

GRADE 4

State Goal 11: Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments, and solve problems.

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>Critical to Understand and Master at Grade 4: 4.11.01 Formulate and ask questions on a specific science topic and outline ideas for steps to answer the questions.</p>	<ul style="list-style-type: none"> • Develop questions about the water cycle. • Discuss, diagram, or write about ways in which the water cycle is evident in everyday life. Choose questions that you can answer by testing some of these everyday events. 	<p>Social Studies/Language Arts: Choose a famous American who is no longer alive and develop questions you would have liked to have asked the person. Math: List steps that need to be followed in solving a multi-step word problem.</p>
<p>4.11.02 Plan a simple investigation, design a valid experiment (a “fair test”) to answer the question, and predict what might happen in the investigation.</p>	<ul style="list-style-type: none"> • Plan an investigation of water evaporation under various conditions. • Decide on what you wish to test (e.g., the variable) and how to make it a fair test (e.g., establish a control). • Predict what you might expect to happen based on your knowledge of water evaporation in the world around you (e.g., water in the hydrosphere or atmosphere). • Design an experiment to investigate why stones become rounded in streams. 	<p>Religion: Discuss what makes a test fair and the ethics involved in taking tests. Language Arts: Write your own prediction of what might happen in a scientific investigation.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>4.11.03</p> <p>Collect data from investigations with plants, animals, rocks, or other materials using skills such as observing, estimating and measuring, and somewhat more sophisticated tools such as scales, microscopes, computers, and calculators.</p>	<ul style="list-style-type: none"> • Observe evaporation under a number of different conditions or with various sources of heat. • Make and record measurements related to evaporation (e.g., the amount of water lost to evaporation, the time it took to evaporate, and the temperature of the air around the water). • Calculate the rate of evaporation and use it to answer a question about evaporation from a larger body of water. • Analyze and record observations of sediments (e.g., sizes, shapes, colors) from a local stream. 	<p>Math: Measure and graph weekly growth of a plant in and out of the sun.</p> <p>Language Arts: Write about a plant growing without sun using information from your science investigations.</p> <p>Business: Find out what kinds of technological tools are used by various professions (e.g., X-ray imaging by radiologists or dentists, GIS by surveyors or field scientists, digital cameras by photographers).</p>
<p>4.11.04</p> <p>Arrange data and observations into logical patterns, describe the patterns, and compare the data with predictions.</p>	<ul style="list-style-type: none"> • Group like observations together and look for patterns in your data. • Compare your observations with your predictions, making sure not to change your predictions just to match your data. 	<p>Language Arts: Read a short story, list ten key events in the story, and arrange them in the proper sequence.</p> <p>Math: View a given pattern and then reproduce it using pattern blocks (e.g., tangrams).</p> <p>Language Arts: Compare a written prediction with what actually happened in an investigation and discuss similarities and differences.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>4.11.05 Use evidence, observations, and logic to develop scientific explanations for student investigations.</p>	<ul style="list-style-type: none"> • Based on your data, explain important factors in the rate of evaporation (e.g., How is evaporation similar to or different from boiling?). • Check your ideas by seeing how well they fit with observations you make every day regarding evaporation (e.g., puddles remain longer on cool days; when liquids evaporate, they leave a residue behind). 	<p>Language Arts: Read a mystery novel and describe the evidence and logic that the author uses to solve the mystery.</p> <p>Language Arts/Drama: Play a mystery game and act out the parts; solve the mystery and explain how you arrived at your solution.</p>
<p>4.11.06 Use evidence, observations, and logic to evaluate respectfully the explanations of other students and other teams.</p>	<ul style="list-style-type: none"> • Ask that other students and teams provide data to support their explanations. • Demonstrate an ability to judge the interpretation of evidence and the conclusion, not the student making the conclusion. 	<p>Social Studies: Read some writings from history that support ideas that are no longer acceptable (e.g., slavery, limited voting rights for some people, racial discrimination) and write a respectful rebuttal from your point of view.</p> <p>Language Arts: Create a rubric that could be used to evaluate your work on a school project.</p> <p>Drama: Consider a play or story with a mystery to solve, and investigate how evidence is used to evaluate possible solutions to the mystery.</p>
<p>4.11.07 Report and display the results of individual and group investigations.</p>	<ul style="list-style-type: none"> • Write lab reports with graphs of results, make science project boards, and participate in discussions about your investigation. • Use charts and graphs to illustrate the patterns in your data and how they support your conclusion. 	<p>Language Arts: Prepare a written report of group investigations using an established format.</p> <p>Religion: Create Me Posters to display in your classroom.</p>

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<p>4.11.08</p> <p>Identify a design problem and propose possible solutions to the problem with words and design sketches.</p>	<ul style="list-style-type: none"> • Select a device that you would like to build that serves a specific function (e.g., carries eggs safely, supports weight, sets dominoes in motion). • Present a design idea and support the idea with an explanation, words, and pictures. • Summarize a design challenge in your local transportation system (airport, train network, highways, school bus routes) and draw sketches showing a possible solution. 	<p>Business: Read newspapers to find articles about automobile recalls.</p> <p>Social Studies: Investigate the building of the Leaning Tower of Pisa to identify why it leans and what people are doing about it.</p> <p>Geography: Read and study design challenges associated with the “Big Dig” project in Boston.</p>
<p>4.11.09</p> <p>Develop a plan, design a procedure to address the problem, and identify constraints (e.g., cost, time, materials, space, technology, safety).</p>	<ul style="list-style-type: none"> • Design your device, paying attention to what materials you need, how much time you have, and what you want your device to do. • Work within the constraints of the classroom (e.g., use easily accessible materials, make the device safe). • In solving a challenge in the transportation system, make a table showing estimates of costs, safety issues, spatial constraints, and technologies needed. 	<p>Language Arts: Prepare a proposal describing what you would do to straighten the Leaning Tower of Pisa.</p> <p>Business: Estimate the time it would take and cost of the materials needed to carry out your plan to straighten the Leaning Tower of Pisa.</p>
<p>4.11.10</p> <p>Build a prototype of the design using available tools and materials.</p>	<ul style="list-style-type: none"> • Build a sample device following your plan to solve a problem. • Use tools and materials safely in building your prototype. • Use cardboard, tape, or other materials to build a prototype of an improved part of the transportation system. 	<p>Art: Examine layers in the Leaning Tower of Pisa, and use simple materials to build a replica.</p> <p>Math: Measure the angular degree of correction that needs to be made to straighten the Leaning Tower of Pisa.</p>

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<p>4.11.11 Test the prototype using suitable instruments, techniques, and quantitative measurements to record data.</p>	<ul style="list-style-type: none"> • Test the device. Make as many quantitative measurements as you can of your results (e.g., From how high can you drop an egg? How much weight does your structure support? At what rate can you get the dominoes to fall?). • Keep accurate records of all tests. • Design an apparatus to simulate how rocks become rounded in streams, build it, and run a test (a simulation). 	<p>Art: Using the replica, make structural changes that straighten the Leaning Tower of Pisa.</p> <p>Language Arts: Give an oral explanation of your procedure including a sequence of steps you took to straighten the tower.</p> <p>Business: Prepare a budget showing actual costs versus estimated costs for straightening the Leaning Tower of Pisa.</p>
<p>4.11.12 Assess test results and the effectiveness of the design using the given criteria and noting possible sources of error.</p>	<ul style="list-style-type: none"> • Evaluate your design and decide if the design achieved the desired results. • Revise your design and suggest changes that you would want to make before you tested it again. • Make the changes and test your device again, if time permits. Decide if your changes improved the quality of your device. 	<p>Physical Education: Test to see if a straight line is the shortest distance between two objects by running along a straight path to a location and along a curved path to the same location; count the number of paces and measure the time.</p> <p>Math: Use the guess and test method (i.e., guess and check) to solve word problems.</p>
<p>4.11.13 Report the test design, the test process, and the test results, as would a team of scientists and engineers.</p>	<ul style="list-style-type: none"> • Share your design and the results of your tests with the class in a written or oral form. • Discuss that scientists share their work in order to check their accuracy, discuss ideas, and come up with new questions they want to answer (e.g., discuss the process to develop a medication used by a member of your family). 	<p>Language Arts: Write a report on a simple scientific investigation that includes sections on the problem, prediction, procedure, data, analysis, revision, and conclusion.</p> <p>Cooperative Learning: Divide the work to prepare the presentation among group members so that all take responsibility.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>4.11.14 Use numbers to describe and compare scientific objects and events.</p>	<ul style="list-style-type: none"> Record in a science notebook quantitative observations (e.g., observations using numbers) as well as qualitative ones (e.g., observations using descriptive words). Use tools of measurement whenever possible to provide quantitative data (e.g., timers, balances, meter sticks). 	<p>Physical Education: Rank sports teams according to their win and loss percentage. Math: Use a statistic such as batting average as a criterion to compare individual players in a sport.</p>
<p>4.11.15 Apply math skills to measure, record, and organize scientific data; apply several types of operations to compare the data and observations (e.g., multiplication, division).</p>	<ul style="list-style-type: none"> Demonstrate the use of mathematics when doing science. Use math to analyze data (e.g., calculate speed, determine percent change) and make simple graphs showing results. 	<p>Math: Solve word problems using repeated addition and multiplication and compare answers. Language Arts: Create a survey (e.g., to determine students' favorite candy), ask students to complete the survey, and present the data using tables and graphs.</p>
<p>4.11.16 Identify shapes and patterns that are found in nature and in things that people make (e.g., circles, rectangles, triangles, cubes); identify how measurements can be displayed with simple graphs.</p>	<ul style="list-style-type: none"> Go to the playground or a nearby park and write in your science notebook shapes and patterns in natural things in that setting. Recognize that solutions to many problems use knowledge about the patterns and behaviors in the natural world (e.g., forces cause motion, energy is needed for evaporation to occur, gravity pulls objects downward, plants grow toward light). Be able to see patterns in the natural world when they are represented as measurements on a simple graph (e.g., when distance increases along with time, so does the speed of the object). 	<p>Art: Take an artistic or scenic picture and identify the shapes you see in the picture. Math: Create a graph of the results of the above activity for your entire class using many scenic pictures to determine the most common shape found in nature.</p>

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<p>4.11.17 Use communication and dialogue (e.g., reading, writing, speaking, listening) to conduct investigations, report results, and learn others' discoveries.</p>	<ul style="list-style-type: none"> • Read about current events in science and report an interesting discovery that has happened in the last few months. • Interview a scientist to learn what questions he or she is asking about the natural world. • Write an organized lab report about an experiment or investigation. 	<p>Technology: Use the Internet to research and learn about recent scientific discoveries. Language Arts: Write a 2-page paper on a recent discovery in the medical sciences of interest to you. Social Studies: Attend a talk at a local museum to see how the person shares his or her expertise and enthusiasm for their professional work.</p>
<p>Significant to Develop at Grade 4: 4.11.18 Give examples of how scientists make the results of their investigations public and how they describe their work so that any other scientist can repeat the investigation. (11A)</p>	<ul style="list-style-type: none"> • Report on some historic developments of scientific ideas (e.g., rovers on surface of Mars, discovery of dinosaur fossils, population studies of mammal herds). • Describe the reason that scientists make their results public and publish their investigations so that other scientists can repeat them. 	<p>Language Arts: Read and discuss an article in a science journal. Home Economics: Create a school cookbook to which each student submits a favorite recipe.</p>
<p>4.11.19 Communicate ideas and findings in science to others using accurate representations, such as models, diagrams, numerics, flowcharts, and schematics. (11C)</p>	<ul style="list-style-type: none"> • Participate in a public forum to discuss your science investigations (e.g., science fair, parents' night). • Design a display that includes all the information and evidence that someone would need to have to understand your investigation and your conclusions. 	<p>Social Studies: Create a flow chart illustrating the steps by which wheat becomes bread. Art: Construct a model of the exterior of your home. Geography: Draw a map of a part of your community including schools, houses, streets, shops, and parks.</p>

State Goal 12: Understand fundamental concepts, principles, and interconnections of the life, physical, and earth and space sciences.

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>Critical to Understand and Master at Grade 4: Life Sciences 4.12.01 Describe that organisms' behaviors develop for adaptation to their environments.</p>	<ul style="list-style-type: none"> • Match an environment to adaptations suited to that environment; include both plant and animal examples. 	<p>Social Studies: Identify different human habitats and the environments in which they are used. Art: Draw an extreme environment and an animal whose adaptation makes it possible for it to survive.</p>
<p>4.12.02 Classify traits and behaviors of living things as inherited or learned (e.g., flower or eye color as inherited traits; language or riding a bike as learned) and state how they relate to the organisms' environments.</p>	<ul style="list-style-type: none"> • Identify traits and behaviors that you have inherited from your parents. • Identify behaviors that you have learned in your family or community. • Describe how traits and behaviors make it easy or hard to live in your environment (e.g., light skin makes you sunburn easily in a sunny climate; not learning to play an instrument makes it hard for you to join the school band). 	<p>Religion: Make a list of God-given talents. Social Studies: Compare cultures around the world and discuss similarities and differences (e.g., how they live, their beliefs, games they play, work they do, clothes they wear). Language Arts: Discuss whether talent in music is learned, inherited, or both.</p>
<p>4.12.03 Identify physical features of plants and animals that help them live in different environments and habitats (e.g., specialized teeth, thorns for protection, insulation for cold).</p>	<ul style="list-style-type: none"> • Explore the function of specialized adaptations in the environment (e.g., bird beaks specialized for eating certain foods) using common materials (e.g., tweezers, chopsticks, scoops) and draw conclusions about the role of adaptations for species survival. 	<p>Art: Make a diorama depicting plants and animals in their natural habitat. Language Arts: Write a poem to describe animal depicted in habitat diorama. Home Economics: Match kitchen tools to their functions.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>4.12.04 Identify differences in individuals of a species that can provide an advantage in survival and reproduction.</p>	<ul style="list-style-type: none"> • Observe and describe variations in species (e.g., length of bean seeds, height of radishes, spot patterns on ladybugs). • Describe individuals of a species with differences and determine how the differences affect survival (e.g., which colored dots on a printed fabric or colored toothpicks in the grass are not picked up during a game of simulated predation?). 	<p>Religion: Bring in baby pictures, mix them up, and then match them to classmates. Art: Draw or create your own organism and show it to the class, describing characteristics that give it specific advantages for survival in a given environment.</p>
<p>Physical Sciences 4.12.05 Explore and describe how chemical and physical properties of natural and human-made materials can change (e.g., dissolving doesn't mean disappearing).</p>	<ul style="list-style-type: none"> • Design an experiment to dissolve a substance in water and then retrieve it again through evaporation. • Identify physical changes that can occur without changing the chemical properties of a substance (e.g., changing phase because of temperature changes, breaking apart when struck, changing shape when poured into a new container). • Identify a substance and chemical changes that change its physical properties (e.g., burning paper, baking bread dough). 	<p>Home Economics: Mix ingredients to make a cake; compare the ingredients before and after mixing and before and after baking. Language Arts: Dissolve salt in water, put it in a sunny window, and record daily changes in a science journal. Art: Mix paint to create various colors.</p>
<p>4.12.06 Describe what happens when some substances are mixed with other substances.</p>	<ul style="list-style-type: none"> • Determine through investigation substances that react together to form new substances. 	<p>Home Economics: Follow recipes from a different culture to create a new meal. Art: Glaze a piece of pottery.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>4.12.07</p> <p>Identify the properties of 2 separate substances before and after they are mixed to create a new substance.</p>	<ul style="list-style-type: none"> • Conduct an experiment with an antacid tablet and water; describe each ingredient before the reaction and describe each ingredient present after the reaction. • Find out how a particular common substance is manufactured (e.g., cement, glass, glue, gelatin), and what ingredients combine to make the substance. 	<p>Business: Go to a pizzeria to make your own pizza.</p> <p>Home Economics: Make gelatin (e.g., Jell-o jigglers).</p> <p>Religion: Participate in a community service project to make play dough for preschool children.</p>
<p>4.12.08</p> <p>Describe that materials occur in different states (solid, liquid, gas) that change by heating or cooling.</p>	<ul style="list-style-type: none"> • Name examples of solids, liquids, and gases; describe all phases of the same substance and the role of heat in the phase present at a given time (e.g., H₂O, lava to rock). • Conduct a race to melt an ice cube. Discuss and analyze the strategies used by different teams. • Record the temperature of water collected during melting and freezing or during boiling and condensing to trace phase. 	<p>Language Arts: Read aloud <i>Bartholomew and the Oobleck</i> by Dr. Seuss.</p> <p>Geography: Identify places on Earth where icebergs and glaciers form. Compare the temperatures in these regions with temperatures near you.</p> <p>Art: Use ice cubes to make diagrams showing how ice floats.</p>
<p>4.12.09</p> <p>Explore and describe different ways to produce heat, such as burning substances, rubbing (friction), or mixing substances.</p>	<ul style="list-style-type: none"> • Compare chemical reactions between a liquid and solid and describe which produces or consumes energy (e.g., mix 5 milliliters of phenol red in ziplock bag with sodium bicarbonate [NaHCO₃]; then mix 5 milliliters of phenol red with calcium chloride [CaCl₂]; then mix the phenol red with different proportions of the two solids). • Design a high-friction apparatus and measure the maximum change in temperature that can be produced. 	<p>Social Studies: Describe how early humans created fire and how harnessing fire changed their lives.</p> <p>Economics and Business: Find out how homes in your area are heated and where the energy comes from.</p> <p>Science: Explore other results of chemical reactions, such as luminosity (e.g., light sticks).</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>Earth and Space Sciences 4.12.10 Describe and explain slow and fast processes that occur on Earth's surface (e.g., weathering, mountain formation, landslides, earthquakes, volcanism).</p>	<ul style="list-style-type: none"> • Observe and describe signs of weathering around your school or community (e.g., corners becoming rounded on stone buildings; fractures and broken corners in bricks; changes in statues, bridges, cliffs). • Choose a local area that has undergone changes due to natural causes and determine if the changes are fast or slow (e.g., fast changes are those that occur with earthquakes and landslides; slow changes are those that occur with weathering and stream erosion). • Describe changes on Earth's surface that are the result of weather conditions (e.g., floods, rock slides) and contrast them with changes that are the result of forces within Earth (e.g., volcanoes, earthquakes). 	<p>Social Studies: Report on a recent natural disaster from around the world (e.g., tsunamis, earthquakes, volcanoes, mudslides). Religion: Find out how students in your school can help families affected by a natural disaster. Plan a way to help in a small way. Geography: Measure the depth of the Grand Canyon in kilometers from a photograph or map. Estimate how long it took the Colorado River to carve the canyon if the river erodes at expected rates of about 100 to 500 meters each million years.</p>
<p>Significant to Develop at Grade 4: 4.12.11 Characterize specific structures of organisms as being inherited from parent organisms. (12A)</p>	<ul style="list-style-type: none"> • Identify similarities between parent and offspring organisms that are inherited (e.g., eye color, earlobe shape, flower color), and contrast them with similarities in behavior that are learned (e.g., manners, carpentry skills). 	<p>Religion: Create a family tree using pictures. Math: Count how many people in your class have attached earlobes and make a pie graph of your results. Use your graph to predict the incidence of attached earlobes in another class, then visit the class to check your prediction.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>4.12.12 Explore and describe how heat can be transferred between objects. (12C)</p>	<ul style="list-style-type: none"> • Explain the transfer of heat when a heated rod is immersed in a glass of cold water. • Describe what is happening when an ice cube melts. Discuss where the heat comes from and where it goes. • Predict the temperature of a cup of coffee to which an equal amount of cold milk is added based on temperature measurements. Test your prediction using tools and materials. 	<p>Home Economics: Determine the time needed to create soft vs. hard boiled eggs when they are cooked in the same hot water.</p> <p>Language Arts: Use descriptive words to write about what happens to a glass on a hot day when ice is added to its contents.</p> <p>Technology: Use a digital thermometer to measure temperature and compare its use to that of an alcohol thermometer.</p>
<p>4.12.13 Describe some locations on Earth where earthquakes and volcanoes occur and how those events relate to processes and people on Earth. (12E)</p>	<ul style="list-style-type: none"> • Analyze a map of volcano and earthquake sites around Earth and draw conclusions about the pattern of earthquakes and volcanoes along some types of plate boundaries. • Describe the effect earthquakes and volcanoes can have on people (e.g., tsunamis, floods, disruption of roads, fires, destruction of habitat). 	<p>Social Studies: Use a world map (or consult internet seismology websites) to record volcano locations and recent earthquake sites.</p> <p>Economics: Discuss the financial effects on communities of earthquakes and volcanoes.</p> <p>Language Arts: Read a first-hand accounting of living through a volcanic eruption or an earthquake.</p>
<p>4.12.14 Describe how processes interacting at the surface of Earth are related in cycles (e.g., water cycle, rock cycle, weather patterns) and have different forces driving the cycles (e.g., gravitation, energy). (12E)</p>	<ul style="list-style-type: none"> • Draw and label the components of the rock cycle. • Describe how the water and rock cycles interact to change Earth's surface. • Model the effects of water erosion and deposition of sediments using a stream table. • Discuss and diagram the forces that drive the water and rock cycles. 	<p>Music: Teach students the <i>Water Cycle Song</i> by Dr. Jean.</p> <p>Art: Use rock samples to create an illustration of the rock cycle.</p> <p>Religion: Discuss the importance of transporting some resources by Earth cycles.</p>

State Goal 13: Understand the relationships among science, technology, and society in historical and contemporary contexts.

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>Critical to Understand and Master at Grade 4: <i>Safety in science</i> 4.13.01 Demonstrate ways to perform science investigations safely at home and at school (e.g., wearing goggles, using fire extinguishers).</p>	<ul style="list-style-type: none"> • Follow safety rules posted in the classroom (e.g., never taste materials, wash hands after working with objects and materials, pick up after yourself, use tools safely). • Explain why the safety rules are important and why you should report unsafe behavior (e.g., wear goggles to protect eyes from splashes, keep work space clean to avoid accidents, don't play with matches). 	<p>Social Studies: Have professionals from industry visit your class to discuss safety on the job. Home Economics: Discuss safety measures that should be taken at home. Economics and Business: Identify businesses that provide items to keep you safe (e.g., sign companies, sunscreen manufacturers, seatbelt manufacturers, handrail installers).</p>
<p><i>Nature of science</i> 4.13.02 Use evidence to explain why similar results are expected when procedures are done the same way.</p>	<ul style="list-style-type: none"> • Perform the same investigation or procedure with an object more than once (e.g., roll a ball down a ramp, connect wires to a battery), show with a graph or table how similar or different the trials are, and analyze the results. • Launch the same paper airplane the same way 5 times and record differences or similarities in flight pattern or behavior; describe if this is a reproducible experiment and the factors that you need to consider. • Predict how the results of an investigation performed by different teams will compare and explain why you think so. 	<p>Home Economics: Discuss why recipes are developed for cooking (e.g., people want to get the same results a number of times). Math: Check your answers using the same formula to see if you get the same answer. Religion: Discuss similarities and differences between scientific protocols and how results for the Eucharist are similar when performed in different churches or by different clergy.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p><i>Natural resources and humans in the environment</i> 4.13.03 Give examples of how the supply of many resources is limited (e.g., wood, fish), while many materials can be reused or recycled.</p>	<ul style="list-style-type: none"> • Make a list of resources you use every day and divide the list into 2 categories: recyclable and not recyclable. • Promote a recycling program in your school by producing an information sheet about recyclable materials. • Consider the demolition of a large building; list all materials that are part of the building and whether or not they can be recycled. • Compare and contrast sources of corn (or rice, beans) and wood and determine if these resources are limited. 	<p>Social Studies: Discuss how people in other cultures use natural resources. Economics: Find out about why some materials that are recyclable are not collected to recycle in your area. Discuss your response to this information. Geography: Research regions of the world with abundant oil reserves and calculate how far away they are from your city.</p>
<p><i>Natural hazards and level of risk</i> 4.13.04 Explain changes in the environment that humans can cause and when these can be hazardous (e.g., increased erosion, pollution).</p>	<ul style="list-style-type: none"> • Explain how a leak in a nuclear power plant can affect people living near it (e.g., Chernobyl, Three Mile Island). • Compare the advantages and disadvantages of river channels with different levee heights and widths and then compare the amount of vegetation in the river bottom or floodplain. • Observe and describe the materials that exit a car, bus, or truck engine through the exhaust pipes and describe changes that the materials can make to the environment. 	<p>Social Studies: Research and examine data of per capita use of resources to determine where in the world the most use occurs, such as with energy consumption. Language Arts: Write a poem about Earth Day. Technology: Learn what a hybrid car is, and how it works.</p>

LEARNING STANDARD/OUTCOME	SAMPLE ASSESSMENT	CONNECTIONS
<p>Significant to Develop at Grade 4: 4.13.05 Explain what a scientist might do if the results of an investigation turn out differently than expected (e.g., replicate the experiment and measurements). (13A)</p>	<ul style="list-style-type: none"> • In a science experiment, explain whether your results match your prediction and what to do if they do not match (e.g., repeat the experiment, but do not change a prediction to match the results). • Compare results from various teams in a class investigation by graphing each team's results and describing whether the results are similar or different overall; discuss next steps if the results are similar versus next steps if they are different. 	<p>Physical Education: Discuss losing a sports game and decide on ways to improve to get desired result the next game.</p> <p>Math: Learn from your mistakes when you get a problem wrong; retrace your steps, recalculate, or work backwards (e.g., check subtraction with addition).</p>