Gulfport School District
Science Instructional Strategies

Check Grade Level K___ 1___ 2___ 3___ 4___ 5___ 6_X_ 7___ 8___ 9___ 10___ 11___ 12___

Competency: _2__ Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.

Objective(s): _c_ Investigate and describe the effects of forces acting on objects. (DOK 2)

- Gravity, friction, magnetism, drag, lift, and thrust
- Forces affecting the motion of objects

Vocabulary: inertia, resistance, mass, force, rolling friction

Teaching Strategy(ies):

1. *Introduction:* Moving heavy objects from one level to another is a common problem. Whether the task is unloading boxes from a truck or moving a wheelchair from one floor to another, the use of ramps or incline planes makes the job much easier. Using a plane increases the distance an object must be moved while decreasing the amount of *force* necessary for its movement.
2. *Activity:*
    a) The students will pull one book up an inclined plane and record the amount of force registered on a spring scale as it moves.
    b) The students will pull two books up an incline plane and record the amount of force registered on the spring scale as it moves.
    c) The students will compare the amount of force needed to move the mass of one book as compared to two books.
    d) DIFFERENTIATED INSTRUCTION Students can alter the surface of the board by covering the surface with wax paper, carpet, plastic, pencils, sandpaper, rubber mats, tin foil, or any material found in the room.
    e) They will compare the amount of force needed to move the object in each case and graph and analyze the variables. The number of surface comparisons completed by students will be based on student need as assessed by the teacher. The students will respond to this activity in their science journal.

Materials: Per group: 1- 6” x 3’ piece of wood (may vary in size), one chair, one spring scale, spool of string, two books, science journal

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Objective(s): _c_ Investigate and describe the effects of forces acting on objects. (DOK 2)

- Gravity, friction, magnetism, drag, lift, and thrust
- Forces affecting the motion of objects

Vocabulary: friction, force

Teaching Strategy(ies):

1. Bellringer: Friction is a force that slows things that are moving horizontally on a surface. What are some examples of friction? The students will answer this question on their own prior to the beginning of class. Answers will vary, but may include the following: the friction of a rubber brake on a bicycle wheel, the friction between carpet and a chair that a person is pushing, or the friction between grass or dirt and a rolling ball to name a few.
2. Activity:
    a) The students will go outside, taking their toy cars with them.
    b) In groups, the students will roll their cars on various surfaces (sand, grass, concrete, pavement, gravel, etc.) to determine which surface inhibits the rolling of the car and which enables the car to roll.
    c) DIFFERENTIATED INSTRUCTION The students will take notes or draw pictures in their science journal on their observations.

Materials: cars, area outside with various surfaces, science journal

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Competency: 2 Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.

Objective(s): c Investigate and describe the effects of forces acting on objects. (DOK 2)

- Gravity, friction, magnetism, drag, lift, and thrust
- Forces affecting the motion of objects

Vocabulary: force, friction, resistance, load, hinder

Teaching Strategy(ies):

1. Explain to the students that when one object moves across another, friction is created. Various surfaces help or hinder the movement of one object across another. "Today you will use manipulative, measurement, and recording skills to construct a device to move a load across a given surface." Students will divide into homogeneous groups of four and determine roles for each member.
2. Direct the students to cover the surface of their desk with construction paper, marking off a starting point in the middle of the desk.
3. Tell the students, "Securely tape one end of the string to the yogurt lid and the other end to the yogurt container. Fill the cup with 80 mL of water and place the top of the lid at the starting point on the desk. (The amount of water should be adjusted as needed to counter-balance the weight of the yogurt container when it is suspended over the side of the table.")
4. Ask students, "How can we move our water-loaded lid to the edge of the desk?" (Accept all answers.)
5. Ask students, "How many pennies placed in the yogurt container do you think it will take to move the lid to the end of the desk?" Record your prediction in your science journal.
6. Tell students to place pennies (one by one) in the container until the lid moves all the way to the end of the desk. Have students record the results in their science journal. DIFFERENTIATING INSTRUCTION: Set up a system that can measure the distance each penny causes the lid to move. Challenge students to devise a surface that will allow a given object to move a specified distance using a given number of pennies. Restrict students to one type of surface and have them discover ways to make the lid move easily (wax it, wet it, etc.)
7. Ask students: "How can we move the water-loaded lid more easily with fewer pennies?" (Accept all hypotheses.)
8. Discuss the various surfaces available in the classroom and have students predict how each surface will change the movement of the load. Have students record their predictions in their science journals.
9. Allow students to test their hypotheses and record their results.
10. Have students examine their hypotheses in relation to the actual results and draw a conclusion based on the data.

Materials: Per Group: One yogurt container and lid, tape, a plastic or paper cup, water, one piece of string [60 cm in length], twenty pennies, various surfaces {rough, wood, carpet, sandpaper, Styrofoam, tin foil, construction paper – whatever is available}, science journal (one per student)

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Competency: _2_ Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.

Content Standard(s): _c, f_ Investigate and describe the effects of forces acting on objects.

- (c)Gravity, friction, magnetism, drag, lift, thrust.
- (f) Develop logical argument to explain how the forces which affect the motion of objects have real world applications including (but not limited to) examples of Mississippi's contributions.

Vocabulary: lift, thrust, gravity, drag, pitch, tool, yaw, Daniel Bernoulli, Bernoulli's Principal

Teaching Strategy(ies):

1. Students will construct a balsa wood airplane. Have students tell things they know about planes and parts of a plane. Display airplanes and plane pictures. Show visual aide that provides information on construction of an airplane. Students will design and construct an airplane. See Science Olympiad "Wright Stuff" www.sonic.org (1d, 1f, 1h).
2. Graph, chart, and analyze distance, time aloft, and accuracy of balsa wood planes built. Students will identify the difference in design that attribute to quality of fight distance, time aloft, and accuracy. How is this important to real-world application?

Materials: Basal wood, tissue paper, masking tape, file cards, scissors, transparency, or visual aide of parts of a plane

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Competency: _2_ Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.

Content Standard(s): _c_ Investigate and describe the effects of forces acting on objects. * gravity, friction, magnetism, drag, lift, and thrust.

Vocabulary: gravity, weight, resistance, mass, Galileo

Teaching Strategy(ies):

1. Introduction: Do you think gravity pulls on heavy objects faster than a light object? Can you think of a way to find out? After students create ways to test the hypothesis, have students perform the following activity.
2. Activity:
    a) Have students stand with arms out at shoulder height. Stand with oranges in hand and drop them at the same time. Students can enter predictions and observation in their science journal.
    b) Repeat the same activity this time holding an orange and a grape.
    c) Teacher can discuss how gravity pulls all objects downward at the same rate regardless of their weight.
    d) Students will record vocabulary terms in journal.
3. Extend lesson: Teacher can ask students which will fall faster if you drop a book and a piece of paper. Teacher will drop objects at the same time and ask students why they think this happened if all objects fall at the same rate? Show students that if you place the paper on top of the book (to cut wind resistance) the paper will fall with the book at the same rate!
4. Students will navigate simulation of gravity in the solar system at www.teachercreated.com/books/2411 click on page 67. Sites 1 and 2 simulation will include:
    a) (4f) examine basic properties of our solar system.
    b) (2c) determine the relationship between gravity and weight
    c) (1c) calculate their weight on various planets in the solar system. (Actually use scale for earth weight)
    d) (4e) analyze the current phase of the moon

Materials: Two oranges, grapes (or other very small object), newspaper, textbook, piece of paper, computer lab, science journal

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Competency: _2_ Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.
Content Standard(s): _d_ Investigate the mechanical and chemical forms of energy from one to another.

Vocabulary: Law of Conservation, Mechanical Energy, Kinetic energy, Potential Energy, Thermal Energy, Light Energy, Sound Energy, Electrical Energy, Chemical Energy, and Nuclear Energy

Teaching Strategy(ies):

1. Introduction: Energy is a property of matter. It comes in many different forms. Energy can be transferred from one object to another but cannot be created or destroyed. Mechanical energy is most easily recognizable because of its motion or position. There are two kinds of mechanical energy: kinetic and potential. Kinetic energy is an object in motion. Potential energy is energy an object has because of its position or shape.
2. Reinforce: Kinetic energy is energy in motion. Potential energy is energy at rest. Law of Conservation of Energy, "Energy cannot be created nor destroyed, it can only change form."
3. Demonstration: Teacher will demonstrate potential and kinetic energy using everyday objects, e.g. hairdryer, ball, match, flashlight, etc.
4. Teacher will ask students to give other examples. Students will select various objects to determine potential and kinetic energy. Next, students will create a paper airplane or rocket car to demonstrate understanding of potential and kinetic energy.
5. Challenges:
    a) All students will work with a partner to test and measure the distance traveled by the object using metric.
    b) Advanced students will graph the motion of object.
    c) Students will identify the different types of energy conversions upon completion of the trials.

Materials: Airplane: white paper, graphing paper, meter sticks, tape. Rocket car: Styrofoam meat trays, straws, hat pins, tape, meter stick, and stop watch

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Competency: _2_ Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.
Content Standard(s): _d_ Investigate the mechanical and chemical forms of energy from one to another.

Vocabulary: Rube Goldberg, Mechanical Energy , Chemical Energy, Law of Conservation of Energy, and Convert

Teaching Strategy(ies):

1. Watch clip of "Home Alone." Rube Goldberg.
2. Introduction: After students review the vocabulary, teacher will place visual of Rube Goldberg Man (DOK1).
3. Students will identify the areas of energy conversion on the machine displayed.
4. The student will pick another student to explain the cause and effect of each conversion (DOK2).
5. DIFFERENTIATED INSTRUCTION Teacher will have step-by-step instructions available for students needing scaffolding.
6. Teacher will distribute Kinex Kit and instructions, if needed, to the students.
7. Students will use Kinex Kit to construct/design a machine that uses energy conversion. (DOK3/4).
8. Students will play with mousetrap game, tea light steam engine, or steam boat when they complete their work.

Materials: Kinex Kit, Home Alone movie (clip), Mouse Trap game, Rube Goldberg Man transparency, tea light steam engine materials

Competency: _2_ Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.
Content Standard(s): _d_ Investigate the mechanical and chemical forms of energy from one to another.

Vocabulary: Pitch, Vibration, Sound Frequency, Hertz

Teaching Strategy(ies):

1. Introduction: Use talking tapes and have students guess what the tapes are saying. Students will ask how the strip of plastic produces sound. Explain how sound is caused by vibrations. Have students speak while touching their necks. They will feel the vibrations. Allow students to explore tapes and feel the indents that caused the vibrations.
2. Lesson:
    a) Students will explore palm pipes.
    b) After a close examination the teacher will ask students to write in their science journals regarding their prediction of what sound the pipe will produce and their justification for that answer.
    c) Students will measure the different sizes of PVC pipe in centimeters (1cm), and match the length of the pipes to the musical note.
    d) Students will cause vibration to make sound by pressing the pipe on their palms.
    e) Students will play songs with pipes.
    f) CHALLENGE: Students will calculate hertz (f=v/d)

Materials: Talking Tapes, ½ inch PVC pipe about 6½ long, metric ruler, sandpaper (if necessary), marker, science journal

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Competency: __2__ Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.

Objective(s): _f_ Develop a logical argument to explain how the forces which affect the motion of objects has real-world applications including (but not limited to) examples of Mississippi's contributions as follows: (DOK 3)

- Automotive industry (Nissan's new production plant is located in Canton, MS. Toyota's new facility is in Tupelo, MS.)
- Aerospace industry (The Raspet Flight Research Laboratory, housed at Mississippi State University, is one of the premier university flight research facilities in the country.)
- Shipbuilding industry (Ingall's Shipbuilding, of Pascagoula, MS, is a leading supplier of marine vessels to the United States Navy.)

Vocabulary: predict, alternative energy, solar power, hydropower

Teaching Strategy(ies):

1. Introduction: The teacher will prepare to demonstrate a steam engine/steamboat/pinwheel. Students will view the demonstration and write their predictions about what will happen in their science journal.
2. The students will construct a pinwheel by using the following steps:
    a) Cut 6-8 notches evenly spaced around the edge of a pie pan.
    b) Bend the cut edges halfway back so they are at about a 90° angle.
    c) Push a pin through the center of the pan and then into the eraser of a pencil.
    d) Use a piece of clay to stand the pencil up on the mirror.
    e) Set the wheel-mirror apparatus in the sun and wait a few moments while it heats up. If the pie tin does not turn, adjust the edges forward or backward.
    f) DIFFERENTIATED INSTRUCTION Students can use different sized mirrors and observe and record in the science journal the difference in the length of time required to begin movement.

Materials: small pie pan, scissors, pin, pencil with eraser, mirror (same size as the pie pan), clay, demonstration model, science journal

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Competency: _2_ Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.

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- Shipbuilding industry (Ingall's Shipbuilding, of Pascagoula, MS, is a leading supplier of marine vessels to the United States Navy.)

Vocabulary: motion, force

Teaching Strategy(ies):

1. Review the pinwheel activity and discuss the effect of using a different size mirror under the pinwheel. Explain to the students that they will be constructing their own steam engine.
2. Make a boat from a plastic bottle, cut in half, lengthwise.
3. Put a small candle fixed with a small piece of sticky tape to keep it in place near the bow.
4. Fold the soft copper tubing to make an engine. Gently bend the tubing around a large pen or pencil to form a coil in the center. Bend the tails of the tubes downward slightly.
5. Poke two holes in the back of the boat with a nail, and force the copper tubes through the holes. The holes in the soft plastic will close around the holes forming a water-tight fit.
6. Gently bend the tubing so the coil is just above the top of where the candle flame will be. The boat is now finished and ready to launch.
7. The copper tubes must be full of water, and both ends must be under water.
8. When the tubes are full of water and the boat is resting in the water with both ends of the tubing under water, light the candle.
9. Students will write in their science journals regarding their observations of their boat and the boat-making process and brainstorm real-world applications for this device.

Materials: tea light candle, 500 mL plastic bottle, ⅛ inch (3mm) soft copper tubing, matches, science journal

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***Competency*: _3_** Explain the organization of living things, the flow of matter and energy through ecosystems, the diversity and interactions among populations, and the natural and human-made pressures that impact the environment.

***Objective:* _b_** Compare and contrast structure and function of living things to include cells and whole organisms. (DOK 2)

- Hierarchy of cells, tissues, organs, and organ systems to their functions in an organism
- Function of plant and animal cell parts (vacuoles, nucleus, cytoplasm, cell membrane, cell wall, chloroplast)
- Vascular and nonvascular plants, flowering and non-flowering plants, deciduous and coniferous trees

Vocabulary: tessellation, trillion, epithelial

Teaching Strategy(ies):

1. Make a transparency of the first page to assist the students in seeing the four types of cells.
2. Ask the students to look around the room and identify objects in the room that are made up of smaller parts. As they do so, guide them to recognize that most objects consist of various components, although some may be very small and difficult to see. If someone brings up atoms and molecules, begin there and trace the progression through the various components to the objects.
3. Challenge the students to think about the construction of their own bodies and what the components might be. List the responses. If the replies include blood, bones, etc., in addition to cells, encourage the students to describe the relationship between these cells and these body parts. If the students have had LIMITED PRIOR EXPERIENCE with cells, describe a cell in general terms. Emphasize that the cell is the basic unit of life.
4. Ask the students to consider how the cells of their own body might be organized. Challenge them to imagine what it would be like if all their cells were scattered in a random fashion, pointing out that structures that hold us together, such as skin and bones, are also made of cells and thus would be scattered too.
5. Discuss the variety of cells in our bodies. Examine, compare, and contrast the drawings of the four different cell types found on the student page.
6. Explain that in order to work well together, individual cells come together with other cells of the same type to form a multi-celled structure called a *tissue*. List and explain the four tissue types. Discuss where each type might be found in the human body, guiding the students to recognize that different types of tissue work together. Point out that:

- Epithelial tissue is a covering both outside and inside our bodies [e.g., skin; covering organs; lining stomach and intestines]
- In addition to bone, cartilage, ligaments, etc., connective tissue includes fat and body fluids. These tissues are typically scattered throughout the other layers, (think of fat, gristle, and “juice” in a steak, which is primarily muscle.) Fat and other connective tissues can also appear as layers.
- A *nerve* is not a single nerve cell (*neuron*) but rather a tissue made up of neurons. The nerves in our skin and heart are scattered throughout the other tissues rather than forming a layer.

7. If the students have some prior knowledge of the function of organs, ask each team of students to think of an organ and discuss which types of tissue it might contain and why they think so.
8. Explain that the teams will construct a model to show the relationship among cells, tissues, and organs. Direct the teams to cut out multiple copies of cells and fit them together on a 4 x 6 card to represent

tissue. Several sheets of each type will be needed. Note: Connective tissue cells should be put together in groups of two to four cells, unless an entire layer of connective is indicated. The smaller groups will represent connective tissue scattered throughout the other layers. Nerve groups in the skin should be represented in a similar fashion.

9. Explain too that they are to place an organ label on each paper bag. DIFFERENTIATION OPPORTUNITY Any number of bags may be used. Working with just a few organs may be preferable depending on the student. Tell the students that each of several different organs is represented by a labeled "organ bag." Instruct the teams to use the information on the label to guide them as they stack tissue cards in the appropriate sequence, including pieces of connective tissue secured here and there throughout the inner layers. The students should then clip the cards together and place them in a bag. Explain that the order of the symbols from top to bottom indicates the structure of the organ from the outside in. Encourage the teams to make several different models as time allows.
10. Unpack each "organ bag" and examine the model(s) inside. Compare and contrast the structure of the different organs. Discuss the students' understanding of these levels of organization in the human body.
11. Have the students respond to this experience by writing in their science journal.

Questions for Discussion 1) How are the basic structure of living organisms different from that of non-living objects? 2) Why are cells called the basic units of living things? 3) What do you think would happen if the cells in your body were not organized? Why might it be better for a group of muscle cells to work together rather than alone? 4) What tissues did all or most organs have in common? Why do you think this is so? 5) Which organs seemed most similar to each other? Which were most different? Why? 6) Cells build tissues, and tissues build organs. What do you think organs build? 7) Do you think that the way your body is organized is effective? Why?

Materials: 8 paper bags (lunch size or larger), labeled; 4x6 inch index cards; scissors; glue; transparent tape; paper clips; copy or scratch paper

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Competency: _4__ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.

Objective(s): _a__ Compare and contrast the relative positions and components of the Earth's crust (e.g., mantle, liquid and solid core, continental crust, oceanic crust). (DOK 1)

Vocabulary: mantle, liquid, solid, core, continental, composition

Teaching Strategy(ies):

1. Give all students a blank sheet of paper and instruct them to draw what the earth looks like when cut in half. Tell students to write what they think the Earth's layers are made of. The teacher will examine the writing and drawings to assess prior knowledge.
2. Ask students, "What do you know about the structure and composition of the Earth?"
3. The teacher will toss a rubber model of the Earth to a student, and while holding the model, the student will answer. (Accept all answers.)
4. Using the Promethean board, show a flip chart with the layers.

Materials: typing or drawing paper, rubber model of Earth

Competency: _4_ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.

Objective(s): _a__ Compare and contrast the relative positions and components of the Earth's crust (e.g., mantle, liquid and solid core, continental crust, oceanic crust). (DOK 1)

Vocabulary: oceanic crust, continental crust, lithosphere, asthenosphere, mesosphere, outer core, inner core

Teaching Strategy(ies):

1. Ask the students, "How are oceanic crust and continental crust alike, and how are they different?" Have students assist in the completion of a Double Bubble Map. Tell the class that the goal today is to learn the composition and the physical properties of the Earth's layers.
2. Students will be placed into one of five groups:
    a) lithosphere
    b) asthenosphere
    c) mesosphere
    d) outer core
    e) inner core
3. Tell the students that they will have books, encyclopedias on the computer, and Internet access available for use in finding information on their assigned topic.
4. Students will create poster or brochure (3-fold) advertisement for their layer based on its composition, location, temperature, and properties.
5. The students will present their project to the class.

Materials: encyclopedia on line, Internet access, various levels of library books, paper, colored pencils, poster board

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Competency: _4_ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.
Objective(s): _a_ Compare and contrast the relative positions and components of the Earth's crust (e.g., mantle, liquid and solid core, continental crust, oceanic crust). (DOK 1)

Vocabulary: mantle, inner core, outer core, crust

Teaching Strategy(ies)

1. Explain to the students that they will be creating an edible model of the Earth's layers as well as writing a paragraph describing each layer. A justification for the choice of the material and a labeled drawing of the model will follow the paragraph.
2. Provide the students with the materials and allow the students to choose the materials with which to create the model.
3. Have the students write their paragraphs in their science journals and collect the journals for assessment purposes.
4. Allow the students to eat their completed project after they have been checked by the teacher for completeness and appropriate thickness of identified layers.

Materials: whipped cream, various colored Jell-Os, various colors of puddings, crushed Oreo cookies, crushed graham cracker cookies, icing

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Competency: _4__ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.
Objective(s): __a__ Compare and contrast the relative positions and components of the Earth's crust (e.g., mantle, liquid and solid core, continental crust, oceanic crust). (DOK 1)

Vocabulary: crust, mantle, outer core, inner core

Teaching Strategy(ies):

1. DIFFERENTIATED INSTRUCTION The students will create an edible model of the earth. Using the materials provided, students will create a model of the Earth's layers.
2. Begin to construct the model by filling a clear plastic cup ⅓ full with gummy bears, chocolate chips, or crushed ice (represents gravels and soils).(Inner Core)
3. Add enough soda to just cover the candy/ice.
4. Add a layer of ice cream to the candy and soda layer. (Outer Core)
5. Add a layer of red Jell-O. (Mantle)
6. Add a layer of crushed Oreos to the top. (Crust)
7. Students will be able to eat their final product after they have completed the project and shown it to the teacher.

Materials: clear plastic cups; gummy bears, chocolate chips, or crushed ice; soda; ice cream; red Jell-O, crushed Oreos

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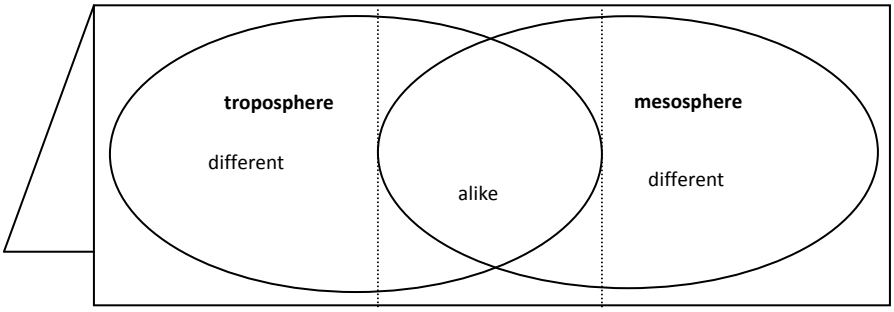
Competency: _4__ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.

Objective(s): __c__ Analyze climate data to draw conclusions and make predictions. (DOK 2)

Vocabulary: atmosphere, air pressure, altitude, troposphere, stratosphere, ozone, mesosphere, thermosphere

Teaching Strategy(ies):

1. Ask students, "What is Air?" (Accept all answers) Show a visual of the layers of the atmosphere that surrounds Earth. On the visual, demonstrate the location of each layer from lowest to highest.
    a) troposphere – lowest layer
    b) stratosphere – second lowest layer
    c) mesosphere – middle layer
    d) thermosphere – top layer
2. Explain that there is another layer above the thermosphere called the exosphere, but that they will not be tested on that material at this time.
3. Using a drawing projected large enough for the students to see and a student handout with the drawing on it, have the students take guided notes on this page by labeling the picture and putting the notes next to the layer's label.
    a) troposphere – This is where we live. Weather exists only in this layer.
    b) stratosphere – This is where jets fly. The ozone layer exists here.
    c) mesosphere – This is the coldest layer. Meteors exist here.
    d) thermosphere – This is the hottest layer. Satellites are in orbit here.
4. Have the students create a foldable for their final project. Using the hot dog fold, the student will create a three flap flip book. On the front of the flip book, students will draw a Venn diagram to compare how layers are similar and how they are different cutting as shown on the diagram:



5. Under each flap the students will write how the two layers are alike or how they are different.

Materials: paper, visual, handout

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Competency: _4_ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.
Objective(s): _c_ Analyze climate data to draw conclusions and make predictions. (DOK 2)

Vocabulary: weather, water cycle, humidity, condensation, cloud, evaporation, transpiration, precipitation, runoff, infiltration, percolation

Teaching Strategy(ies):

1. Ask the students, "What are cycles?" Accept all answers.
2. Challenge the students to identify some examples of cycles in nature. Explain that the Sun is the major source of energy for the Earth and drives many processes that support life. One of the processes is the "Water Cycle." Guide students to the understanding that the water cycle is the continuous movement of water from water sources into the air, onto land, into and over ground, and back to the water sources.
3. Ask students to determine where, if at all, new water comes from. Guide them to the realization that there is no source of *new* water.
4. Use the Promethean board or a visual to review the steps in the water cycle and have students give an example of each, explaining what happens in each step.
5. Activity: DIFFERENTIATED INSTRUCTION the students will create a foldable depicting selected stages of the water cycle. Depending on readiness, some students will create a trifold and others will create a flipbook. In the finished product students will have a colorful drawing depicting the stage, label the drawing, and clearly explain the process shown.

Materials: paper, visual, scissors, colored pencils

Competency: _4_ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.
Objective(s): _f_ Differentiate between objects in the universe (e.g., stars, moons, solar systems, asteroids, galaxies). (DOK 1)

Vocabulary: spiral galaxies, elliptical galaxies, stars, moons, solar system, asteroids

Teaching Strategy(ies):

1. Have students examine celestial bodies and determine the characteristics of each: stars, moons, solar systems, asteroids, galaxies (elliptical and spiral).
2. After discussing the flip chart, the students will create a Double Bubble Map to gain a clearer understanding of the similarities of these celestial bodies.
3. Students will then construct a universe of their own with models of the celestial bodies.

Materials: glitter, construction paper (blue/black), small foam balls, markers, colored pencils

Gulfport School District
Science Instructional Strategies

Check Grade Level K___ 1___ 2___ 3___ 4___ 5___ 6 _X_ 7___ 8___ 9___ 10___ 11___ 12___

Competency: _4_ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere. ***Content Standard(s):*** _c_ Analyze climate data to draw conclusions and make predictions.
Vocabulary: Weather, humidity, condensation, clouds, precipitation, air mass, front, thunderstorm, lightning, thunder, tornado, hurricane
Teaching Strategy(ies): 1. Introduction: Student will use Promethean Planet flipchart, United Streaming and/or fema.gov/kids to learn about weather conditions and tools. 2. Demonstrate examples of weather tools. Allow students to handle tools and ask questions. 3. Student Activity: a) All students will create a weather map using the Sun Herald. b) Use the meteorologist chart from Promethean Planet to make weather predictions and forecast. Students will then present forecast. c) Students will then construct weather instruments. Anemometer, weather vain, barometer, rain gauge, wind sock, etc.
Materials: computer lab, Promethean, rain gauge, thermometers, anemometer, windsock, weather maps, compass

Gulfport School District
Science Instructional Strategies

Check Grade Level K___ 1___ 2___ 3___ 4___ 5___ 6_X_ 7___ 8___ 9___ 10___ 11___ 12___

Competency: _4_ Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.

Objective(s): _e_ Explain the daily and annual changes in the Earth's rotation and revolution. (DOK 2)

- How the positions of the moon and the sun affect tides
- The phases of the moon (e.g., new, crescent, half, gibbous, full, waxing, waning)

Vocabulary: new moon, crescent moon, half moon, gibbous moon, full moon, waxing moon, waning moon, lunar phase, lunar cycle

Teaching Strategy(ies):

1. Give students drawing paper and have them draw their interpretation of the Moon. (The students should produce several different phases.) Have students place their drawings on the board with a piece of tape.
2. Ask the students to examine the pictures on the board and determine whether they are in order. Lead students to the correct order and fill in where necessary with your own drawing.
3. Once the moons are in order, ask students, "How many moons does the Earth have? If the Earth has one moon, why do these drawings look so different from each other?" (Accept all answers.)
4. Activity:
    a) Arrange students into a large circle (students will need a piece of paper and a black marker).
    b) Turn on a single light and darken the room.
    c) Using an incandescent light bulb in a corner, have one student hold a ball in the center of the room.
    d) Instruct students to observe the ball and to draw on their paper the shape of the shadow they see and sketch what they see in their science journals.
    e) Once all students have completed their drawings, have the students share their drawings with the class beginning with the student closest to the flashlight (proceed clockwise around the circle until all students have shared their drawings).
    f) Ask students to develop a hypothesis concerning how this is related to the Moon we see at night and write it in their science journals.
    g) Initiate a short discussion as to why the shadows appear as they do and the progression of the shadows around the circle.
    h) Have students write the phase on their diagrams (new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, last quarter, waning crescent).
    i) Once the activity is completed, view the website http://www.ioncmaste.ca/homepage/resources/web_resources/CSA_Astro9/files/html/module3/lessons/lesson4/phasesMoon.html to watch the moon move through the phases.

Materials: lamp/flashlight, Styrofoam balls, drawing paper, Internet, large ball, black marker, tape, science journals.