

M.A.D. about Science

(Many Adults Devoted to Science)



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Goals and Objectives

Common Core

CCSS.ELA-Literacy.RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

CCSS.ELA-Literacy.RI.5.6 Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.

CCSS.ELA-Literacy.RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

CCSS.ELA-Literacy.RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

CCSS.ELA-Literacy.RI.5.10 By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently.

New Generation State Standards

Grade Level:	5
Body of Knowledge:	Nature of Science
Big Idea:	<p>The Practice of Science -</p> <p>A: Scientific inquiry is a multifaceted activity; The processes of science include the formulation of scientifically investigable questions, construction of investigations into those questions, the collection of appropriate data, the evaluation of the meaning of those data, and the communication of this evaluation.</p> <p>B: The processes of science frequently do not correspond to the traditional portrayal of "the scientific method."</p> <p>C: Scientific argumentation is a necessary part of scientific inquiry and plays an important role in the generation and validation of scientific knowledge.</p> <p>D: Scientific knowledge is based on observation and inference; it is important to recognize that these are very different things. Not only does science require creativity in its methods and</p>

	<p>processes, but also in its questions and explanations.</p> <p><u>(see individual benchmarks below for specific benchmark numbers of Big Idea above)</u></p>
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<p>Benchmark Number:</p>	<p>SC.5.N.1.1</p>
<p>Benchmark Description:</p>	<p>Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.</p>
<p>Benchmark Number:</p>	<p>SC.5.N.1.2</p>

Benchmark Description:	Explain the difference between an experiment and other types of scientific investigation.
Benchmark Number:	SC.5.N.1.3
Benchmark Description:	Recognize and explain the need for repeated experimental trials.
Benchmark Number:	SC.5.N.1.4
Benchmark Description:	Identify a control group and explain its importance in an experiment.

Overview

This workshop is directed for students, parents and teachers in 3rd- 5th grade who will be helped in developing background knowledge in the science area through professional development and outside resources in Science through hands-on-science activities. This first year our focus has been grades 3-5 students but can be adapted to grades K – 2.

With the saturation of technology today, students are not being taught to step outside of the parameters that they know. Thus, there is an increased need to teach students, our future leaders, to think critically and to apply their knowledge to problem solve. I strongly believe that the elementary level is the best place to start this, to help students develop and apply their critical thinking skills through hands-on Science labs. Additionally, most elementary teachers do not have a strong background in Science, since the average teacher preparation program only includes maybe one course in Science. By making the materials needed to teach Science more accessible, teachers will be more likely and more excited to do labs, and in turn, transfer that excitement to the students, making Science something that they look forward to learning. By teaching Science through technology and hands-on learning, not only will we increase our students' interest in Science, but more importantly, we will also teach them how to think critically and problem solve. Students, parents and teachers in 3rd--5th grade will be helped in developing background knowledge in the science area through the use of lab materials, outside resources and the application of hands-on-science activities to strengthen teaching and learning of the new National Science Standards as well as increasing students interest in learning Science.

The approach that will be used to increase this interest in Science will be through the 5 E Learning Cycle. It is an instructional design model that defines a learning sequence based on the experiential learning philosophy of J. Dewey and the experiential learning cycle proposed by D. Kolb. There are 5 phases: 1 is engagement: The activities in this section capture the student's attention, stimulate their thinking and help them access prior knowledge, 2 is exploration: In this phase students are given time to think,

plan, investigate, and organize collected information , in 3 is explanation: Students are now involved in an analysis of their exploration, in 4 is extension: This section gives students the opportunity to expand and solidify their understanding of the concept and/or apply it to a real world situation and the final phase is evaluation. This provides active learning experiences recommended by the National Science Education Standards (National Research Council, 1996).

I've tried to include as many hands on activities as possible with materials that can be found anywhere. I've also included websites for you to use as reference.



PRE/POST SURVEY

(For September and then in May)

Directions for Science is:

Think about how scientist looks like and what IS Science. What tools would they have? What would they wear? Now draw a picture to show what you think a Scientist looks like and explain what you believe "Science Is". You can write/draw anything that comes to mind!



SIZZLING SCIENCE NIGHT



Dear Parent(s),



Thanks to a Verizon Science Grant that we received this year, Kendale Elementary and High Touch High Tech will be presenting a hands-on Science experience for you and your 2nd through 5th grade scientist absolutely free! This scientific adventure will be held as follows:

When: Monday, November 14, 2011

Time: 6:30 P.M.-7:30 P.M.

Where: Kendale Elementary Cafeteria

We will learn about testing for acids and bases in different materials; we will learn through a science experiment what a chemical reaction is. Next, we will separate colors using the science of chromatography! The last experiment will be making Gummy Drops; this will be a fun and scientific way to make candy!

Don't miss out on this free, wonderful opportunity for you and your scientist to have a fun learning experience. It's absolutely free BUT you must R.S.V.P. for you and your child below, so that we can have an adequate amount of supplies.



Please note that only Kendale Elementary students who are in 2nd through 5th grade are allowed to attend this activity. Additionally, every student scientist *must* have an adult accompanying them.

[] My child and I will participate. Child's Name _____

Parent(s) participating _____

Grade: _____ Teacher _____

[] We will NOT be participating in this activity. Child's name _____



All scientists MUST be accompanied by at least one adult.

Name _____ Date _____

Family Science Awareness Survey

The following suggestions give you an opportunity to examine your current family science practices with an eye toward adding more positive science practices to your family's schedule. Begin placing a check before each true statement. Then place a star by one unchecked item that you and your family would like to try to do. In a month or so, recheck all true statements. Hopefully, the starred item will then become one of the ones that you check. ***sign form below and I will then return it to you to keep. I will resend the survey at the end of the year☺

NOTE: Check only those items that you do on a regular basis.

___ 1. I share science information from the local newspaper or national magazines with my child regularly.

___ 2. I buy science-oriented books for birthdays, holidays, or other occasions.

___ 3. The family goes on "field trips" to various locations in and around the local community and discusses some of the scientific principals we observe.

___ 4. Family members make regular use of the library to read or consult science-related books.

___ 5. I encourage my child to talk about some of the new things he or she is learning about the natural world.

___ 6. My child knows that I have a positive attitude toward science.

___ 7. I encourage my child to view selected TV programs dealing with the world of science.

___ 8. My child has an encyclopedia, science reference material at home.

___ 9. I encourage my child to write for science information, catalogs, or materials to use at home.

___ 10. I talk with my child about some of the new things I am learning about the world.

Thank you so much for your time! Please see below if you are available to help during our Science Lab Day or even if you are willing to send in materials that we may need for an upcoming lab.

Name of Student_____ Parent_____

[] I can help you on Science Lab Day on _____ from _____

[] *I am willing to send in Science materials for upcoming Science labs*

[] Sorry I can't help at this time

X_____

Dear Parents,

We would like to create Science Lab Coats this year for all our Scientific Labs. We need each student to bring in an X or XX Large (depending on the size of your child 😊) White Round or V-Neck T-Shirt, that we will cut down the middle (this way it will hang like a coat). Mr. Hall, the art teacher, will be helping them create their own unique "lab coats". We need these white t-shirts no later than next Friday, _____. Please label your child's t-shirt on the collar tag with a permanent marker so we know who it belongs to.

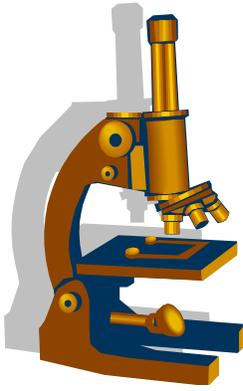
Thank you for your help in this great project!!

Science Teacher's Name _____

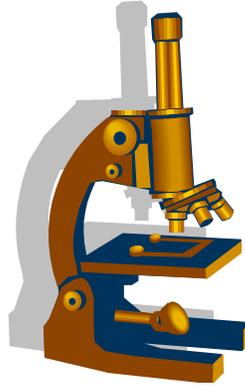
Child's Name _____

Parent Sign and return that you have received this letter:





SET UP SCIENTIST



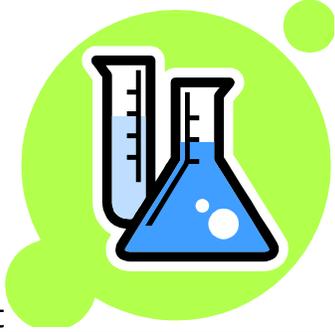
SET UP SCIENTIST



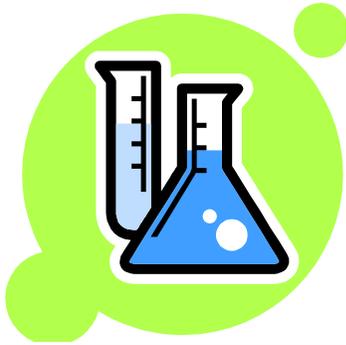
SAFETY/OBSERVATION SCIENTIST



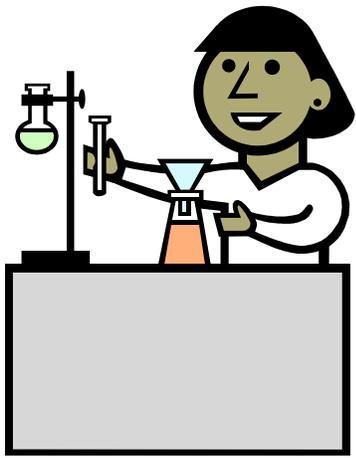
FOLLOW DIRECTIONS SCIENTIST



Details Scientist



DETAILS SCIENTIST



CLEAN UP SCIENTIST



CLEAN UP SCIENTIST



Introducing the Scientific Method

- Divide the class into groups. Give each group a complete but non-working flashlight.
- Ask them to look at the flashlight, but not take it apart. They are to predict why it isn't working and propose a solution. They need to come up with a test to show their prediction is correct.
- Once documented, they can take the flashlight apart and attempt repairs.
- Each time they reassemble the flashlight and it doesn't work, they need to stop and come up with a new written plan.
- The group must document each step as they try to determine what is wrong with their flashlight.

Since these are very simple devices, they can be set up as follows:

- One or more dead batteries
- Tape over battery terminal
- Batteries installed incorrectly (positives together)
- Dead bulb (see update below)
- Switch or broken circuit in flashlight

I would probably set each flashlight up with at least two failures so that the exercise is not over in a minute. For instance, if I installed the batteries incorrectly, I would also make sure that one of them is dead.

There are two ways they can problem solve. They can share parts with other groups to make the flashlights work or there can be a pile of batteries, bulbs, and bodies to use. I'm also not sure if I want to have meters available. I may have them available but only if someone thinks to ask for one. At conclusion, go into a class discussion of how they developed their plan and made sure the test did what it was supposed to do.

Background Information:

The scientific method is a way to ask and answer scientific questions by making observations and doing experiments.

The steps of the Scientific method are to:

Ask a question, do background research, construct a hypothesis, test your hypothesis by doing an experiment, analyze your data and draw a conclusion, and communicate your results. It is important for your experiment to be a fair test. A “fair test” occurs when you change only one factor(variable) and keep all other conditions the same.

Lab #1: Solving a Problem Using the Scientific Method



Objective

This lab will give you an opportunity to use the scientific method to solve a problem. You will make a guess as to what is wrong with your flashlight and then come up with a test to prove your hypothesis. You will repeat this process until the flashlight is working.

Background

In order to make your observations in a scientific fashion, you must do the experiment under controlled conditions. In a well designed experiment, only one variable will be changed at a time, all other possible variables will be controlled.

As you carry out any investigation, keep in mind that a scientist does at least five things as observations are made:

1. Make a written record of each observation right after making the observation.
2. Record all observations, no matter how trivial some may seem to be.
3. Make both qualitative and quantitative observations.
4. Try to separate important and unimportant observations. This can be done by repeating or replicating the experiment two or three times.
5. Use your observations to form conclusions. Do not confuse observations with conclusions. A general rule is that a conclusion is made up of two or more observations.

Procedure

1. Write down the preliminary information in your lab notebook. This should include your table of contents entry, page headers, the objective or problem, your hypothesis, materials, the procedure in your own words, and your lab group.
2. Turn on the flashlight to see if it works properly. It should not function properly. Without further physical contact with the flashlight, come up with a hypothesis that explains why the flashlight is not working.
3. Now create a test that would determine if your hypothesis is correct. Call this Hypothesis #1. In your notebook, write out the exact steps you will do to test this hypothesis.

4. Do the test you described and *only* that test. Change nothing else. **If you do not follow these directions, you will receive a failing grade for this lab.**
5. If you took the flashlight apart, put it back together and test if it works.
6. If it does not work, create a new hypothesis and a new test. Make sure you document your new hypothesis and test procedure thoroughly before continuing.
7. Again, do the test you described and only the test described.
8. Repeat this procedure until the flashlight works properly.

Suggestions for Success

- Take your time. Discuss your options with your group before coming up with each hypothesis and test.
- Always read the instructions completely and carefully before beginning. If you aren't sure about something, ask.
- You can be creative, but do not discuss what you learn and observe with other groups. Let them learn and discover on their own.
- If anything ever feels unsafe, stop and ask for help.
- Just because you finished the experiment doesn't mean you are done. Make sure you finish the write-up for the lab.

Questions

These are to be answered in your lab notebooks under *Analysis*.

1. You are all familiar with flashlights and have had them not work in the past. What made you decide to choose your first hypothesis and test?
2. When your first hypothesis didn't solve the problem, how did you and your group decide what to experiment on next?
3. Explain how you used the scientific method to solve the problem of the non-working flashlight.
4. If you were to do this lab again, what would you do different?
5. What specific recommendations do you have to improve this lab for future students?

Name _____

Date _____

Shine a Light on Science

Hypothesis #1:

If _____ then _____

How I will test my hypothesis:

Hypothesis #2:

If _____ then _____

How I will test my hypothesis:

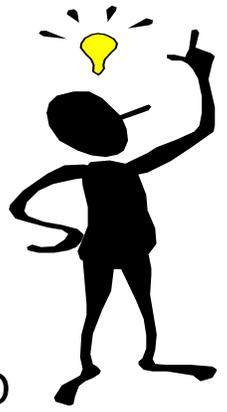
Materials: _____

Observations:

Pictures/diagrams labeled:

Hands on Ideas

Science Tools



Have students research Science tools and make 3-D poster “advertising” the important tools Scientists use. (see student samples)

Exploring Animal and Plant Cells

- 1) Create a 3-D model of an animal and plant cell (see rubric next page) (see student samples)

Ideas:

<http://www.kathimitchell.com/cells.html>

- 2) Creating a help wanted ad for a cell part(see worksheet below) See student samples around the room.

Cell Project Rubric		Name: _____		
Category	Scoring Criteria	Excellent (3 pts)	Satisfactory (2 pts)	Minimal (1 pt)
Craftsmanship	Model is creative, shows effort			
	The model is 3 dimensional			
	Model stays together, not too messy or difficult to move around			
Cell Parts	Key, legend, or labeling is easy to use to identify parts on the model			
	Functions of cell parts included (accurate)			
	Appropriate material is used so that it looks like the cell part it is modeling			
	Parts of organized within the cell in their appropriate places			
Written Word	Basic grammar, spelling on key and any other writing used in model			

Name _____

Date _____

21-24=A 20-18= B 17-14=C 13-11= D

Name _____ Date _____

Help Wanted Ad for an Animal or a Plant Cell Part

The first part of your assignment is to create a "Help Wanted" ad for a cell part. Your ad should include:

1. A list of qualifications (what qualities should an applicant have?)
2. A list of responsibilities (what job will the applicant do?)
3. A list of benefits (why this is a great job)
4. Where the job is located (plant or animal cell)
5. Contact (phone number or address)

Example:

Looking for a great opportunity to lead? Do you enjoy making decisions for others? Is guidance your strong point? If so, we are seeking to fill a managerial position. We are in need of a control center for a cell. Must be able to operate a cell. Should have solid experience reading and de-coding DNA. Should exhibit strong leadership skills.

Benefits include: placement in both plant and animal cells, long life guaranteed...you don't die, you just divide and multiply!

If interested contact THE BODY at 1-817-8WE-CELL

Write the cell part you have chosen: _____

Teacher approved: _____

Exploring Animal Kingdom

Linnaeus's system classified plants and animals on seven levels, using Latin and Greek words. On the chalkboard, reproduce the example below, which shows how a brown squirrel is classified:

Kingdom (Animalia, or "animal")

Phylum (Chordata, or "has a backbone")

Class (Mammalia, or "has a backbone and nurses its young")

Order (Rodentia, or "has a backbone, nurses its young, and has long, sharp front teeth")

Family (Scuridae, or "has a backbone, nurses its young, has long, sharp front teeth, and has a bushy tail")

Genus (*Tamiasciurus* , or "has a backbone, nurses its young, has long, sharp front teeth, has a bushy tail, and climbs trees")

Species (*hudsonicus* , or "has a backbone, nurses its young, has long, sharp front teeth, has a bushy tail, and has brown fur on its back and white fur on its under parts")

New Species

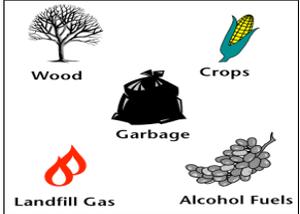
Create new animal species. Imagine that you have discovered a new species of animal, never before seen. Draw a picture of your animal, describe its physical and behavioral characteristics, describe its habitat, and make up a name for it that would fit into the system of identifying animals.

Name _____ Date _____

Energy Webquest

Part 1

1. You will be assigned to a group
2. Each group should define specific **roles** for each participant
3. Each researcher is responsible for studying two of the energy sources shown below

<p><u>Solar Energy</u></p> 		 <p><u>Wind</u></p>	
 <p><u>Water</u>(Hydroelectric)</p>	 <p><u>Nuclear</u></p>	 <p><u>Geothermal</u></p>	<p>Types of Biomass</p>  <p><u>Biomass</u></p>

4. Answer the following questions:

Energy 1: _____

1. How does this energy get its power? Explain the source of this energy form.

2. How is this energy transformed into usable energy?

3. List and describe the advantages to using this source of energy.

4. List the disadvantages to using this energy.

5. **Where is this source of energy commonly used? Is Florida using this type of energy?**

6. **Is this a renewable or non-renewable resource?**

7. **How can this energy resource be conserved? Is conservation necessary?**

8. **How does using this energy effect the environment?**



Energy 2: _____

1. **How does this energy get its power? Explain the source of this energy form.**

2. **How is this energy transformed into usable energy?**

3. **List and describe the advantages to using this source of energy.**

4. **List the disadvantages to using this energy.**

5. **Where is this source of energy commonly used? Is Florida using this type of energy?**

6. Is this a renewable or non-renewable resource?

7. How can this energy resource be conserved? Is conservation necessary?

8. How does using this energy effect the environment?

Go back to your group and discuss which resource would be the best to use and why.

Why did you choose these forms of energy?

Now make a poster “advertising your chosen energy and why....make sure you cover (on poster or in presentation):

- **Why are they better than the other sources?**
- **Where can these energy sources be obtained?**
- **How can they be conserved? Is conservation necessary?**
- **Are there any effects on the environment?**

*****Egg Project will be due on _____, final writing
will be due on _____

Name _____ Date _____

Egg Drop Science Experiment

GRADE _____ REGULATIONS AND MATERIALS

Hold an egg at ceiling's height. Drop it. What happens? **Problem Statement: Can you design a container that will prevent the egg from breaking or cracking?** That's not really so hard if you think about what you will use inside the container to cushion the egg's fall.

That is the focus of the experiment, and that will be the fun part – a really “eggcellent” activity! Before you begin designing your project, however, you should review the materials provided so that you get a good idea of the science involved in the experiment. Read over all of the information provided in this packet before you start so you don’t “crack” under pressure. The more knowledge you have about the science behind the experiment, the better your results will be. I am sure that we will see some very “eggstravagant” projects, and have lots of fun in the process.

INTRODUCTION

Gravity is a powerful force that has a fundamental impact on the way we live our lives. Even walking, which we take for granted, is not possible without gravity. Gravity provides the necessary downward force on our bodies which creates friction between our feet and the ground, allowing us to walk (push our body weight forward with one leg and then the other).

When astronauts tried to walk on the moon, they found it extremely difficult, as the gravity on the moon is approximately one sixth of what it is here on earth. When we jump into the air, even though it is only for a second or two, we can be said to be momentarily overcoming the force of gravity. Engineers have designed many ways to overcome the effects of gravity. For instance, in a Dodge Truck commercial, a truck is dropped to the ground from a height of perhaps three feet. The truck should be damaged by this fall, but the truck is equipped with shock absorbers and springs. The shock absorbers and springs of the truck dissipate the kinetic energy of the truck falling, compressing them almost to the point where the bottom of the truck hits the ground.

The truck, because of the shocks and springs, finally returns to its designed position, with the bottom of the truck a foot or so off the ground.

When other forces are combined with gravity, such as motion (the movement of an object), inertia (the tendency of an object to resist change with regard to movement based on its mass), or power (the ability to exert energy over time), it may be impossible to prevent an impact which will cause damage.

For instance, if you roll an egg along the ground downhill at considerable velocity towards a wall, you can reasonably expect the egg to break. Your arm provided the force (power) to accelerate the egg to a certain velocity (motion). That motion is being increased due to the acceleration of the egg down the hill (gravity). The egg will not drastically vary its direction and avoid the wall (inertia tends to keep it moving in a straight line). The combination of power, gravity, motion and inertia will probably be sufficient to result in an impact between the egg and the wall that breaks the egg. This impact is called the primary impact.

There is a further impact which takes place when the egg hits the wall; this is when the mass inside the egg impacts against the inside of the wall of the egg. The egg white and egg yolk are usually in liquid form, and though liquid has considerable mass, the liquid inside the egg will rarely be the cause of the egg shell breaking. If you put a steel ball bearing into a plastic egg, and then shake the egg, you can hear the impact of the ball bearing hitting the inside of the egg, and it is easy to imagine the egg cracking because of the steel ball bearing.

The impact resulting from the ball bearing striking the inside of the plastic egg due to the motion or change in motion of the egg is called the secondary impact.

Scientists and engineers have been working for many years to reduce the effect of impacts, primarily in the automobile industry. Efforts to reduce the primary impact (energy absorbing bumpers, crumple zones, modified chassis construction) and efforts to reduce the secondary impact (airbags, padded dashboards, collapsing steering wheels, and seatbelts) are commonplace.

OBJECTIVE

The objective of the project is to successfully drop a packaged egg from a predetermined height without breaking the egg.

This is an individual project to be constructed at home. You are to design something that is the lightest possible weight (if you are considering weight to be a factor in victory) following the constraints listed below. **The project must be durable enough to protect an egg thrown off the 800 building roof so that**

the egg doesn't break from the fall. Think of the egg as a passenger in a car going through a crash test.

RESEARCH REQUIRED

You may decide the amount and form of research that you do prior to the experiment. You may want to research aspects of this project that you personally find interesting. Learning mathematical formulas to calculate the force of an impact, researching the impact absorbing capability of different materials, identifying the most stable geometric structures, or even studying the basic egg are all research opportunities related to this project.

Kinetic energy is the energy that a body possesses as a result of its motion. Potential energy is the energy that exists in a body as a result of its position or condition rather than of its motion.

In building the container, you should think about how the energy is converted from potential energy to kinetic energy, and the work done on the container and the work done on the eggs. You could also research how car manufacturers test air bags or make air bags that protect you in a car. You can research anything you want but **you must have at least a page of research(normal size writing).**

PROJECT DESCRIPTION

You might want to research the latest discoveries on how best to dissipate force. You should then decide on the concept you want to employ, and begin the design process.

Once the prototype egg container has been designed, you should sketch the design, including labels, and create a list of materials required for the construction of your design....that will be due by Friday, May 27th.

CONSTRAINTS

Only raw, store bought chicken eggs - size large - may be used. Your design must not include changing the egg in any way (no tape on the egg, no nail polish on the egg, no soaking the egg in vinegar, no hollow eggs...). You must supply the egg to be used in the project.

-

Your design materials and the egg must fit into a standard shoe box or something smaller.

No glass of any kind may be used in the design, for obvious reasons.

The box lid must be secured – you don't want the lid to come off at impact. Any type of common adhesive may be used to secure the lid.

The box and all materials must remain intact. For example, no parts – inside or out - can fall or break off during flight or impact.

The box must be able to be opened once we return to the classroom so that we may check on the condition of the egg. The inside materials must be designed to allow a raw egg to be easily inserted and removed.

Containers must be constructed prior to the school day of testing.

Label your package with your name – you may also assign a name to the project itself. Be creative – example: “The Eggs-terminator”

Once a project is in school it may not be touched by anyone other than its owner, or Ms. Brody.

You may bring your project in early to have it weighed (without the egg) if you are considering weight as a factor in winning the competition. If you feel it is too heavy, you may take it home and make the necessary adjustments. If there is a “tie”, the project that weighs the least (without the egg) will be named the winner!

THINGS TO CONSIDER

Do keep in mind that your egg-protection device will be dropped from the roof. Ms. Brody will be dropping them.

CONSTRUCTION AND TESTING

You will construct your impact-absorbing container according to the designs you came up with, should you discover flaws in your design during your construction or test phase, you should go back to the drawing board and create a new a design or a design modification.

COMPETITION

The competition determines whose method enables an egg to survive a drop from the 800-building roof. Each package will be weighed before the drop (including the egg). All packages will be dropped from the same height. In the event there is more than one successful drop, winners will be based on the lightest weight package.

What will be due by _____

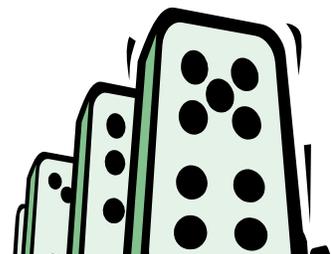
1) Once the prototype egg container has been designed, you need to sketch the design, including labels, and create a list of materials required for the construction of your design....that will be due by _____. (I will look at it and collect on _____)

2) A full page of what you researched concerning this experiment.

3) **POST-EXPERIMENT ANALYSIS...Please answer these questions on a separate sheet of paper:**

1. What are the forces acting on the egg as it falls?
2. How can you control the forces that cause the egg to break?
3. Was it the material, the amount of it, or its compression factor that was the key?
4. What are the common characteristics of the materials that protected some eggs?
5. Did layering of materials play a role in protection?
6. What did you learn from this experiment?

X_____ **Parent please sign that you have seen this assignment**



Force and Motion Lab Stations

STATION #1 Dominoes

Materials:

6 dominoes
ruler
book to use as a barrier

Procedure:

1. Set up a book to use as a barrier so the the dominoes do not leave the table.
2. Stack the dominoes with the widest parts touching each other. Place the stack 8 to 12 inches from the barrier.
3. Use the ruler to hit the bottom domino, sharply, toward the barrier. The bottom domino should be the only one that is dislodged, although other may move a bit.
4. Do the same thing, except this time, hit the domino lightly.
5. Restack the dominoes and attempt to reduce the pile, one domino at a time.
6. Let everyone in the group make this attempt.
7. Write down all observations in your notebook.

STATION #1 Dominoes Questions

1. What happened when you hit the cominoes sharply?
2. What happened when you hit the pile gently?
3. Were you able to reduce the pile completely? Why do you think this was possible?

STATION #2 Egg and Coin Lab

(this station is two very simple activities)

Part A-

Materials:

nickel
dime
penny
piece of paper

Procedure:

1. Place the paper so that part of the paper is on the table and part is hanging off the edge
2. Place one of the coins on the paper that is on the table.
3. Attempt to remove the paper from under the coin with the least disturbance to the coin.
(the coin doesn't move, much)

Part B- (teacher note-- you may want to have several of both kinds of eggs on hand- label them before students arrive)

Materials:
hard boiled egg
raw egg

Procedure:

1. Spin each egg on the table, separately. Do not spin the eggs so hard that they fly off the table or into something so that they break!
2. Note what happens as you spin each egg.
3. Which egg do you think is the hard boiled egg?
4. Explain your reasoning to your group. Try to convince everyone in your group that yours is the correct answer.
5. Let each person in your group do this activity.

STATION #2 Eggs and Coin

1. Were you able to move the coin without disrupting it?
2. Why is this trick possible?
3. What happened when you spun each egg?
4. How does inertia help you decide which is the hard boiled egg?



STATION #3 Dropping Objects

Materials:

ruler with a groove in the center

3 marbles of different sizes

pieces of paper

other objects: ping-pong ball, cork, small rubber bouncy balls, cotton balls, etc.

Procedure:

1. One student should stand on a chair
2. The student places the three marbles in in the groove on the ruler and holds the ruler over the student's head.
3. Turn the ruler so that all three marbles drop at the same time, toward the floor, not the table top.
(one student should be appointed the "retriever", to watch where the marbles go; others in the group should watch the demonstration).
4. Repeat the demonstration so that everyone in the group can be an observer.
5. Do the same thing with a flat piece of paper and a piece of paper that has been balled up.
6. The demonstration may be repeated with other objects.
7. Record your observations.

STATION #3 Dropping Object

1. Could you tell which object hit the floor first? If so, explain why you think that object hit the floor first.
2. Were forces caused by air important in the investigation? Why?
3. What did you observe when you used different objects?

STATION #4 Car Crash

Materials:

toy car: needs to be a convertible or truck
several textbooks to form a ramp and barrier
clay figure or Ping-Pong ball
string or thread

Procedure:

1. Set up a ramp that is two textbooks high with a barrier at the bottom of the ramp that will stop the rolling vehicle.
2. Place the clay figure or Ping-Pong ball in the vehicle in such a way that it will fly out of the vehicle upon impact with the barrier.
3. Place the vehicle with its passenger (ball or figure) at the top of the ramp and let it roll down the ramp. (do not shove or push the car down the ramp)
4. Record your observations. Use measurements
5. Increase the height of the ramp and repeat the demonstration, recording observations.
6. Use a thread or string to tie the passenger into the vehicle, and repeat the demonstration.
7. Repeat the demonstration.

STATION #4 Car Crash

1. What happened to the passenger in the first trial? Why?
2. How far did the passenger travel from the vehicle in the first trial?
3. Did the height of the ramp make a difference in how far the passenger traveled? How? Why?
4. Could you make a better seat belt? Explain it.

Hands on Rock Cycle Model



Rocks: Sugar Cube Rock Cycle

Have your students complete the rock cycle, using sugar cubes.

You'll need:

- Sugar cubes,
- Squares of aluminum foil, folded into a "boat"
- Hammer (or other smashing device)
- Candles (birthday or Hanukkah)
- Lumps of clay
- Test tube holder
- Matches

Each student begins with a sugar cube, which represents the original sedimentary rock. Then...

- Weathering:** Crush the rock with a hammer (or heavy book)
- Erosion:** Move the crushed rock into the foil boat
- Heat/Melting:** Using the test tube clamp, hold the foil boat over the candle flame until it melts. (Use a lump of clay as a candle holder).
- Cooling:** Set the melted sugar aside for several minutes.
- Weathering:** Break the new, igneous rock into pieces.

Name: _____

Research Skills: Note-Taking (on a step book in shape of earth)

Layers of the Earth

The Four Layers
(Page 1 and 2) List the Four Layers of the Earth. Write how thick each layer is beside its name.

Thickness

Name of Layer

1.

2.

3.

4.

The Crust (Page 3 and 4) Write down five interesting facts about the Earth's Crust:

The Mantle: (Page 5) Write 3 interesting facts about the Mantle of the Earth:

Page 6: Look at the direction the arrows show the "Convection current" moving. Would the crust of the earth, which is above it, move to the right or the left? Tell why! Draw a picture to help explain why you think this.

The Outer Core (Page 7) Write three interesting facts about the Outer Core of the Earth.

The Inner Core (Page 8:) Write three interesting facts about the Inner Core of the Earth

Science Ideas That Work!



Interactive Science Vocabulary Word Wall

http://exceptional-children-and-aig-education.district.chatham.k12.nc.us/modules/locker/files/get_group_file.phtml?gid=3114976&fid=16905509

<http://community.prometheanplanet.com/en/blog/blog/archive/2011/10/12/teaching-science-vocabulary-with-word-walls.aspx>

Using Interactive Science Notebooks

<http://sciencespot.net/Pages/ISNinfo.html>

Foldables for Science Notebook

Foldables help students build understanding through the use of visual and kinesthetic connections. The use of a Foldable or graphic organizer can help students build their understanding of a science concept in a well thought-out and concrete way.

Article from NSTA:

http://learningcenter.nsta.org/files/ss1103_45.pdf

<http://cmase.pbworks.com/w/page/6923144/Foldables>

<http://cmase.pbworks.com/f/foldables+that+fit+in+a+notebook.pdf>

<http://loving2learn.com/Topics/Reading/Vocabulary/ScienceWordWall.aspx>

Science Spot:

<http://sciencespot.net/Pages/classmetric.html>

Human Body Sites:

<http://www.instructorweb.com/lesson/humanbody.asp>

http://kidshealth.org/kid/htbw/htbw_main_page.html

Moon Phases with Oreo Cookies:

<http://analyzer.depaul.edu/paperplate/Oreo%20Moon%20Phases.htm>

Earthworm Investigation:

<http://www.uen.org/Lessonplan/preview.cgi?LPid=18886>

The Education Fund's

Adapter Grant Application

M-DCPS teachers, media specialists, counselors or assistant principals may request funds to implement an IMPACT II idea, teaching strategy or project from the Idea EXPO workshops and/or curriculum ideas profiled annually in the *Ideas with IMPACT* catalogs from 1990 to the current year, 2013-14.

Most catalogs can be viewed at The Education Fund web site at www.educationfund.org under the heading, Publications. How-to booklets for each idea can be accessed at www.educationfund.org under Publications. They are listed under Curriculum Idea Packets.

- Open to all K-12 M-DCPS teachers, counselors, media specialists
- Quick and easy reporting requirements
- Grants range from \$200 - \$400.
- Grant recipients recognized at an Awards Reception in late January.

To apply, you must contact the teacher (the Disseminator) who developed the idea. Contact may be made by attending a workshop at the Idea EXPO given by the IMPACT II disseminator teacher.

Project funds are to be spent within the current school year or an extension may be requested. An expense report with receipts is required by June 15th.

APPLICATION DEADLINE: December 10th.

Apply online at www.educationfund.org.

For more information contact:
Lorna Pranger Valle
The Education Fund
305-892-5099, ext. 18;
Lvalle@educationfund.org