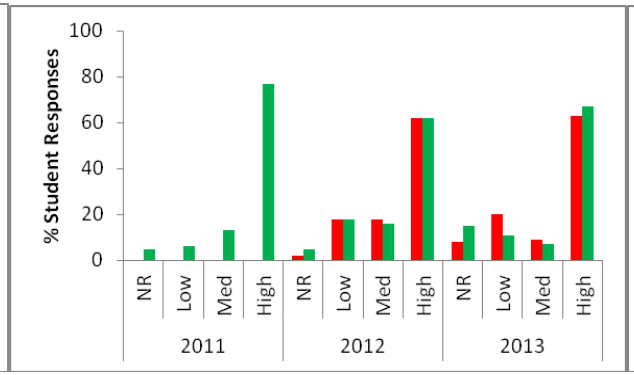


Figure 2a-c: The percentage of student responses (for all test questions, general test questions, and program-specific test questions) that were no response (NR), low, medium, and high quality answers for Pre (red) and Post (green) tests given as part of Matter Day at Welleby Elementary School for the years 2011, 2012, and 2013. In 2011 there were 0 pre and 84 post tests. In 2012 there were 85 pre and 108 post tests. In 2013 there were 53 pre and 72 post tests.

2a: Summary data for all seven test questions for Matter Day



2b: Summary data for four general test questions for Matter Day



2c: Summary data for three program-specific test questions for Matter Day

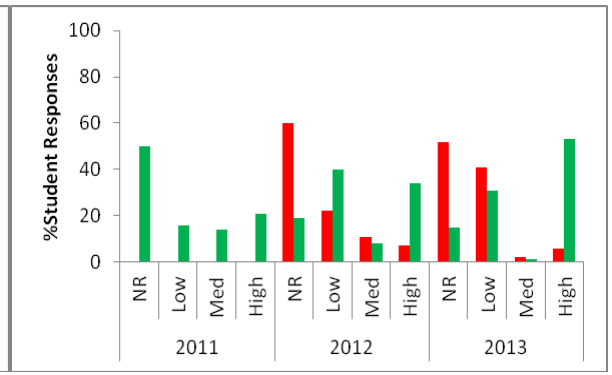


Figure 3a-c: The percentage of student responses (for all test questions, general test questions, and program-specific test questions) that were no response (NR), low, medium, and high quality answers for Pre (red) and Post (green) tests given as part of Forces Day at Manatee Bay Elementary School for the year 2014. There were 70 pre and post tests for Forces day.

3a: Summary data for all six test questions for Forces Day

3b: Summary data for two general test questions for Forces Day

3c: Summary data for four program-specific test questions for Forces Day

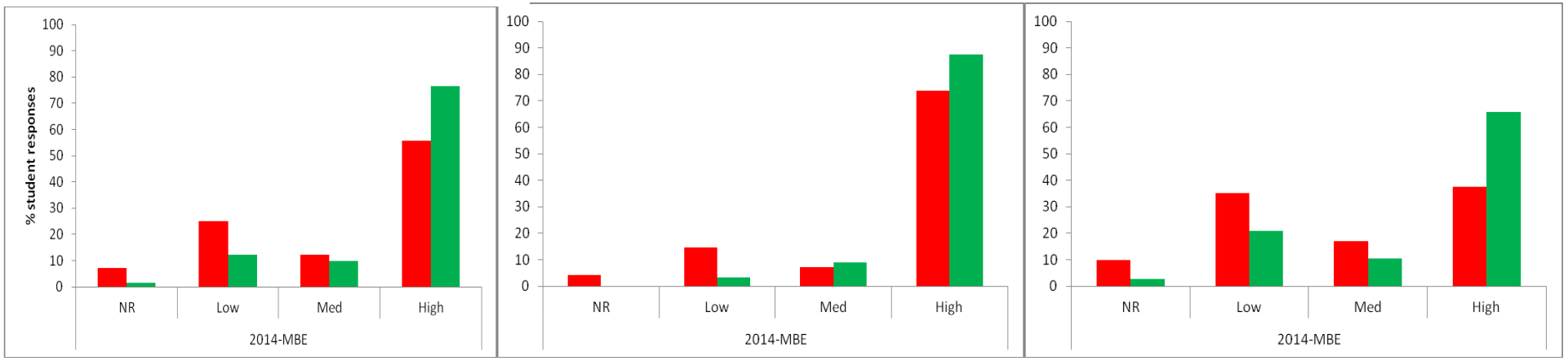
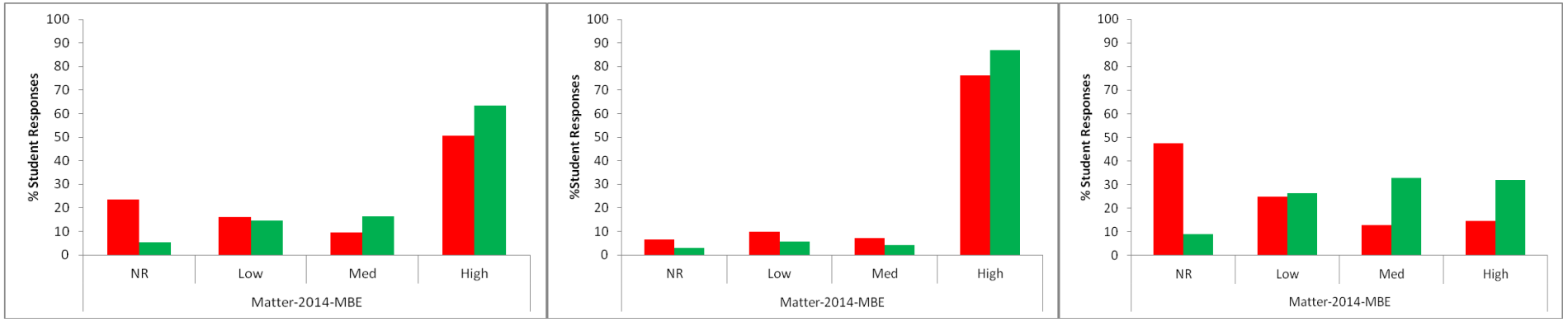


Figure 4a-c: The percentage of student responses (for all test questions, general test questions, and program-specific test questions) that were no response (NR), low, medium, and high quality answers for Pre (blue) and Post (red) tests given as part of Matter Day at Manatee Bay Elementary School for the year 2014. There were 58 pre and post tests.

4a: Summary data for all seven test questions for Matter Day

4b: Summary data for four general test questions for Matter Day

4c: Summary data for three program-specific test questions for Matter Day



APPENDIX 6a-NSU-student surveys-Average survey response from NSU student volunteer participants at Welleby Elementary School and Manatee Bay Elementary (MBE) for Forces Day and Matter Day (for years 2012, 2013, 2014; number of surveys given at the top of each column). Average scores are given based on 1 = strongly agree, 2 = agree, 3=neutral, 4= disagree, 5=strongly disagree.

Survey Question	Forces Day 2012 (17)	Forces Day 2013 (8)	Forces Day MBE 2014 (9)	Matter Day 2012 (10)	Matter Day 2013 (7)	Matter Day MBE 2014 (6)
I enjoyed this experience for community service	1.0	1.0	1.0	1.0	1.0	1.0
I enjoyed working with my team members	1.0	1.0	1.0	1.0	1.0	1.0
I made new or re-established contacts with classmates and/or upperclassmen that may be	1.4	1.1	1.1	1.0	1.3	1.1
I plan to put my participation in this event on my resume	1.0	1.0	1.0	1.0	1.0	1.0
I believe these experiments were a great way to present simple science demonstrations using basic	1.0	1.0	1.0	1.0	1.0	1.0
I plan to return again for additional events if I am in the area and available	1.0	1.0	1.0	1.0	1.0	1.0
I can imagine myself doing these experiments again at another school or with a family member	1.1	1.0	1.0	1.0	1.0	1.0

2012 Comments

I love hearing the kids be amazed during the experiments. They were so excited!
I think this is a wonderful program and should be expanded to other schools as well! It was a great experience for both volunteers and the students!

I had a memorable experience at science alive. I plan to participate in future events! Thanks Dr. Schmitt :)
I enjoyed working with younger children and setting and example for them. It was fun watching them enjoy science.
I always really enjoy doing these events. The kids are always a pleasure to work with and I love their reaction. Thanks so much!

I really enjoyed this experience, and I consider this an excellent way to teach science to children.
It was a joy to participate in this awesome activity! I truly enjoyed helping. This is my 4th time coming here and I will definitely be back!
This is a wonderful experience and a perfect way to share science with the little ones. I hope we can extend these events to other schools.
So much fun :) The children seemed to enjoy :) Everything and I had fun watching them do their science experiments :)

2013 Comments

:) <3 (Peace sign)

Love helping you Dr. Schmitt!

Science alive even teaches me things I didn't know or never noticed :)

Great as always. This is my 3rd year doing it and I enjoy it every day. I love the children's reactions and enthusiasm as they participate and learn about science.

Hooray science!!!

APPENDIX 6b-Teacher surveys-Average survey response from Teacher participants at Welleby Elementary School for Forces Day and Matter Day (for years 2012 and 2013) and Manatee Bay Elementary (MBE in 2014; number of surveys given at the top of each column). Average scores are given based on 1 = strongly agree, 2 = agree, 3=neutral, 4= disagree, 5=strongly disagree.

Survey Question	Forces Day 2012 (9)	Forces Day 2013 (6)	Forces Day MBE 2014 (5)	Matter Day 2012 (6)	Matter Day 2013 (8)	Matter Day MBE 2014 (5)
The demonstrations regarding Matter, are great ways to demonstrate the Florida State Standard Big Ideas for science education	1.0	1.0	1.0	1.0	1.0	1.0
I believe these experiments were a great way to present simple science demonstrations using basic household items	1.0	1.0	1.0	1.0	1.0	1.0
Hands-on learning is a wonderful way for children to learn, aside from learning the materials in the classroom.	1.0	1.0	1.0	1.0	1.0	1.0
I look forward to having additional activities performed by Science Alive!	1.0	1.0	1.0	1.0	1.0	1.0
Outside of science alive, additional similar opportunities exist for our students	2.1	2.0	2.0	1.0	2.3	2.0
I believe that this science alive demonstration will enhance the students ability in science literacy/knowledge	1.0	1.0	1.0	1.0	1.0	1.0
The event was the perfect amount of time	1.4	1.0	1.0	1.4	1.0	1.0
The science alive volunteers were well prepared	1.0	1.0	1.0	1.0	1.0	1.0
I appreciate that the science alive volunteers have given up their time to come and teach/interact with the students	1.0	1.0	1.0	1.0	1.0	1.0
The demonstrations discussed today were simple enough for the students to do at home, yet they were also sufficiently informative	1.0	1.0	1.0	1.0	1.3	1.0
I would like to see these science alive demonstrations posted on the school website	1.2	1.0	1.0	1.0	1.0	1.0

2012 Comments

Always love the science alive activities! Thank you all very much! :)
Thanks for your time and efforts. It was greatly appreciated. We are doing the experiments in our science series as much as possible- just finished "float your boat".

Maybe 40 minutes!

More! More! More! Great educational fun experience!

Thanks so much for the time and efforts!

2013 Comments

Fun as always!

The demonstrations were excellent! All my students want to become scientists after attending science alive!

Love science alive!!!

The kids love it! The teacher loves it! Great ways to enhance learning and understanding.
Students love these presentations :)

APPENDIX 7-Links to Video interviews about *Science Alive!* (Videos recorded March-April 2014)

1. **College Faculty**

NSU Faculty Appreciate *Science Alive!*
https://drive.google.com/file/d/0Bz2JwllexdvOTS1XRFROSl82ZE0/view

TEDxNSU Talk About *Science Alive!*
https://www.youtube.com/watch?v=xgtj3Ue3uDY

2. **Elementary School Students**

Second grade students (at Welleby Elementary School) Appreciate *Science Alive!*
https://drive.google.com/file/d/0Bz2JwllexdvOQWw5LXJTRTNfMW8/view

Alexander Lavin (grade 4, age 10) speaks about the value of older and younger students working together
https://drive.google.com/file/d/0Bz2JwllexdvOdWZsMTI4VFZZamc/view

Cynthia Lavin (Pre-K, age 5) speaks about making a straw oboe as part of Forces Day.
https://drive.google.com/file/d/0Bz2JwllexdvOVnBKOURiNVN5b3M/view

3. **College Students**

Devin Rogers and Emeline Calligaris (NSU College Junior Biology majors) talk about the value of *Science Alive!*
https://drive.google.com/file/d/0Bz2JwllexdvOZW1razFxck8tVVE/view

Kaitlin Donovan (NSU College Senior) talks about the value of *Science Alive!*
https://plus.google.com/photos/108826446330403035231/albums/6152544070717340257?authkey=COXshZC3qrnCNw

NSU Students practice for an upcoming *Science Alive!* event
https://drive.google.com/file/d/0Bz2JwllexdvOWk05VUVUU3NRaEk/view

NSU Students at Welleby Elementary School before the Science Family Night (March, 2014)
https://drive.google.com/file/d/0Bz2JwllexdvOdVJmam9RQ1h1dTg/view

4. **Elementary School Teachers and Administrators**

Cassie Hughes, second grade teacher
https://drive.google.com/file/d/0Bz2JwllexdvOa25JSnVvVE4ydXc/view

Kim Baston, school administrator
https://drive.google.com/file/d/0Bz2JwllexdvOZnNocTRPV0FlLXM/view

5. **Link to pdf of presentation made to National Science Teachers Association, April 2014**
https://drive.google.com/file/d/0Bz2JwllexdvOckx0c1QtY2loWVE/view

6. Students- Parents and Teachers Enjoying *Science Alive!* Family Night
https://drive.google.com/file/d/0Bz2JwllexdvOcWR0VFVqSmdxdU0/view -Student (Will) and parent
https://drive.google.com/file/d/0Bz2JwllexdvOa3RNOVpONHdFc00/view - Mrs. Rivera (4th grade teacher)
https://drive.google.com/file/d/0Bz2JwllexdvOVWhuUVkwcGZvd0k/view - Mrs. Flurher (5th grade teacher and parent)