Elementary Science Assessment Resource Pilot

Grade 4
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“Science, it’s all around you! It’s part of our everyday life.”

“My absolute favorite part of science is experiments. Mixing and stirring different formulas, then waiting and waiting while the suspense builds up in you and BANG! White soda fzo pours out slowly overlaying the glass tube.”

“You never know what you are going to do in science, that’s what makes it exciting. You might go out to study the rocks or plants, or you might go out and pick up some of the garbage, or you might go on a field trip.”

  Grade 6 students, NL
To the Teacher

The *Elementary Science Assessment Resource* was created to provide more opportunities for elementary students to acquire the necessary level of scientific knowledge and skills. It is a support document for assessing scientific literacy and process skills.

All assessment activities in the resource were created by elementary classroom teachers in Newfoundland and Labrador and support specific curriculum outcomes in the *Elementary Science Curriculum Guide (2002)*.

The resource provides 10 or more lessons per unit of content. There are several activities accompanying each lesson, each of which is correlated to specific outcomes. The related knowledge (300s), skills (200s), and STSE (400s) outcomes are indicated at the top of each lesson.

The *Elementary Science Assessment Resource* encourages students to research, use a wide variety of resources; work co-operatively and assume a variety of group roles. All information and student ideas need not be presented through written language and this is reflected in the resource guide. In the resource, you will find opportunities for students to engage in science activities, research and participate in classroom discussions and presentations. Collectively, these activities are designed to enhance greater understanding of subject matter, present science as process and enhance scientific literacy.

It is understood that the *Elementary Science Assessment Resource* will be used along with existing resources provided by the Department of Education (i.e. Student Text, Teacher’s Guide, Program and Assessment Guide, and teacher materials). In addition, the resource should be used on a continual, yet selective, basis throughout each unit and primarily in the classroom context. For the most part, these pieces should not be used at the end of a unit as a form of summative evaluation, as homework assignments or for individual seat work.

All students need not complete activities in the same manner that they are presented. Teachers should make interventions as appropriate including selecting appropriate lessons, making modifications for students and using activities in a manner that supports cross curricular teaching. Accommodations for students could include, but are not limited to, the following:

- Illustrating responses
- Reducing the number of questions
- Rerording instructions and/or the nature of the question
- Limiting aspects of science inquiry (i.e. provide purpose and hypothesis; students follow given procedure)
- Providing word banks for completion items
- Providing graphic organizers
- Providing examples within questions
- Allowing students to list key points instead of complete paragraphs
- Defining key terms in questions

Be advised that student responses are provided for some activities in *Appendix C* (page 93) of this resource. In addition, selected response items are provided in *Appendix D* (page 99). These items should be used concurrently with the lessons and not for end of unit exams.
Teachers should remain cognizant that the lessons and activities contained in this document are one means to ascertain a student’s performance as he/she engages in various facets of science learning. However, teachers should not be overly analytical in their approach to all the assessment items in this resource. Informal assessment should characterize the teaching and learning of elementary science. This is reflected in the various rubrics provided in this resource as well as the Program and Assessment Guide (Scholastic).

There are various types of assessment activities included in the resource including:

- Journal entries
- Exploration activities
- Open and closed constructed response questions
- Selected response questions (multiple choice, completion, matching and true/false)

In addition, informational/visual texts based on Grades 4 – 6 Science, Technology, Society and the Environment (STSE) outcomes will be provided next year. These texts are being piloted in ten different schools across the province this year. Reading and responding to such texts will assist students in making connections between science and their world.

“ In these early years of the 21st century, there are few who would question the importance of ensuring that students acquire a level of scientific literacy and understanding to enable them to function with comfort and competence in the world in which they live, work, and play.” (CMEC, 2005)
Think of an area in your community where humans have done something to affect other living things (organisms). Describe what happened, how it affected the organisms, and the results of these actions.
Use a picture, diagram, thought web, or paragraph to demonstrate your understanding of the statement,

“All actions are like stones thrown in a puddle causing ripples to spread out.”
Refer to page 4 and 5 of your science textbook to complete the activity below.

How is science about asking a lot of questions and trying to find answers?
Question: What makes up a habitat?

Hypothesis: If I observe an area outside of school, then I will see ______________
_______________________________.

Materials: ______________________ _______________________
_____________________________
_____________________________

Procedure:
  1. Go outside and choose an area to observe.
  2. Observe the area and list everything you see there.

Results:

1. The area I choose to observe is __________________________.

2. Complete the table below to show what you observed.

<table>
<thead>
<tr>
<th>Plants</th>
<th>Animals</th>
<th>Non-living things</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Make a bar graph to show the number of plants, animals and non-living things you observed in your area. Be sure to label your graph and provide a title.

   Title: ________________________________

   Conclusion: (Was the hypothesis correct? Why or why not?)

   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
1. What does a habitat provide to allow plants and animals to survive?

2. What other factors affect plants and animals in a specific habitat?

3. Why do you think plants and animals live in specific habitats?
Compare the physical characteristics of two different organisms in your model habitat by completing the table below, with pictures, diagrams or words.

**Observing Organisms in My Classroom Habitat**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Organism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Beaver

Use the information below and page 15 of your science text book to answer the questions on the next page.

The beaver lives by rivers where there are trees nearby. Beavers can be found from northern Canada all the way to the southern United States.

The beaver's tail is special. It is flat and has very little hair. The beaver steers with its tail when it swims. When the beaver stands on its hind feet, the tail helps to hold the body up. The beaver also uses its tail to warn other beavers. It slaps its tail on the water to make a loud noise.

It chews and chews around the tree trunk until the tree falls down. The bark and leaves are eaten. The branches are used for building a dam and a home.

Beavers are hard workers. They work together to build the dam and the home. They make a pond by building the dam across a stream. The dam holds back the water and a deep pond is formed. Then the beavers build their home in the middle of the pond where they are safe from most enemies.

The beaver's home is called a lodge. It is made out of mud and branches. Tunnels lead to the doors of the lodge. The tunnels are under water.

The beaver eats the leaves and the bark of trees. It also likes cattails and other water plants.

Beavers are strong swimmers. Their hind feet are webbed and their fur is oily and thick. The beaver sees well underwater.
1. What does a beaver need in order to survive?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. Describe the beaver’s lodge. Use pictures, words and labels.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3. Name at least three physical features of a beaver. Explain how each feature helps it survive in its habitat.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
4. How does the design of a beaver’s lodge help protect it from predators?

5. Beavers prefer to live by ponds or lakes. Sometimes, however, there may only be a river or stream around. What will a beaver do to change its environment? Why does it do this?
Use pages 16 and 17 of your science text book to create a table with five living organisms and their features that enable them to survive.

Title: ______________________________

<table>
<thead>
<tr>
<th>Living Organisms</th>
<th>Features that Enable them to Survive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>
Refer to pages 38 and 39 of the student text to complete the activity below.

How did animals, such as the wooly mammoth, survive during the Ice Age?
Refer to page 18, 19 and 24 of your student text book to complete the activity below.

Question: What do plants need in order to survive?

Hypothesis: (Complete the statement below)

If sunlight is removed from a habitat, then plants will ________

Materials:

________________________  _________________________

________________________  _________________________

________________________  _________________________

________________________  _________________________

________________________  _________________________

Procedure:
1. Cover a grassland habitat model (Lesson 3, page 10 of the student text book) with newspaper. Make sure no light can pass through.
2. Place the model in a dark area, like a cupboard.
3. Remove the paper after 5 days and observe.

Results:
1. What changes do you see in the plants? What caused the changes?
2. Do you think that plants need sunlight (the factor you tested) to survive? Why or why not?

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

3. Was this a fair test? Why or why not?

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

Conclusion: (Was your hypothesis correct? Why or why not?)

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________
Describe what you think would happen if there were no decomposers to break things down and return the nutrients to the soil.
Every year leaves fall off trees in the woods and other park areas. No one rakes them, yet, every spring most of the leaves are gone. Explain what happens to these leaves.
1. Draw or collect a variety of pictures of living organisms from various resources and paste them on a separate piece of paper to construct a food chain.

2. In groups of three or four, combine your different food chains from similar ecosystems to create one food web. Sketch this web in the space below.

3. How would removing one organism from the food web affect other organisms and the food web?
Make a flow chart to show how the wooded areas of Eastern Ontario and Western Quebec rebuilt themselves after the devastating ice storm in January 1998. Include a picture and caption to go with each box in the flowchart.

- Box 1: Trees are covered in ice and branches cover the ground.
- Box 2: The forest is flourishing with animals.
Visit the Environment Canada Website, www.ec.gc.ca/acidrain/index.html, to find out more information about acid rain and its effects in Canada. Create a brochure to inform people about what acid rain is and what they can do to help reduce acid rain emissions.
Listening Activity
“Big Yellow Taxi” by The Counting Crows

A. Listen to the song, Big Yellow Taxi, for your enjoyment.
B. Read the questions.
C. Listen to the song again.
D. Answer the questions below, after listening to the song.
E. Listen to the song a final time as you check your answers.

1. Which example from the song shows how people affect the environment?
   a. Looking at the birds and the bees.
   b. Putting up a parking lot.
   c. Slamming a screen door.
   d. The girl leaving in a taxi.

2. What does the songwriter imply about the environment?
   a. Farmers are putting away their DDT.
   b. Nature is being destroyed by humans.
   c. Nature is staying the same.
   d. They are planting more trees.

3. Thinking about the song, draw a picture to compare the environment in the past with the present. Write a caption for each.

| ___________________________ | ___________________________ |
| Past                        | Present                    |
4. The song repeats the line, “That you don’t know what you got till it’s gone”. What do you think is meant by this line? Give an example from the song and an example from something you have experienced, seen, or read.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

5. What is the message of this song? Use support from the song to explain your answer.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
They paved paradise and put up a parkin' lot
With a pink hotel, a boutique, and a swingin' hot spot
Don't it always seem to go
That you don't know what you got till it's gone
They paved paradise and put up a parkin' lot

They took all the trees, and put em in a tree museum
And they charged the people a dollar and a half to see them
No, no, no, don't it always seem to go
That you don't know what you've got till it's gone
They paved paradise, and put up a parkin' lot

Hey farmer, farmer, put away your DDT
I don't care about spots on my apples,
Leave me the birds and the bees - please
Don't it always seem to go
That you don't know what you got till it's gone
They paved paradise and put up a parking lot
Hey now, they've paved paradise to put up a parking lot
Why not?

Listen, late last night, I heard the screen door swing,
And a big yellow taxi took my girl away
Now don't it always seem to go
That you don't know what you got till it's gone
They paved paradise and put up a parking lot
Hey now now, don't it always seem to go
That you don't know what you got till it's gone
They paved paradise to put up a parking lot
Why not, they paved paradise
They put up a parking lot
Hey hey hey, paved paradise and put up a parking lot

I don't wanna give it
Why you wanna give it
Why you wanna givin it all away
Hey, hey, hey
Now you wanna give it
I should wanna give it
Cuz you're givin it all away, no no

I don't wanna give it
Why you wanna give it
Why you wanna givin it all away
Cuz you're givin it all givin it all away yeah yeah
Cuz You're givin it all away hey, hey, hey

Hey, paved paradise, to put up a parking lot
la,la, la, la, la, la, la ,la ,la ,la
Paved paradise, and put up a parking lot
Habitats can be changed by time, natural disasters, and people. Think of a situation in Newfoundland and Labrador where habitats have been affected, damaged or destroyed. Describe the situation, the affects on the habitat and what we could do to prevent this from happening again. Use pictures, words, or diagrams to support your answer.
If the mouse is removed from the food chain above, how will its removal affect the habitat?
Refer to pages 40 and 41 of your science text book to complete the activity below.

Design a poster to promote the 5 R’s (Reduce, Reuse, Recycle, Rethink, Rebuild) of preserving habitats and help reduce garbage and post them on walls around your school. Be sure to include a catchy slogan, eye catching colours and illustrations.
Describe ways to reduce the amount of waste created by each household in your community.

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________
A superstore wishes to build close to your community. As a result, the local government in your community is selling them land that is now a park that is a home to many different animals and plants. It also provides feeding and resting areas for many migrating birds.

1. Give two reasons why the government thinks this is a good idea.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. Give two reasons why some people may not like this idea.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

3. How do you feel about the superstore coming to your community? Explain.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

4. On a separate sheet of paper make a banner with a slogan that states your position on this issue.
Imagine if you lived in the Arctic where there is no daylight for two months during winter. Write about a day without daylight. Start when you get up in the morning and end with you going to bed. Explain how your day would be different and what activities in which you could not participate.
1. What must happen for us to see an image?

2. Why are we able to see the moon in the night sky if the moon does not give off light?

3. With reference to #2, explain why sometimes we cannot see our moon in a clear night sky.
Investigate possible sources of light at home by completing the table below. You may need to go in a dark room to make your observations about whether or not the object is a light source (emits its own light).

Select three other objects to investigate and write them in the table.

<table>
<thead>
<tr>
<th>Object</th>
<th>Prediction</th>
<th>Observations</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light source</td>
<td>Can see</td>
<td>Light source</td>
</tr>
<tr>
<td></td>
<td>Not a light source</td>
<td>Can not see</td>
<td>Not a light source</td>
</tr>
<tr>
<td>Paper</td>
<td>Light source</td>
<td>Can see</td>
<td>Light source</td>
</tr>
<tr>
<td>Ball</td>
<td>Not a light source</td>
<td>Can not see</td>
<td>Not a light source</td>
</tr>
<tr>
<td>Glowstick</td>
<td>Light source</td>
<td>Can see</td>
<td>Light source</td>
</tr>
<tr>
<td>Mirror</td>
<td>Not a light source</td>
<td>Can not see</td>
<td>Not a light source</td>
</tr>
<tr>
<td>Window</td>
<td>Light source</td>
<td>Can see</td>
<td>Light source</td>
</tr>
<tr>
<td>Television On</td>
<td>Light source</td>
<td>Can see</td>
<td>Light source</td>
</tr>
<tr>
<td>Television Off</td>
<td>Not a light source</td>
<td>Can not see</td>
<td>Not a light source</td>
</tr>
<tr>
<td>Moon</td>
<td>Light source</td>
<td>Can see</td>
<td>Light source</td>
</tr>
<tr>
<td>Sun</td>
<td>Not a light source</td>
<td>Can not see</td>
<td>Not a light source</td>
</tr>
<tr>
<td>Candle</td>
<td>Light source</td>
<td>Can see</td>
<td>Light source</td>
</tr>
</tbody>
</table>

Look at your predictions and results (conclusion). Were your predictions correct? Are you surprised at the results? Why or why not?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Set up the materials as shown in the diagram below.

1. Sketch the path of the light shown in this activity on the diagram above.
2. Write a conclusion about the path that light travels.

3. Would the path of light be different if the light source was a candle? Explain.
Refer to page 14 of your science text book to complete the activity below.

Question: Can light travel in a curved path?

Hypothesis: If

then

Materials: __________________________

Procedure:

1. Look through a straight straw at a book below.
2. Look through a curved straw at a book below.

Results:

1. When you looked through the straight straw could you see the book? Why, or why not?

2. When you looked through the curved straw could you see the book? Why, or why not?

Conclusion:
Question: What happens to light when it hits even and uneven surfaces?

Hypothesis: If light hits an uneven surface, then ________________________________

If light hits a smooth surface, then ________________________________

Materials: ______________  ______________  ______________

Procedure:
1. Turn off the lights.
2. Shine the light on the smooth, shiny surface of the tinfoil and observe what happens.
3. Shine the light on the crumpled, uneven surface of the tinfoil and observe what happens?

Results:
1. a) How did the smooth shiny surface reflect the light beam?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

1. b) Describe the pattern you saw being reflected by the light hitting the smooth surface.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
2. How did the uneven surface reflect the light? Explain why it reflected this way.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Conclusion: (Was the hypothesis correct? Why or why not?)

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________

________________________________________________________________________
Up to lesson 5 you have learned four properties of light. List the four properties below.

1. 

2. 

3. 

4. 

Small Group Activity:
Choose one of the properties to present to your class. Explain what it means in your own words and be sure to include an example to reinforce your understanding of the property. An outline is provided below.

Outline

1. The property you are going to discuss.
2. What the property means in your own words.
3. Provide an example to reinforce the property.
4. You may present drawings if you wish.
5. Conclude with why you think it is important to know this property.
Refer to page 22 of your science text book to complete the activity below.

Question: What is the difference between the reflections of an object in a concave mirror and a convex mirror?

Materials: spoon

Procedure:
1. Hold the concave surface of the spoon approximately 10 cm from your face.
2. Observe the image of your face on the surface of the spoon.
3. Slowly move the spoon further away from your face.
4. Slowly move the spoon toward your face.
5. Observe the changes in the image.
6. Repeat steps 1 to 5 for the convex surface of the spoon.

Results:
1. Describe the appearance of the image as you moved the spoon further away from your face.
   Concave:
   ____________________________________________________________
   ____________________________________________________________
   Convex:
   ____________________________________________________________
   ____________________________________________________________

2. Describe the appearance of the image as you moved the spoon toward your face.
   Concave:
   ____________________________________________________________
   ____________________________________________________________
   Convex:
   ____________________________________________________________
   ____________________________________________________________
3. In some department stores large mirrors are located in the corners of the ceilings. Are these concave or convex? Why?

4. What is the difference between the reflections of an object in a concave mirror and a convex mirror?
Fill in the blanks with either concave or convex.

1. A ______________ mirror curves inward.

2. The image from a ______________ mirror will always appear smaller than the actual object.

3. In a Fun House, a mirror that makes you look upside down would have to be a ______________ mirror.

4. When a dentist uses a mirror to look in your mouth, he uses a ______________ mirror.

5. A car mirror is a ______________ mirror.

Label the mirrors below as concave or convex. Draw the image of the clover that would appear inside the mirror.

---

type of mirror: ______________

---

type of mirror: ______________
Question: What effects do different shapes of lenses have on light?

Hypothesis:

If ________________________________________________________________
then ______________________________________________________________

Materials:

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Procedure:

1. Examine all of the lenses and describe their appearance.
2. Place the concave lens over the printed page. Look for some printed words. Are they easy to read? Did the type get smaller or larger?
3. Still looking through the concave lens, move it up and down between your eyes and the page. Observe what happens.
4. Repeat steps 2 and 3 using the convex lens.
5. Repeat steps 2 and 3 using the flat lens.

Observations:

1. Complete the table below to describe the appearance of concave, convex and flat lenses.

<table>
<thead>
<tr>
<th>Lens</th>
<th>Diagram</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Concave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Convex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Flat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Describe what happened as you looked through the concave lens at the printed page. (Hint: Did the print get smaller or larger)

3. Describe what happened as you looked through the convex lens at the printed page. (Hint: Did the print get smaller or larger)

4. Describe what happened as you looked through the flat lens at the printed page. (Hint: Did the print get smaller or larger)

5. What happened to the print as you moved each lens up and down?
Conclusion: (Was the hypothesis correct? Why or why not?)
1. If you have trouble seeing a hockey puck from the back section of a rink, which type of lens would help you see the puck better? Explain.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. If objects in a photograph appear blurry, which type of lens will help you see better? Explain.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3. How does a pencil look when you place it in a glass of water? Draw a picture to show what you see and explain why this happens. Make sure you look from the side of the glass.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Complete the following statement.

The other day I was experimenting with my glass of water. I couldn’t believe my eyes when I stuck my pencil in the glass. The pencil looked …..

Draw what the pencil looked like in the water.
When light passes from one material to another, the light rays are bent or refracted. When a light ray from a flashlight hits a prism the light ray is bent when they go from air to glass. As the light ray leaves the other side of the prism we see the visible spectrum or rainbow of colours. Colour the visible spectrum below in the order they appear.

Use the example above to explain how a rainbow naturally occurs. Identify what acts as the light source and the prism when rainbows are created.
Refer to page 30 and 31 of your science text book to complete the activity below.

Complete the questions below after completing the exploration activity (Colour Wheel) on page 30.

1. Based on the spinning of your colour wheel, what can you conclude about white light?

2. What colour is reflected by a red t-shirt? Explain in detail why that colour is reflected.

3. What would the world look like if you wore glasses with red lenses?

4. If black is not a colour of the visible spectrum, explain why some objects look black?
Shine light from a flashlight on the objects listed, and then complete the chart.

<table>
<thead>
<tr>
<th>Object</th>
<th>Observations</th>
<th>Transparent, Translucent, or Opaque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex: Ball</td>
<td>I can’t see through the ball. When light hits it a shadow forms behind it.</td>
<td>Opaque</td>
</tr>
<tr>
<td>Plastic Wrap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tissue Paper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Styrofoam Tray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Paper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waxed Paper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tinfoil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper Towel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardboard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If you lived in a hot sunny area, what colour clothing would be best to wear, black or white? Explain.
Unit: Light Up Your Life

Lesson 11 Activity 1

Design a poster to promote how we can protect ourselves from the harmful UV rays. Be sure to include a catchy slogan, eye catching colours and illustrations.
Brainstorm: Make a web of all the sounds you heard today since you woke up.
Using the information from the web you previously created, complete the table below.

<table>
<thead>
<tr>
<th>Things that make sound</th>
<th>What is the purpose of this sound?</th>
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</thead>
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</table>
Refer to page 6 of your science text book to complete the activity below.

Question: What kind of motion makes sound?

Hypothesis: If __________________________________________________,
then ________________________________________________ .

Materials:

________________________________________________________

________________________________________________________

Procedure:
1. Cut one rubber band and tie it to the paper clip. Then run the band through a hole in the bottom of the cup.
2. Put on the safety goggles. Hold the cup while you partner holds one end of the rubber band and gently plucks it.
   a. What do you hear?
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   b. What do your fingers feel?
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
3. Switch roles and repeat number 2.
4. Stretch plastic over the top of the cup and keep it in place with a rubber band. Then sprinkle cereal on the plastic. Have your partner pluck the rubber band while you hold the cup.

a. What do you see when your partner plucks the rubber band?

b. How can you tell when sound is made?

Results:
1. Movements up and down or back and forth are called vibrations. How could you tell the rubber band was vibrating?

2. How did the cereal move? Was the cereal making the sound? If not, then why did it move?

Conclusion: (Was your hypothesis correct? Why or why not?)
Energy starts vibrations, which in turn causes sound. List 3 vibrations which produce sound and identify the material which vibrated to produce the sound.

<table>
<thead>
<tr>
<th>Action that produces sound</th>
<th>Material that vibrates to produce sound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blowing on a blade of grass held tightly between your hands</td>
<td>The grass vibrates to produce sound.</td>
</tr>
<tr>
<td>Talking</td>
<td>Movement of air between vocal chords</td>
</tr>
</tbody>
</table>


Complete the graphic organizer below. Name each form of energy, and give a definition and an example for each.

<table>
<thead>
<tr>
<th>Form of Energy</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
Refer to page 16 of your science text book to complete the activity below.

Question: ________________________________________________

Hypothesis: If _____________________________________________
then _________________________________________________

Materials:
________________________________________________________

Procedure:
1. Strum the teeth of the comb with your thumb. Listen to the sound. What do the sound waves travel through to get to your ears?
________________________________________________________
________________________________________________________
________________________________________________________

2. Strum the comb against the edge of a desk. Take turns with your partner listening with one ear on the desk. Describe how the comb sounds and identify what the sound waves are traveling through.
________________________________________________________
________________________________________________________
________________________________________________________
________________________________________________________
________________________________________________________
________________________________________________________
3. Strum the comb in the container of water. Take turns with your partner listening with one ear against the container.
   a. Did the sound change? Why or why not?

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________

   b. What did the sound waves travel through?

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________

   Results:

   1. Sound waves must travel through matter to reach you. A rocket taking off from Earth makes a loud noise because the sound of the rocket moves through air to get to you. There is no air on the moon. If you were standing on the moon near a rocket taking off, do you think you could hear it? Why or why not?

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________
Conclusion: (Was your hypothesis correct? Why or why not?)

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
Sound Vibrations
Sound waves must travel through some medium (solid, liquid, or gas) in order to be heard. The vibrations of sound cause collisions of air molecules, transporting the sound to our ears. The molecules in liquids and solids are even closer together than the molecules in air, so vibrations usually move more quickly through liquids and solids than they do through air. Sometimes people literally feel the vibrations as sound travels through the air, a floor, or the ground.

The data below shows the speed that sound travels through different mediums.

<table>
<thead>
<tr>
<th>Medium</th>
<th>Speed of Sound (m/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>5500</td>
</tr>
<tr>
<td>Sea Water</td>
<td>1500</td>
</tr>
<tr>
<td>Air</td>
<td>400</td>
</tr>
</tbody>
</table>

1. Based on the information above, in which medium are molecules closest together? Explain why by referring to the molecules in the medium.

2. Vibrations are required for us to hear sound. Can you think of something else we do everyday that requires a vibration? Describe how vibrations are used in this situation.
Refer to page 17 of your science textbook to complete the activity below.

Last week Megan and her family were packing up things in her room to move. As they removed the items from her room they found they could hear each other better. What was happening to their voices? Explain with words and drawings.
Last night Emily was awakened by the sound of a car alarm outside on her street. When she arrived at school the next morning her friend, Dominique, who lives on the street behind her, was complaining about the lack of sleep she received last night. She heard the car alarm too but didn’t describe it as loud as Emily. Draw a picture to demonstrate how both girls heard the alarm and then explain in a paragraph how both girls heard the alarm and why Dominique heard a fainter sound.
Refer to page 19 of your science text book to complete the activity below.


2. How is the shape of the human ear designed for picking up sound waves?
Refer to pages 23 to 25 of your science text book to complete the chart below.

What Animals Hear Better Than Humans?

<table>
<thead>
<tr>
<th>Animal</th>
<th>Frequency (higher than humans)</th>
<th>Pitch (higher than humans)</th>
<th>Hearing Used For…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bats</td>
<td>yes</td>
<td>yes</td>
<td>helping move around in dark caves and helping catch prey</td>
</tr>
<tr>
<td>Cats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dogs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elephants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dolphins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grasshoppers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robins</td>
<td></td>
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</tbody>
</table>

Do snakes hear sounds differently than humans? Explain.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Refer to pages 26 of your science text book to complete the activity below.

Question: What makes sounds loud or soft?

Hypothesis: If _________________________________________________________________

then _________________________________________________________________

______________________________________________________________

Materials: ___________________________ ___________________________

______________________________________________________________

______________________________________________________________

Procedure:
1. Put on safety goggles. Ask your partner to stretch the rubber band between two fingers.

2. Gently pluck the rubber band. What did you observe?

______________________________________________________________

______________________________________________________________

3. Pluck the rubber band with a lot more force. Compare what you observed with step 2.

______________________________________________________________

______________________________________________________________

4. Repeat steps 1 to 3 with a rubber band with a different thickness.

5. Sprinkle some cereal over the plastic wrap on your cup.

6. Place a speaker (radio, CD player) next to the cereal. What happens to the cereal? ___________________________
7. Repeat step 5, increasing the volume gradually. What happens to the cereal?

Results:
1. What is the relationship between the thickness of the rubber band and the loudness of the sound?

2. Did soft or loud sounds make the cereal vibrate more?

3. Do you think loud sound waves travel farther than soft sound waves? How can you find out?

Conclusion: (Was your hypothesis correct? Why or why not?)
Refer to pages 26, 27 and 29 of your science text book to complete this activity.

1. Define volume.

2. Define pitch.

3. Draw a sound wave for the following volumes produced by a CD player.
   Volume 2:

   Volume 15:

4. At which volume above will the amplitude be higher? Explain.
5. Draw a sound wave for the volumes of the following objects.

fog horn:

whistle:

6. Which sound wave above would produce more cycles per second? Explain.

7. List two ways you can increase the pitch of a stringed instrument.
Unit: Sounds Good
Lesson 8 Activity 1
(104-1, 207-6)

**Refer to the page 33 of your science text book to complete the activity below.**

Think of a place in your community or province where there is loud and constant noise. Describe the place and the cause of the noise level. Make two suggestions to decrease the noise pollution in this area.

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________
Refer to pages 36 and 37 of your science text book to complete the activity below.

1. List five technologies that use sound to benefit human life.

   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________

2. Describe, in detail, how one of the technologies you listed in #1 benefit human life. Use your science text book, any other resources in the classroom, and your own experiences.

   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
Choose one of the following Canadians and research their contributions to sound technology.

Alexander Graham Bell
Hugh Le Caine
Douglas Shearer
Reginald Fessenden
Andrew Mercer
Classifying Rocks

As a group, observe the rocks placed at your center. Discuss the characteristics of each of the rocks. Complete the table below.

<table>
<thead>
<tr>
<th>Rock #</th>
<th>Sketch</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
Collect three rocks from different locations. Complete the table below.

<table>
<thead>
<tr>
<th>Rock #</th>
<th>Location</th>
<th>Properties of Rock</th>
<th>Coloured Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>backyard</td>
<td>Grey and white. Smooth. Hard to break.</td>
<td></td>
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<tr>
<td>1</td>
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<td>2</td>
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<td>3</td>
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</table>
Refer to page 15 of your science text book to complete the activity below.

Characteristics of Rocks

Use the tools at your center to help you understand and chart the different features of your rocks. Use an eyedropper to drop vinegar onto each rock. If the vinegar bubbles, that means your rock contains carbon. If your rock contains carbon, it was formed from an organic (living) substance. Use the tile, penny, and paper clip to test your rock for hardness.

Tools:
- magnifying glass
- flashlight
- bar magnet
- eye dropper
- container of vinegar
- unglazed ceramic tile
- penny
- paper clip

<table>
<thead>
<tr>
<th>Rock #</th>
<th>Hardness (Scratched by)</th>
<th>Magnetic</th>
<th>Contains Carbon</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</table>
Refining Ores

When mining companies extract (remove) ores from Earth, they are left with unnecessary materials. Devising ways of disposing waste products is quite a chore. The following activity will help you understand the difficulties mining companies have when extracting ores we need to make things for our use.

Materials: 1-cup gravel 1 litre container ½ cup vinegar
¼ cup baking soda slotted spoon small bowl

Procedure:
1. Pour the gravel into the 1 litre container.
2. Sprinkle the baking soda over the top.
3. Add the vinegar to the gravel and baking soda mixture.
4. Describe what happened.
5. You are now left with gravel and vinegar. Spoon out the gravel and place it into the small bowl. This is your ore.
6. Decide with your group how you can dispose of the vinegar. Remember, you cannot dump it because it represents a hazardous substance.

Results:
1. What is the best way to dispose the vinegar?
2. Why should hazardous wastes be disposed of properly? Give two reasons.
3. When mining companies remove hazardous material from their sites, they have to find a way to contain the wastes. What do you think this means?

4. The provincial government has allowed a company to build a smelter in your community. Give two advantages and two disadvantages of this project.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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</table>
Mines are located throughout our province. Research information about a nearby mine. These aspects should be considered.

- Is the mine still in operation? If not, what happened?
- What rocks or minerals are mined there and what are their properties?
- How are these rock and minerals used in your everyday life?
- What is the economic benefit to the community?
- What environmental issues are associated with the mine?
From Rocks to Household Goods

List 5 objects in your house that are made using different rocks and minerals. Include a drawing.

<table>
<thead>
<tr>
<th>Object</th>
<th>Drawing</th>
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</table>

Extra challenge:
Find out if any of these objects are composed of minerals mined in Newfoundland and Labrador.
Mr. White works at Gleaming Crystal Jewellery Store. One day he dropped a tray of gold rings. Some of the gold rings contained diamond and some of them contained glass. Luckily, nothing got broken. How can Mr. White do a quick scratch test to see which rings have diamonds and which ones have glass?
Question: Can water break apart large rocks to form smaller rock pieces?

Hypothesis: If I put several different sizes and types of rocks in a jar and cover them with water and shake the jar, then …….

Materials: (other rock types can be used if the ones below are unavailable)

- ¼ cup small thin shale pieces
- ¼ cup small gravel
- ¼ cup medium gravel
- ½ cup mudstone rocks
- 2 cups water
- 1 sturdy plastic jar with lid
- 2 coffee filters

Procedure:
1. Put shale pieces, small gravel, medium gravel, and mudstone into a sturdy plastic jar.
2. Pour in 2 cups of water and fasten the lid.
3. Each member of a 4 person group shakes the jar for 2 minutes for a total of 8 minutes all together.
4. Drain off the water.
5. Pour equal amounts of the rock mixture out onto each of the coffee filters.

Results:
1. Describe your results.

2. How does this activity represent weathering?
Conclusion: (Was your hypothesis correct? Why or why not?)


Very often cracks develop in pavement. Why does this occur? Describe what would happen to the pavement if the cracks were not filled by town workers.
1. Where does the sand on a beach come from? Use the terms weathering and erosion in your answer.

______________________________________________________________________________
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______________________________________________________________________________
______________________________________________________________________________

2. Draw a picture of a beach rock. Why do you think most beach rocks are smooth?
On the diagram below, draw large circles (O) to show where the larger rocks would be found and draw small dots (•) to show where the smaller rock particles would be found. Explain the reasons for both.
Refer to pages 30 and 31 of the student text to complete the activity below.

Question: When water that contains rocks freezes, will the water expand and move the rocks?

Hypothesis:
If I put fine sand, fine gravel and medium sized gravel in a container and freeze it, then the ice will expand and move the rocks.

Materials:
- 1 two-litre bottle
- ¼ cup medium gravel
- ¼ cup fine sand
- 2 cups water
- ¼ cup fine gravel

Procedure:
1. Pour fine sand, fine gravel and medium gravel into a two litre bottle.
2. Pour two cups of cold water into the bottle and tighten the cap.
3. Freeze the mixture.

Results:
Describe what you observed.

Conclusion: (Was the hypothesis correct? Why or why not?)
Refer to the photograph on page 28 (Percé Rock, Quebec) of your science text book to complete the activity below.

Along the seashore it is common to see hollows in the face of a cliff at water level. Why is this?
Question: How are different types of soil layered?

Hypothesis: 

Materials: (Note: Other soil types can be substituted for the ones below)

- ¼ cup silt
- ¼ cup fine sand
- ¼ cup medium gravel
- ¼ cup small gravel
- 1 plastic jar with lid
- 2 cups water

Procedure:
1. Pour all types of soil into the plastic jar.
2. Pour in the water.
3. Put the lid tightly on the jar.
4. Draw a picture to show what you think will happen if you shake the jar. Explain.
5. Shake the jar very hard for about 10 seconds.
6. Set the jar aside until the next day and record observations below.

Results:
Draw a picture to show how the jar looks on the next day. Explain why it looks this way.
Conclusion: (Was my hypothesis correct? Why or why not?)

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Appendix A
Assessing Science

The Elementary Science Assessment Resource focuses on three concepts:
1. Science Content - knowledge and skills
2. Scientific Processes - inquiry, problem solving, and decision making
3. Scientific Literacy - appreciating and understanding science; communicating with others about science;

These concepts are outlined more extensively in the Elementary Science Curriculum Guide.

Scientific Process
The scientific process is a systematic approach to asking questions and finding answers. The Elementary Science Assessment Resource contains exploration activities that should be completed using the scientific process. The five steps below outline the process.

1. Ask a question that tests a variable.
2. Make a hypothesis. The hypothesis should be written as an “If … then …” statement. It is an educated guess as to what will happen if you change one variable (e.g., temperature).
3. Outline the procedure. This is a step by step design of the investigation.
4. Record the results. This could include completing tables, drawing graphs, or answering questions about the investigation.
5. Write a conclusion. The conclusion states whether or not the hypothesis was true and provides an explanation as to why or why not.

“...it’s great to figure out how things work with hands-on experiments instead of reading it from a text book. It makes me intrigued about the world, although it is disappointing when some experiments don’t work out.” (Grade 6 student, NL)"
Alternate Assessment
Assessment techniques should match the style of learning and instruction employed. Diverse assessment strategies should be used since there are many diverse learners in the classroom. Several options for alternate assessment are suggested on pages 8 to 10 of the *Elementary Science Curriculum Guide*. The *Elementary Science Assessment Resource* uses many of these strategies.

Assessing Cognitive Levels
The activities in the *Elementary Science Assessment Resource* assess elementary science outcomes at different levels of cognitive learning. The cognitive level of an assessment item does not require students to have a greater knowledge than indicated by the outcomes. Most outcomes can be evaluated at all cognitive levels.

The Department of Education of Newfoundland and Labrador has summarized Bloom’s categories of competence into three levels of cognitive learning. These levels are outlined below.

**Level 1** The student demonstrates attainment of outcomes through the ability to recall learned materials and to grasp the meaning of material. It can range from the recall of simple facts to translating material from one form to another. It represents the lowest level of learning and understanding of outcomes.

**Level 2** The student demonstrates attainment of outcomes through the ability to apply rules, concepts, principles, laws, or theories.

**Level 3** The student demonstrates attainment of outcomes through the ability to use learned materials in new situations, the ability to break material down into its component parts so that its organizational structure may be understood, the ability to put parts together to form a new whole, or the ability to judge the value of a piece of information.
Appendix B
Science Rubric

This rubric incorporates the following domains of science literacy:
- Content
- Science process skills including use of technology
- Science language and communication skills
- Nature of science (real life connections to science)

While this rubric can be used to score individual pieces of student work, it is recommended that teachers use the rubric in a reflective manner at the end of a unit or for cumulative purposes. Doing so will inform instructional and evaluation practices and assist with reporting.

Level 5 - OUTSTANDING
- demonstrates understanding of all basic concepts
- successfully uses the scientific process to solve problems (i.e., asks questions, makes a hypothesis, collects materials, records results, and draws conclusions)
- consistently uses specific science language appropriately (i.e., terminology)
- consistently applies knowledge of science to make real life connections
- chooses appropriate materials and uses them efficiently and effectively with little assistance

Level 4 - STRONG
- demonstrates understanding of most basic concepts
- usually uses the scientific process correctly to solve problems (i.e., leaves out one step)
- usually uses specific science language appropriately (i.e., terminology)
- usually applies knowledge of science to make real life connections
- chooses appropriate materials and uses them efficiently and effectively with occasional assistance
Level 3 - ADEQUATE

- demonstrates understanding of some basic concepts
- sometimes uses the scientific process to solve problems (i.e., leaves out two steps)
- sometimes uses specific science language appropriately but often uses general science language instead
- sometimes applies knowledge of science to make real life connections
- usually chooses appropriate materials and uses them efficiently and effectively with occasional assistance

Level 2 - LIMITED

- demonstrates understanding of a few basic concepts
- shows little evidence of using the scientific process to solve problems
- rarely uses specific science language
- rarely applies knowledge of science to make real life connections
- sometimes needs assistance to choose appropriate materials and uses them efficiently and effectively with frequent assistance

Level 1 - VERY LIMITED

- rarely understands basic concepts
- shows no evidence of using the scientific process to solve problems
- does not use specific science language
- does not apply knowledge of science to make real life connections
- continuously needs assistance to choose appropriate materials and use them efficiently and effectively with continual assistance
Appendix C
Student Responses

Unit 1: Healthy Habitats

Lesson 1 Activity 1
Friend of ours cleared bush to plant potatoes. There is now less places for animal life and more places for plant life. There was a lot more diversity of plant life when it was bush. Now it’s just potatoes. The result is less animal habitat and plant diversity but a crop for our friends that they can sell.

Lesson 1 Activity 2
A pebble causes a reaction much larger than you would expect for something so small. All or most of the pond is affected by ripples. Every little thing that touches a habitat has big or far reaching effects. Some people say you shouldn’t even move a rock at the beach because it could mess up some creature’s home.

Lesson 4 Activity 1
1. Food, Water, Shelter, Space (Shelter and space could be included as one.)

2. under water entrance, made of mud and wood, has a hole on top for air

3. teeth for chewing, webbed feet for swimming, tail for steering in the water

4. Under water entrance is hidden from predators in water, so predators must swim.

5. It makes a dam to stop water flow and create its own pond or lake.

Lesson 4 Activity 3
- thick layer of fat and a furry coat to keep it warm
- big tusks for shoveling away the snow to get plants to eat
Lesson 8 Activity 1
Box 2 – *Now that trees are broken, sunlight can reach the soil and help rebuild the wooded areas.*

Box 3 – *The sun enabled many plants such as shrubs flowers and grass.*

Box 4 – *The grasses and plants attract animals.*

Box 5 – *The dead wood on the ground provided places for the many creatures that lived on the forest floor.*

Lesson 9 Activity 2
The song can be played from the website, www.

Lesson 10 Activity 1
*The snake will not have the mouse to eat. There will be so many grasshoppers that they will take over the habitat. There will be so many grasshoppers that they will tear apart all the flowers.*

Unit 2: Light Up Your Life

Lesson 3 Activity 1
2. *Light travels in a straight line and reflects.*
3. *It would be different because the candle light would go everywhere.*

Lesson 5 Activity 1

Hypothesis: *If light hits an uneven surface then light it goes everywhere. If light hits a smooth surface then it goes in a straight line.*

Materials:  Flashlight, Smooth tin foil, Crumpled tin foil

Results:
1. a) *The smooth shiny surface made a big spot of light on the door.*
   b) *It was a circle pattern.*

2. *When we shone the lights on the uneven paper light went everywhere.*

3. *When light shone on the uneven paper it went all over the place but when we shone on the smooth paper it stayed in one place.*
Lesson 5 Activity 2
1. *Light travels in a straight line*
2. *The further away a light source is, the smaller the shadow*
3. *Light travels in straight lines in all directions from a light source*
4. *Light reflects evenly from smooth surfaces and unevenly from rough surfaces.*

Lesson 6 Activity 1
Results:

1. Concave:  *The image is small and we are upside-down*
   
   Convex:  *The image got smaller*

2. Concave:  *The image got bigger and we were upside-down*
   
   Convex:  *The image got bigger*

3. *These are convex because it gives you a full view of the store.*

4. *The differences are that in a convex mirror, your image is right-side-up  
In a concave mirror, your image is upside-down.*

Lesson 6 Activity 2

1. A **CONCAVE** mirror curves inward.

2. The image from a **CONVEX** mirror will always appear smaller than the actual object.

3. In a Fun House, a mirror that makes you look upside down would have to be a **CONCAVE** mirror.

4. When a dentist uses a mirror to look in your mouth, he uses a **CONCAVE** mirror.

5. A car mirror is a **CONVEX** mirror.
Lesson 7 Activity 2
1. *A convex lens because it makes things magnified, and if I had trouble seeing it far away it would have to be bigger.*

2. *A concave lens because it makes things look smaller.*

3. *The pencil is being magnified by the water. The light travels faster through air than water so the light slows down and the pencil appears to bend.*

Lesson 8 Activity 1
*The colours, in order, are: red, orange, yellow, green, blue, indigo, violet*

*An rainbow forms because the sun is the light source and the water droplets act as the prism. When the sunlight hits the droplets, the light refracts and it causes a spectrum. (rainbow)*

Lesson 9 Activity 1
1. *White light is made up of all colours of the spectrum.*
2. *Red because it absorbs all other colours and reflects its own.*
3. *Only red objects would appear red while others would appear dark.*
4. *Black absorbs all colours and reflects none.*
Unit 3: Sounds Good

Lesson 2 Activity 1

Hypothesis: *If I make the rubber band vibrate, then it will make a sound.*

Materials: *Paper cup, Paper clip, Plastic wrap, Cereal, 2 rubber bands, Safety goggles*

Procedure:
2.a. *I heard strumming, like someone playing guitar.*  
   b. *My fingers feel like they are vibrating from the feel of the rubber band.*

4.a. *All of the cereal pops up.*  
   b. *The object vibrates to make the sound.*

Results:
1. *When I plucked the rubber band it shook quickly back and forth, and that means it was vibrating.*

2. *The cereal bounced and made a crackling sound.*

Conclusion: *When I vibrated the rubber band a sound was produced because vibrations cause sound to occur.*

Lesson 2 Activity 2

<table>
<thead>
<tr>
<th>Action that produces sound</th>
<th>Material that vibrates to produce sound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bee</td>
<td><em>When the wings hit the air very quickly</em></td>
</tr>
<tr>
<td>Piano</td>
<td><em>When the keys hit the strings which create vibrations</em></td>
</tr>
<tr>
<td>Car engine</td>
<td><em>When the key is entered and the engine vibrates</em></td>
</tr>
</tbody>
</table>
Unit 4: Rockhound

Lesson 7 & 9 Activity 4

As rock and sandy material is washed downstream, the speed of the water decreases and the heavier material (large rocks) settles on the river bed first.
Appendix D
Selected Response Items

(I) Multiple Choice

1. If crickets live in sandy soil, which habitat would be best for its needs?
   A. dessert
   B. forest
   C. grassland
   D. pond

2. What is the main role of decomposers?
   A. break down dead animals
   B. break down living plants
   C. provide food for animals
   D. provide sunlight for plants

3. Which best represents humans?
   A. carnivore
   B. decomposer
   C. herbivore
   D. omnivore

4. Which animal is a scavenger?
   A. crow
   B. fox
   C. hawk
   D. owl

5. What is the correct order of the levels in a food chain?
   A. Consumer – Producer – Decomposer
   B. Decomposer – Producer – Consumer
   C. Decomposer – Consumer – Producer
   D. Producer – Consumer – Decomposer
Use the food chain below to answer the next three questions.
Sun – Plants – Mice – Snakes – Hawks

6. Which organism’s population would most likely decrease soon after the number of mice greatly increased?
   A. hawks
   B. mice
   C. plants
   D. snakes

7. Which best describes the hawk?
   A. decomposer
   B. predator
   C. prey
   D. scavenger

8. Which best describes the mice?
   A. decomposer
   B. predator
   C. prey
   D. scavenger

9. Producers are an important part of the food chain. What are producers?
   A. animals
   B. humans
   C. insects
   D. plants

10. Plants and animals are very important to each other. Animals provide plants carbon dioxide. What do plants provide animals?
    A. chlorophyll
    B. oxygen
    C. photosynthesis
    D. water
11. Which best explains what happened to the population of rabbits that were brought to the island of Australia in the 1800’s?
   
   A. The population decreased because predators moved to Australia.  
   B. The population decreased because prey moved to Australia.  
   C. The population increased because there was much food available.  
   D. The population increased because there was much sunlight available.  

12. Which is most likely the cause of small holes starting to form in marble steps and statues?
   
   A. acid rain  
   B. sunlight  
   C. wind  
   D. worms  

(II) Completion

1. ______________ always come first in the food chain.
2. In order to survive, an animal must __________ to its environment.
3. A ____________ is the place that provides an organism with food, water and shelter.
4. During the process of photosynthesis, plants use _________, _________, and _________ to make their own food.
5. Polar bears fir is a(n) ____________.
6. Air, water, soil and sunlight are not enough to make a habitat. A habitat also needs ____________ and ____________.
7. Along a food chain, __________ is passed from one organism to the next.
Unit: Healthy Habitats

(III) Matching

1. _____ food web  a. mushrooms, fungi, or mold and bacteria.
2. _____ recycle  b. contamination of an environment especially by man made waste.
3. _____ hypothesis  c. a plant eating animal
4. _____ decomposers  d. how plants and animals in a habitat connect through their food.
5. _____ behavioral adaptation  e. returning bottles and newspapers.
6. _____ pollution  f. a statement about a possible answer or solution to a problem.
7. _____ herbivore  g. wolves hunting in a pack.

(IV) True or False

1. Many food chains make a food web. ______
2. An empty lot is a habitat. ______
3. All food chains start with the sun. ______
4. Plants can survive without light. ______
5. A habitat can recover from a flood. ______
1. Which forms of energy are released from a burning candle?
   A. electrical and mechanical
   B. light and heat
   C. magnetic and nuclear
   D. sound and chemical

2. In which direction does light travel?
   A. all directions
   B. back and forth
   C. straight line
   D. up and down

3. Flashlights can be used to make animal shapes on a wall. What happened to size of the animal shapes when the flashlight is moved away from the hands?
   A. disappears
   B. gets bigger
   C. gets smaller
   D. stays the same

4. What part of the eye acts like a movie screen where images focus?
   A. iris
   B. lens
   C. pupil
   D. retina

5. Which mirror makes a small area larger?
   A. concave
   B. convex
   C. flat
   D. opaque
6. When a pencil is dropped into a glass of water the pencil looks like it has cracked in half. What happens to light to make this happen?

   A. It is absorbed.  
   B. It is emitted.  
   C. It is reflected.  
   D. It is refracted.

7. Which type of vision makes nearby objects appear fuzzy?

   A. far-sightedness  
   B. irregular  
   C. near-sightedness  
   D. normal

8. What spectrum of light is seen by humans?

   A. electromagnetic  
   B. infrared  
   C. ultraviolet  
   D. visible

9. What is used to refract light?

   A. microscope  
   B. mirror  
   C. prism  
   D. telescope

10. Why do rainbows appear?

    A. They act like concave lenses.  
    B. They act like convex lenses.  
    C. They act like mirrors.  
    D. They act like prisms.
Unit: Light Up Your Life!  

11. When the colours of the rainbow are combined on a colour wheel and spun, what colour is produced?

   A. black  
   B. orange  
   C. white  
   D. yellow

12. If you combine red lenses and yellow lenses what colour will objects appear?

   A. orange  
   B. red  
   C. white  
   D. yellow

13. Plastic cups of different colours are filled with water and placed in direct sunlight. Which coloured cup will show the highest temperature after 60 minutes?

   A. black  
   B. blue  
   C. red  
   D. white

14. What type of object glows in the dark?

   A. electromagnetic  
   B. fluorescent  
   C. phosphorescent  
   D. neon
Unit: Light Up Your Life!                      Selected Response

(II) Completion

1. A red shirt _________ all other colours except red.
2. _________ lenses make objects look bigger.
3. White light can be separated in to the colours of the _____________.
4. Light ___________ as it passes from air to water.
5. Light hits an object and is ______________ into your eyes.
6. In a flat mirror, images appear _____________.

(III) Matching

1. _____ transmit a. a block of glass that separates white light.
2. _____ transparent b. electrical energy changing to heat energy.
3. _____ prism c. a lenses that curves inward.
4. _____ retina d. allows light to pass through so that objects can be seen clearly.
5. _____ conversion e. to give or send out energy.
6. _____ concave f. the layer of cells at the back of the eye.
7. _____ emit g. to allow to pass through.

(IV) True or False

______ 1. A solar water heater is powered by electrical energy.
______ 2. The colour black does not reflect light.
______ 3. A shadow is the absence of light.
______ 4. Cone cells allow use to see shapes only.
______ 5. An image of a pencil will appear right side up on the retina.
______ 6. A piece of construction paper is opaque.
______ 7. Phosphorescent plastic keeps glowing after it has been exposed to light.
Unit: Sounds Good!                         Selected Response

(I) Multiple Choice

1. Which structure vibrates in your throat to produce the sound of your voice?
   A. esophagus
   B. larynx
   C. tonsils
   D. vocal cords

2. What is always needed for sound to be produced?
   A. electricity
   B. heat
   C. vibrations
   D. waves

3. What do the large flat panels that hang on walls in movie theatres do to sound?
   A. absorb
   B. convert
   C. measure
   D. reflect

4. Which object can force sound in one direction?
   A. amplifier
   B. megaphone
   C. microphone
   D. speaker

5. Why do you hear an echo when you scream under a bridge?
   A. A person is on top screaming back what you screamed.
   B. Cold air makes the sound of the scream come back to you.
   C. The sound bounces off the walls and ceiling of the bridge.
   D. The trucks and cars above sound like your scream.
What does a human’s middle ear look like?

A. rabbit  
B. snake  
C. snail  
D. worm

Which produces a high frequency sound?

A. fire truck  
B. flute  
C. foghorn  
D. tuba

Which animal can hear a lower frequency than a human?

A. bat  
B. dolphin  
C. grasshopper  
D. robin

What is the height of a sound wave?

A. amplitude  
B. cycle  
C. frequency  
D. pitch

What do doctors use to see unborn babies inside their mothers’ bodies?

A. sonar  
B. sonogram  
C. spectrograph  
D. stethoscope
Unit: Sounds Good!                          Selected Response

(II) Completion
1. Sound is a form of energy caused by ___________________.
2. A fog horn makes a _______ pitched sound.
3. Sound travels ____________.
4. Sound waves move in _________ directions.
5. Mud, grass and fabric _________ sound.
6. Objects vibrating faster have a ___________ pitch.
7. Jackhammers cause noise ________________.

(III) Matching

1. ______ vocal cords a. the ability to make things move
2. ______ energy b. energy needed to iron your clothes
3. ______ megaphone c. used to measure frequency
4. ______ soundproof d. a device that amplifies sound
5. ______ hertz e. folds in your throat that vibrate and produce sound
6. ______ sign language f. allowing no sound to escape.
7. ______ electrical g. communicating using your hands.

(IV) True or False
1. Sound cannot travel through water. ______________
2. Dogs and cats can hear sounds so quiet that humans hear nothing. ______
3. Sound travels faster through water than air. __________
4. The emptier the room the greater the echo you will hear. __________
5. The farther sound waves travel, the stronger they get. __________
6. A crickets ears are located on its back legs. ____________
Unit: Rockhound

(I) Multiple Choice

1. Which properties are used to describe rocks?
   A. cold, warm, thin
   B. color, texture, hardness
   C. heavy, light, smelly
   D. square, fat, round

2. In which type of rock would you expect to find fossils?
   A. aluminum
   B. gemstone
   C. mudstone
   D. zinc

3. How can you show the true color of a mineral?
   A. rub it across porcelain
   B. shine a light on it
   C. test it for magnetism
   D. weigh it on a scale

4. Which substance makes limestone fizz when dropped on it?
   A. lemon juice
   B. lime juice
   C. salt water
   D. vinegar

5. What is limestone most often used to make?
   A. bricks
   B. cement
   C. jewelry
   D. sculptures
Use Moh’s Hardness Scale below to answer the next two questions.

<table>
<thead>
<tr>
<th>MOH’S SCALE</th>
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<tbody>
<tr>
<td>TALC</td>
<td>1</td>
</tr>
<tr>
<td>GYPSUM</td>
<td>2</td>
</tr>
<tr>
<td>CALCITE</td>
<td>3</td>
</tr>
<tr>
<td>COPPER CON</td>
<td>4</td>
</tr>
<tr>
<td>FLUORITE</td>
<td>5</td>
</tr>
<tr>
<td>APATITE</td>
<td>6</td>
</tr>
<tr>
<td>STEEL KNIFE</td>
<td>7</td>
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<tr>
<td>ORTHoclase</td>
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<tr>
<td>STEEL FIFE</td>
<td>9</td>
</tr>
<tr>
<td>QUARTZ</td>
<td>10</td>
</tr>
<tr>
<td>LACULITE</td>
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<td>HEMATITE</td>
<td></td>
</tr>
<tr>
<td>SERPENTINE</td>
<td></td>
</tr>
<tr>
<td>LIMESTONE</td>
<td></td>
</tr>
<tr>
<td>“EMERY”</td>
<td></td>
</tr>
</tbody>
</table>

6. Why is diamond listed as number 10 on Moh’s Hardness Scale?
   A. all other minerals can scratch it
   B. it can scratch all other minerals
   C. it is least valuable
   D. it is most valuable

7. Which mineral is closest to diamond if Mineral D will scratch Mineral B and Mineral C, but will not scratch Mineral A?
   A. A
   B. B
   C. C
   D. D

8. Which is an example of erosion by water?
   A. avalanche
   B. hurricane
   C. mudslide
   D. tornado
9. Which is a result of weathering?
   A. heavy rain
   B. jagged rocks on a cliff face
   C. smooth rocks on a cliff face
   D. volcanoes spewing out lava

10. How would you expect rocks in the middle of a lake to look compared to those near the shore?
    A. flatter
    B. lighter
    C. rougher
    D. smoother

11. Which represents where the bigger, heavier rocks settle first in a lake?
    A. where the river enters a lake
    B. on the shores
    C. in the middle
    D. where the lake empties
Unit: Rockhound

(II) Completion

1. Dropping _________ onto a rock will prove whether the rock contains traces of something that was once living.
2. A(n) _________ is a limestone column formed on the ceiling of an underground cave.
3. _____ is the softest mineral and cannot scratch another mineral.
4. The _________ of a rock classifies whether it is shiny.
5. A(n) _________ test tells the true color of a rock.
6. The mineral _________ is also known as table salt.
7. A(n) _________ makes a sudden change to the landscape.
8. _________ is when a mineral splits along a flat, even surface.
9. A(n) _________ is a rock or mineral that can be cut and polished to make jewelry.
10. When _________ gets into concrete and pavement it forces cracks open wider.

(III) Matching

1. _____weathering
2. _____ gemstone
3. _____ erosion
4. _____ geologist
5. _____ crystals
6. _____ hardness
7. _____ diamond
8. _____ luster
9. _____ fossil
10. _____mineral

A. this mineral can scratch all others
B. when Earth materials wash away
C. a natural element that has a definite crystal structure
D. how shiny a mineral is
E. the breaking down of rocks by wind, rain and snow
F. remains or imprint of earlier life
G. a scientist who studies rocks
H. a mineral that can be cut, polished and used as jewellery
I. all minerals are made up of these regular patterns
J. the ability of a mineral to resist scratching
Selected Response Items
Answer Key

(I) Multiple Choice

<table>
<thead>
<tr>
<th></th>
<th>1. A</th>
<th>7. B</th>
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<tbody>
<tr>
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<td>8. C</td>
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<td>3. D</td>
<td>9. D</td>
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<td>5. D</td>
<td>11. C</td>
<td></td>
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<tr>
<td>6. C</td>
<td>12. A</td>
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</table>

(II) Completion
1. producers
2. habitat
3. carbon dioxide, light, and water
4. adaptation
5. animals and plants

(III) Matching
1. d
2. e
3. f
4. a
5. g
6. b
7. c

(IV) True or False