Gulfport School District
Science Instructional Strategies

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

Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth.
Content Standard(s): _a_ Justify the importance of earth materials to humans (e.g., rocks, minerals, atmospheric gases, water). (DOK3)

Vocabulary: wetlands, sediment, marsh, decay, leveeing, channelization, justification

Teaching Strategy(ies):

1. Website for other information and activities http://www.nwrc.usgs.gov/fringe/subsiden.html

Background information:

2. Subsidence in the coastal marshes involves two factors: the sinking of the marsh surface and a lack of sediment being added to the marsh surface. As materials in the marsh settle, decay, and compact, the marsh effectively sinks a little. If new sediments are not being added to the system, the entire system is going to decline in elevation. Water will now pool in these lower elevation spots when there is a very high tide.
3. As the temperature of the earth increases little by little and the sea level begins to rise, these areas become permanently flooded, the marsh is lost, and more open water areas result. To some degree leveeing and channelization have impacted this sinking and building up of the marshes because they reduce the amount of sediment available for vertical marsh buildup. A healthy marsh system with adequate amounts of vegetation will tend to trap whatever sediment is available and promote vertical buildup.
4. *Activity:*
    a) Fill ⅔ of one end of a large glass dish or clear plastic box with loosely packed soil. Let the students mark the level on the side of the container. Using a watering can or spray nozzle, drench the soil (use a ruler or board to keep the soil from being washed into the other end of the container) and let the students observe the difference in "elevation" of the soil. Explain that in a marsh, the air in the soil is always being replaced by water (the percolation process) and the soil settles or subsides.

Materials decay quickly under moist conditions, so this also reduces the amount of organic material in the soil. Ask the students for suggestions as to what would be needed to keep the elevation constant. Ask how building levees along rivers has hindered sediment addition to the wetlands. Water used to drench the soil should have run off into the empty ⅓ of the pan. Have students mark the level of the water on the "shore" (use a toothpick or small stick).

Add additional water to this to simulate sea level rise. Have the students mark the new "sea level" after the addition of the water. If the pan is large enough, create a large wave. If there are any depressions that formed during the settling of the soil, ask the students what happens to them after the wave recedes. Have the students speculate about what will happen to this newly formed pond.

Extension: Let the students set up the experiment with the soil except that the soil should be 4 -6" deep. It can be in a large plastic tub or on the ground outside. (The water next to the soil is not necessary for this step.) Have the students decide where they are going to dig a canal. Have them place several strips of paper vertically from the edge of the site of the canal out towards open land. As they dig the canal, they should place the spoil (dirt dug from the canal) right along the edge of the canal they are digging. As they pile the spoil up along the bank, they should notice that the soil in this area is sinking – the end of the paper along the bank begins to settle lower than the other end. Ask the students to discuss the effect of dredging and canal building on subsidence and whether wetlands are a resource that can be renewed. Have the students write their response in the science journal and explain their justification for this choice.

Materials: glass dish or plastic box, watering can, soil, science journal

Gulfport School District
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Check Grade Level K___ 1___ 2___ 3___ 4___ 5___ 6___ 7_X__ 8___ 9___ 10___ 11___ 12___

Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth.
Content Standard(s): _a_ Justify the importance of earth materials to humans (e.g., rocks, minerals, atmospheric gases, water). (DOK3)

Vocabulary: mineral, justification

Teaching Strategy(ies):

1. Divide students into four groups. Explain that they will be examining items found in the home and the minerals that are fond in the item. Explain that these minerals occur in nature and cannot be replenished.
2. Assign one of the four rooms or allow groups to select a room below. Tell the students that they are to examine the list of items and the minerals contained in the item from their assigned/chosen room in the house and determine whether the item is important enough to humans to continue using and justify each answer.
3. The students are to write their responses in their science journal.

Minerals Around the House

Minerals in a computer room

1. COMPUTER: Includes gold, silica, nickel, aluminum, zinc, iron, petroleum products, and about thirty other minerals.
2. PENCIL: Includes graphite and clays.
3. TELEPHONE: Includes copper, gold, and petroleum products.
4. BOOKS: Includes limestone and clays.
5. PENS: Includes limestone, mica, petroleum products, clays, silica, and talc.
6. FILM: Includes petroleum products and silver.
7. CAMERA: Includes silica, zinc, copper, aluminum, and petroleum products.
8. CHAIR: Includes aluminum and petroleum products.
9. TELEVISION: Includes aluminum, copper, iron, nickel, silica, rare earths, and strontium.
10. STEREO: Includes gold, iron, nickel, beryllium, and petroleum products.
11. COMPACT DISC: Includes aluminum and petroleum products.
12. METAL CHEST: Includes iron and nickel. The brass trim is made of copper and zinc.
13. CARPET: Includes limestone, petroleum products, and selenium.
14. DRYWALL: Includes gypsum, clay, vermiculite, calcium carbonate, and micas.

Minerals on the outside of a house

1. BRICKS: Includes graphite, clays, and silica.
2. CONCRETE STEP: Includes gypsum, iron, limestone, clays, and silica.
3. BIKE: Includes barite, iron, nickel, and petroleum products.
4. DOOR KNOB: Includes copper and zinc, which make brass.
5. SHINGLES: Includes petroleum products and clays.
6. MAIL BOX: Includes copper and zinc, which make brass.
7. WINDOWS: Includes silica, feldspar, soda ash, coal, and salt.
8. TOOLS: Includes iron and nickel.
9. SCOOTER: Includes aluminum, calcite, mica, nickel, petroleum products, clays, silica and talc.
10. AUTOMOBILE: Includes aluminum, barite, calcite, iron, lead, mica, nickel, petroleum products, clays, silica and zinc.
11. PAINT: Includes titanium, gypsum, barite, and sulfur.
12. LIGHT AND FIXTURE: Includes tungsten, molybdenum, aluminum, silica, copper, and zinc.

Minerals in the kitchen

1. RADIO: Includes aluminum, copper, gold, iron, and petroleum products.
2. TOASTER: Includes copper, iron, nickel, mica, chromium, and petroleum products.
3. ELECTRICAL WIRING: Includes copper, aluminum, and petroleum products.
4. MICROWAVE: Includes copper, gold, iron, nickel, and silica.
5. STOVE: Includes aluminum, copper, iron, nickel, and silica.
6. REFRIGERATOR: Includes aluminum, copper, iron, nickel, petroleum products, and zinc.

7. TABLE SALT: Includes halite; light salt can be made from sylvite. Most salt has added iodine.
8. PLATES: Includes clays, silica, and feldspar.
9. CUTLERY: Includes iron, nickel, silver, and chromium.
10. CLOCK: Includes iron, nickel, petroleum products, and silica.
11. STAINLESS STEEL SINK: Includes iron and nickel.
12. BLACKBOARD: Includes clays. Chalk includes limestone or petroleum products.
13. MAGNET: Includes cobalt.
14. DISH RACK: Made of petroleum products.

Minerals in the bathroom

1. DEODORANT: Includes aluminum and the container is made of petroleum products.
2. TOOTHPASTE: Fluorite, barite, and calcite. The container is made up of petroleum products or aluminum.
3. DRINKING GLASSES: Includes feldspar, silica, and soda ash.
4. ABRASIVE CLEANSER: Includes silica or calcite.
5. LIPSTICK AND MAKEUP: Includes clay, mica, talc, limestone, and petroleum products.
6. PLUMBING: Made of copper, clay, and petroleum products.
7. RUGS: Includes limestone, petroleum products, and selenium.
8. PLASTIC SHOWER CURTAINS: Contains petroleum products.
9. FLOWER POT: Made of clays and metallic minerals for pigments in glaze.
10. TALCUM POWDER: Contains talc and mica.
11. DANDRUFF SHAMPOO: Includes coal tar, lithium, clays, and selenium. The container is made of petroleum products.
12. MIRROR: Includes feldspar, silica, and silver.
13. FAUCETS: Includes iron, nickel, and chromium.
14. TILES: Made of clay, feldspar, wollastonite or talc, mineral pigments.
15. TOILET: Includes clays, silica, copper, zinc, petroleum products, and borates.

Materials: list, science journal

Gulfport School District
Science Instructional Strategies

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Competency: _4__ Describe the properties and structure of the sun and the moon with respect to the Earth.
Objective(s): _a__ Justify the importance of earth materials to humans (e.g., rocks, minerals, atmospheric gases, water). (DOK3)

Vocabulary: Galapagos, Andalusia, lynx, lemur, extinction, population, reduction

Teaching Strategy(ies):

NOTE: The day before the activity, mark several circles on the lawn using flour. Mark one 20 foot (diameter) circle for each team of three. In each circle scatter 100 toothpicks as randomly as possible. Prepare a handout of the *Extinction Simulation Data Table* and make copies for your students. Complete the activity as follows.

1. Divide the class into teams of three. Assign each team to one of the areas marked out on the lawn. Designate one student as "**hunter**," one student as "**timer**," and the third student as "**counter**."
2. Tell the students that there are 100 "**toothpick grasshoppers**" in their circles and that the hunter will have two minutes to "**catch**" as many toothpick grasshoppers as she or he can.
3. Have the timer for each group say, "**Ready. Set. Go.**" and then time two minutes for the hunter to collect toothpick grasshoppers.
4. At the end of the two minutes, have the counter determine how many toothpick grasshoppers have been caught and then calculate the number of toothpick grasshoppers remaining in the circle. The counter then records this information on the **Extinction Simulation Data Table** handout.
5. Have the team scatter one additional toothpick grasshopper into the circle for every pair of toothpick grasshoppers remaining. This simulates **reproduction**.
6. Have the group rotate roles and **repeat the activity a second time**, recording the information on the handout when done.
7. After the second round is finished, have the group rotate roles once again and **repeat the activity for a third time**, recording the information on the handout when done.
8. Have the students draw a line graph of the number of toothpick grasshoppers in the grass at the end of each round as a function of time.
9. Discuss with the students the implications of the graphs. Some focus questions might include:
    a. What has happened to the population of the toothpick grasshoppers over time? [numbers declined, numbers became steady]
    b. What environmental factors might account for differences in graphs and/or total numbers of toothpick grasshoppers from group to group? [There were different kinds of grass in each circle. The hunters were different.]
    c. Have the class discuss what effect habitat reduction might have on toothpick grasshoppers' population. Have them suggest a method for tasting their hypothesis. Suggestions should include reducing the circle size and repeating the activity.
10. Using the suggestion of circle size reduction, repeat this activity on a second day and compare the resulting graphs with those from the first day. Reduce the diameter of each circle by one-third.
11. If no "**extinction**" has occurred, discuss why with the class.
12. Culminating Activity: Have the class watch ***Nature: The Loneliest Animals***. Have them discuss what human factors have contributed to the population reduction of the species featured in this episode.

Materials: several boxes of wooden toothpicks, stopwatch, pencil and paper, flour to mark the areas on the lawn

Gulfport School District
Science Instructional Strategies

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

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

Objective(s): _b_ Draw conclusions about historical processes that contribute to the shaping of planet Earth. (DOK 3)

- Movements of the continents through time
- Continental plates, subduction zones, trenches, etc.

Vocabulary: sedimentary, rock cycle, Petra

Teaching Strategy(ies):

1. Have students examine a diagram of the rock cycle. Ask a volunteer to explain the diagram. Once the review of the rock cycle is complete, tell the students they are going to focus on one type of rock in this lesson – sedimentary rock.
2. Have the students view the images of the sandstone structures at Petra by visiting the Science NetLinks online resource, http://www.sciencenetlinks.com/ebook/rocks_title.html (Images at Petra).
   While looking at the photos, ask the students the following questions:
   - What do you think this is? [Students should recognize that it is something, possibly a building, carved out of stone.]
   - What type of sedimentary rock is this? [sandstone]
   - Why do you think there are so many colors of stone? [Students should understand that over time, many different plants and animals died and were buried here along with different kinds of rock sediments.]
   - Can you describe the pattern on this building? [striped]
   - Does this support the idea that layers of sediments exposed to heat and pressure form solid rock? [yes]
3. Explain to the students that the theory of Herman Makse suggests that particles separate, settle, and form layers based on their size. Today the students will be completing an activity that will prove or disprove that theory.
4. Activity
   a. Fill a glass jar ¾ of the way with rice.
   b. Place the ball in the jar along with the rice, pushing the ball down so that it is buried in the rice.
   c. Now place the jar on the table and shake it back and forth. What happens? Can you explain the phenomenon? Write your explanation in your science journal. Today we are going to discover why this is called the "Brazil Nut Effect."
   d. Divide the students into groups. Give each group a can of mixed nuts with at least 3-4 types of nuts in it. Have students put on gloves and carefully open their can of nuts. Have them record in their science journal the number of each kind of nut on the surface. Then ask the following questions:
      1) If we shake the can from side to side, what type of nuts do you think will settle on the top of the can? Why? [Accept all answers.]
      2) What type of nut is the largest? [Brazil nut]
5. Have the students remove only the Brazil nuts from the top layer, place them on a paper towel or napkin, and record the results in the science journal. Then have them replace the lid and gently shake the can from side to side for one minute. When time is up, have them open the can, record the number of Brazil nuts on the surface in the science journal, and then remove them. Repeat the process

three more times and record the results in the science journal.

6. Look back in your journal at you first entry concerning the Brazil nuts. Was your explanation correct? Why or why not?
7. Ask the students, "What type of nut repeatedly came to the top every time? Why do you think that is? What type of nut ended up on the bottom layer? If you had a mixture of sand and pebbles in a jar and shook it, which material would most likely end up forming the bottom layer and why?" Record the answers in the science journal.
8. Look again at the photographs of Petra and ask students to write in their journals how these stripes of sedimentary rocks formed?
9. Write a short reflection in your science journal on how this activity helped them better understand how sedimentary rocks are formed.

Materials: a can of mixed nuts for each group with at least 3-4 types of nuts in the can, wide-mouthed glass jar (approximately a liter or a quart), uncooked rice to fill the jar about ¾ of the way to the top, small rubber ball For Each Group: paper towels or napkins

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

Objective(s): _b_ Draw conclusions about historical processes that contribute to the shaping of planet Earth. (DOK 3)

- Movements of the continents through time
- Continental plates, subduction zones, trenches, etc.

Vocabulary: plate tectonics, inner core, mantle, continental drift, lithosphere plates, lithosphere, continental crust, convergent boundary, subduction, divergent boundary, crust, outer core, mid-ocean ridges, transform boundary, oceanic crust

Teaching Strategy(ies):

1. As a warm-up, help students complete a KWL chart about plate tectonics. Ask students to share what they know (K) and what they want to know (W) about the topic as you list their ideas on a chart. Tell the students they will complete the last column, what they learned (L), after playing a game.
2. Review the plate tectonics theory with the students, in which the Earth's outer surface, or lithosphere, is described as separate and distinct plates that move or shift. The plates meet at one of three types of boundaries.
3. Give each group of three to five students a copy of The Plate Game reproducible and supplies to make the game (or have them gather and use their own supplies). Read the directions together to check for understanding. The students can make their game in class or for homework. Encourage the students to use reference materials and the KWL chart to help them write questions for their cards. Tell them to write the questions on the front and the answers on the back.
4. Invite groups to present and explain their games in front of the class, and then give them time to play their game. After students have played their own game, suggest that they trade with another group and play that game.
5. Conclude the activity by having students create a KWL chart. Invite volunteers to share what they learned from playing the games while the teacher lists their ideas on the chart.

Materials: The Plate Game; chart paper; poster board; art supplies; index cards; dice; counters or other game pieces; reference materials on plate tectonics, earthquakes, and volcanoes

Gulfport School District
Science Instructional Strategies

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

Objective(s): _b_ Draw conclusions about historical processes that contribute to the shaping of planet Earth. (DOK 3)

- Movements of the continents through time
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Vocabulary: earthquake, liquefaction

Teaching Strategy(ies):

NOTE: In this activity students will simulate **liquefaction** and discover what happens to land when an earthquake shakes it up. You may decide to do this activity as a demonstration or in small groups. As the teacher, you should practice first. Note how dry the sand is and how much water it takes to wet it as prescribed. Give your students an approximate amount of water to start with, then add a little at a time. (Sand gets wet faster than anticipated).

Activity

1. Fill the pan about 3/4 full with sand.
2. Put the pan on a level desk. Pour water into the pan to just below the surface of the sand.
3. Insert the brick, skinny end up, into the wet sand so it resembles a building.
4. Let the pan stand for a few minutes, allowing the water and sand to settle.
5. Now, gently tap the side of the pan with the rubber mallet.
6. Notice what happens to the sand and the brick.
7. Ask the students what happened to the structure in the pan. [Students should notice that the sand got all squishy and the brick fell over. Mixing water with the sand allows the sand grains to settle until they touch each other. There will be water in cavities between the grains, but the mixture will behave as a solid.]
8. Ask students why the object fell. [By striking the container with the mallet, the sand is squeezed or sheared closer together. In order to do this, the particles have to push the water between them out of their way. In the case of an earthquake (simulated by striking the container with the mallet), the squeezing done by the shockwave happens very quickly and the water does not have time to flow out of the way of the sand particles. This results in the particles pushing on the water and causing an increase in water pressure as the particles try to move into a denser configuration.]
9. How does this action affect the "ground" portion of the model? [This increased pressure causes the force at the contact points between the sand particles to decrease, and if the pressure is high enough it can reduce the interparticle forces to zero, essentially trying to "float" the sand particles away from each other for a very short time. This is known as **liquefaction**. The loss of strength occurs because there is no contact between the grains of sand; the mixture of sand is suspended.]
10. How would having this knowledge assist people living in earthquake prone areas? [Accept all reasonable answers.

Materials: heavy plastic of metal pan – loaf pan size, sand, water, smooth brick, rubber mallet

Gulfport School District
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Competency: 4 Describe the properties and structure of the sun and the moon with respect to the Earth.
Content Standard(s): _c_ Describe the causes and effects of heat transfer as it relates to the circulation of ocean currents, atmospheric movement, and global wind patterns (e.g., trade winds, the jet stream). Provide examples of how these global patterns can affect local weather. (DOK 2)

- Characteristics of the Gulf Stream and other large ocean currents
- Effects on climate in Eastern North America and Western Europe
- Effects of heat transfer to the movement of air masses, high and low pressure area, and fronts in the atmosphere

Vocabulary: thermal energy, temperature, thermometer, heat, conduction, convection, ocean currents, trade winds, local wind, global wind belts, global convection currents, the jet stream, sea breeze

Teaching Strategy(ies):

1. Make transparency of vocabulary to be defined by students using text corresponding with the lesson at hand
2. Students will make a foldable of the vocabulary for the unit being covered to keep in their binder.
3. *Ocean Currents:* Explain heat transfer- measuring temperature, how heat is transferred, conduction and convection
4. *LAB:* Supplies needed: Hot water and Cold water, clear tank. Pour HOT (RED) water on one side of the tank and slowly pour in COLD (BLUE) water on the opposite side. This demonstrates the convection current in the oceans. Students will record observations in their science journal.

Materials: Text: ScienceSaurus, red dye, blue dye, small aquarium

Competency: 4 Describe the properties and structure of the sun and the moon with respect to the Earth.
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- Characteristics of the Gulf Stream and other large ocean currents
- Effects on climate in Eastern North America and Western Europe
- Effects of heat transfer to the movement of air masses, high and low pressure area, and fronts in the atmosphere

Vocabulary: thermal energy, temperature, thermometer, heat, conduction, convection, ocean currents, trade winds, local wind, global wind belts, global convection currents, the jet stream, wind, anemometer, wind vane, data table, local wind, sea breeze, wind-chill factor, land breeze, global wind, Coriolis effect, latitude , ozone air pressure, high pressure, low pressure, , exosphere, thermosphere, mesosphere, stratosphere, troposphere, barometric pressure, anemometer, wind scale, humidity, dew point, latitude, longitude, elevation

Teaching Strategy(ies):

1. *Global Wind patterns:*
2. Explain and discuss: what is wind?
3. Explain the difference between Local winds and Global winds.
4. *LAB:*
    a) In groups, have the students locate where the major global wind belts are located.
    b) Have students compare and contrast global convection current, Coriolis Effect, Global wind belts. Use a Venn Diagram.

Materials: Text: ScienceSaurus

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Vocabulary: weather probe, crosshairs, land breeze, sea breeze, temperature cycle, formation, dissipation

Teaching Strategy(ies):

1. Students will actively use Coastal Winds and Clouds Gizmos to observe the cycle of breezes and cloud formation that occur on the coast.
2. In the Gizmo, students will observe the behavior of the sailboat over a 24-hour period, and note the wind direction in particular.
3. Check the drifting balloon and observe the balloon over a 24-hour period. Describe the path the balloon travels and when the changes occur.
4. Allow the simulation run until 6:00 a.m. then pause. Check the weather probe (purple crosshairs).
5. Identify the temperature and wind speed and direction.
6. Differentiate between land breeze and sea breeze.
7. Move the probe to 5,000 feet, directly over the city. Identify the temperature.
8. Move the probe to 10,000 feet, directly over the city. Identify the temperature.
9. How do these temperatures differ? Why does this change occur?

Materials: Gizmos: Coastal Winds and Clouds, computer

Gulfport School District
Science Instructional Strategies

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

Competency: __4__ Describe the properties and structure of the sun and the moon with respect to the Earth.
Content Standard(s): _e_
Research and develop a logical argument to support the funding of NASA's Space Programs. (DOK 3)

- Space Exploration (e.g., telescopes, radio telescopes, X-ray telescopes, cameras, spectrometers, etc.)
- Spinoffs (e.g., laser, pace maker, dehydrated food, flame retardant clothing, global positioning systems [GPS], satellite imagery, global weather information, diagnostic imagery)
- Mississippi's contributions to the space industry

Vocabulary: telescopes, spectrometers, laser, pace maker, dehydrated food, flame retardant clothing, global positioning systems [GPS], satellite imagery, global weather information, satellites, cameras, geosynchronous orbit, astronomy, rockets, satellites

Teaching Strategy(ies):

1. Make a visual of vocabulary to be studied. Have students make a matchbook foldable for each vocabulary word which explains what the word is either by definition or drawing.
2. Using a visual of each; discuss multistage rockets, artificial satellites, space stations, space shuttles, types of electromagnetic radiation and electromagnetic spectrum.
3. Demonstrate how rockets work by handing each student a small balloon to blow up and then release. Ask students, "How is the balloon being released like a rocket being sent into space and how is it different?"
4. The students will record their observations in their science journal.

Materials: paper, visual, balloons, eggs, assorted materials

Competency: __4__ Describe the properties and structure of the sun and the moon with respect to the Earth.
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- Mississippi's contributions to the space industry

Vocabulary: telescopes, radio telescopes, X-ray telescopes, constellation, visible light, wavelength, spectrum, electromagnetic radiation, refraction telescope, convex lens, reflecting telescope, observatory, radio telescope

Teaching Strategy(ies):

1. Make a visual of vocabulary to be studied. Have students make a matchbook foldable for each vocabulary word which explains what the word is either by definition or drawing.
2. Using a visual of each; discuss the Hubble Telescope and the observatory on Mt. Palomar.
3. Use a visual to demonstrate the difference between reflecting and refracting telescopes. Have students determine what type of telescopes Hubble and Palomar are and whether MS has any large telescopes located within the state.
4. Utilizing a variety of lenses, the students will construct a telescope to be used to examine various objects of their choosing. The students will write their observations in their science journal.

Materials: visuals, lenses, heavy poster paper, tape, stapler

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Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth.
Content Standard(s): _e_ Research and develop a logical argument to support the funding of NASA's Space Programs. (DOK 3)

- Space Exploration (e.g., telescopes, radio telescopes, X-ray telescopes, cameras, spectrometers, etc.)
- Spinoffs (e.g., laser, pacemaker, dehydrated food, flame retardant clothing, global positioning systems [GPS], satellite imagery, global weather information, diagnostic imagery)
- Mississippi's contributions to the space industry

Vocabulary: pacemaker, radiation blocking lenses, excimer laser, microbe detector, balance function disorder research, cool suits, advanced x-ray imaging system, skin damage assessment, implantable and external pumps, ocular screening test, dehydrated food, flame retardant clothing, global positioning systems [GPS], satellite imagery, global weather information

Teaching Strategy(ies):

1. Explain to the students that NASA research for flight into space has helped to further developments of many new and unimaginable types of technology.
2. Discuss one or two with which the students are most likely familiar.
3. Depending on the size of the class, allow individuals, or groups of students to select one of the innovations attributed to NASA, and research: what the innovation is, how it came to be, its use(s) in space, and its use(s) on Earth.
4. Students will create a visual and oral presentation for the class.

Materials: visuals, resource books, heavy poster paper, Internet, computer

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Science Instructional Strategies

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Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth.
Content Standard(s): _f_
Distinguish the structure and movement of objects in the solar system. (DOK2)

- Sun's atmosphere (corona, chromospheres, photosphere, and core)
- How phenomena on the sun's surface (e.g., auroras, interference in radio and television communication)
- Eclipses relative to the position of the Sun, Moon, and Earth
- Contributions of Copernicus, Galileo, and Kepler in describing the solar system

Vocabulary: Nuclear Fusion, core, photosphere, chromospheres, corona, solar wind, sunspot, prominence, solar flare, geocentric, heliocentric, ellipse, inertia, solar eclipse, lunar eclipse, tides, high tide, low tide,

Teaching Strategy(ies):

1. Make two balls out of modeling clay. One ball should have a diameter of about 4 cm and will represent the Earth. The other should have a diameter of about 1 cm and will represent the moon.
2. Place tow balls about 15 cm apart on the sheet of paper.
3. Hold the flashlight approximately 15 cm away from the large ball. The flashlight and the two balls should be in a straight line. Keep the flashlight about the same level as the clay. When the whole class is ready, turn on the flashlight and turn off the lights.
4. Shine the light on the closer ball, and sketch your model in your science journal. Include the beam of light in your drawing.
5. Move the flashlight to the opposite side of the paper. The flashlight should now be approximately 15 cm away from the smaller clay ball. Repeat step 4.
6. After students' drawings are complete, discuss the activity with the students. Some of the questions to be answered are as follows:
    a. What does the light in this model represent? [The flashlight represents the Sun.]
    b. As viewed from Earth, what event did your model represent in step 4? In step 5? [Step 4 – a lunar eclipse; Step 5 – a solar eclipse]
    c. As viewed from the moon, what event did your model represent in step 4? In step 5? [Step 4 – a solar eclipse; Step 5 – an eclipse of Earth]
    d. According to this model, how often would solar and lunar eclipses occur? Is this accurate? Explain your answer. [There lunar and solar eclipse each month. This is because the model shows Earth and the Moon orbiting in exactly the same plane around the Sun; however the planes are usually above.]

Materials: flashlight, clay

Gulfport School District
Science Instructional Strategies

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

Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth.
Content Standard(s): _f_
Distinguish the structure and movement of objects in the solar system. (DOK2)

- Sun's atmosphere (corona, chromospheres, photosphere, and core)
- How phenomena on the sun's surface (e.g., auroras, interference in radio and television communication)
- Eclipses relative to the position of the Sun, Moon, and Earth
- Contributions of Copernicus, Galileo, and Kepler in describing the solar system

Vocabulary: Edwin Hubble, Nicolas Copernicus, Galileo Galilei, Johannes Kepler, Edmund Halley

Teaching Strategy(ies):
The students will use various resources available to research scientists whose work was centered on describing the Solar System.

- Nicolas Copernicus
- Galileo Galilei
- Johannes Kepler
- Edwin Hubble
- Edmund Halley

Have students complete a project and presentation on a given scientists. Honors classes will have to create a power point presentation.

Materials: various resources, variety of materials for project, Internet, computer

Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth.
Content Standard(s): _f_
Distinguish the structure and movement of objects in the solar system. (DOK2)

- Sun's atmosphere (corona, chromospheres, photosphere, and core)
- How phenomena on the sun's surface (e.g., auroras, interference in radio and television communication)affect Earth. (e.g., auroras, interference with radio and television communication)
- Eclipses relative to the position of the Sun, Moon, and Earth
- Contributions of Copernicus, Galileo, and Kepler in describing the solar system

Vocabulary:

Teaching Strategy(ies):

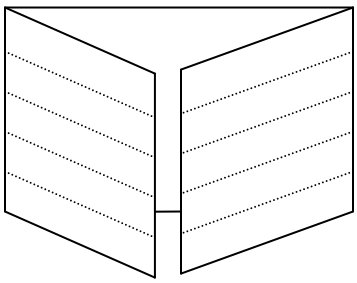
1. Using the website http://www.thehomeschoolmom.com/schoolroom/astronomy.php or http://www.michielb.nl/sun/ view the astronomy show labeled the virtual sun.
2. Upon completion of the show have students compare and contrast the atmosphere of the Sun and the Earth and their actual impact one upon the other.
3. Have students determine what the consequences of the Sun's atmosphere have on everyday actions and live of people.

Materials: Internet, computer

Gulfport School District
Science Instructional Strategies

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

Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth. ***Content Standard(s):*** _h_ Predict weather events by analyzing clouds, weather maps, satellites, and various data (DOK 3).
Vocabulary: cumulus, stratus, cirrus, cloud, fog, nimbostratus, cumulonimbus, altostratus, altocumulus, cirrocumulus
Teaching Strategy(ies): 1. The students will sing the Cloud Cover song with their classmates. 2. Afterwards, the students will write and perform their own song about cloud types.
Materials: Cloud Cover Song

Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth. ***Content Standard(s):*** _h_ Predict weather events by analyzing clouds, weather maps, satellites, and various data (DOK 3).
Vocabulary: cumulus, stratus, cirrus, cloud, fog, nimbostratus, cumulonimbus, altostratus, altocumulus, cirrocumulus
Teaching Strategy(ies): 1. Create a double flipbook out of 8½" x 11" paper. 2. Students will fold paper as below:  3. Write the name of the cloud type on the flap (cumulus, stratus, cirrus, cloud, fog, nimbostratus, cumulonimbus, altostratus, altocumulus, cirrocumulus). 4. Write the predicted weather types to under the flap. 5. Students may use this as a study guide.
Materials: 8½" x 11" paper, writing instrument

Gulfport School District
Science Instructional Strategies

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

Competency: _4_ Describe the properties and structure of the sun and the moon with respect to the Earth.

Objective(s): _h_ Predict weather events by analyzing clouds, weather maps, satellites, and various data. (DOK 3)

Vocabulary: Celcius, weather, climate, meterology, meteorologist

Teaching Strategy(ies):

NOTE: This investigation accumulates data over a period of time. It can be adapted to accommodate your schedule. Students will be reading a thermometer. It is best to choose small groups to take each reading. Make sure all students have an opportunity to participate. Mount thermometer outside.

1. Students will go outside and obtain a temperature reading at three times: 9:00 a.m., 12:00 noon, 2:00 p.m.
2. Students will report the temperature reading to the class and record it on their Temp-Rate daily chart. After all three temperatures have been acquired, an average temperature will be recorded on the Temp-Rate average daily temperature chart.
3. Each day students will record in their science journal their prediction for the next day and correlate the temperature with the weather.

Materials: thermometer, science journal, recording sheets for daily and average temperatures.