

2012 Charlotte-Mecklenburg Schools

Fifth Grade Science

North Carolina Essential Standards Resource Guide

Overview of FIFTH Grade Science	
Unit	Suggested Pacing
Scientific Inquiry	1-2 weeks
Forces and Motion	5-6 weeks
Matter: Properties and Change	4-5 weeks
Energy: Conservation and Transfer	4-5 weeks
Earth Systems, Structures, and Processes	4-5 weeks
Ecosystems	4-5 weeks
Structures and Functions of Living Organisms	3-4 weeks
Evolution and Genetics	2-3 weeks
Review	2-3 weeks

SCIENTIFIC INQUIRY

National Science Education Standards:

The student will have the abilities necessary to do scientific inquiry.

The student will gain understandings about scientific inquiry.

Can be found at: http://www.nap.edu/openbook.php?record_id=4962

No Essential Standard and No Clarifying Objectives.

Unpacking: What does this standard mean that a student will know and be able to do?

Students know that a scientist can be anyone of any gender or age.

Students know that scientists are curious, inquire, and constantly wonder about the world around them.

Students know that scientists follow the scientific method, which is a set of procedures, or directions, for completing an experiment.

Students know that scientists use many process skills such as observing, recording, measuring, etc. in order to complete the scientific method carefully and correctly.

Essential Vocabulary: FIFTH Grade

Science, scientist, inquiry, investigate, process, questioning, hypothesis, procedure, observation, results, conclusion, scientific method

FORCES AND MOTION

Essential Standard:

5.P.1 Understand force, motion and the relationship between them.

Clarifying Objective:

5.P.1.1 Explain how factors such as gravity, friction, and change in mass affect the motion of objects.

5.P.1.2 Infer the motion of objects in terms of how far they travel in a certain amount of time and the direction in which they travel.

5.P.1.3 Illustrate the motion of an object using a graph to show a change in position over a period of time.

5.P.1.4 Predict the effect of a given force or a change in mass on the motion of an object.

Unpacking: What does this standard mean that a student will know and be able to do?

5.P.1.1

Students know that gravity pulls any object on or near the earth toward it without touching it. Students know that friction is a force that is created anytime two surfaces move or try to move across each other. Students know that all matter has mass. Students understand that changing any or all of these factors will affect the motion of an object.

5.P.1.2

Students know that it is possible to measure the motion of an object based on the distance it will travel in a certain amount of time.

5.P.1.3

Students know that a graph can be created using one axis to represent the distance that an object travels, and the other axis to represent the period of time the object is traveling. Students know how to construct a graph that demonstrates a relation of distance to time.

5.P.1.4

Students know that the greater a force is, the greater the change (in motion) it produces. The greater the mass of the object being acted on, the less the effect of the (same) force.

Essential Vocabulary: FIFTH Grade

gravity, friction, mass, matter, distance, time, graph, force, motion, momentum, acceleration, velocity, inertia, Newton's 3 Laws

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Essential Questions	Criteria for Success: "I Will"	Suggested Resources/Activities
<p>1. Why are all objects pulled toward the Earth? How does gravity affect the motion of all objects? (5.P.1.1)</p>	<p>5.P.1.1 -I will drop objects of varying mass and observe the pull of each object. -I will observe the objects hitting the earth's surface at the same time. -I will explain why objects of different mass are pulled toward the earth's surface and hit at the same time.</p>	<p>-Compare objects by dropping paper and a ball. Then a ping pong ball and golf ball. Discuss mass and air resistance. Compare experiment on earth vs. the moon. -Penny in a Cup: Use plastic cup, index card, and penny to demonstrate Newton's 1st Law. Flick the index card to realize that the only object that moves is the card because that's the only object that was acted upon. -Discovery Ed Passages: "Chicken Collision", "Down with Gravity", "Falling for Gravity", "Forces to be Reckoned With", "Let's Get Away".</p>
<p>2. What causes friction? What is the effect of forces rubbing against each other? (5.P.1.2)</p>	<p>-I will push objects of varying mass across different surfaces. -I will use different models to observe how friction affects the motion of an object. -I will explain how friction slows objects down. - I will analyze how different kinds of surfaces create the least/most amount of friction.</p>	<p>-Gather toy cars and various surfaces for them to travel over such as thick carpet squares, tiles, sandpaper, etc. Use a book to act as a ramp to control speed and use a yard stick/ruler to measure distance traveled. -Discovery Ed Passages: "A Wheel than Never Stops Spinning", "The Ocean Star".</p>
<p>3. How does a change in mass affect the motion of objects? How can we model the relationship of position, motion, direction and speed? (5.P.1.3)</p>	<p>-I will observe the mass of various objects. -I will demonstrate how the mass of the various objects affects their motion by rolling balls of different mass across the same flat surface. -I will demonstrate how the mass of various objects affects their motion by rolling balls of different mass across a sloped surface. -I will compare and contrast the mass of the objects and the affect on the motion of each object. -I will create a graph illustrating the motion of each object on both the sloped and flat surfaces.</p>	<p>-Use activity above for this concept as well. You can also add masses to the toy cars to vary the speed. -Pose a scenario in which a large object with a large mass and a large object with a small mass must be moved. What are the challenges that might arise with each object? How could you solve them using what you know about force and motion? -Discovery Ed Passages: "May the Force be With You", "Speed Racers".</p>

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<p>4. How does momentum affect the motion of an object? How can you predict the direction an object will travel? (5.P.1.4)</p>	<p>-I will design an experiment to test how mass affects momentum. -I will follow the scientific method to test how mass affects momentum. -I will explain how the mass of an object is related to its momentum.</p>	<p>-Use the “Fling a Cow” activity in which students create a catapult to transport toy animals. (See CMS Force and Motion unit for details) -Discuss which object would take longer to decelerate: a toy truck or a semi-truck? Why? Which would take longer to accelerate? Why? -Balloon experiment: You will need a balloon taped onto a straw. Put a long string through the straw and tape either end of the string so that it travels at least 4 yards. Students can test how the amount of air they blow in the balloon affects the distance traveled. Many variations can be used. -Discovery Ed Passages: “Picking the Perfect Playground”, “No Pain No Gain”.</p>
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Helpful Websites:

- <http://www.edheads.org/activities/simple-Machines/>
- <http://science.discovery.com/interactives/literacy/newton/newton.html>
- www.physicsclassroom.com/mmedia/
- <http://www.ncpublicschools.org/curriculum/science/units/elementary/>
- http://www.eduplace.com/science/hmsc/content/organizer/3/org_3f_15_2.pdf
- http://www.eduplace.com/science/hmsc/content/organizer/4/org_4f_16_1.pdf
- <http://serc.carleton.edu/sp/mnstep/activities/19866.html>
- <http://serc.carleton.edu/sp/mnstep/activities/26894.html>
- http://www.mysciencesite.com/motion_graphs.pdf
- <http://graphs.mathwarehouse.com/distance-time-graph-activity.php>
- <http://www.gamequarium.org/cgi-bin/search/linfo.cgi?id=8442>
- <http://www.gamequarium.org/cgi-bin/search/linfo.cgi?id=7895>
- http://star.spsk12.net/science/science_05.htm
- <http://studyjams.scholastic.com/studyjams/jams/science/index.htm>
- http://www.livebinders.com/play/play_or_edit?id=217643

Writing Prompts:

1. Write an essay describing three pieces of playground equipment (swing, teeter-totter, slide, monkey bars). Explain how each piece of equipment works. Make sure to cite the simple machines that are in each piece of equipment.
2. Some people think school buses ought to have seat belts. Do you agree with this, or not? Write an essay explaining your opinion and your reasons for having it.

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3. Write an essay explaining the importance of car seats for young children.
4. Should police be permitted to speed whenever and wherever they must in order to apprehend a criminal? Explain what you think about this and why.
5. If you owned an amusement park, what three rides would you think you absolutely ‘must’ have in order to keep your patrons satisfied? Write an essay explaining the three rides and why you think they are essential to a popular amusement park.

MATTER: PROPERTIES AND CHANGE

Essential Standard:

5.P.2 Understand the interactions of matter and energy and the changes that occur.

Clarifying Objective:

5.P.2.1 Explain how the sun’s energy impacts the processes of the water cycle (including, evaporation, transpiration, condensation, precipitation and runoff).

5.P.2.2 Compare the weight of an object to the sum of the weight of its parts before and after an interaction.

5.P.2.3 Summarize properties of original materials, and the new material(s) formed, to demonstrate that a change has occurred.

Unpacking: What does this standard mean that a student will know and be able to do?

5.P.2.1

Students know that the sun provides the energy that is a driving force for most biotic and abiotic cycles on the surface of the earth. Students know that the sun’s energy fuels the water cycle and impacts different aspects of the water cycle (evaporation, transpiration, condensation, precipitation).

5.P.2.2

Students know that the weight of an object is equal to the weight of the sum of its parts. This is true in all closed systems.

5.P.2.3

Students know that by making qualitative and quantitative data records, we are able to create before/after representations of materials (and their properties), so that we can compare before/after versions of materials.

Essential Vocabulary: FIFTH Grade

water cycle, evaporation, condensation, precipitation, runoff, transpiration, biotic, abiotic, qualitative, quantitative, matter

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Essential Questions	Criteria for Success: "I Will"	Suggested Resources/Activities
<p>1. How does the sun affect life on earth? Can you create a way to show the water cycle? (5.P.2.1)</p>	<p>-I will examine the role of the sun in life processes. -I will explain the difference between biotic (living) and abiotic (nonliving) organisms. -I will illustrate the steps in the water cycle and explain the sun's energy as a driving force.</p>	<p>-To show plant basic needs and growth over time, gather grass seeds and plant in 4 small containers. Place one in windowsill and water every day. Place one next to it but do not water it. Place one in a dark place and water every day. Place the last container in a dark place but do not water. Discuss the role of variables in experiments. SW keep a log of plant growth and record their observations every day. -Use the seeds mentioned above to create a water cycle in a bottle. Take a sealed 2 liter bottle and plant the seeds in soil. Put water in and the close it. Put in windowsill and monitor over time. You should see condensation on the inside wall, and precipitation if you shake it so the drops fall. -Place a cold cup of water with a few drops of food dye in it outside on a hot day. Bring it 5 minutes later and discuss what parts of the water cycle are at work. -Discovery Ed Passages: "Can You Repeat That?", "Runoff or Recharge?", "The Rain Man" - Discovery Ed Video: "Basic Needs"</p>
<p>2. What is the relationship between the weight of objects and the sum of their parts? How can we describe matter? How can matter be changed? How can we describe the changes that take place in matter? (5.P.2.2)</p>	<p>-I will observe a whole object -I will weigh the object and record the data. -I will divide the object into fractional parts. -I will weigh all the parts of the object together and record the data. -I will compare and analyze the weight of the two objects and point out that the weight of the object does not change.</p>	<p>-Use a 1 pound bag of rice per group. Use measuring cups and a balance scale to determine weight, and how it changes as you take out certain amounts. (1/4, 1/2, 3/4, etc.) -Take water and weigh as a liquid, and then freeze and weigh as a solid. Discuss how the weight doesn't change. SW work in groups to determine another object they would like to change its state of matter and weight. -Teachers can align this unit with the math measurement unit.</p>

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<p>3. Can you create before and after representations of the properties of materials using qualitative and quantitative representations? (5.P.2.3)</p>	<p>-I will observe and describe a solid object based on some of its qualitative properties (color, texture, smell, taste, and appearance). -I will measure some of the quantitative properties (temperature, weight, volume) of the object and record the data. -I will make a hypothesis. -I will alter the properties of the object so it is no longer solid, and observe its new qualitative and quantitative state. -I will analyze and compare the data.</p>	<p>-See previous ideas. Add in variables that may change the experiment. -Discovery Ed Passages: “What’s the Matter?”, “States of Matter”</p>
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Helpful Websites:

- <http://www.teachnet.ie/hjones/x-ploringscience/pdfs/ecoquest.pdf>
- <http://www.sheppardsoftware.com/content/animals/kidscorner/foodchain/producersconsumers.htm>
- <http://www.sheppardsoftware.com/content/animals/kidscorner/games/producersconsumersgame.htm>
- <http://www.ncpublicschools.org/curriculum/science/units/elementary/>
- <https://files.oakland.edu/users/jthomas3/web/inspiration.html>
- <http://www.elmhurst.edu/~chm/vchembook/104Aphysprop.html>
- <http://serc.carleton.edu/sp/mnstep/activities/20101.html>
- <http://www.gamequarium.org/cgi-bin/search/linfo.cgi?id=7685>
- <http://www.gamequarium.org/cgi-bin/search/linfo.cgi?id=7907>
- http://star.spsk12.net/science/science_05.htm
- <http://studyjams.scholastic.com/studyjams/jams/science/index.htm>
- http://www.livebinders.com/play/play_or_edit?id=217643

Writing Prompts:

1. Many people have favorite foods that they snack on. Do you have a favorite snack food? Describe your favorite snack food. Explain what you think is in your snack food that makes it so appealing to you.
2. Imagine you are a drop of water falling from the sky as rain. Describe your adventure as you land on the earth, move towards the ocean, and ultimately are evaporated or transpired back into the atmosphere.
3. You have decided to bake a batch of cupcakes to share with your friends at school. Describe the process you will go through to prepare the cupcakes for your classmates.
4. After burning for 3 hours, a candle has lost half of its mass. Write an essay explaining where the mass has gone.

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5. Your mom has asked you to clean the sliding glass doors that lead out to your play area in the yard. However, there is no window cleaner left in the bottle. Your mom tells you that you can mix water with white vinegar or the juice from a lemon to make some home-made window cleaner. Which of these household chemicals would you use, and why?

ENERGY: CONSERVATION AND TRANSFER

Essential Standard:

5.P.3 Explain how the properties of some materials change as a result of heating and cooling.

Clarifying Objective:

5.P.3.1 Explain the effects of the transfer of heat (either by direct contact or at a distance) that occurs between objects at different temperatures. (conduction, convection or radiation).

5.P.3.2 Explain how heating and cooling affect some materials and how this relates to their purpose and practical applications.

Unpacking: What does this standard mean that a student will know and be able to do?

5.P.3.1

Students know that when warmer things are put with cooler things, the warmer things lose heat and the cool things gain it until they are all at the same temperature. Students know that a warmer object can warm a cooler object by contact or at a distance. Conduction is the transfer of thermal energy between things that are touching. Conduction can happen within one object. (For example, thermal energy can be conducted through the handle of a metal pot.) Convection is the movement of thermal energy by the movement of liquids or gases. Convection in the oceans and atmosphere helps to move thermal energy around Earth, and is an important factor influencing weather and climate. Radiation is the transfer of energy by electromagnetic waves. Electromagnetic waves can carry energy through places with or without any matter. The Sun is the main source of electromagnetic energy on Earth. Part of this energy, light, is used by producers to make food. Radiation can also happen in other circumstances (i.e. sitting in front of a fireplace).

5.P.3.2

Students know that heating and cooling can cause changes in the properties of materials, but not all materials respond the same way to being heated and cooled. Students know that heating and cooling cause changes in the properties of materials, such as water turning into steam by boiling and water turning into ice by freezing. Students know and notice that many kinds of changes occur faster at higher temperatures. Students know that some materials conduct heat much better than others, and poor conductors can reduce heat loss. Students need not come out of this grade span understanding heat or its difference from temperature. More important, students should become familiar with the warming of objects that start out cooler than their environment, and vice versa. Computer lab ware probes and graphic displays that detect small changes in temperature and plot them can be used by students to examine many instances of heat exchange. Because many students think of cold as a substance that spreads like heat, there may be some advantage in translating descriptions of transfer of cold into terms of transfer of heat.

Essential Vocabulary: FIFTH Grade

conduction, convection, radiation, electromagnetic waves, thermal energy, convection cell, transfer

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Essential Questions	Criteria for Success: "I Will"	Suggested Resources/Activities
<p>1. What are the effects of combining warmer objects and cooler objects? (5.P.3.1)</p>	<p>-I will place a warmer object and cooler object a specific distance apart and measure the time and temperature changes of both objects. -I will move a warmer and cooler object at a closer distance from each other and measure the time and temperature changes of both objects. -I will discuss the effects of the changes that occurred.</p>	<p>-Experiment: Take a cup of hot water and iced water, and measure the temperature of both. Then, combine the two in a larger cup. Immediately measure the temperature of the new mixture. Take the temperature every 2 minutes for 14 minutes. Discuss how it changed.</p>
<p>2. How many ways can you describe conduction? (5.P.3.1)</p>	<p>-I will heat various objects and observe how heat is gradually transferred through the object. -I will examine and explain the relationship between the transfer of thermal energy in the object (warmer to cooler) and conduction.</p>	<p>-Begin by teaching the difference between heat and temperature and also the 3 main states of matter. -Cite real life examples of heat: why do we place fans and air conditioning near the ceiling? Why does a kettle feel hot when you start to boil water? -Conduction is the transfer of heat through direct contact. -Discovery Ed passages: "Heat Transfer"</p>
<p>3. How is convection at work in the world around you? What are some natural examples of each type of heat transfer? (5.P.3.1)</p>	<p>-I will recognize that thermal energy moves between liquids and gases. -I will define this process as convection. -I will identify the process of convection as the heating and cooling of the atmosphere. -I will illustrate a convection cell. -I will examine and explain how convection influences weather and climate by moving air around the world (updrafts and downdrafts).</p>	<p>-Demonstrate convection with candles and soapy water in a pan. Heat the soapy water with the candle underneath it. Over time (10 minutes), the SW observe that the "pearl" or "shiny" parts to the water disappear. This is because the water in the pan nearest the candle was heated, and the heated water rose and broke down the soap molecules. -Create a cross-section of this experiment in their notebook. Relate this to a cross-section of the earth and how convection occurs underneath the crust. -Put food coloring in a small amount of hot water in a small jar with a small opening- the smaller the better. (A small jar example would be a similar size to a hotel shampoo bottle. Dropper bottles will work also.) Use tongs to place small jar on bottom of a large clear container of cold water. (Container example would be a beaker or a canning jar) Have the students observe, draw, and try to explain what you</p>

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		<p>see.</p> <p>-Convection is the transfer of heat through the movement of in air or water. See animation for “convection” on Discovery Ed.</p> <p>-Discovery Ed passages: “Test Time”, “Heating, Ventilating, and Air Conditioning”.</p>
<p>4. How would you explain processes of radiation? (5.P.3.1)</p>	<p>-I will identify the sun as the main source of electromagnetic energy on earth.</p> <p>-I will explain how electromagnetic waves can carry energy through places with or without any matter</p> <p>-I will describe the role of radiation as the energy that producers use to make food.</p>	<p>-Radiation is the transfer of energy as electromagnetic waves.(Anything that’s burning emits energy through air or water is radiation)</p> <p>-Use of hot plate in the room; discuss if you have ice water on it as it heats, where is radiation occurring? Where is conduction occurring? Where is convection occurring?</p> <p>-Discovery Ed passages: “Electromagnetic Radiation”, “Rays to the Rescue”, “Caution! May be Harmful to Your Health”.</p>
<p>5. What are the ways that heating and cooling change the properties of materials? (5.P.3.2)</p>	<p>-I will observe the heating and cooling of water (solid, liquid, gas).</p> <p>-I will explain how heating and cooling changes the properties of materials.</p> <p>-I will recognize that energy can be gained or lost depending on the temperature.</p> <p>-I will recognize that some materials conduct heat better than others.</p>	<p>-Utilize hot plates and hot and cold water to observe the changes in states of matter.</p> <p>-Experiment with which materials conduct heat the best: a wooden pencil, a plastic straw, a plastic ruler, and a metal spoon. Stick the materials along the side of a bowl with clay or sticky tack. Then place markers on the materials with butter. (Make sure all sticky tack is at the rim of the plate, and the butter is all at the same spot on each object. Add in water from a hot pot. On which object does the butter melt first? 2nd? Discuss.</p>

Helpful Websites:

http://www.physics4kids.com/files/thermo_transfer.html

<http://www.neok12.com/Heat-Temperature.htm>

<http://www.sciencekids.co.nz/gamesactivities/keepingwarm.html>

<http://www.kidsgeo.com/geography-for-kids/0061-transferring-heat.php>

<http://www.ncpublicschools.org/curriculum/science/units/elementary/>

<http://pbskids.org/dragonflytv/pdf/DoghouseDesign.pdf>

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http://www.ucar.edu/learn/1_1_2_5t.htm

http://www.ucar.edu/learn/1_1_2_6t.htm

<http://www.re-energy.ca/solar-oven>

<http://www.ciese.org/curriculum/tempproj/en/index.shtml>

http://www.ucar.edu/learn/1_1_2_5t.htm

http://www.teachengineering.org/view_activity.php?url=http://www.teachengineering.org/collection/cub_/activities/cub_energy2/cub_energy2_lesson06_activity2.xml

http://www.teachertube.com/viewVideo.php?video_id=159713

http://www.teachertube.com/viewVideo.php?video_id=186099

http://www.teachertube.com/viewVideo.php?video_id=186395&title=Bill_Nye_heat_2

<http://www.videosurf.com/video/bill-nye-the-science-guy-on-heat-full-clip-86007993>

http://star.spsk12.net/science/science_05.htm

<http://studyjams.scholastic.com/studyjams/jams/science/index.htm>

http://www.livebinders.com/play/play_or_edit?id=217643

Writing Prompts:

1. Write an essay describing what happens to the heat energy from a gas stove when you boil an egg in a pot of water.
2. It is freezing outside! Describe how you will dress in order to stay warm as you hike to the park a half mile away.
3. You have just made yourself a nice hot cup of tea. You are blowing on the top of the tea so you will not burn your mouth. Write an essay explaining why the blowing will cool off the tea so that it is safe to drink.
4. There is a need to conserve energy; if we are to make our natural resources last as long as possible. Some people do this by lowering their thermostat in the winter months, and their homes feel a little cool inside. Often, they have to wear sweaters indoors to stay warm. Do you think people should be required to conserve heat energy this way? Explain your position.
5. In North Carolina, we experience four seasons. This doesn't happen everywhere on earth. Some places stay hot year round, while others stay cold year round. If you had to relocate to such a place, and you had to choose between them, which would you choose – hot or cold? Explain the reasons for your choice.

EARTH SYSTEMS, STRUCTURES AND PROCESSES

Essential Standard:

5.E.1 Understand weather patterns and phenomena, making connections to the weather in a particular place and time.

Clarifying Objective:

5.E.1.1 Compare daily and seasonal changes in weather conditions (including wind speed and direction, precipitation, and temperature) and patterns.

5.E.1.2 Predict upcoming weather events from weather data collected through observation and measurements.

5.E.1.3 Explain how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.

Unpacking: What does this standard mean that a student will know and be able to do?

5.E.1.1

Students know that weather can change from day to day, and that many factors are measured to describe and predict weather conditions. (EG: wind speed and direction, precipitation, temperature and air pressure). Students know that in different latitudes and hemispheres there are different (and sometimes opposite) seasonal weather patterns.

5.E.1.2

Students know that one can collect and compare weather data in order to predict the likelihood of a particular weather condition occurring. Students know how to read basic weather instruments: thermometer, barometer, anemometer, wind vane, and rain gauge. Students also can identify atmospheric conditions (presence and type of clouds [stratus, cirrus, cumulous], fronts) that are associated with predictable weather patterns. Students can make basic weather predictions using these skills.

5.E.1.3

Students know that local weather conditions are influenced by global factors such as air and water currents. The jet stream is an air current in the upper atmosphere, located over North America that has a powerful influence on the weather conditions there. The jet stream flows from the west to the east and changes location depending on global conditions. The Gulf stream is a warm water surface current in the Atlantic ocean that moves from south of Florida up the eastern seaboard and then across the Atlantic. The Gulf stream moderates weather along the eastern seaboard, warming the air and land there during the cooler months. In the Pacific, there is an oscillation of water temperatures known as El Nino/La Nina. This oscillation impacts the climate of North and South America for long periods of time. Hurricanes are major storms that form over warm ocean water and are caused by global weather patterns.

Essential Vocabulary: FIFTH Grade

wind speed, wind direction, precipitation, temperature, barometer, jet stream, water currents, air pressure, latitude, hemisphere, anemometer, rain gauge, wind vane, thermometer, cirrus, stratus, cumulus, cumulonimbus, nimbostratus

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Essential Questions	Criteria for Success: “I Will”	Suggested Resources/Activities
<p>1. In what ways do tools aid in comparing changes in weather? (5.E.1.1)</p>	<p>-I will be able to graph weather changes over a period of time. -I will use weather trends from graphs to predict weather conditions. -I will describe different kinds of weather conditions (wind speed, wind direction, precipitation, temperature, air pressure). -I will distinguish that different latitudes and hemispheres result in different seasonal weather patterns.</p>	<p>-Gather monthly weather data from a variety of locations around the globe. SW compare and contrast the weather based on where the cities are located. Then SW create a double/triple line graph of the cities. -Bottle and Balloon Demonstration: You need a bottle with a balloon over the top of the bottle. Place that bottle in water and heat the water. Observe and discuss what happens to the balloon. Why does the balloon inflate? Take the bottle off the heat and observe the balloon why does it deflate? -Discovery Ed passages: “It’s Falling”, “How Much”, “Measure the Weather”, “The Shortest Distance”, “Weather”, “Weather and Climate”, “What is Climate? Can it be Measured?”.</p>
<p>2. Can you design a way to evaluate data to predict changes in weather? (5.E.1.2)</p>	<p>-I will collect and compare weather data to predict particular weather conditions. -I will read basic weather instruments (barometer, thermometer, anemometer, wind vane, rain gauge). -I will name the different types of clouds and fronts. -I will identify different atmospheric conditions and make basic weather predictions.</p>	<p>-View pictures of stratus clouds and students come up with questions they have about the clouds. -Start a class/student chart for the 3 types of clouds OR do a flip book. Observe clouds over the course of the unit. -Bottle and Balloon Demonstration: You need a bottle with a balloon over the top of the bottle. Place that bottle in water and heat the water. Observe and discuss what happens to the balloon. Why does the balloon inflate? Take the bottle off the heat and observe the balloon why does it deflate? -What Can change air pressure? Experiment on Science book page D53. -Discovery Ed passages: “Weather Report”, Getting a Larger View”, “Factors that Affect Climate”.</p>
<p>3. How can you analyze global weather patterns and their influence on local weather?</p>	<p>-I will identify local weather conditions. -I will identify what causes changes in local weather. -I will recognize the jet stream and Gulf</p>	<p>-Visit weather website to monitor daily Charlotte weather conditions. -In a large 13x9 pan, pour in hot water. Place food-dye colored ice cubes at either end. (One red and one blue) Notice the movement</p>

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(5.E.1.3)	stream as a factor in local weather conditions. -I will discuss the movement and direction of global wind patterns and ocean currents. -I will illustrate and label global weather patterns and water currents.	of the water and discuss implications for ocean currents. Relate to air currents. -Discovery Ed passages: “Earth’s Changing Climate”.
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Helpful Websites:

- http://www.epa.gov/safewater/kids/flash/flash_watercycle.html
- http://www.classzone.com/books/earth_science/terc/content/visualizations/es0105/es0105page01.cfm?chapter_no=visualization
- <http://www.kidzone.ws/WATER/>
- <http://www.brainpop.com/science/weather/wind/preview.weml>
- http://www.hpc.ncep.noaa.gov/dailywxmap/index_20080713.html
- www.weatherwizkids.org
- <http://www.ncpublicschools.org/curriculum/science/units/elementary/>
- http://star.spsk12.net/science/science_05.htm
- <http://studyjams.scholastic.com/studyjams/jams/science/index.htm>
- http://www.livebinders.com/play/play_or_edit?id=217643

Writing Prompts:

1. Stormy weather can be quite dangerous and frightening, but it can also be quite dramatic, and even beautiful, depending on your perspective. Write a poem (serious or funny) about a storm you have experienced.
2. Explain how the Jet Stream controls the weather in North America and what affect that has on our climate.
3. Write a short essay explaining how the Jet Stream and the Gulf Stream and alike and different.
4. Explain each of the weather conditions that meteorologists must monitor on a daily basis. Which weather condition (air pressure, temperature, etc.) do you think is the most useful for meteorologists to predict the weather and why?
5. Research your city’s climate and another city at a different latitude. What factors affect each city’s climate?

ECOSYSTEMS

Essential Standard:

5.L.2 Understand the interdependence of plants and animals with their ecosystem.

Clarifying Objective:

5.L.2.1 Compare the characteristics of several common ecosystems, including estuaries and salt marshes, oceans, lakes and ponds, forests, and grasslands.

5.L.2.2 Classify the organisms within an ecosystem according to the function they serve: producers, consumers, or decomposers (biotic factors).

5.L.2.3 Infer the effects that may result from the interconnected relationship of plants and animals to their ecosystem.

Unpacking: What does this standard mean that a student will know and be able to do?

5. L.2.1

Students know that there are different types of ecosystems (terrestrial and aquatic). These ecosystems can be divided into two types according to their characteristics:

Terrestrial

Land-based ecosystems include forests and grasslands.

Forests have many trees (with needles or with leaves), shrubs, grasses and ferns, and a variety of animals. They usually get more rain than grasslands. Diverse types of animals can be found in forests, depending on their type. Deciduous: black bear, deer, red fox, vole, rabbit, cardinal.

Rain forest: panther, monkeys, capybara, snakes, spiders. Temperatures in the forests may vary depending on where the forest is located.

Grasslands have fertile soil and are covered with tall grasses. They usually get a medium amount of rain, but less than forests. Temperatures may also vary depending on where the grassland is located. Some examples of animals that live in the grasslands are prairie dogs, bison, and grasshoppers.

Aquatic

Water-based ecosystems may be fresh water (lakes and ponds) or saltwater (oceans, estuaries and saltwater marshes).

Lakes and *ponds* are bodies of freshwater that are surrounded by land. Ponds are usually shallower than lakes and the temperature of the water usually stays the same from top to bottom. Plants and algae usually grow along the edges where the water is shallow. Some examples of animals may be different types of fish, amphibians, ducks, turtles, or beavers.

Oceans are large bodies of saltwater divided by continents. Oceans have many types of ecosystems depending on the conditions (sunlight, temperature, depth, salinity) of that part of the ocean.

Most organisms live where the ocean is shallow (from the shoreline to the continental shelf) because sunlight can reach deep and the water is warm making food abundant. Some examples of organisms that live in the shallow ocean are drifters (jellyfish or seaweed), swimmers (fish), crawlers (crabs), and those anchored to the ocean floor (corals).

Some organisms live in the open ocean, near the surface or down to the deep ocean bottom. Plankton float in the upper regions of the water.

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Some organisms swim to the surface to find food or for air (whales, turtles, sharks) while others live closer to the bottom (certain fish, octopus, tubeworms). Students know typical visual representations of the various ecosystems, as well as graphic representations of the food chains and webs, cycles and energy pyramids that are commonly associated with ecosystems.

5.L.2.2

Students know that organisms in an ecosystem can be producers, consumers, or decomposers. Students know that producers convert energy from the sun into organic matter through the process of photosynthesis. This organic matter is used by producers and consumers as food which provides the energy that fuels basic life processes. Consumers sometimes consume only or mostly other consumers as a food source. Producers and consumers produce wastes as they perform their life processes, and become waste organic matter when they die. Decomposers use these waste materials and other non living organic matter to fuel their life processes and recycle nutrients that are necessary for producers to carry out their life processes.

5.L.2.3

Students know that all of the organisms in an ecosystem have interconnected relationships. Students know that because of this, factors that impact one population within an ecosystem may impact other populations within that ecosystem.

Essential Vocabulary: FIFTH Grade

terrestrial, aquatic, estuary, salt marsh, fertile, species, deciduous forest, rainforest, grasslands, oceans, lakes, ponds, continental shelf, shoreline, plankton, food chain, food web, energy pyramid, producers, consumers, decomposers, photosynthesis, interconnected, salinity, algae, amphibians, community, population

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Essential Questions	Criteria for Success: "I Will"	Suggested Resources/Activities
<p>1. How can you compare the characteristics of several common ecosystems? (5.L.2.1)</p>	<ul style="list-style-type: none"> -I will differentiate between aquatic and terrestrial ecosystems. -I will recognize the major characteristics (living and non-living) of terrestrial ecosystems. -I will identify and compare different land-based ecosystems. -I will describe the major characteristics (living and non-living) of aquatic ecosystems. -I will identify and compare different aquatic ecosystems. 	<ul style="list-style-type: none"> -If possible: take a trail walk and record observations of land animals and aquatic animals. Come back and share to discuss their characteristics they noticed. -Use a large chart/graphic organizer for each ecosystem. Utilize reading passages and science textbook to include information about its common plants, animals, climate, soil, etc. -SW then choose one ecosystem to create a power point on. Orally present power point to the class. -Discovery Ed passages: "Desert and Tundra Ecosystems", "Can a Plant Live Anywhere?", Plants Everywhere", "Don't Bug Me Please", "Living the High Life".
<p>2. What is the relationship between producers, consumers, or decomposers? How can you classify organisms according to these categories? (5.L.2.2)</p>	<ul style="list-style-type: none"> -I will be able to recognize plants as producers that make (produce) their own energy from the sun (photosynthesis). -I will identify consumers as animals that get energy by eating (consuming) other organisms. -I will give examples of different types of decomposers. -I will understand that decomposers break down the tissues of dead organisms and return nutrients to the soil. -I will explain the role of producers, consumers, and decomposers in the food chain/food web/energy pyramids. -I will illustrate a simple food chain showing the role of producers, consumers, and decomposers. -I will illustrate a complex food web showing the role of producers, consumers, and 	<ul style="list-style-type: none"> -Ask 1 student to act as the sun, 12 students to come up and act as grass, 8 students to come up and act as grasshoppers, 6 students to act as mice, 4 students to act as snakes, and 2 students to act as hawks. SW sit in a triangle on the floor. The sun will start with all the energy (use small connecting cubes as pieces of energy), and as the organisms are eaten, the students will pass the energy to the next level. Vary amount of organisms as populations increase and decrease. Determine the producers, consumers, and decomposers. Discuss what decomposers would be appropriate for this ecosystem. -Have a variety of organism pictures to classify into groups based on the vocabulary being discussed. -Discovery Education Passages: "A Food Chain", "Decomposers", "Food Chains", "Food Webs on the Savannah", Huge Gain, Tiny Loss", "Producers and Consumers", "World Wide Web".

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	decomposers.	
3. How are all the organisms in an ecosystem interconnected? (5.L.2.3)	<p>-I will identify various relationships that organisms share in an ecosystem (food web, symbiosis, population, community).</p> <p>-I will explain each relationship and its impact on an ecosystem.</p> <p>-I will discuss the factors that impact populations within an ecosystem.</p>	<p>-Compose a document with a variety of food webs. In groups, SW interpret the food webs and discuss what would happen in certain populations change.</p> <p>- Then the teacher and students will read pages B22-B27 in the Science book. The teacher will stop and discuss the various relationships within a community. The students can create a graphic organizer to keep track of their thinking about each of the relationships. (Types of symbiosis: mutualism, commensalism, parasitism)</p> <p>-Create a debate and discussion of how humans change their environment.</p> <p>-Discovery Ed passages: “Changing Populations”, “Populations and Pollution”. “Animals Without a Home”, “Deforestation”, “Ecosystem Changes”, “Human Effects on Ecosystems”, “Sudden Changes in Ecosystems”, “Recycling in Ecosystems”.</p>

Helpful Websites:

- <http://www.teachnet.ie/hjones/x-ploringscience/pdfs/ecoquest.pdf>
- <http://www.ngfl-cymru.org.uk/vtc/Phase3delivery/Wales/Science/Keystage4/Livingthingsand/Feedingrelation/Introduction/act2.swf>
- <http://www.vtaide.com/png/foodchains.htm>
- <http://www.learnnc.org/lp/pages/3451>
- http://www.educationworld.com/a_lesson/03/lp308-04.shtml
- <http://www.ncpublicschools.org/curriculum/science/units/elementary/>
- http://star.spsk12.net/science/science_05.htm
- <http://studyjams.scholastic.com/studyjams/jams/science/index.htm>
- http://www.livebinders.com/play/play_or_edit?id=217643

Writing Prompts:

1. Imagine you are a small mosquito living in the tropical rainforest. Explain how you are connected to other animals in the rainforest. Be sure to include producers, consumers, and decomposers in your description.
2. Most climate scientists agree that humans are causing the earth to become warmer than it would normally be. (Climate change) Why do they think this? What factors are causing the earth to warm? What could you do to convince someone else that this is true?
3. Explain how the theme of “change” can be seen in our environment. What are the ways that animals change? Plants? Our environment?

STRUCTURES AND FUNCTIONS OF LIVING ORGANISMS

Essential Standard:

5.L.1 Understand how structures and systems of organisms (to include the human body) perform functions necessary for life.

Clarifying Objective:

5.L.1.1 Explain why some organisms are capable of surviving as a single cell while others require many cells that are specialized to survive.

5.L.1.2 Compare the major systems of the human body (digestive, respiratory, circulatory, muscular, skeletal, and cardiovascular) in terms of their functions necessary for life.

Unpacking: What does this standard mean that a student will know and be able to do?

5.L.1.1

Students know that unicellular organisms consist of a single cell and perform all life processes within a single cell. Students know that multicellular organisms are organisms that consist of more than one cell and have differentiated cells that perform specialized functions in the organism. Students know that many organisms –including humans – are multicellular. Students know that in complex multicellular organisms, only the surface cells that are in contact with the external environment are able to exchange substances with it. Cells within the organism are too far away from the environment for direct exchange. This is the reason multicellular organisms have developed transport systems.

5.L.1.2

Students know that there are many systems in the human body. Some of these systems are:

- Circulatory System (heart, blood, vessels)
- Respiratory System (nose, trachea, lungs)
- Skeletal System (bones)
- Muscular System (muscles)
- Digestive System (mouth, esophagus, stomach, intestines)
- Nervous System (brain, spinal cord, nerves)

Students know that each system performs a special life process function and that the systems work together to maintain health and fitness.

Essential Vocabulary: FIFTH Grade

single cell, multi-cellular, organisms, Circulatory System (heart, blood, vessels) ,Respiratory System (nose, trachea, lungs) ,Skeletal System (bones), Muscular System (muscles) , Digestive System (mouth, esophagus, stomach, intestines), Nervous System (brain, spinal cord, nerves)

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Essential Questions	Criteria for Success: “I Will”	Suggested Resources/Activities
<p>1. How would you analyze the ways simple and complex cells sustain life? (5.L.1.1)</p>	<ul style="list-style-type: none"> -I will distinguish between a single cell and multi-cell organisms. -I will give examples of single cell and multi-cell organisms. -I will describe the specialized functions of multi-cell organisms. 	<ul style="list-style-type: none"> -Begin with the basics: what is a cell? What are the two kinds of cells? -Making cells: Use jello and various food materials to place in the jello that can act as each part of a cell. (Simpler: Use a variety of construction paper colors to create the different cells) -Create a comparison chart for animal and plant cells. Compare/contrast by describing their characteristics. -Discovery Ed passages: “How Does a Cell Work?”, “Comparing Cells and Cars”, “Cells and Organisms”, “What Holds a Cell Together?”, “Cells”.
<p>2. What are the major systems of the human body, and what are their purposes? How are parts of human body systems independent, and interdependent? What features of the human body (structure and function) are common to all humans? (5.L.1.2)</p>	<ul style="list-style-type: none"> -I will identify each system of the human body (circulatory, respiratory, skeletal, muscular, digestive, nervous). -I will illustrate, name, and label major parts of each system. -I will identify the special functions of each body system. -I will differentiate between each human body system and its function. -I will be able to infer how these systems work together to maintain health and fitness. 	<ul style="list-style-type: none"> -Use the Discovery Ed Science Lab Skill Builder: “The Human Body” to discover the human body systems. -Divide the class into 4 groups, each with diagrams of two human skeletons sections. Count the number of bones and record in a data table. Compile a class table with each part of the body. Draw conclusions about the total number of bones in the body. (206) We need our bones for support, protection, and locomotion! -Read more about ways to keep each system healthy – foods, exercise, etc. Then get a chicken bone and expose it to soda/vinegar/and milk for 8 days. Record results and observations of its strength. Relate to real world. -To learn about muscles: Cut the bendable part off a straw. Insert the cut straw into the bendable end of another straw. This bend is the hinge joint in the arm. Poke a paper clip into a point just above the bend and at the other end. Connect with a rubber band. As they move the straw they should notice the muscles (rubber band) flex in their model. This helps our bones move. -On large sheet paper, draw the outline of a human body, and as each system is introduced, add the system parts to the body. -Discovery Ed passages: “Your Nervous System – Ready for Action!”, “The Human Body – An Incredible Machine”, “Human Body Shop”, “Body Lite”, “Wired!”, “You, Matter”, “Systems of the Body”, “Pain

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Over Brain”.
-The RHASE unit could be aligned with this unit.

Helpful Websites:

- <http://www.kathimitchell.com/cells.html>
- http://www.kidsbiology.com/human_biology/index.php
- http://streaming.discoveryeducation.com/braingames/iknowthat/ScienceIllustrations/humanbody/science_desk.cfm
- <http://www.teach-nology.com/themes/science/cell/>
- <http://www.ncpublicschools.org/curriculum/science/units/elementary/>
- <http://www.sciencenetlinks.org/lessons.cfm?BenchmarkID=11&DocID=385>
- <http://www.smm.org/heart/lessons/lesson10.htm>
- <http://health.howstuffworks.com/human-body/systems/digestive/adam-200086.htm>
- http://www.accessexcellence.org/AE/AEC/AEF/1995/cave_digest.php
- <http://www.medtropolis.com/VBody.asp>
- http://teachengineering.org/view_lesson.php?url=http://www.teachengineering.org/collection/cub_/lessons/cub_biomed/cub_biomed_lesson05.xml
- <http://www.teachersdomain.org/resource/idptv11.sci.life.stru.d4kbrn/>
- http://www.gamequarium.org/dir/SqoolTube_Videos/Science/Bill_Nye_Videos/Human_Body/
- http://star.spsk12.net/science/science_05.htm
- <http://studyjams.scholastic.com/studyjams/jams/science/index.htm>
- http://www.livebinders.com/play/play_or_edit?id=217643

Writing Prompts:

1. If you were to become a doctor, which body system would you most want to be your area of focus? Explain your choice and tell what your job would be like.
2. Some people think humans could survive by eating the same three meal menu daily. Others think there must be more variability in our diet in order for us to be truly healthy. What do you believe is the case? Explain your position.
3. Write a story about a character who eats nothing but chocolate all day, every day. Describe this character in detail and make sure to explain how chocolate came to be the only food he/she consumes.
4. Pretend you are a human body part, organ, or system. Nominate yourself for BOS (body part, organ, or system) of the year. Explain in your nomination essay the many things that you do to help humans survive, and why you are the most important body part, organ, or system.

EVOLUTION AND GENETICS

Essential Standard:

5.L.3 Understand why organisms differ from or are similar to their parents based on the characteristics of the organism.

Clarifying Objective:

5.L.3.1 Explain why organisms differ from or are similar to their parents based on the characteristics of the organism.

5.L.3.2 Give examples of likenesses that are inherited and some that are not.

Unpacking: What does this standard mean that a student will know and be able to do?

5.L.3.1

Students know that the life processes and species characteristics that define a population will be transmitted from parent to offspring. Students also know that these processes and characteristics cover a broad range of structures, functions and behaviors that can vary substantially from individual to individual.

5.L.3.2

Students know some likenesses between parents and children are inherited. Other likenesses are learned from parents or within the community (population/culture). Students know that in order for offspring to resemble their parents there must be a reliable way to transfer genetic information from parent to offspring. Students can be encouraged to keep lists of characteristics that animals and plants acquire from their parents, things that they don't, and things that the students are not sure about either way. This is also the time to start building the notion of a population whose members are alike in many ways but show some variation.

Essential Vocabulary: FIFTH Grade

inherited traits, species, population, culture, genetics, offspring, characteristics

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Essential Questions	Criteria for Success: "I Will"	Suggested Resources/Activities
<p>1. How can you prove that organisms differ from or are similar to their parents? (5.L.3.1)</p>	<p>-I will recognize that characteristics are transmitted from parent to offspring. -I will recognize that each individual has a unique and broad range of characteristics.</p>	<p>-TW use the Discovery Ed passage "A Litter of Kittens" to discuss how certain characteristics, or traits, are passed on from parent to child. This happens no matter what organism it is. -SW research their family's genetic traits. Create a shape of a hand on paper. On each finger, the students write: 1. Trait no one else has. 2. Trait shared with a sibling. 3. Trait shared with parent. 4. Trait shared with grandparent. -Compare pictures of many different types of animals. (Vary with reptiles, amphibians, mammals, birds) Compile pictures with parent animals and their offspring. What do they have in common? What is different? Now compile pictures of parent plants and their offspring. What is similar? Different? Conclude that although organisms look similar to their parents, they each have different characteristics that make them unique.</p>
<p>2. In what ways can you classify similar traits of parents and offspring as inherited or not inherited? (5.L.3.2)</p>	<p>-I will identify and explain some traits that are inherited from parents. -I will compare characteristics between offspring and parents. -I will list similar and different characteristics between various offspring and parents. -I will explain ways in which traits are learned from parents, population, and/or culture.</p>	<p>-View animation on "genetic traits" from Discovery Ed. -Introduce Gregor Mendel, who is the "founding father" of genetics. -Create a class list of common genetic traits that make each of us unique. Some common traits are: hair color, eye color, widow's peak, earlobe attachment, tongue rolling, cleft chin, dimples, freckles, naturally curly hair, allergies, colorblindness, and way of hand clasping. Take class polls for each trait. Discuss the most common and the least common. Students can also create graphs to show traits. -Create a chart with recessive and dominant traits. Allow them to go through each trait and put a check mark in the column of the physical characteristics they have. Allow students to work in pairs and help each other recognize which traits they have. Once everyone has finished their chart allow students to share their results by raising their hands and completing a class data table. - Ask: Were traits that are dominant, actually dominant among classmates? Is it possible for you to have traits that are not visible in your</p>

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		<p>parents?(yes, if both parents have heterozygous traits (Bb) then there is a 25% chance that the recessive trait be passed to an offspring. Both parents could have the dominant trait but also be carriers for the recessive trait -Discovery Ed Passages: “Genetics Lite”, “True Gene-ius”, “What is DNA?”.</p>
<p>Helpful Websites: http://learn.genetics.utah.edu/content/begin/traits/activities/ http://www.cccoe.net/genetics/daddy2adv.html http://www.ncpublicschools.org/curriculum/science/units/middle/ http://star.spsk12.net/science/science_05.htm http://studyjams.scholastic.com/studyjams/jams/science/index.htm http://www.livebinders.com/play/play_or_edit?id=217643</p>		
<p>Writing Prompts:</p> <ol style="list-style-type: none">1. Create a graphic organizer (tree organizer would work) showing the main physical traits of your grandparents, parents, and their offspring. Write an essay analyzing the similarities and differences of your family’s traits. Explain why you look similar to your parents and/or grandparents.2. What is DNA? How did your father and mother’s DNA affect yours?		

This document was compiled by Kate Martin (Duda), Julia Lagas, and Dee Chinault.