Science Inquiry at Home

An Introduction to Science Inquiry at Home – Grade 5

These exploration suggestions are designed to support parents and students explore science content at home. Each suggestion starts with a question to answer. Included here are suggested materials and activities to help answer each question and suggestions on ways to communicate the findings.

Consider creating a science journal to record observations, take notes, and reflect on your learning. The science journal may be on paper or on a computer. You could choose to use a spiral notebook or a composition book. You could have a journal for each topic, each quarter, or one for the whole year.

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make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents, and through contact between objects (5.2 b)	Science journal Items around the house that use energy	**Why are energy transformations helpful?** Light, sound, heat and electricity are all forms of energy. Look around your home. How many forms of energy can you find? Make a table in your science journal that shows the different forms of energy. Under each form of energy, indicate different items in the house that use each of these different forms of energy. For example, you might have a table lamp under the table section of light energy. Once you have completed your table, think about whether the form of energy for each device has been changed from another form of energy. For example, does the sound energy from the radio happen because of a change from another type of energy? Trace the different objects where you see energy change from one form of energy to another form of energy. For example, the radio has sound energy that came from electric current. Is there one type of energy that you see more often than other types of energy?

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- plan an experiment to collect time and position data for a moving object. Chart the data in a table and a line graph and interpret the data to determine if the speed of the object was increasing, decreasing, or remaining the same (5.3 b)
- interpret data in graphs, charts, and/or diagrams related to force and the motion of objects (5.3 c, d)

</td><td>Science journal
Measuring tape, stopwatch</td><td>

How do we analyze speed?

It is race time! As you run or walk in your neighborhood, you may observe how fast you and others either walk or run.

First, mark a distance. You could use a tape measure and mark of 30 feet or 30 meters or even 30 large steps. As you design your investigation on speed, the distance you choose and how you measure it is up to you! Then have a friend use a stopwatch or timer to determine how much time it takes for you to reach that distance. Travel the distance with different types of movement—you can walk, jog, run, or skip. Be sure that the distance remains the same with each different type of movement. Record the data in the chart.

Record the data in a data table.

<table>
<tr><th>Type of movement</th><th>Time (seconds)</th><th>Distance Traveled</th></tr>
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Graph each of the types of movement as a different line on the graph. In each case you are starting at distance 0 and time 0.

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		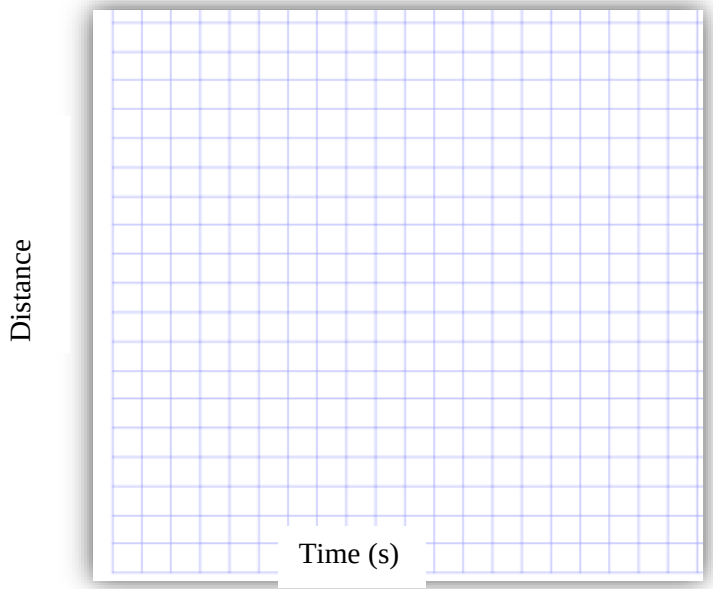 What do you notice about the graphs? How can you tell which type of movement was the fastest by looking at the graph?
plan and conduct an investigation related to net force and the movement of an object (5.3 c, e)	Science journal Cardboard box Objects to put in the box	**What is the relationship between force, motion, and mass?** Find a cardboard box and push it along the floor. Describe in your science journal what that feels like. Now add something to the cardboard box. You can add something like books, blocks, or canned goods to the box. Push the box across the floor again. Write in your journal what it feels like to push the cardboard box now. When you have completed your investigations, write a

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plan and conduct an investigation to test the question, "What is the relationship between motion and mass?" (5.3 c, e)		conclusion statement on the relationship between, the mass of an object and the amount of force required to move it using evidence from your investigation.
plan and conduct an investigation to determine the effect of friction on moving objects (5.3 e)	Science journal Cardboard box Toy car	**How does friction effect the movement of objects?** While investigating the relationship between force, mass, and motion (above), observe the amount of force required to move the objects over different floor surfaces or ground surfaces. You can do a simple experiment by using two canned goods of different sizes. Roll the cans on different surfaces (wooden floors, tile floors, carpet, pavement, grass). What do you notice? Two students are arguing about the direction of friction. Student 1 says that friction is a force that goes in the opposite direction of the motion of the object. Student 2 says that friction is a force that is in the same direction of the motion. What do you think? Use evidence gathered from your investigation to support your reasoning.
ask questions and predict outcomes about the	Science journal Various balls of similar and	**What happens when two objects collide?** Have you ever seen two objects, or even two people collide? Make a prediction about what would happen when the following balls collide head-on:

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changes in motion that occur when objects collide (5.3 d)	different weight OR canned goods	- 2 balls, same weight (2 cans of the same size (weight)) - 1 heavy and 1 light (2 cans of different weight) Consider other questions or scenarios and predict the outcome. Using items in your home, conduct the investigations and compare your predictions with the outcomes you observe. Be sure to include your questions or scenarios, your predictions, and your observations of what happens in each investigation in your science journal.
identify ways to generate static electricity (5.4 c)	Science journal Carpeted floors, balloons	**Are you shocked?** Have you ever walked across a carpeted floor and then gotten a small shock when you touched a metal door knob or another person? This is due to a build-up of static electricity in you. The purpose of this investigation is to identify ways you can generate static electricity. Note: The success of this investigation on static electricity is very much determined by the level of humidity. Winter is usually the best time to do this. Blow up a balloon and tie it. Rub the balloon on a wool shirt or a carpet and place it next to your hair and observe what happens to your hair. Once this is accomplished, try rubbing the balloon on a variety of different shirts and other objects, and checking its attractiveness to hair. Make notes of your observations in your science journal.
collaboratively plan and	Science journal	**How can the pitch of sound be changed?**

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conduct an investigation to demonstrate that vibrating materials can produce sound and transmit energy, determine data that should be collected and organized to identify patterns, and communicate findings (5.5 a) two different pitches; record design changes made based on testing outcomes, and communicate results and challenges (5.5 d)	String (about 2-3 ft) It helps if the sting is thin. You can use nylon or cotton.	Many bands or musical groups use instruments such as guitars. Guitars are in a group of musical instruments that depend on wire strings to produce sounds. The purpose of this investigation is to see how changing the length of a string and the tightness of a string affects the pitch made by plucking the string. Pitch is a term to describe sound and musicians often describe the sounds produced by their instruments as a high or low pitch. Tie off one end of a string about 2 feet long. Then pull the string so that it is straight and tight. With the other hand, pluck the string and listen to the sound it produces. - Try pulling the string tighter and listen to the plucked string, noticing if it is higher or lower in pitch. - Move your hand at different distances along the string, and pluck the string. Record in your science journal whether the pitch is higher or lower. Identify patterns between the pitch and the length of the string and/or the tightness of the string. Communicate the findings of your investigation in your science journal.

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• construct a model of a transverse wave and label a wavelength, crest, and trough (5.6 a)	Science journal Rope or clothesline (about 15 ft.) or a jump rope Bucket or bowl that can be filled with water	**How can I make waves?** Waves can be made different ways and you are going to explore two different ways to make a wave. Tie one end of the rope to a secure surface at about waist level. Walk away holding the rope so that it is pulled tight and forms a straight line. Slowly move the rope up and down. The whole rope should move in unison with the movement of your arm. Then flick the rope very quickly up and down one time and observe the wave traveling down the rope. Draw in your science journal the motion of your hand (up and down) and the motion of the wave down the rope. What part of the wave do you think is the crest, and what part do you think is the trough? Be sure to label the crest and trough. Now move the rope up and down quickly so that you get 2 waves traveling down the rope. How many waves can you get on the rope? What do you notice about the energy that you have to do to make the waves? Record these observations in your science journal. Fill up a bucket with water. After the water settles, quickly tap the top of the water one time with you finger and observe the wave. Do this again multiple times and observe the wave. Then, lightly tap the water about every second and observe the waves. Can you tap the water and make the waves disappear? Repeat the experiment with a container that is a different size. Do you notice any differences with the waves? If so, what are those differences? Record your observations in your science journal.

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<tr><td>plan and conduct an investigation to determine how different materials interact with light (5.6 c)</td><td>Science journal
Flashlight, various objects around the home which could include mirror, window, paper, wax paper, different types of plastic bags</td><td>How do materials affect a beam of light?

Light travels in straight paths until it hits an object. The material may cause the light to be reflected, transmitted through the object, or absorbed. Use a flashlight to identify several objects around the home. You can make a table to record your observations in your science journal.

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<tr><th>Objects that reflected light</th><th>Objects that allowed light to go through</th><th>Objects that absorbed light</th></tr>
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Light passes through some materials easily (transparent materials), through some materials partially (translucent materials), and through some not at all (opaque materials). Make a prediction about whether an object is transparent, translucent, or opaque. Use a flashlight to verify or reject your prediction. Note that an object is translucent if even a little light can be seen shining through. Record your findings in a table.

<table>
<tr><th>Object testes</th><th>Prediction (transparent, translucent, opaque)</th><th>Actual</th></tr>
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plan and conduct an experiment to separate two or more types of matter within a mixture (5.7 b)	Science journal Various mixtures	**How can I separate mixtures?** A mixture is something that has two or more substances mixed together. Do you put milk on your cereal? If you do, then you have made a mixture. Think about the different things that you do during the day, and make a list in your science journal. Often it is necessary to separate a mixture. For example, you might want to separate different types of blocks or Legos ™ in a box. Write down times when you have separated a mixture. How did you separate the mixture? Dissolve some sugar or salt in a small amount of water in a cup. You have just made a mixture. Now set the cup somewhere where it won't be touched. A window sill works well. Check the mixture periodically. Record your observations. What is happening to the mixture?
locate, chart, and report weathering, erosion, and deposition at home or on the school grounds; create and implement a plan to reduce weathering,	Science journal	**How can I reduce erosion?** Materials can be moved by water and wind (*erosion*) and deposited in new locations as sediment (*deposition*). Locate areas around your home where you see evidence of erosion or deposition. Create a plan to reduce weathering, erosion, and/or deposition problems. If you can, implement your plan and record your actions and the results in your science journal.

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erosion, and/or deposition problems that may be found and discuss the results of the experiment (5.8 d)		
create and implement a plan to conserve energy in the home or school (5.9 b)	Science journal	**How can I conserve energy?** Is electricity the main way that you use energy in your house? During the course of a day, write down all the ways that you and your family use energy. Then think of ways that you can conserve energy. Create and implement a plan to conserve energy. Keep a record of your actions in your science journal. Where was it easy to conserve energy? Where was it harder?