Grade One Physical Kit: Light & Sound Unit Study

The following resources are included in the physical kit and need to be returned to HCOS:

2. *Scholastic Sound and Light* by Pan Canadian Science Place
3. *Fun Science with Toys Light & Sound*
4. *What are Light Waves?* By Robin Johnson
6. 2 Prisms
7. 2 Convex Lenses
8. 2 Concave Lenses
9. Primary colored paddles
10. Tuning fork
11. Parent Guide

All unit studies are checked to ensure links are working. You can access the up-to-date guides on our website: hcslearningcommons.org, under Distance Learning Resource, Unit Study Kits K-9. Or you can log in to L4U and search for the unit study title. The guides can be found in the title record at the bottom of the page, under Resources, and can be downloaded.

HCOS Subscriptions

HCOS families have access to a wide variety of wonderful subscriptions which can be used to enhance student learning. Several of these subscriptions are used throughout the unit. Each year, a document containing the usernames and passwords for each subscription is sent to families. If you have not received this document please contact your child’s teacher.
“You are the light of the world. A city set on a hill cannot be hidden; nor does anyone light a lamp and put it under a basket, but on the lampstand, and it gives light to all who are in the house. In the same way, let your light shine before others, that they may see your good deeds and glorify your Father in heaven.” (Matthew 5: 14-16 ESV)

“Make a joyful noise to the LORD, all the earth, break forth into joyous song and sing praises!” (Psalm 98:4 NIV)

“When Jesus spoke again to the people, he said, “I am the light of the world. Whoever follows me will never walk in darkness, but will have the light of life.” (John 8:12)

Goals of the British Columbia Education Plan

Our curriculum team is excited to bring you a summarized version of the new BCEd plan core goals (competencies), strategies and content. As we develop the kits we will be personalizing the content to suit your students’ need and interests. Big ideas and concepts will be the focus as well as curricular threads, inquiry learning (discovering how to ask the right questions based on who, how and why things occur, as opposed to what things occur), technology integration, and collaboration. First Peoples content will include the natural history/culture of our province and encourage our God given diversity. The kits are designed to help you gain a greater understanding of the following:

**Biblical Worldview:**

We believe that every child in our school needs to hear the voice of God interwoven into all of their curriculum. Therefore we will be striving to make sure that this goal is an overarching strategy.
Communication Competency:
Involves imparting and exchanging information, experiences and ideas, to explore the world around them, and to understand and effectively engage in the use of digital media.

Thinking Competency:
Encompasses the knowledge, skills and processes we associate with intellectual development. It is through their competency as thinkers that students take subject-specific concepts (ideas that interest them) and content, (topics that need to be covered to increase knowledge, and transform them into a new understanding to increase knowledge), and transform them into a new understanding. This includes specific thinking skills as well as how students are allowed to learn, make mistakes and grow from failure. Encompassed in this thinking is the ability to feel safe and comfortable so that students can explore their surroundings.

Creative Thinking Competency:
Involves the ability to generate new ideas and concepts that have value to the individual or others, and then develop these ideas and concepts from thought to reality. It requires a curiosity and a wondering reflection about God’s creation, with a desire to make something new and different from what they have read, seen or observed.

Critical Thinking Competency:
Encompasses a set of abilities that students use to examine their own thinking and that of others, and process information they receive through observation, experience, and various forms of communication.
Social Responsibility:
Involves the ability and disposition to consider the interdependence of people with each other and the natural environment; to contribute positively to one’s family, community, society, and the environment; to resolve problems peacefully; to empathize with others and appreciate their perspectives; and to create and maintain healthy relationships.

Personal and Social Competency:
Is the set of abilities that relate to students’ identity in the world, both as individuals and as members of their community and society?

Learning Strategies
In response to the goals set out by the BC Ministry of Education, HCOS has made it a priority to make use of the following learning strategies throughout our unit studies and courses.

Biblical Worldview: Biblical worldview refers to the framework of ideas and beliefs through which a Christian individual, group or culture interprets the world and interacts with it. Individuals with a biblical worldview believe their primary reason for existence is to love and serve God. A Biblical worldview is based on the infallible Word of God. When you believe the Bible is true, then you allow it to be the foundation of your life. We believe that every student at HCOS needs to develop a worldview based on their Biblical thinking and beliefs.

Inquiry-Based Learning/Mindset: Students with an inquiry mindset have a God-given curiosity; a desire to dream big, constantly challenge themselves, and a desire to research more for increased understanding and clarity. Students who actively inquire will scan their environments, generate good questions, try new approaches, observe and collect evidence, synthesize the information, draw conclusions, and generate new questions from their research.

Maker Education: The Maker Education Initiative’s mission is to create more opportunities for all young people to develop confidence, creativity, and interest in
science, technology, engineering, math, art, and learning as a whole through making. This may be through STEAM – science, technology, engineering, art and mathematics. The “maker mindset” includes learning to use your imagination to make connections, use intuition, persist through difficult circumstances in learning, collaborate with other team members and community, and become disciplined learners. Maker education often involves an interdisciplinary approach, teaching science, math and art together. Here is an example. To learn more go to this page.

**First Peoples Content:** First Peoples content has been interwoven into every grade in the new BCEd plan. Aboriginal content is for all learners of all ages, and includes a healthy diversity of approaches. From learning about cultural traditions and schooling injustice, creative ways of storytelling, and good stewardship of land and resources, we can gather rich learning from the traditions of the people groups indigenous to BC. As Christians we can draw many similarities from their holistic thinking, and share how our beliefs and traditions might be similar or different.

**Big Ideas**

“Big ideas are statements that are central to one’s understanding in an area of learning. A big idea is broad and abstract.” (CT) Big ideas represent the overarching theme of each unit. They contain references to the content and key questions students will be investigating throughout the unit. Big ideas are often cross-curricular in nature. Similar themes can be found in many different subject areas within each grade-level.

**Science**

**Light and sound can be produced and their properties can be changed.**

- How can you explore the properties of light and sound?
- What discoveries did you make?

**Curricular Competencies**

“Competency represents the combined skills, processes, behaviours and habits of mind that learners use to make sense of the world.” (CT)
Science

- **Questioning and predicting**
- **Elaborations:** Form and function: Form and function refer to something being designed, structured or shaped in a way that will help it perform a certain function or functions. For example, the fins of fish help them propel themselves through the water. The human skeleton provides protection for organs, and support for muscles, and allows people to stand upright. Science recognizes this important relationship between form and function.
- Demonstrate curiosity and a sense of wonder about the world
- Observe objects and events in familiar contexts
- Ask questions about familiar objects and events
- Make simple predictions about familiar objects and events
- Make and record observations
- Safely manipulate materials to test ideas and predictions

Content and Elaboration

Content refers to the topics that will be investigated throughout the unit. The key questions serve as a guide as you and your child explore the content. Throughout this unit the key questions will be the starting point for learning.

Science

- **Content:** natural and artificial *sources of light* and *sound* (*natural and artificial*)
- **Elaborations:** natural sources include the sun; artificial sources include light bulbs
- **Elaborations:** natural sources include crickets; artificial sources include car horns
- **Content:** properties of light and sound (*properties*) that depend on their source and the objects they interact with
• **Elaborations:**
  ○ examples: brightness, colour
  ○ objects are made visible by radiating their own light or being illuminated by reflected light
  ○ interactions of light with different objects create images and shadows
  ○ light interactions can make plants grow, make shadows, or cause sunburn, depending on the source and location (seasons depend on light from the sun and how spread out the sun’s rays are)
  ○ plants grow toward light

• **Elaborations:**
  ○ examples: pitch, tone, volume
  ○ ways of making, recording, and transmitting sound
How to Use This Kit

The Ministry of Education is in the final stages of overhauling curriculum, learning strategies, and learning goals for students in the Province of British Columbia. This kit is designed with those goals in mind. On the next several pages you will discover the content that serves as the “bulk” of this kit. Rather than being divided by day, the unit plan uses the key questions detailed on page 8 to breakdown content, activities, and experiences.

Each key question will have books to read, videos to watch, and activities to share with your child. You will not be required to complete all activities listed under each key question, instead, you will be able to choose activities which most appeal to you and your child. Each key question featured in the unit will include recommendations on how many activities to complete in order to fully address the curriculum content and competencies. Finally, each activity will have icons (shown on pages 2 and 3) showing which goals of the BCEd Plan the activity addresses.

**You are encouraged to choose varied activities to ensure all goals are being addressed. In order to fully meet the goals of this kit, it is important to read 6-8 of the recommended books, and watch 4-6 videos.**

Reading and discussing/watching and discussing the books and videos listed in this unit will consistently address the following goals of the BCEd Plan:

It is our hope that our redesigned format will allow for flexibility, individual preference, and student-centered learning. When selecting activities to complete with your child we recommend selecting a variety of activities to ensure that you touch on each BCEd Plan goal throughout the unit. Most activities are designed to address multiple goals.
How can you explore the properties of light and sound? What discoveries did you make?

Books to Read and Talk About:

Usborne Light, Sound, Electricity by Kirsteen Rogers, Phillip Clarke, Alastair Smith and Corinne Henderson.
**Things to think about:** What is light? What is sound? How does light travel? How does sound travel? What would the world be like without sound? What would the world be like without light? When was light created? What are sources of light? How is sound created?

Scholastic Sound and Light by Pan Canadian Science Place
**Things to think about:** What is light? What is sound? How does light travel? How does sound travel? What would the world be like without sound? What would the world be like without light? When was light created? What are sources of light? How is sound created?

Fun Science with Toys Light & Sound
**How to use this book:** Pick and choose from a selection of fun experiments to conduct with your child.

Energy by Darlene R. Stille
**Things to think about:** What is energy? What do you think of when you hear the word energy? What is heat? What are some examples of heat? How do we use heat? Is heat important? Why or why not? What is light? What would happen if we had no light?

What are Light Waves? by Robin Johnson
**Things to think about:** Is it easy to see light? Does all light look the same? What are some different kinds of light?

Have Fun Using: prisms, color paddles, and the tuning fork can be used in activities throughout the unit.
Videos to Watch and Talk About:

Exploring Sound (Discovery Education)

Sound: Investigate Properties of Sound (Discovery Education)

I Want to Know: Sound (Discovery Education)

A First Look: Sound (Discovery Education)

The Wonder of Sound (Discovery Education)

Exploring Sound (Discovery Education)

Sid the Science Kid: Too Much Noise (Discovery Education)

Sound (Learn 360)

Vibrations and Waves (Learn 360)

My Shadow: Reading Rainbow (Learn 360)

Day and Night (Learn 360)

The Sun (Learn 360)

Light (BrainPopJr.)

Sound (BrainPopJr.)

Activities (Choose 4-6 sound activities and 4-6 light activities):

Create a Xylophone (Sound Experiment): Follow the instructions [here](#) to create an amazing, colourful water xylophone. You will need 6 baby food jars (or similar small glass jars), food colouring, a measuring cup, and a xylophone striker. Experiment with creating music using your xylophone. Does each jar have the same tone? Why do you think this is? What happens if you add more water to one of the jars? What happens if you take water out of the jar? Use this [fun notebooking page](#) to document your experiment.
How Does Sound Travel Underwater? (Sound Experiment): Have you ever been swimming? What do voices sound like when your ears are under water? Do they sound the louder or softer than usual? Why do you think this is? Experiment with underwater sound waves! You will need a large bucket or waterproof container, a wide-lid water bottle with the bottom cut off, and metal butter knives. Clink the knives together in the air. What do they sound like? Now, submerge the knives to make the sound again in a bucket full of water. Use your bottomless plastic water bottle to listen under the surface. How do the knives sound now? Why do you think this happened? (Sound waves travel faster through water than they do through air). Use this fun notebooking page to document your experiment.

Singing Glasses Toothpick Mover (Sound Experiment): Try this exciting experiment from Steve Spangler Science. You will be able to move a toothpick using sound waves! For this experiment you will need two identical wine glasses, water, and toothpicks. What happens to the toothpick? Why do you think this happens? Did you know that you could make that noise with a wine glass filled with water? Do you think you could play a song? After you conduct the experiment read the “How Does it Work?” section to learn more. Use this fun notebooking page to document your experiment.

Sound Amplifying Balloons (Sound Experiment): Use a balloon to create a sound amplifier. All you need for this experiment is a regular balloon. Blow up the balloon, then hold it close to your ear while you tap lightly on the other side. What does it sound like? Did you expect it to be that loud? Does it sound any louder when you tap firmly on the balloon? What other sounds can you try making on the other side of the balloon? Why does this happen? (When you blow up a balloon, you are compressing air molecules inside it, the compressed air molecules conduct sound waves better than the ordinary air all around us). Use this fun notebooking page to document your experiment.

Technology Time: Download the free eBook activity, Sound Uncovered, from the iTunes store. Explore the surprising side of sound!
Make Some Noise! (Sound Experiment): Try this fun experiment using simple, at home materials. You will need containers of various sizes (empty tin cans and bowls work well), chopsticks or wooden spoons to act as drumsticks, cellophane paper and extra-large balloons for the drum skins, various materials to bounce on the drums (rice, flour, dried beans and marbles), rubber bands and scissors. Use the scissors to cut the end of the balloon, then, stretch the balloon over your first container. For your second drum, cut cellophane paper to fit over another container and secure it with a rubber band. Repeat alternating balloons and cellophane until you have four or five drums. Add items such as rice, dried beans or marbles to the top of each drum. Now, bang on your drums. What happens? Why does this happen? Use this fun notebooking page to document your experiment.

Dancing Salt Experiment (Sound Experiment): Follow the instructions here to make salt dance using sound waves! You will need a plastic cup, salt, scissors, a balloon, and a speaker or CD player. Can you see sound waves? If you can’t see them, how can you tell that they are there? What other things do you think you could make dance using sound waves? Use this fun notebooking page to document your experiment.

The Science of Sound Waves (Sound Experiment): Learn more about how sound waves travel through materials by conducting this simple experiment. You will need a metal spoon, yarn or twine, scissors, and a wooden or plastic ruler. Begin by creating a loop in the middle of the yarn or twine, insert the handle of the spoon and pull tightly so the spoon hangs in the centre of the yarn and you have two long pieces roughly the same length. If your spoon slips, you can add some tape to keep it secure. Hold the spoon in mid-air and hit it gently with the ruler. What does it sound like? Now, take each string and wrap it around the pointer finger on each hand. Then, push the string against each ear (the spoon should hang around waist level). Now, have someone gently hit the ruler against the round part of the spoon. What happens this time? Was the sound the same or different? Did you expect the sound to be louder or softer? Why did this happen? (The yarn acts as a conductor for the sound waves, they travel through the spoon, into the string, and up into your ears, this makes the sound different. A larger
spoon will produce a gong-like sound, a smaller spoon will sound more like church bells). Use this fun notebooking page to document your experiment.

Seeing Sound Experiment (Sound Experiment): Follow the instructions here to see how sound waves affect things. For this experiment you will need a large bowl, plastic wrap, 1 teaspoon of uncooked rice, a metal pan (cookie sheets work well), and a metal spoon. What do the sound waves do to the rice in this experiment? Can you see the sound waves? How do you know they are there? Sound waves travel through air, do you think sound waves can travel in outer space where there is no air? Use this fun notebooking page to document your experiment.

Straw Pan Flute: Create beautiful music with your Pan flute made from plastic straws! You will need 9 plastic straws, scissors, and clear tape. Begin by lining up your straws evenly on the top and then tape them securely. Take your arrange straws and cut the bottoms off along an angle (shown here). What sound does your flute make when you blow through it? If you have lots of straws, try creating different arrangements to see what happens.

Joyful Noise: Read Psalm 98 together. What are joyful noises? What kinds of sounds/noises do you like to hear? What kind of sounds/noises do you think God enjoys? Do you have a favourite worship song? Thank God for your favourite sounds.

Technology Time: Make your own iPod speakers! For this experiment you will need two plastic cups, a paper towel roll, 1 sharpie, and scissors or an exacto knife. Cut holes in one side of each cup (large enough to insert your paper tube into, then, cut a small hole in the top of your paper tube, insert a smartphone or iPod into the slot in the paper tube. Press play on your music. What happens? Use this fun notebooking page to document your experiment.
Sound Detective: Use a smartphone, iPod, or another device with a recording feature. Spend some time going from room to room in your house. What sounds do you hear? Take time to record familiar sounds in each room (toilet flushing, water running, dishwasher, refrigerator, washing machine/dryer, the shower, fire crackling etc.). Now, play the sounds for a friend or a sibling, how many can they recognize?

Turn Sound Around Experiment (Sound Experiment): Follow the instructions from Highlights Kids to turn sound around and trick your ears. This is an amazing experiment! You will need two funnels, flexible tubing (available at all hardware stores), and tape. Use this fun notebooking page to document your experiment.

Paper Cup Phone (Sound Experiment): Try making a phone out of paper cups (or tin cans if you are feeling particularly brave!). You will need two paper cups, yarn (approximately 6 metres), a pencil, and two paper clips. Use the tip of a pencil to poke a small hole at the bottom of each of your two cups, then thread the string through the hole of one cup (tie a knot in the yarn on the inside of the cup to hold it in place. If your string tries slipping through tie it to a paper clip to hold it in place. Next, pull the string through the bottom of the second cup and secure in place. For your cup phone to work the string must be pulled taut. When one person whispers through their cup the other person should be able to hear their voice through their own cup!

Let There Be Light: Read Genesis 1: 1-3 with your child. Talk about God’s creation. Why do you think God created light first? Why is light so important? What is special about light? Are there other Bible verses that talk about light?

Turning Arrow (Light Experiment): For this experiment you will need index cards or small piece of white paper, a pen, and a clear, plastic cup filled with water. Draw a horizontal arrow on a small piece of paper or index card. Now, place the card behind the
cup, what happens to the arrow? (The arrow will appear to be pointing in the opposite direction) Why do you think this happens? (The arrow appears to have turned because the light is passing through two different mediums twice. From air to the glass, back to air, back to the glass, to air, to your eye. Light moves more slowly through water than it does through air). Try creating another drawing and holding it behind the cup, what happens? Use this fun notebooking page to document your experiment.

Rising Coin (Light Experiment): For this experiment you will need a cereal bowl, water, tape, and a nickel. Tape the nickel in the bottom centre of the bowl. Then, have your child walk backward (slowly) until they just cannot see the coin, have them freeze on that spot. Now, slowly, pour water into the bowl. When there is sufficient water in the bowl, your child will be able to see the coin again! Why does this happen? What does the water do to the light? Have you ever observed at a river or lake that rocks often appear closer to the surface of the water than they actually are? This experiment works because the water causes the light to bend up and over the edge of the bowl making the coin visible, even though the coin has not moved at all. Use this fun notebooking page to document your experiment.

Bending Light (Light Experiment): For this experiment you will need a clear plastic cup, water, and a pencil. Place the pencil in an empty cup. Have your child draw what they see. Then, place the pencil in a cup that is filled with water. Now what do they see? Why has this happened? Is the pencil actually bent? What else can you place in the cup with water? How does it look in the empty cup? How does it look in the cup filled with water? This experiment works because light travels more slowly through air than it does through water. Use this fun notebooking page to document your experiment.

Storytelling with Shadows: Begin by using construction paper to create shadow puppets. Use stencils from the internet, or draw your own. Attach your puppets to Popsicle sticks or skewers. Then, use a dark room or hallway, wall space, and a flashlight to perform with your shadow puppets! Talk to your child about what causes shadows. (Shadows are created when light is blocked by an opaque object).
Reflection Activity: Stand in front of a mirror with your child. Ask them what they see in the mirror. Have them wink their right eye. Which eye in the mirror winked? Have them wave their right hand. Which hand in the mirror waved? Have them hold up a piece of paper with their name written on it in big letters. What happens to the writing? What happens when we look in the mirror? (Explain that the image in a mirror is always reversed. When light reflects off a smooth, flat surface it causes the image to be reversed). Brainstorm other places where your child has seen their reflection. Use this fun notebooking page to document your experiment.

What Happens When Light Hits an Object? (Light Experiment): For this experiment you will need transparent objects (clear plastic cup, glass, water etc.), translucent objects (tinted/colourful plastic cups, waxed paper, sunglasses etc.), opaque objects (plastic cups, aluminum foil, cardboard etc.), a flashlight. Show your child three different objects (one transparent, one translucent, and one opaque), ask them to predict what will happen when they shine a light on each of the objects. Record their predictions. Then, have your child shine the flashlight on each object individually, observe what happens, and then draw a picture of it. What happens to each object? Why can light pass through some objects and no others? Hold up the transparent object to your child’s eye, can they see through it? Have them describe what they see. Do things look different in any way? Hold up the translucent object to your child’s eye, can they see through it? Have them describe what they see. Do things look different in any way? Now try the opaque object, what happens? Use this fun notebooking page to document your experiment.

Does Light Travel in a Straight Line? (Light Experiment): For this experiment you will need a flashlight, 3 index cards with a hole punched in the centre of each card, and something to hold each card in an upright position. Stand the cards approximately 10 centimeters apart from each other so that the holes in the centre are lined up. Shine a flashlight from one end through the holes. Did the light travel through all the holes? Move the middle card a little so that hole is not lined up. Shine a light through the holes. What happens? Does the light travel through all the holes? Do you think that light
travels in a straight line? What happens to light when it is blocked? Use this fun notebooking page to document your experiment.

The Colours of White Light: For this experiment you will need a prism, a flashlight, a white wall/ceiling or posterboard. Begin by asking your child to describe light. What does light look like? What does like feel light? What colour is light? Explain that you will be conducting an experiment to find out what colour light is. Have your child hold up a prism to natural light or a flashlight. Take time to observe a rainbow on the wall, ceiling, or poster board. Now, ask them what colour light is. Read the story of Noah in Genesis and talk about the sign of the rainbow. What does a rainbow mean? Have your child draw a picture of a rainbow.

Make a Suncatcher: Have fun creating beautiful suncatchers to hang in your windows. There are many different kinds of suncatchers. Try making suncatchers using wax paper, coloured tissue paper, and liquid starch following the instructions here. Or, if you are feeling a little more ambitious, try making melted bead suncatchers following the instructions here. For melted bead suncatchers you will need translucent pony beads and a metal baking dish. These suncatchers turn out beautifully!
Bibliography


