

Mentor-Teacher-Community Toolkit
Resources for Math, Science & Reading

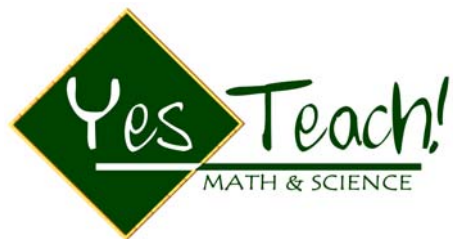
Mentoring Exercises

**Developed for the Florida Independent College Fund
and
The Independent Colleges & Universities of Florida**

by

**Caliber Associates, Inc.
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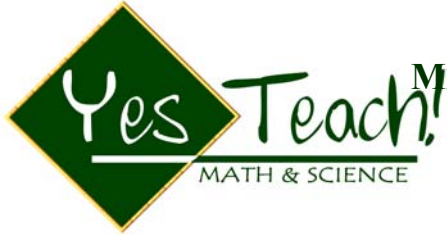


MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES

In support of the YesTeach! Math & Science – Mentor-Teacher-Community (MTC) Toolkit and Evaluation service agreement, Caliber Associates is pleased to present the Mentoring Exercises. Caliber shares the commitment of the Florida Independent College Fund (FICF) to recruit, prepare, place and support new math and science teachers throughout Florida. Moreover, the Caliber shares the YesTeach! belief that mentors, teachers and community members that support and coach students are an invaluable untapped resource. The purpose of the Mentoring Exercises is the provision of instructional tools that consist of activities in math, science and reading. In fulfillment of the aforementioned agreement (product #6), four practical exercises for each category are presented for mentors, teachers and community members to use in working with at-risk students. Each of the twelve exercises targets specific age groups and is designed to boost skill, confidence and ultimately school performance.

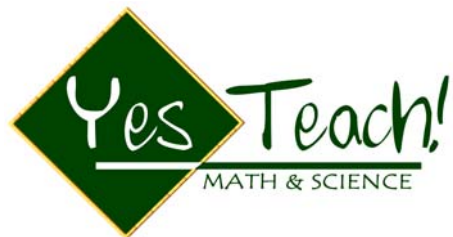
The MTC Toolkit project is sponsored by the FICF. The Toolkit was prepared by Dr. Jeanette Hercik, Dr. Jackie Booth, Dr. Stephanie VanDeventer, Mr. Richard Lewis, and Ms. Tara Croan. All opinions are those of the authors and do not reflect the views of the sponsoring organization. Questions and comments should be directed to Dr. Jeanette Hercik at jhercik@caliber.com.



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MENTOR-TEACHER-COMMUNITY TOOLKIT

RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES

Purpose of Exercises:

The following are 12 math, science and reading exercises that mentors, teachers and community members could use with students to boost skill, confidence and ultimately classroom performance. Whether mentoring activities occur in-school, after-school or during summer programs, the accompanying exercises are designed for both experienced and first-time mentors. Each exercise is clearly labeled with the subject area and the appropriate grade level. Often, students who are matched with mentors need confidence in academic areas, such as those highlighted here: math, science, and reading. These activities are high-interest and allow for natural interactivity and discussion between mentor and student. In addition, the exercises reinforce important skills that students need to acquire and practice to become academically successful.

As a mentor, your role with the student is primarily to become an advocate for the student. The time you spend both preparing for, getting acquainted with and working with your student is time that can be rewarding for you as well as critically beneficial for the student. As you build rapport and gain understanding of what your student needs, you can more easily adjust these exercises to fit your particular situation and/or search out other lessons and activities that work.

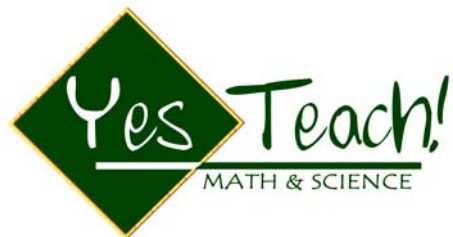
Remember, too, that these exercises are not for a grade but are to serve as introductory sessions while the two of you decide on your goals together.

Helpful Hints for Using These Activities:

One of the great benefits of mentoring is the quality of the one-on-one helping relationship. Take advantage of this less formal way of teaching and learning together. The discussion and introductory sections are particularly good for getting to know one another.

Read through the exercise until you feel completely comfortable with the activity. Think about your own experiences with the topics and the skills. Decide what you would like to share with your student and how that might enhance the student's understanding and skill building.

Finally, evaluate how each session as your student progresses so that you can become more comfortable with pacing and timing for allowing the student to solve problems or work through exercises. Don't be afraid to ask for assistance or for additional help on any aspect of working with your student. Be assured that as a mentor, you are making a tremendous difference in the educational and social development of your student.



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – MATH 1

Title of Activity: Party Planning
Grades 6-8

Objective: Applying calculating, estimating and problem solving skills

Materials Needed: Paper and pencil
Optional: newspaper ads for grocery stores/food coupons

Introductory “Hook”:

People in the United States are some of the most frequent partygoers in the world. It is estimated that there are more than 800,000 birthday parties each day, not to mention parties for other celebrations. What kinds of statistics might you consider in trying to figure out how many parties are held each year in the U.S., again, not including birthday parties? Think about the items involved in celebrating all these parties and you can see why people spend a lot of money on parties. Chances are that you will plan or help plan and host several parties during your lifetime. Now might be a good time to learn a few skills that can help you both plan a fun party and appreciate what goes into planning a great party.

Development of Lesson:

Let’s say that your parents have agreed that you can have a party on your next birthday as long as you do all the planning and consider a reasonable budget. After careful consideration, you decide you want to have 16 friends, including 8 girls and 8 boys. You plan to serve hamburgers, chips and salsa, soft drinks, birthday cake and ice cream. Now, figure out the following?

1. How many people do you need to invite to get 16 people (8 girls and 8 boys) to come to your party?

Helpful hints: On average, 89 % of girls invited to parties will actually attend while 61% of boys invited to parties will attend.

2. What do you estimate your party food will cost? Base your estimate on the following information:
 - Each hamburger takes 1/4 pound of meat and 36 cents for bun and condiments
 - A sheet cake will feed 20 people one piece of cake. You will need two half-gallons of ice cream to go with 20 cake servings.

- An assortment of chips and dips cost around \$1.55 a person.
- If you have \$3.50 in coupons for the food you are purchasing, what percentage of your total party food bill will you save by using coupons?
- If you changed your menu to have pizza and sodas only and found a deal for 5 or more pizzas for \$5 each and \$1 per liter for soft drinks, how many pizzas and sodas would you need to order for your party? Which menu (burgers, chips and cake or pizza and sodas) would be the least expensive?
- At the party, unfortunately there is an accident and the television gets broken. You promise to make it up to your parents. Which of these options is best? Replace the television with a similar set for \$229. Call a repair shop for a \$60 service charge plus \$45 an hour plus parts plus tax. Have your parents file an insurance claim with a \$200 deductible?

Discussion and Questions:

Talk with student about how to solve each of these problems using calculations, estimates and consideration of the consequences of the choices. Emphasize that there are many different options in planning and paying for a party and that learning to evaluate options and consider accurate information are critical steps in making good decisions.

This is also an opportunity to discuss such intangibles as responsibility (television incident), convenience as a consideration (pizza/sodas versus burgers, chips and cake), and social considerations (what if you have more friends who are girls than friends who are boys?).

Application:

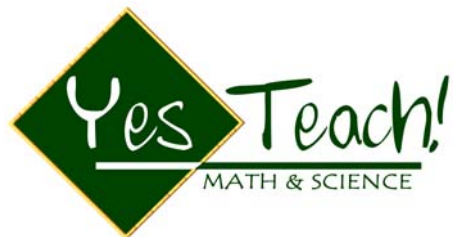
This activity is related to problem solving, budgeting, decision making and alternative methods of calculating information. There are websites with interesting statistics that can extend this lesson to include estimating the total costs of birthday parties, celebrations for new babies, etc.

www.census.gov/population

www.prb.org

Assessment:

Evaluate the correctness and completeness of student answers.



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – MATH 2

Title of Activity: Tortilla Math
Grades 3-5

Objective: Practicing calculations using fractions and mathematical thinking.

Materials Needed: A package of round tortillas
Something to cut the tortillas (butter or plastic knife, scissors, straight edge)

Introductory “Hook”:

According to food industry statistics, 90 billion tortillas are eaten in the U.S. each year. There are many different varieties, including flavors, low calorie, low carbohydrate and tortillas made with different materials, including flour, corn and wheat. But in addition to eating tortillas, you can use them to illustrate fractions and to improve your ability to do mathematical problem solving.

Development of Lesson:

Open the package of tortillas and begin by asking the student to separate and count out the tortillas. Try to keep them as rounded” as possible without tearing them yet. Then answer these questions:

- If you eat two of the tortillas, what percent remains? How do you express that in fractions?
- Based on the number of tortillas per package, what are the common denominators you could use in describing different portions of tortillas?

The word fraction comes from the Latin word *fractio*, which means “act of breaking”. Using scissors, a butter knife, or a marker, cut one tortilla into eight equal pieces, one into three equal pieces and one into six equal pieces. Describe how you determine how to cut the tortillas in equal pieces before you begin the process. Now with the pieces you have, answer the following questions:

- Which is a larger fraction, $3/8$ or $1/3$?
- Which is smaller, $4/6$ or $5/8$?

- What time would it be if you ate $\frac{1}{8}$ of a tortilla and gave another $\frac{1}{8}$ to someone else?
- How can you cut a tortilla into 8 slices, all the same shape and size with only 3 cuts?
- How would you illustrate (using tortillas) this problem?

$$6 \times \frac{2}{3} = \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} = \frac{12}{3} = 4$$

Discussion and Questions:

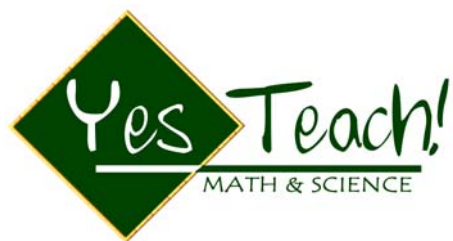
Encourage the student to talk about the thought processes used to solve these problems. Emphasize that using tangible objects, such as tortillas, can help people to visualize what the numbers represent and how fractions make up part or whole numbers. Ask the student how he or she might teach someone else what they know about fractions using food, including tortillas.

Application:

This activity is related to mathematical problem solving and fractions. Additional examples you can provide of real-life situations involving understanding, usage and manipulation of fractions will help reinforce these concepts.

Assessment:

Evaluate the approach the student has to solving these problems and the ability to connect the manipulation of the tortillas to solving problems and calculations using fractions.



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – MATH 3

Title of Activity: Calculator Magic
Grades 3-5

Objective: To reinforce basic mental mathematical operations.

Materials Needed: A calculator
Paper and pencil

Introductory “Hook”:

Have you ever seen someone perform a magic trick? Once you learn what the “trick” actually is and how to do it, it seems to make more sense. Perhaps you have played “Let Me Guess Your Favorite Number” or some other variation that has interesting results regarding numbers. Here’s an interesting trick to play with a calculator. Hand a calculator to the student and tell him or her to put in 37,037. Then ask the student to name a number between 1 and 9. Whatever the number is, ask the student to multiply it mentally (not with the calculator) and then multiply that number times 37,037 that is on the calculator. The result should fill the screen with repeats of the favorite number. (37,037 on the calculator; 2 is the number selected. $2 \times 3 = 6$. Multiply 37.037 by 6 to get a row of 2s.)

Is this really “magic”? How do you think someone figured out this trick?

Development of Lesson:

Some people seem to be able to do arithmetic computations faster than any one else---almost as fast as a calculator. One such prodigy, a 7 year-old boy, Jacques Inaudi, showed he could do very complicated calculations in his head while he worked at herding sheep. When leading scientists of the 1800s tested him, they learned that he had an extraordinary memory and he practiced computing in his head constantly.

While some people may have that talent, almost everyone can improve their mental calculations by practice. Ask your student which math operation (addition, subtraction, multiplication or division) he or she feels most comfortable doing mentally. How did the student become proficient at that operation?

Together, create a schedule for the student to work on any of the operations that need improvement. Share with the student how you create a plan to work towards accomplishing a goal as well as how you use mental calculations in your work or in other real-world situations.

Create with paper and pencil,

Discussion and Questions:

As you and your student develop a plan for improving mental math operations, create milestones that will help you both evaluate progress. Consider such things as:

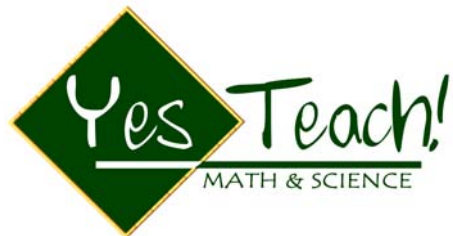
- Memorizing multiplication tables is a foundation for other mental calculations
- Creating the habit of double checking math calculations
- Finding specific times (during commercials, waiting for the bus, while brushing your teeth, etc) when practicing mental calculations would be easy

Application:

Practice scenarios with the student involving estimating purchases or estimating the amount of change you should receive from purchasing something. An example is: If you order a hamburger for one dollar, fries for \$1.25 and a cookie for 75 cents, estimate how much change you should get back from a five-dollar bill. Once the student has the correct answer, change the numbers slightly and see how the student adjusts his or her response.

Assessment:

Identifying skills that can be improved is a major asset to thinking mathematically and being able to estimate many math problems. Over time, your student should be able to mentally calculate and estimate quickly and more accurately.



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – MATH 4

Title of Activity: Worldwide Shopping
Grades 6-8

Objective: To practice calculating whole numbers and decimal numbers as they relate to currencies

Materials Needed: Calculator
Recent list of currency values from newspaper or Internet
Paper and pencil

Introductory “Hook”:

Do you know where you can buy anything from shoes to make-up, food to cars “on sale?” The answer is in a country whose currency rates are favorable to the U.S. This means that if something costs 150 Mexican pesos doesn’t mean it is the equivalent of 150 U.S. dollars. In fact, the rate is more like 14 U.S. dollars. In other parts of the world, it is the reverse. The U.S. dollar has been weaker than the European Euro so if the price of something in Europe is 100 euros, it costs more like \$120 U.S. dollars. Many things affect the value of a country’s currency but you need to be prepared that prices in other countries need converting to be able to tell how much they really are in U.S. dollars.

Development of Lesson:

Using the currency values from the newspaper and a calculator, have your student prepare a sheet of paper you could use for the following situations. To check their answers, you may want to use a currency calculator on the Internet.

1. You are traveling to Italy and need to know how much money you need to take. You estimate that your hotel, food and transportation each day will cost about 125 euros. You will be gone 6 days and want to have about \$250 spending money for the trip.
2. You are going to Canada for the summer to stay with your grandparents. You can never tell if the things in the stores are expensive or a good deal. You decide to make up a chart you can carry around with you with the following information:

If an item costs 1 Canadian dollar, it is the equivalent of _____ U.S. dollars.

If an item costs 5 Canadian dollars, it is the equivalent of _____ U.S. dollars.

If an item costs \$10 Canadian dollars, it is the equivalent of _____ U.S. dollars.

If an item costs \$15 Canadian dollars, it is the equivalent of _____ U.S. dollars.

3. You are signing up for a cruise for spring break. You can either pay \$250 in U.S. dollars or 2400 Mexican pesos. Which is the better deal?

Discussion and Questions:

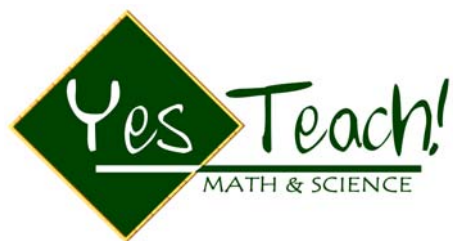
Discuss with your student what might happen for people who want to travel if the U.S. dollar is stronger than the euro. Does it matter if they are from the U.S. or from a European country? Also, what world events might make a difference in the value of a country's currency? Why is it important that people know how to convert currencies?

Application:

This entire exercise is devoted to a practical application. If you have or can borrow some foreign currency to use with the activity, that can make it even more realistic. You might also want to discuss with your student how U.S. companies can hire workers in other countries at a much lower cost in some instances.

Assessment:

If students are able to complete the currency conversions and discuss their answers, you have met your goal with this exercise.



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – SCIENCE 1

Title of Activity: Thinking Outside the Box
Grades 3-5, Science

Objective: Teaching creative thinking, problem solving and transfer

Materials Needed: One each: tennis ball, small jagged rock, marble, raw egg
Several sheets of paper
Two twist ties
Plastic straw
Thimble
Pair of scissors
Ruler
Two shoe boxes
Large clear table or desktop

Introductory “Hook”:

One of the most important skills you can ever have is to think creatively to learn to solve problems. Albert Einstein said that “Imagination is more important than knowledge”. There can be many ways to solve a particular problem, but if you look at the problem from only one direction, you might not see these many potential solutions. A good example is the story of the Gordian Knot. In the ancient world, in a city called Gordium, there was a huge knot tied to the yoke of a cart. It was so intricate that no one for scores of years had been able to unravel it, though thousands had tried. It was believed that whoever finally unraveled the knot would become the ruler of Asia. Alexander the Great came upon the knot and studied it for a short while. He then drew out his sword and cut it in half. The knot was now undone, and while he had not solved the problem in the way that everyone had anticipated and attempted, the knot was nevertheless unraveled. This was a form of creative thinking.

Development of Lesson:

1. Place the two shoe boxes side by side.
2. Place one of the four items (tennis ball, rock, marble, or egg) into one of the shoe boxes.
3. Using the materials on hand, paper, twist ties, plastic straw, thimble, scissors, and ruler, devise a way to move the item from one shoe box to the other *without touching it with your hands*.

4. Try it with each of the four items and consider different solutions each time. While there is no one correct solution, the key is creatively thinking of ways to accomplish the task. Possible solutions include using gravity by moving the boxes to different heights, creating a harness and lifting the item across, rolling the item through holes in the shoe boxes, finding a way to bounce the item, etc.

Discussion and Questions:

Talk with students about how, after solving the problem one time, they applied what they learned to solving a slightly different problem the second time, or devising new solutions. Explain that this is the concept of transfer and it is a key element in creative problem solving.

Talk about the following:

What method worked best?

What method was easiest?

How was the solution different for the different objects?

Which object was the most difficult to move? Why?

What solutions do you think are the most common? Why?

What real world ideas did this activity make you think about?

Did you find your mind working differently than usual when you were trying to solve the problem?

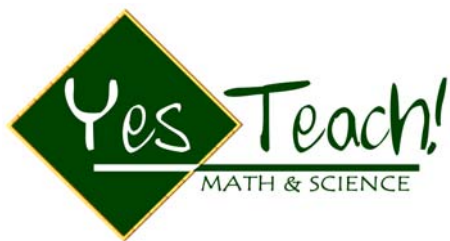
How?

Application:

This lesson is related to concepts of scientific inquiry, investigation and experimental design.

Assessment:

The assessment is open-ended and entails the child's satisfaction with the solution. If the item was moved from one box to another without the child's hands touching it, then the problem was satisfactorily solved. Everyone will have a different solution and the key is to think creatively.



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – SCIENCE 2

Title of Activity: All Bottled Up
Grades 3-5, Science

Objective: Teaching concepts of creative thinking, problem solving,
And the scientific method

Materials Needed: One large bottle, one cork to fit the bottle, one coin

Introductory “Hook”:

Sometimes we fail to see an obvious solution to a problem because we are thinking along the same lines we always do. Learning to think of alternate or creative solutions to problems can help us in all aspects of our lives. Sometimes we get hung up on what we believe the rules to be and can't see a solution because we pay too much attention to the rules or limiting factors. To solve a problem creatively, it can help to brainstorm, listing all possible solutions no matter how far-fetched they might seem. Then when you look at all of the ideas together, very often the solution “jumps out” at you, or the ideas lead to new ideas. Write down your ideas along with the rules or limiting factors to solving the problem. This will help you to think outside of these rules. For instance, in this problem, the rules we know about are:

1. Get the coin out of the bottle
2. Don't break the bottle
3. Don't pull the cork out

Development of Lesson:

1. Ask the child to drop the coin into the bottle, then to stop up the bottle with the cork.
2. Now, the task is to get the coin out of the bottle without pulling the cork out or breaking the bottle.
3. Brainstorm with the child all of the potential ways to complete the task, reminding him or her that nothing is too crazy to mention when brainstorming. Sometimes one idea that doesn't work leads to one that does.
4. One solution to the problem is to push the cork into the bottle and then shake the coin out.

Discussion and Questions:

Talk with students about how it is important to look at the limiting factors in solving a problem. In this case those factors were to not remove the cork and to not break the bottle. Sometimes what is *not* said (in this case it was not said that the cork could be pushed into the bottle) can be a big clue to a solution. In solving problems, writing down the information you have can help to look at the problem as a whole.

Talk about the following:

1. What did you learn about thinking by solving this problem?
2. Do you think this was an easy problem or a difficult problem? Why?
3. Can you think of other problems like this?
4. Did listing the rules help you to think differently about the solution to the problem?

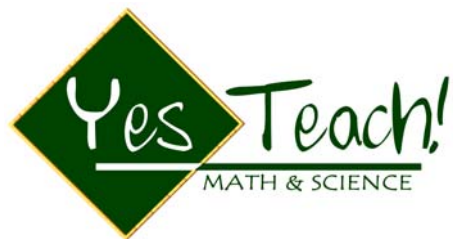
Application:

This lesson is related to aspects of scientific inquiry, problem solving, creative thinking and lateral thinking.

Assessment:

In this activity, the best assessment is the student's understanding of learning to think of alternate solutions to problems. If the student can state an understanding of how the rules limited the thinking process and that solving the problem meant thinking outside of those rules, then he or she has succeeded at the problem.

* Basis for activity found at www.discovery.com



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – SCIENCE 3

Title of Activity: Eat Your Electrons!
Grades 5-6, Science

Objective: Demonstrating the production of light caused by a simple chemical reaction

Materials Needed: Wintergreen candies (the round, green striped kind)
Mirror

Introductory “Hook”:

Chemical reactions occur all the time, such as when we eat something or when two substances unite to make a new substance. Even though they’re happening all the time, we usually don’t see chemical reactions, or at least we don’t pay attention to them. Here’s a simple activity that demonstrates a chemical reaction that takes place in your mouth just by chewing!

When sugar crystals break apart they give off electrons. These electrons release invisible ultraviolet light. Ultraviolet light reacts with a common chemical called methyl salicylate. Wintergreen candy contains this chemical. This is what gives the wintergreen its flavor, and also what makes it fluorescent. The methyl salicylate reacts with ultraviolet light to create visible flashes of light. When you chew the candy, the sugar crystals break, changing physically and giving off electrons, which in turn create ultraviolet light, which then reacts with the methyl salicylate in the wintergreen, making tiny shoots of light. The physical change in the candy then turns into a chemical change that produces light. *

Development of Lesson:

1. Have the child place a piece of wintergreen candy in his or her mouth and chew.
2. Have him or her open her mouth while chewing and look into the mirror to see the sparks.
3. Try it in a dark room as well as a light room to see if a difference can be noticed.

Discussion and Questions:

1. Were you surprised at what you saw when you looked into the mirror?
2. Did you feel anything unusual when you chewed the candy?
3. Did knowing that sparks of light were being created by chewing make you feel different? How?

4. Can you think of any other ways to make this same result occur? For instance, would it work if you broke the candy up with a hammer?
5. Did you see a difference in a dark room as compared to a light room?
6. Do you think this same thing happens with other candy? Why or why not?
7. Does this help you to understand the process of chemical reactions? How?
8. Can you describe any other chemical reactions that take place from chewing?

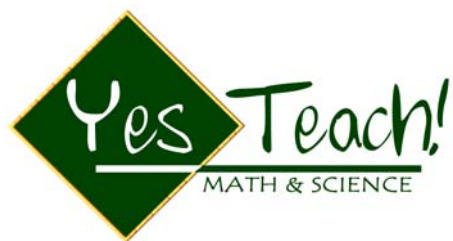
Application:

This activity relates to an understanding of chemical reactions, an understanding of electrons, and an understanding of physical and chemical changes.

Assessment:

The activity is a success if the child sees the flashes of light while chewing the wintergreen candy.

* Fact found in Chemistry A-Z: Teacher's Resource Guide; The Discovery Store



MENTOR-TEACHER- COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – SCIENCE 4

Title of Activity: Hurricane Factory
Grades 6-8, Science

Objective: To demonstrate the swirling motion around the eye of a hurricane; concepts of centripetal and centrifugal force

Materials Needed: Large bowl of water, a large spoon to stir with, food coloring with a dropper

Introductory “Hook”:

Hurricanes are enormous storms where clouds, wind and rain move in a circle around a calm, central “eye”. To form, hurricanes need warm tropical oceans, moisture, and winds. Once they form, if the conditions are right, hurricanes can grow to produce extremely strong, damaging winds, torrential rain, and very high waves. Hurricanes develop over warm tropical waters and are moved through the ocean, and often toward land, by high winds. The winds of hurricanes swirl in a counterclockwise motion around the eye, which is the very center of the hurricane, and stretch out for hundreds of miles in bands of wind and rain. They can be very damaging when they touch land. In this activity, you can see how a hurricane looks from up above by dropping colored dye into swirling water.

Development of Lesson:

1. Fill the bowl two-thirds of the way with water.
2. Using a large spoon, stir the sides of the bowl counterclockwise until the water is moving rapidly in the bowl.
3. While the water is swirling, stop stirring and drop a few drops of food coloring into the center of the swirling water. This is the “eye” of your hurricane.
4. You will see the water move out from the eye and form bands, much like the clouds do in an actual hurricane.

Discussion and Questions:

Did you see how the bands of swirling water moved away from the center? The very center forms the “eye” where the motion forms a circle. This is related to the concepts of centripetal and centrifugal force. In an actual hurricane there is no wind in the eye. What happens is that centripetal force causes the wind to circulate around the low pressure in the center of the hurricane, forming the eye. Centrifugal force then balances this effect and keeps wind from entering the eye. With

centripetal force, the rotating winds are being drawn inward and are circulating around the eye. At the same time, the force inside the eye, centrifugal force, is keeping the eye intact and not allowing winds to enter it. The bands at the outside of the hurricane, as you can see with the colored water, move away from the center, being less affected by the forces of wind pressure.

1. Did the experiment work as you expected?
2. Were you surprised at how quickly the dye was spread outward?
3. In the experiment you stirred the water counter-clockwise to simulate what happens in an actual hurricane. Do you think it would make a difference if you stirred clockwise instead? Why or why not?
4. Can you give other examples of centrifugal and centripetal force?

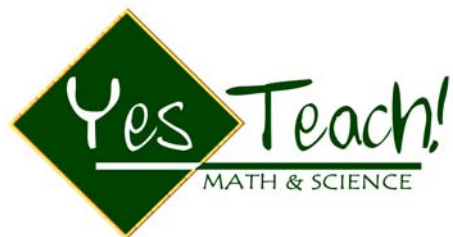
Application:

This activity is related to physics concepts of centrifugal and centripetal force and demonstrates these forces as they are seen in a naturally occurring phenomenon.

Assessment:

The student should understand the concept of the eye of the hurricane, the bands swirling away from it, and the balancing concepts of centrifugal and centripetal force.

* Activity idea from NationalGeographic.com



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – READING 1

Title of Activity: Hang On for the Ride!
Reading: Grades 6-8

Objective: Reinforce reading skills including vocabulary, comprehension and fluency.

Materials Needed: Copy of reading selection
Any additional information about thrill rides from the Internet

Introductory “Hook”:

Ask the student these questions and discuss your own answers together:

1. What is the most thrilling ride you’ve ever been on?
2. Who do you think designs and builds thrill rides?
3. Why do you think people enjoy riding them?
4. What are the elements that make a ride thrilling?
5. How would you describe the difference between a merry-go-round and a roller coaster to someone who had never seen either?

You can have the student read the passage silently or you can both read it together aloud, depending on the reading fluency of the student.

READING PASSAGE

Hang On for the Ride!

Where can you travel over 90 miles an hour upside down without a roof over your head? If you guessed a roller coaster you would be correct. In a race to build the tallest, fastest twisting ride, roller coasters get most people’s vote for the most thrilling experience at amusement parks.

With names like Dueling Dragons, Montu, Millennium Force, Space Mountain and Joker’s Jinx, most of the popular roller coasters around the world live up to the nickname “scream machine”. Using twists, loops and dives, the rides draw people who want to pack in a lot of excitement in a few, short minutes.

While whirling around the track, most riders don’t have time to even think about how the coaster works. Actually, engineers use several laws of science while designing the rides. One of the first

differences between a roller coaster and other rides is the fact that most machines that move have engines. However, a roller coaster is one ride that moves without an engine. Once the roller coaster is pulled to the top of the first hill, the laws of motion and energy drive the cars for the entire length of the ride. The wheels (or rollers) keep the cars on the track even when they are upside down. To end the ride, brakes are installed on the cars to stop the motion.

Each year, newer coasters are built to attract riders. The new rides compete with speed, height, and other heart-racing features. The “Top Thrill Dragster” opened in Cedar Point, Ohio during the summer of 2003 as the tallest, fastest roller coaster in the world. Riders went from zero to 120 miles per hour in four seconds following the first hill drop that began 420 feet in the air. At least ten new roller coasters are under construction now to try to beat those figures.

As theme parks compete to build the scariest roller coaster, there are people trying to set records for riding them. A recent world record holder spent six days on two different roller coasters. To be in the Guinness Book of World Records, riders have to spend 8 hours a day riding roller coasters with no more than a 15-minute break. Some record-setters carry pillows and portable toilets for their extended sessions.

As faster and higher coasters are built, fans are rushing to see what new thrills they can experience. Until a new adventure is invented that can match the heart-pounding sensation of roller coasters, there is plenty of excitement for everyone who gets in line for the ride.

QUESTIONS ABOUT THE PASSAGE:

Read this sentence from the article:

Some record-setters carry pillows and portable toilets for their extended sessions.

1. Which word has almost the same meaning as *extended*?
 - A. short
 - B. lengthy
 - C. thrilling
 - D. embarrassing

2. According to the article, how are roller coasters designed?
 - A. Theme parks design rides for all ages.
 - B. Engineers use scientific laws in their designs.
 - C. Scientists conduct experiments on the rides.
 - D. Record holders give their ideas to theme parks.

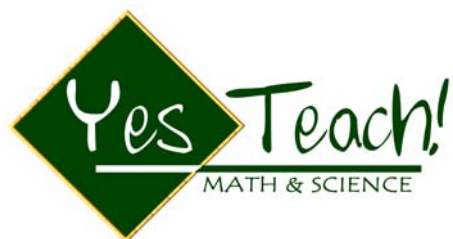
3. What was the author's purpose in writing this article?
- A. to reduce fear of roller coasters
 - B. to get more people to design roller coasters
 - C. to convince people to ride roller coasters more often
 - D. to provide information and facts about roller coasters
4. What two features of roller coasters make them thrilling to riders?
- A. width and length
 - B. location and name
 - C. speed and height
 - D. color and number of cars
5. A roller coaster costs on average \$25 million dollars to design and build. If an amusement park builds a new roller coaster every three years, how much would they spend on roller coasters over a 15-year period?
- A. \$75 million
 - B. \$100 million
 - C. \$125 million
 - D. \$250 million

Application:

Ask the student where he or she might find additional information about roller coasters. Also, help the student to find a time when he or she might share the information from this article with someone else.

Assessment:

Go over the answers with the student to assess comprehension. If student needs practice with reading fluency, ask him or her to re-read portions or all of the selection aloud to you again.
(Answers: b. b. c. c)



MENTOR-TEACHER-COMMUNITY TOOLKIT RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – READING 2

Title of Activity: Shark Attack
Reading: Grades 7-8

Objective: Reinforce reading skills including vocabulary, comprehension and fluency.

Materials Needed: Copy of reading selection
Any additional information about sharks from newspaper or other media

Introductory “Hook”:

Ask the student these questions and discuss your own answers together:

1. Do you think sharks are a danger to people?
2. Why do so many shark bites occur each year?
3. How could the number of shark bites be reduced?
4. Are sharks portrayed realistically in movies and on television?

You can have the student read the passage silently or you can both read it together aloud, depending on the reading fluency of the student.

READING PASSAGE

Shark Attacks

Here’s an interesting question: When is the worst possible time in your life to be mistaken for a seal? Is the answer, while you’re at Seaworld with your girlfriend?; while you’re at the Prom in an all black tuxedo?; or while you’re swimming off the coast of Florida?”

If you picked the last one, then you’re on target. The first two are pretty embarrassing, but the last answer involves life and death. The waters off the coast of Florida, particularly on the East coast are the sites of some of the most frequent shark attacks in the world. From 1990 to 2002 in Florida there were 289 reported attacks, 29 of them fatal. The coasts of Brazil, South Africa and Australia are other areas highly prone to shark attacks. Worldwide there are about 70-100 shark attacks each year, of which 5-15 results in death. Even more interesting, most attacks happen to people ages 15-29 while engaging in activities such as surfing, boogie boarding, snorkeling or scuba diving. Why? One theory is that a couple of arms and legs dangling from the edges of a surfboard look quite a bit like a favorite shark snack – seals. Also, as a diver or snorkler, even without a board, when you’re lying on top of the water looking down, especially if splashing your arms and legs, you can appear surprisingly inviting to a hungry shark.

There are three main types of shark attacks, the bump and graze, the hit and run, and the sneak attack. In the hit and run, the shark will commonly attack a swimmer or surfer near the surf zone of the water, bite the person and then swim away, not returning. Usually this happens because the shark is in its own normal feeding zone and happens upon a human by mistake. It is most likely drawn by some type of shiny jewelry, a colorful bathing suit, and splashing around near the breaking surf. Typically, when the shark realizes its mistake, it swims away. Most of these types of attacks happen to the legs and feet, usually the lower leg, and are generally not fatal.

With the bump and graze, and the sneak attack, the events are somewhat different, and usually result in more serious bites and more fatalities. While they can occur in near shore waters, they typically occur in deeper waters to swimmers, divers, and surfers. Often, the shark will first bump the victim and then come back to attack him. Sneak attacks have no warning bump, just an attack seemingly out of nowhere. In both the bump and graze, and the sneak attack the shark may return to attack repeatedly.

While any shark over six feet long can pose a threat, the white shark, the tiger shark, and the bull shark are the sharks most commonly found to attack humans. In Florida, the Blacktip shark is the most common attacker, with 20-30 reported attacks per year. All of these sharks grow to relatively large sizes and hunt larger sized prey such as sea turtles, seals, and large fish.

So, what can you do about all of this? Well, you can choose to stay out of the water altogether, or you can take some safety precautions, and you can know what to do if a shark does attack.

Safety Precautions:

1. Don't swim alone—having a buddy along to watch out for you can help both to spot danger, and in the case of attack. Swimming in groups is even better, because sharks are more likely to attack an individual alone.
2. Don't swim at dusk or at night—sharks like to feed at dusk and at nighttime and can often come surprisingly close to shore.
3. Don't swim if you have a cut or open wound—sharks are drawn to blood and can sense it from very far away.
4. Don't swim where there are lots of fish or where things have been dumped in the water—sharks will naturally come to places like this to feed.
5. Don't lie on top of the water looking down—you will look like prey to a shark.
6. Try not to splash too much—this can attract sharks.
7. Don't hang out in the area between sandbars or near steep drop-offs— these are favorite shark cruising grounds.
8. Don't swim in cloudy waters where it is more difficult to see.
9. Don't go too far out—not only will the likelihood of sharks increase, but also you are less likely to get help if you're alone and too far out.
10. Watch out for wearing brightly colored bathing suits or jewelry—sharks are drawn to highly visible markings.
11. Pay attention to signs—read the posted signs on the beach. If there has been a recent attack or if sharks have been seen in the area there may be information on or near the beach.

12. Be alert to your environment—Watch your surroundings and pay attention to others in the water. If everyone else is getting out, that’s probably a good sign that you should too. Always pay attention to lifeguards and never swim where there are warning signs.
13. Stay informed—read the paper, watch the news, check websites to find out about the waters where recent attacks have occurred.

If a shark does attack:

1. Hit him near the eyes or gills. These are his most sensitive areas. Use anything you have with you, including your fist if necessary. It is important to fight back if you are being attacked because fighting a shark is like fighting anyone – he needs to know that you will defend yourself and that you’re not just an easy meal. Making it as difficult as possible can increase the chances that he will go away.
2. Scream. This will probably come naturally. Make as much noise as possible and try to get help.

Finally, remember, despite what you hear in the news about shark attacks, they are very rare. While the discrete number of shark attacks is on the rise, this is because more humans are engaged in water activities. Proportionately, the number of attacks has not risen. In fact, your chance of getting hit by lightning is 15 times that of being attacked by a shark.

READING QUESTIONS

1. According to the article, Florida is one of the most common places in the world to experience a shark attack. Where is another?
 - a. Africa
 - b. Hawaii
 - c. Brazil
 - d. New Zealand
2. The article starts off by asking when is the worst possible time to be mistaken for a seal. According to the article, what is the most complete reason why looking like a seal is a bad thing?
 - a. because sharks like seals
 - b. because if you look like a seal that might be confusing to a shark
 - c. Because if you look like a seal, you increase the likelihood of being attacked by a shark
 - d. because if you are lying in the water a certain way, then you might look like a seal and that is something sharks like to eat

3. Read the following sentence:

The coasts of Brazil, South Africa and Australia are other areas highly prone to shark attacks.

What does the word *prone* mean?

- a. having a growth of
 - b. having a liability for
 - c. having an increase in
 - d. having a tendency toward
4. Using details and information from the article summarize the main points of the article.

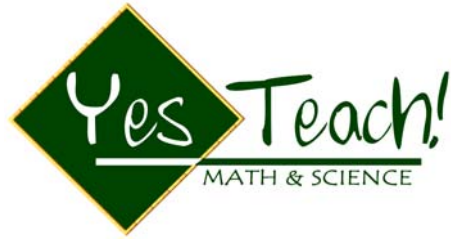
5. Which of the following is the best reason not to swim in murky waters or at dusk?
- a. Some species of sharks swim exclusively in murky waters
 - b. It is difficult to see an attacking shark in murky or cloudy water
 - c. Sharks cannot be easily distinguished from porpoises at dusk or twilight
 - d. Sharks are known to have a good sense of visual contrast, helping them to distinguish their prey in clouded or darkened waters
6. From 1990 to 2002 there were 735 confirmed shark attacks worldwide. Of these, 289 were reported from Florida. What percentage of the worldwide attacks occurs in Florida?
- a. 25%
 - b. 39%
 - c. 54%
 - d. 60%

APPLICATION

Discuss with student the question asked previously about how information should be disseminated so that more people are aware of the danger of shark bites.

Assessment

Go over the answers with the student to assess comprehension. If student needs practice with reading fluency, ask him or her to re-read portions or all of the selection aloud to you again. (Answers: c, c, d, reasonable answer, d, b)



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – READING 3

Title of Activity: Oh I Wish I Were. . .
Grades 3-4

Objective: Reinforce reading skills including vocabulary, comprehension and fluency.

Materials Needed: Copy of reading selection
A menu from any restaurant

Introductory “Hook”:

Ask the student these questions and discuss your own answers together:

What is your favorite food?

What is your favorite summer food?

How do you think people remember certain food products to order in restaurants or to buy at the store?

Have you ever seen a Weinermobile or a Batmobile?

You can have the student read the passage silently or you can both read it together aloud, depending on the reading fluency of the student.

READING PASSAGE

Oh I Wish I Were . . .

Hot dogs are one of the most popular foods in the U.S. In fact, more than seven billion hot dogs are eaten in June, July and August. Each year, the biggest day for eating hot dogs is the 4th of July. On that holiday, almost 150 million hot dogs are eaten! Another 26 million hot dogs are eaten at baseball games each year.

Hot dogs are sometimes called frankfurters. That is because hot dogs were first made in Frankfurt, Germany. A man named Oscar Mayer brought hot dogs to the U.S. when he moved from

Germany to Detroit and then Chicago. It didn't take long for hot dogs to become a very popular meat for all ages.

There are two interesting ways that one meat company, Oscar Mayer, uses to get more people to buy and eat their products. One is the famous songs or jingles used in their ads. Almost everyone knows some of the words to these jingles:

“Oh I wish I were an Oscar Mayer weiner.” and another begins “My bologna has a first name. . .”

The company also has a special car, shaped like a hot dog. It is called a Weinermobile. This car goes around the U.S. to get attention. It looks like a hot dog and it weighs exactly the same as one million hot dogs. It also has seats the color of mustard and ketchup.

QUESTIONS ABOUT THE PASSAGE:

1. What is a jingle?
 - A. a short song
 - B. a bell-shaped hot dog
 - C. a Christmas specialty
 - D. a place to store hot dogs

2. According to the article, how did hot dogs get to the U.S.?
 - A. they sang songs about them
 - B. people brought them in special cars
 - C. a man brought them from Germany
 - D. they came with baseball from another country

3. What was the author's purpose in writing this article?
 - A. to make people eat more meat
 - B. to explain about hot dogs in the U.S.
 - C. to convince people to enter contests
 - D. to explain different ways to celebrate July 4th

4. According to the article, what two ways does Oscar Mayer advertise its products?
- A. Free samples at baseball games
 - B. Letting people drive the Weinermobile
 - C. Offering coupons for buying products
 - D. Using jingles and an interesting hotdog shaped car
5. People in the U.S. eat the most hot dogs during
- A. the summer
 - B. the fall
 - C. the spring
 - D. the winter

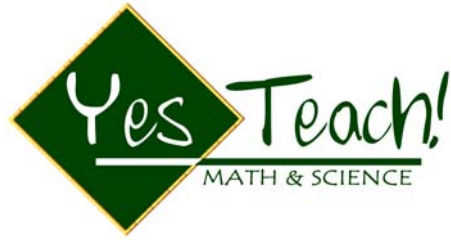
Application:

Ask the student where he or she might find additional information about hot dogs. Also, help the student to find a time when he or she might share the information from this article with the class, someone in his or her family, or someone who loves hot dogs.

If you have a menu from another restaurant, ask the student what he or she might like to order from the menu. Then discuss what you both know about the type of food or the specific food item such as where the food came from, how it got its name, how popular it is, etc.

Assessment:

Go over the answers with the student to assess comprehension. If student needs practice with reading fluency, ask him or her to re-read portions or all of the selection aloud to you again.
(Answers: a. c. b. d. a)



MENTOR-TEACHER-COMMUNITY TOOLKIT
RESOURCES FOR MATH, SCIENCE & READING

MENTORING EXERCISES – READING 4

Title of Activity: The King of Reptile Pets
Grades 4-5

Objective: Reinforce reading skills including vocabulary, comprehension and fluency.

Materials Needed: Copy of reading selection
Photos or additional information from the Internet about iguanas

Introductory “Hook”:

Ask the student these questions and discuss your own answers together:

- Do you have a pet?
- If you could have any kind of pet, what would you choose?
- Do you know much about iguanas?
- Have you ever seen one in wild or in captivity?
- How do you think most people learn about new animals?

You can have the student read the passage silently or you can both read it together aloud, depending on the reading fluency of the student.

READING PASSAGE

The King of Reptile Pets

One of the most popular reptile pets is the iguana. They are called green iguanas or green dragons. Many people enjoy having iguanas for pets. But there are several things you should know about iguanas before thinking about one as a pet.

First of all, they are not good pets for young children. They have rough surfaces, sharp nails and teeth that can hurt you. In general, baby iguanas are gentle. If a baby iguana is raised with

children and gets used to being handled, it usually grows up to be calm with people. But there are times when even a young iguana used to people can become difficult to handle.

Iguanas are diurnal. That means they sleep at night and are active during the day. They eat mostly plants, especially dark green, leafy plants. Some good ones are spinach, beet greens and turnip greens. They also need to have plenty of water to drink.

Because iguanas are cold-blooded, they need to keep warm. Special lights can heat their cage or bedding area. The ideal temperature is between 75 degrees (at night) and 95 degrees (during the day). They also like some flowers, such as dandelions, rose petals and hibiscus flowers.

One thing you have to consider is the size of the iguana's cage. They need to have plenty of room. Since adult iguanas can grow to be six feet long, you need to have a cage the size of a small room. Some people don't plan in advance for the growth of an iguana. Then they are not prepared with a good cage.

If you think you might like an iguana for a pet, you need to read everything you can find about these reptiles. They are interesting animals and can live for 20 years with the proper care.

QUESTIONS ABOUT THE PASSAGE:

1. According to this article, who makes the best pet owner of an iguana?
 - A. an adult
 - B. a young person
 - C. a person with experience handling reptiles
 - D. a person who reads about and understands iguanas
2. What is the **opposite** of diurnal?
 - A. diagonal - slanting at an angle
 - B. nocturnal - awake during the night
 - C. original - from the beginning
 - D. sensible - practical, comfortable

3. What was the author's purpose in writing this article?
- A. to get more people to buy iguanas
 - B. to describe how iguanas use their senses
 - C. to make people better pet owners
 - D. to describe iguana food
4. According to the article, what do iguanas do that requires such large cages?
- A. they are large from birth
 - B. they eat a lot of food every day
 - C. they like to spend time outdoors in the sun
 - D. they grow large and live long lives
5. Why should young children learn about iguanas?
- A. they might think they are always gentle
 - B. they might be afraid of iguanas
 - C. iguanas love young children
 - D. adults are not as good as children with iguanas

Application:

Ask the student where he or she might find additional information about iguanas. Also, help the student to find a time when he or she might share the information from this article with the class, someone in his or her family, or someone who might be interested in getting one for a pet.

Assessment:

Go over the answers with the student to assess comprehension. If student needs practice with reading fluency, ask him or her to re-read portions or all of the selection aloud to you again.
(Answers: d, b, c, d, a)