May 2023

OHPC Grade One Science Curriculum

Waves, Lights and Sounds

Purpose of the Subject
The study of science encompasses knowledge, process skills, and values. Scientifically literate persons will foster an attitude of caring not only for themselves, but as responsible citizens for the world around them. Their decision-making will be enhanced by a systematic study of the structure and behavior of the physical and natural world through observation and experiment. In learning science, students benefit from leveraging and evaluating available technological tools to study and therefore understand the world and their relationship to it.
Essential Learning Outcome (ELO-1)
Learners will be able to plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]
Grade Level Guidelines: Refer to grade level expectations at the beginning of this curriculum document

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
Learners are expected to: **Knowledge** ● **Define the terms**: ○ Sounds ○ vibrate ○ waves ○ loud ○ Soft ○ Sign language	**Introductory Questions** What does the word vibrate mean? Students – "Tell me one way that you can make a sound with a vibration". (a stick on a table, plucking a rubber band, blowing on a piece of grass, tapping a drum, singing a song etc.) Why do we hear sounds? (The wave from the sound goes in our ear)	Students, have you ever heard the word **sound?** What types of sounds do we hear around us? (birds, cars, children, etc.) A teacher can bring a drum into class. They tap the skin of the drum with their finger and ask the children what happened? (they heard a sound). They ask the children what will happen if they strike the drum harder? (louder sound).

<table>
<tr><th>Specific Curriculum Outcomes</th><th>Inclusive Assessment Strategies</th><th>Inclusive Learning Strategies</th></tr>
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- Demonstrate an understanding of how to produce sounds.
- Compare and describe sounds produced as (loud, soft, pleasant, unpleasant.
- Discuss and identify the effects and uses of sounds in our daily lives.
- Show that sound is a wave - like water is a wave.

Skills

- Classify - sounds according to loudness.
- Investigate - how sounds are produced and its effects on objects.
- Observe - the effects of sounds on objects.

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Why are sound soft and loud? (the bigger vibration makes the sound seem louder). Show me how you can make a soft and loud sound by clapping your hands (Gentle versus aggressive clap).

How to Make Sounds

Provide students with materials (e.g. covered and empty cans, rubber bands, bottles with varying water levels to describe the sounds they make. Include a worksheet to record observations (drawings, new words, classify sounds by picture) on what they see, hear, or feel and answer questions based on the activity (orally, in groups or individually).

For group work, allow students to indicate "How can sounds be made?" Provide the items. Have them complete a table illustrating how sounds are made by checking the relevant column.

<table>
<tr><th>Item</th><th colspan="6">How Sound is Made</th></tr>
<tr><th></th><th>Striking</th><th>Plucking</th><th>Blowing</th><th>Rubbing</th><th>Shaking</th><th>Scratching</th></tr>
<tr><td>Bottle</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Flute</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Drums</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Guitar</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Empty bottle</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

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<td>

Now the teacher places some sand on the skin of the drum and asks the children what will happen if they tap the skin of the drum (the sand will bounce). The teacher then demonstrates this.

So children, we can see that tapping the drum skin causes it to make a sound and make the sand move. We call that movement a **vibration.** The vibration causes a sound and it moves to our ears where we hear it. Think of it like a wave of water coming in on the shore. The waves are the vibration, and they move. Our ears can collect those vibrations!

The teacher can also show that sound causes vibration using the demonstration video at: https://www.youtube.com/watch?v=BoeDI-YkzI0 (1.57 mins)

"Students, please pick up your ruler or a stick."

"Let us tap it gently on our desk. It makes a sound doesn't it? What do you feel in your hand when you tap the stick on the desk?" (it moves in my hand).

We say that when we tap the stick it **vibrates.**

So from our drum experiment we saw that a bigger vibration causes a bigger sound because the sound was louder and the sand jumped higher! This is why we have

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Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
• Predict the effects of sounds on objects and the sounds made by different materials. • Communicate effectively the results of sound experiments. **Attitudes/Values** • Work respectfully with others in exploring and investigating sounds. • Show respect for persons with hearing or speaking impairment. • Willingly observe, question, and explore the effects of sounds. • Show interest and curiosity about sounds and their uses.	others **Distinguishing Loud and Soft Sounds** Play guessing games: I know a sound that is soft. It is made by …, you would find it in…what is it? Another game that can be played is where learners have to identify recorded sounds. E.g., animals, transportation, using sound words to describe the volume and pitch of sounds. Also, you can use a matching activity where learners classify loud/soft, and pleasant/unpleasant and match them with a picture of the item that makes that sound. **Sounds Can Be Pleasant to the Ear** Show students pictures or actual musical instruments (e.g. guitar, drum, oboe) and ask them how the vibration is made. Students compose with the teacher a song or poem about the term's sounds, vibrations and waves in the environment to practice vocabulary. Get students to put in order a group of sounds from loudest to softest.	**soft and loud sounds** because the vibration can be smaller or bigger. "What if we move our two hands together gently. We don't hear a very loud sound because our hands are only vibrating a little bit. But what if we clap them together harder, what do we expect?" (a louder sound with harder clapping because we have a bigger vibration) Useful books: ○ "Vibrations Make Sound" by Jennifer Boothroyd ○ "What are Sound Waves" by Robin Johnson ○ "Sound: Loud, Soft, High and Low" by Natalie Rosinsky ○ Sound All Around: Illustrated by HollyKeller You can play a video read aloud of this book here: https://www.youtube.com/watch?v=ui2ut1gbhzA (8.04min) **How to Make Sounds With Vibrations** Identifying through small group experiments, how do we make things vibrate? (e.g., sounds can be made by hitting, plucking, blowing etc. on different objects and materials.

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
• Develop an awareness that loud sounds (noise pollution) affect people and animals e.g., loud music, machinery, firecrackers, and airplanes.		**Sound is a wave: We Can See it!** Hold strips of paper, or plastic in front of a speaker or a radio with the volume turned up, or rest a container of water, or hands close to or on a radio or speaker. "Students as you watch this video, what evidence do you see that sound is a wave?" https://www.youtube.com/watch?v=AGjxfx8sy6s (7.39mins) **Musical Instruments Based on Different Vibrations** Make a model of a musical instrument and demonstrate its use. https://www.youtube.com/watch?v=3yqB2KFwJCo (4.37mins) **Identifying the Origin of Sounds: "Can you guess what is vibrating?"** Play a game to identify, name and classify materials as metals, wood, plastic, etc. based on the sound produced.

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
		Students, let us look at a picture of a musical instrument called an oboe. It has a thin piece like grass (called a reed) that you blow on at the end of the instrument to make a vibration. The holes in the instrument are covered by your fingers and help change the vibrating sound.  Retrieved from: https://www.8notes.com/oboe/

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
		"What does it sound like?" Listen here! https://www.youtube.com/watch?v=QNBsgfh4UMY (8:24 mins) **Sounds Can be Dangerous.** Have a classroom discussion to identify the danger of loud sounds in our world (identify dangerous sounds with children) and how to protect our hearing. **What if We Couldn't Make Sounds?** Students I want you to look at this rubber band. I can stretch it and then pluck it. Listen - it makes a very quiet sound. I can also take this piece of grass between my thumbs and blow gently on it. Can you hear the sound it makes as the air from my mouth blows by the grass. It makes the grass **vibrate** and makes a sound. Did you know that we have something in our throat called vocal cords that are like the grass? When air from our lungs passes by the vocal cords it makes sounds and our lips and mouth can shape those sounds to make words. Amazing isn't it?

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
		But you may have friends that can't hear or make sounds. They either can't make the vibration or hear the vibration They must use their hands to send messages to us. We call that **sign language.** It takes a lot of practise, but they have agreed to certain hand signals that everyone can understand. They even have their own alphabet. (see: https://deafchildren.org/2019/06/free-asl-alphabet-chart/)

Useful Content Knowledge for the Teacher about the Outcome: (Links to professional sources that connect back to the Curriculum and Assessment Principles of Learning and Principles of Assessment)

Sound is defined as vibrations that travel through the air or another medium, as an audible mechanical wave.

It is produced from a vibrating body. The vibrating body causes the medium (water, air, etc.) around it to vibrate, thus producing sound. The sound is produced when something vibrates. The shorter the vibrating body the higher the sound. The longer the vibrating body the lower the sound.

Effects of force on sounds produced (huge forces produce more vibrations)

• Forces cause vibrations

• Sound is a form of energy - Sound is a wave (see downloadable simulation at: https://phet.colorado.edu/en/simulation/legacy/sound

• The ear is the organ used to detect sounds

• Sounds can reflect (echo) and diffract (spread)

• Sounds travel in waves and carry energy with it.

Areas for Subject Integration

• **Social Studies:** Effects of noise pollution in the community, especially when using firecrackers and loud music. (See - Science Around Us Book 5, p. 55)

• **Mathematics:** Use of block graphs to compare pitch of sounds. Also seriation activities can be used where we put in order, the loudness or pitch of sound.

• **HFLE:** Self and Interpersonal relationship (Love for oneself and others - care for those with hearing impairment)

Managing the environment (Noise pollution)

• **Literacy:** Vocabulary, reading (poem), listening, speaking and writing. Examples:

https://i.pinimg.com/originals/7a/d7/45/7ad7458bdf160676ea70358a3c7e30cb.jpg

• **https://sciencepoems.net/sciencepoems/sound.aspx**

• **http://commoncore2012.homestead.com/Grade_Level_Files/First/Science/Q4/Resources/Sound_Song.pdf**

• Science Around Us Book 5 pp 95-97

• **TVET:** Design a model of a stringed or drum musical instrument (e.g. elastic bands, sticks, plastic bags, cans, etc.)

• **Elements from local culture:** Drama on the effects of sounds on people and animals; use instruments made to produce music.

• **Instructional technology (**introduction to sound for various levels of elementary school (3.5 mins)) see YouTube®-

• https://www.youtube.com/watch?v=3-xKZKxXuu0

Inclusive Resources and Materials From Regional Specialists Use of multisensory activities and materials to assist all learners. (texts, family & community knowledge and resources, contextually relevant professional web resources)

Tape recorder/video recorder, computers, speakers, strings of different materials e.g. rubber, plastic, cotton thread; wood, pieces of metal, rubber

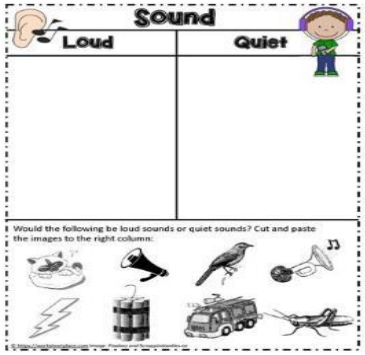
bands, drums, plastic bottles, paper, seeds, pebbles, beads, rice, shells, wind chimes, bells, a guitar, shack-shacks, vocabulary chart with key terms e.g. sound waves, vibrations, volume, pitch, echo.

Teachers should be encouraged to design high ceiling-low threshold activities to differentiate instruction.

(see explanation here: https://schoolecosystem.org/2016/12/28/low-floor-high-ceiling-wide-walls-in-ela-classrooms/) >https://nrich.maths.org/7701

Additional Resources: In this simple activity, children can explore noise with different types of objects. All you need to do, is gather objects that make noise, **and** allow the child to use them to create sound.

Picture courtesy of: C. Vital



Retrieved from: https://www.pinterest.com/pin/338262621993541956/

Resources for a learner who is struggling: (Links to earlier learning activities for similar knowledge, links to resources for special education needs)

ebooks:

https://www.youtube.com/watch?v=ui2ut1gbhzA **(8.04mins)**

https://www.youtube.com/watch?v=Xcp4Pe2hrwA **(7.13mins)**

Videos:

https://www.youtube.com/watch?v=jHgXrO_894M **(11.01mins)**

https://www.youtube.com/watch?v=-J9HhdgV1cY **(4.16mins)**

https://www.youtube.com/watch?v=FNTmzX3GpOU **(4.39mins)**

https://www.youtube.com/watch?v=92nAhXXpqm0&t=16s **(0.30mins)**

(https://sandbox.teachforlife.org/what-makes-sound/

https://youtu.be/gdGyvGPZ1G0 (3.53mins)

Worksheets:

https://www.liveworksheets.com/pf2729442lb

https://www.liveworksheets.com/yn2421175fh

https://www.liveworksheets.com/worksheets/en/Science/Sources_of_sound/Natural_and_Man-made_Sound_Sources_lz2742583hb

Resources for a learner who needs challenge: (Links to learning activities and resources in later grades)

Videos that explain how to make different sounds vibrations and record them.

https://www.youtube.com/watch?v=SemQS4RLeFU **(3.13mins)**

https://www.youtube.com/watch?v=L5fVFA2sWt4 **(3.54mins)**

https://www.youtube.com/watch?v=ivSS0Q8J5LY **(3.01mins)**

https://www.youtube.com/watch?v=3-xKZKxXuu0 **(3.57mins)**

Worksheets:

https://www.thefirstgraderoundup.com/2014/03/5-for-finally-friday.html

https://www.liveworksheets.com/bv2838598jk

https://www.k5learning.com/worksheets/science/grade-1-sound-words-a.pdf

Strategies that Support the OECS Curriculum and Assessment Framework1

Elements of the Essential Education Competencies that are addressed:

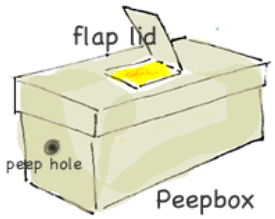
An educated person in the OECS will demonstrate they have:	**Where might this competency be promoted/developed in this learning outcome and associated lessons?**
Developed Citizenship Competencies	The importance of light and how to conserve energy.
Developed Critical Thinking and Ethical Communication Competencies	Distinguish between artificial and natural light.
Developed Well-being Competencies	Compassionate to others who are visually impaired.
Developed Knowledge and Entrepreneurial Competencies	Understand the different sources of light, and how light can be produced. Inventions of light sources.

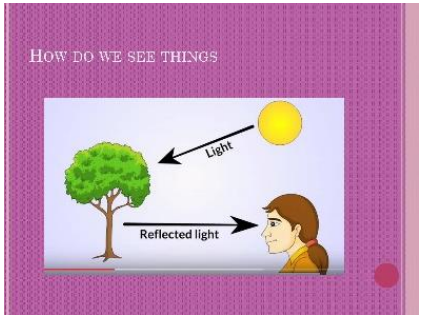
Grade One: Waves Lights and Sounds
Essential Learning Outcome 2

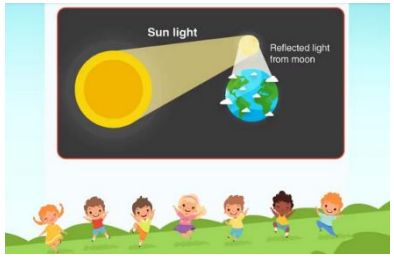
Purpose of the Subject
The study of science encompasses knowledge, processes, and values. Scientifically literate persons will foster an attitude of caring not only for themselves, but as responsible citizens, for the world around them. Their decision making will be enhanced by a systematic study of the structure and behavior of the physical and natural world, through observation and experiment. In learning science, students benefit from leveraging and evaluating available technological tools to study and therefore understand the world and their relationship to it.
Strand: Waves Lights and Sound **Essential Learning Outcome (ELO-2)**
Make observations to construct an evidence-based account, that objects can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]
Grade Level Guidelines: Refer to grade level expectations at the beginning of this curriculum document

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:

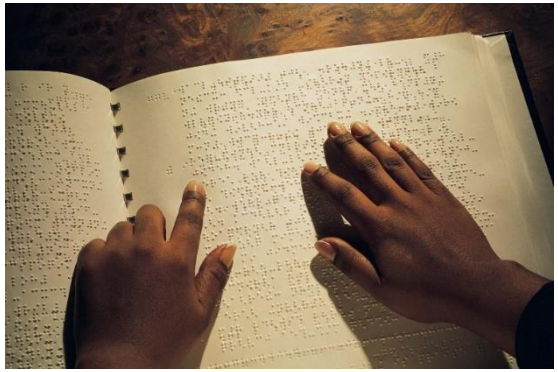
Learners are expected to:
 	
<u>Knowledge</u>
 	
• Define the terms
  ○ light/darkness
  ○ Artificial
  ○ Natural
  ○ Reflect
 	
• Give examples of the sources of light.
 	
• Identify different light sources in and out of the classroom.
 	
• Describe why objects can be seen when illuminated. (Based on reflection of light to eyes.
 	
• Understand that the sun is a natural source of light that is a burning sphere.
 	
• Understand that the spherical moon reflects the sun's light.
 	
<u>Skills</u>
 	
• Classify light according to their source (natural, artificial).
	<u>Introductory Questions</u>
	
	"Students, use the word light in a verbal sentence." Teacher goes through the class getting a range of sentences that children offer. (*Teacher can check for correct context and meaning*)
	
	"Students, what are some sources of light?" (*sun, torch, headlamps, stars etc.)*
	
	Place two hoops on the floor; one represents artificial light and the other natural light. The teacher supplies pictures on cards that children can place in the correct hoop. (*pictures could include glow sticks, ambulance lights, lightning, fireworks, campfires, TV screens etc.)*
	
	True or false Game: (read statements to class and ask for responses)
	
	A candle is a form of natural light. (F)
	
	The moon has its own light. (F)
	
	The sun is a form of natural light. (T)
	
	Artificial light is a light that is made by humans. (T)
		What Does Light Mean to You?
		
		• "Students, when you hear the world "**light"** what comes to your mind?" (*seeing, eyes, objects etc..)*
		
		Types of Light
		
		"Students, where can we find light in nature?" (*Sun, moon, stars*). What you have just listed is said to be **natural** light because it is light that is part of nature around us.
		
		"Do you know that people can create (make) light? Think of other things you get light from that are not the sun, moon or stars." (*Candle, flashlights, glow sticks, light bulbs, etc..*) . These are called **artificial light**. The word artificial means humans made it.
		
		Let me check to see if you understand the difference, with a couple of quick questions.
		
		Is the headlight on a car natural or artificial? (*artificial*)
		
		Is the light from a firefly or an eel artificial or natural? (*natural because it comes from nature)*
		
		Watch these videos to learn more about sources of light.
		
		<u>https://www.youtube.com/watch?v=4Ni6TuB-21o</u> (1.51 Minutes)

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
• Investigate - how objects can be seen. • Observe - the effects of light on objects. • Predict the effects of turning on and off the lights in a room, closing and opening eyes, etc. • Communicate ideas about light using new words. • Safe use of candles as a source of light. **Attitudes/Values** • Willingly participate in, and contribute to classroom discussions. • Develop an awareness that light must be present for objects to be seen.	The light that comes from fireflies is natural light. (T) **How do we see Objects?** Use a picture in a box to make a peep box. Have students describe how they are able to see the picture using a flashlight. (We see an object because light rays travel from a light source, bounce off the object and travel to our eyes.) We can make a special experiment box using the directions and the picture here: https://www.kindergarten-lessons.com/science-for-kids/  	https://www.youtube.com/watch?v=d65mdTJaJTI&list=PLiMIqKsOLxPwNa9ITqboVGwxtcgofpNoL (3.17minutes) **Building on Children's Intuition About Light** "Students, let's pretend we have finished school for the day and go home. We have an evening meal and we get ready for bed. It is now getting dark outside. We go into our bedroom and turn off the lights because it is easier to sleep in the dark. We close our eyes and drift off to sleep. In the middle of the night, we hear a loud sound of something hitting against our house. We want to know what this sound is because it is disturbing our rest. It is still very dark. What do we do first to investigate this sound?" (*turn on a light*) "Why do we turn on a light?" (*because we can't see in the dark)* "So you are telling me we need light to see things around us?" (*yes teacher*) "When we look in a mirror, what do we see students? "(*we see ourselves*). We say that the mirror **reflects** our image back at us.

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
• Appreciate the importance of light e.g. for warning (sirens), safety (lighthouse, traffic lights.). • Show appreciation for and assist persons with visual impairment. .	Were you able to see the picture in the box without the flashlight? Why or why not? (*No, because we need light to see objects.*)	In a similar way, everything we see in the world is because light **reflects** off the object and enters our eyes. Look at this picture. What type of light is sunlight, artificial or natural? *(natural)*  Retrieved from: https://www.learnpick.in/prime/documents/ppts/details/301/reflection-of-light "When the sun goes down at night, we can't see the tree. Did it disappear?" (*no teacher it is still there but there is no light to shine on it so we can't see it)* "If I turn on my torch (flashlight), will I see the tree then?": *(yes teacher)* "What type of light is the torch (flashlight) artificial or natural?" (*artificial)*

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
		"So, the light from the torch (flashlight) reflects off the tree and goes in my eye!" "What other **natural light** do we see in the sky at nighttime? "(*the moon and stars*) The moon is different from the sun. The sun is a burning **sphere** of fire. The moon doesn't have its own light, it is not burning, it is a cold **sphere** of rock! We see our moon because it reflects the sun's light.  Retrieved from: https://www.playosmo.com/kids-learning/how-does-the-moon-shine/ **Teacher Note**: *we introduce the word sphere (and show a model of a ball if we have one) because we don't want students to think the moon is a flat reflective mirror- this is a common misconception).* I want to check and see if you understand.

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	<u>Appreciation for persons with visual impairment</u> Pupils are asked to put on a blindfold and walk in the direction towards the teacher's voice while she holds an object in her hand. "What am I holding?" (*I don't know. I can't see teacher*) Giving specific instructions: the teacher asks one student to walk to another while wearing a blindfold. (student will respond they can't see) Teacher explains to students that there are people who also move around everywhere and aren't able to see - just like this. **Differentiation** Can You Guess? **>What might this artificial light be used for?** 	"Let's pretend there are two brooms in the closet, a red one and a blue one. You walked into the closet, and it is dark. I ask you to pass me the red broom. You can feel the two brooms but you can't tell the color. Why can't you choose the correct broom?" (*without light reflecting off the broom and into my eyes, I can't tell the color. I need to turn on the light in order to see the colors of the brooms*) When we close our eyes, our eye lids cover our eyes so no light can get in. That is why we can't see anything! But some children have eyes that somehow don't work right. Even with their eyelids wide open they are unable to see. They use their sense of touch and sound to detect objects. Watch this story carefully children and think about what objects Helen Keller could detect without light and her sight- Useful Read-Aloud About Helen Keller: https://www.youtube.com/watch?v=-4-STugHphY (6.54 mins) "Did you know that a man named Louis Braille invented a touch alphabet so that Blind Children could read?"

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	Retrieved from: https://www.outdoorhub.com/best-headlamps-2/ (outdoor sports climbing, camping, caves, , mining, jewelry inspection etc.) **>What are the dots on this book or under these elevator buttons?**  (Braille dots for the blind to read the information by touch.)	A book called Six Dots (by Len Bryant) tells the story Read Aloud here: https://www.youtube.com/watch?v=0S6dj3DlEWc (17:44mins)

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	Retrieved from: https://www.colleyelevator.com/state-of-illinois-ada-braille-mandate/  **>What are these special lights for?**  *Traffic control light*	

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	Retrieved from: https://www.freepik.com/search?format=search&query=traffic%20light  *Emergency: Protecting the Public* Retrieved from: https://www.freepik.com/search?format=search&query=police%20car%20light  *Lighthouse to Guide Ships*	

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	Retrieved from: https://www.freepik.com/search?format=search&query=lighthouse	

Useful Content Knowledge for the Teacher about the Outcome: (Links to professional sources that connect back to the Curriculum and Assessment Principles of Learning and Principles of Assessment)

Worksheets

laptops/computers

shoe boxes

charts on illuminating and illuminating objects

flashlight

Charts to be used by students

Sources of light - https://th.bing.com/th/id/R.af65f7437cf37a3cb32cc3fbc113ce31?rik=VdQsVS%2fdDA0pOw&riu=http%3a%2f%2fknightowl.education%2fwp-content%2fuploads%2f2020%2f10%2fSlide6.jpg&ehk=IX27LGYW7FctENStBi4PHulDvonkHlLxF41rkM95WeQ%3d&risl=&pid=ImgRaw&r=0

https://th.bing.com/th/id/OIP.GeZ4mWmRYcvAtkRR6XE_7QAAAA?pid=ImgDet&rs=1

Natural & Artificial sources of light

https://image.slidesharecdn.com/c103gsb-naturalandartificiallight-161101141349/95/natural-and-artificial-light-5-638.jpg?cb=1478009652

Inclusive Resources and Materials From Regional Specialists: Use of multisensory activities and materials to assist all learners. (texts, family & community knowledge and resources, contextually)

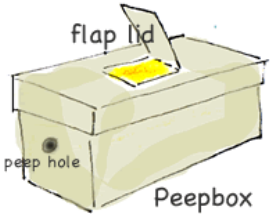
Useful Read aloud Book that Covers Nature and all Properties of Light "All About Light" by Lisa Trumbauer

https://youtu.be/CokH5VXxnT4 (4:13 mins)

Another useful reading resource: "All About Light" by Angela Royston.

Have students draw and cut out sources of light or use light tracers: https://www.kindergarten-lessons.com/wp-content/uploads/light_tracers.pdf

Make a peep box to show that we need light to see things



https://www.kindergarten-lessons.com/science-for-kids/

Additional Resources: In this simple activity, children can practice:

How we see objects : Practice How We See Objects Worksheet: Test Results, Check Answer & Solution (kidsacademy.mobi),

Practice Light and Sound: Assessment 1 Worksheet: Test Results, Check Answer & Solution (kidsacademy.mobi)

How do We See Things? - Science Class 5 - YouTube 58 min

Practice Is It a Light Source? Worksheet: Test Results, Check Answer & Solution (kidsacademy.mobi)

How We See - Light & Mirror Game - Science Activities for Kids (sciencekids.co.nz)

Identifying sources of light: Practice Sources of Light Worksheet: Test Results, Check Answer & Solution (kidsacademy.mobi)

How we see objects worksheets: Layout 1 (bbc.co.uk)

What is light? light waves and sources of light : https://www.youtube.com/watch?v=LCEqlvHFIhM&list=PL5sCDSl4o5Zbd0ZWahYy84QijOMLnuKv8 3.40 min

Sources of light : https://www.youtube.com/watch?v=d65mdTJaJTI&list=PL5sCDSl4o5Zbd0ZWahYy84QijOMLnuKv8&index=2 3.17

Who turned out the lights? Discusses natural and manmade light sources https://www.youtube.com/watch?v=6ARPnrSEt3E 6.20 mins

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Opportunities for Subject Integration: (How the inclusive learning strategies might be adapted and/or applied to include other subjects in the curriculum)

Mathematics: the sun and moon are spheres

Social Studies: How we make use of the sources of light (Natural and Artificial)/Conservation of various sources of light. Festival of Light celebrations.

Language Arts: Building vocabulary/reading poems/oral language-(reading, speaking, listening: importance of light.

TVET: inventions that create artificial light/making a peep box.

Agriculture: importance of light for plant growth.

-Health and Safety: dangers of bright light/ safe practices to follow with various sources of light.

Resources for a learner who is struggling: (Links to earlier learning activities for similar knowledge, links to resources for special education needs).

ebooks:

https://youtu.be/VBsiQP_Y92w (2.27mins)

https://youtube.com/watch?v=K-13my2hMOU&feature=share (3.59)

https://youtu.be/CokH5VXxnT4 (4.14)

Videos:

https://youtu.be/4Ni6TuB-21o (1.52mins)

https://youtube.com/watch?v=3E10KEDouVA&feature=share (2.06mins)

https://youtu.be/nzkcwjONNao (09.26mins)

Worksheets

https://www.liveworksheets.com/gy2374514gq

https://www.liveworksheets.com/im1632621bn

https:www.liveworksheets.com/bk2857081av

Resources for a learner who needs challenge: (Links to learning activities and resources in later grades)

Videos:

https://youtube.com/watch?v=Eii5UBK0rJE&feature=share (2.25mins)

https://youtube.com/watch?v=UV4C9PH8qws&feature=share (6.03mins)

Worksheets:

https://www.liveworksheets.com/ka85588hm

https://liveworksheets.com/cc2786563mq

https://www.kidsacademy.mobi/printables/sources-of-light/

https://www.k5learning.com/worksheets/science/grade-1-light-rays-a.pdf

Strategies that Support the OECS Curriculum and Assessment Framework1

Elements of the Essential Education Competencies that are addressed:

An educated person in the OECS will demonstrate they have:	**Where might this competency be promoted/developed in this learning outcome and associated lessons?**
Developed Citizenship Competencies	The importance of light and how to conserve energy
Developed Critical Thinking and Ethical Communication Competencies	Distinguish between artificial and natural light.
Developed Well-being Competencies	Compassionate to others who are visually impaired

Grade One: Waves Lights and Sounds
Essential Learning Outcome 3

Purpose of the Subject		
The study of science encompasses knowledge, processes and values. Scientifically literate persons will foster an attitude of caring not only for themselves, but as responsible citizens, for the world around them. Their decision making will be enhanced by a systematic study of the structure and behavior of the physical and natural world, through observation and experiment. In learning science, students benefit from leveraging and evaluating available technological tools to study and therefore understand the world and their relationship to it.		
Strand: Waves Light and Sound **Essential Learning Outcome (ELO-3)**		
Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]		
Grade Level Guidelines: Refer to grade level expectations at the beginning of this curriculum document		
Specific Curriculum Outcomes:	**Inclusive Assessment Strategies:**	**Inclusive Learning Strategies**

Learners are expected to:
 	
<u>Knowledge</u>
 	
• Define the terms:
  ○ Glass
  ○ Transparent
  ○ Translucent
  ○ Reflective
  ○ Reflect
  ○ Opaque
 	
• Demonstrate they understand that objects can block varying amounts of light from passing.
 	
• Account for the use of different types of glass for different applications in our homes.
 	
• Explain that only clear and smooth glass can allow most light to pass through.
 	
• Understand that rough glass is more likely to allow less light to pass through.
 	
<u>Skills</u>
	Using New Words in Spoken Sentences
	
	Have the students complete the following sentence in words with the proper term.
	
	1) The window of the car is _____ (transparent or translucent) so that we can see clearly other cars on the road.
	2) The bathroom window is _____ (transparent or translucent) so that we have privacy when we visit the bathroom.
	3) A dark curtain is sometimes good for blocking the sunlight if we want to go to sleep. This is because the curtain is _____ (transparent or opaque)
	4) We use a mirror to look at ourselves because it is _____. (translucent or reflective)
	
	Rough Versus Smooth Surfaces
	
	Which glass surface is more likely to allow the most light through A or B?
		Glass is Useful
		
		"Students, have you ever heard the word **glass**?"
		
		What things around us are made of glass? (drinking cups, windows, car windshields).
		
		Did you know that glass is made of sand that is heated to a very high temperature? Because we can find lots of sand, glass can be a very useful material for making things.
		
		Different Properties of Glass
		"Students did you ever notice that glass windows in a house can look very different?"
		
		"Sometimes we want to look through glass like a window to the outdoors so we can see outside when the weather looks stormy."
		
		Demonstration: If I take this small piece of glass (plate glass or clear drinking glass-whatever is available) and shine a torch (flashlight) through one side we can easily see the light passing through to the other side. We say that this type of glass is **transparent.**
		
		Sometimes the glass window in a bathroom or a shower is not clear. Have you ever noticed it can have a rough or bumpy surface? Here is a picture of that type of glass window to remind you.

- Observe the amount of light that is blocked by different objects.
- Classify objects placed in the beam of light as transparent, translucent, reflective or opaque.
- Predict which types of glass or objects may be best suited for different applications in the home.

Attitudes/Values

- Appreciation - that understanding how light interacts with objects may impact our use of objects to control light.
- Interest/Curiosity to investigate light properties with the teacher.
- Inventiveness- how could we use our understanding to design useful products.

A) 

B) 

B - will reflect light off the rough surface so less light will pass through. A - will allow the most light to pass.

Students: tell me a sentence that uses the word "reflect"

(the mirror reflected my face)

Practicing the Terminology

Two activities to practice the terminology and evaluate understanding:

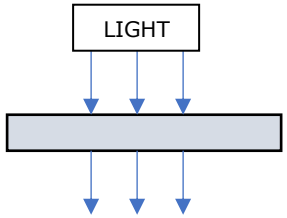
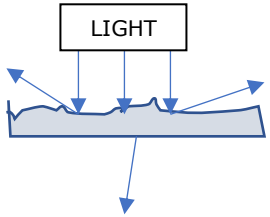
1) The teacher could bring in pictures and ask students to match the object with the new word that describes its properties i.e., transparent, translucent, reflective, opaque.
2) The students could do a walk with the teacher around the

Translucent Window

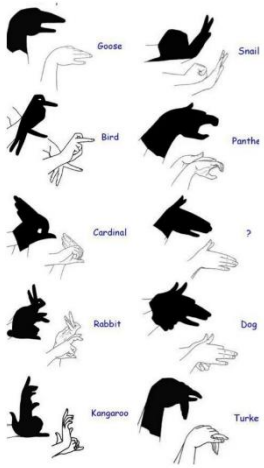
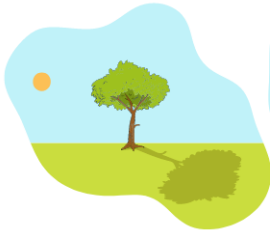
Retrieved from: https://upload.wikimedia.org/wikipedia/commons/8/81/KMM_PFL_3rd_St_bathroom_frosted_glass_window_August_2021_SS2.jpg

Demonstration: This piece of wax paper is not made of glass but it is very similar to the glass in a bathroom window. If I shine my torch (flashlight) through one side, what do you notice on the other side? (some light passes through but it is not so clear).
If we look through a window like this we can see an outline of a person but it isn't clear. Not all of the light can get through like a normal glass window.

Because the surface of that glass is rough some of the light gets reflected in many directions and doesn't go through the glass. We say that rough glass is **translucent**.

• When conducting practical and group work, display sensitivity and offer assistance to peers who may have physical or learning challenges • Participate actively in classroom discussions.	school and school yard to identify objects that fit each of the aforementioned categories. *Differentiation:* When we look at the surface of water on a sunny day, it sometimes is very bright. Why do you think that happens? (the surface of the water is not perfectly flat so the sunlight doesn't all pass through the water; some of it reflects back in our eyes)	 Clear Smooth Glass  Rough Glass Surface There is another type of glass in our bathroom. Can you guess what it is? Maybe if I show you this picture you will remember. What is this a picture of? (a mirror) You can see that the vase is showing up in the mirror! This is a special type of glass! 

		Retrieved from: https://upload.wikimedia.org/wikipedia/commons/5/52/Mirror.jpg *Demonstration*: I have a small mirror to show you. If I shine the torch (flashlight) into the mirror, what do you think I will see? (the light will shine back in my eyes!) We say that this type of glass is **reflective** because it **reflects** all of the light back towards us instead of letting it pass through the glass. Sometimes we can see the back of the mirror and it seems totally painted with something grey. It doesn't let any light through. **Objects Other Than Glass Interact With Light Too** *Demonstration*: We know that cardboard is not like glass or a mirror. How is it different? (not shiny, not clear) If I hold the cardboard in front of the torch (flashlight) how much light do you feel will pass through or be reflected? (no light would pass through) When an object blocks a beam of light from passing through, we say the object is **opaque.** **Opaque Objects Make Shadows** If we place our hand in front of a light, we can see the trace of a **shadow** of our hand on the wall. We can make many types of shadows using our hands, but the sun shining on trees and buildings also can make shadows.

		  Retrieved from: https://www.nagwa.com/en/worksheets/980140349017/ Retrieved from: https://i.redd.it/bnfvtnzpkbh41.png

Useful Content Knowledge for the Teacher about the Outcome*:* Comparing terminology

https://www.youtube.com/watch?v=8rrnMOjIGjI (1.57 mins)

https://www.youtube.com/watch?v=d7yTlp4gBTI&list=PL2bioFl3lbM4bA3r6myv9sh60ThmFYuoy (4:42 mins)

https://www.youtube.com/watch?v=wL_yVzBH40Q (6:16 mins)

Inclusive Resources and Materials From Regional Specialists

Glass slide or small window pane

Wax paper or translucent glass or plastic

Cardboard

Mirror

Torch (flashlight)

Additional Resources:

Differentiation: Read the work of Tomlinson (https://resilienteducator.com/classroom-resources/examples-of-differentiated-instruction/)

Based on content, process, product and environment: https://www.learninga-z.com/site/company/what-we-do/differentiated-instruction

High ceiling-low threshold tasks**: https://blog.missyounger.com/2021/06/16/low-threshold-high-celling-tasks/**

Opportunities for Subject Integration: (How the inclusive learning strategies might be adapted and/or applied to include other subjects in the curriculum)

Mathematics: Objects can be placed in order of the amount of light they allow through. (seriation activity)

Social Studies: How is glass used to enhance privacy?

Language Arts: Reading materials: All About Light by Lisa Trumbauer (read aloud: https://www.youtube.com/watch?v=4a7_--1zTco (3: 04 mins)

TVET: How can glass be used in different ways to solve human problems.

Agriculture: Greenhouses use transparent and translucent glass and plastic.

Health: Protecting our eyes against reflected light.

Elements from Local Culture:

Using the sun's light beam to make a clock: See how a sundial maybe used in your community.

Sundials https://www.twinkl.ch/teaching-wiki/sundial#:~:text=A%20sundial%20is%20a%20device,this%20shadow%20shows%20the%20time. (4:53 mins)

Resources for a learner who is struggling: (Links to earlier learning activities for similar knowledge, and links to resources for special education needs.)

All About Light by Lisa Trumbauer (read aloud: https://www.youtube.com/watch?v=4a7_--1zTco (3:04 mins)

Resources for a learner who needs challenge: (Links to learning activities and resources in later grades)

Using the sun's light beam to make a clock: See how a sundial maybe used in your community.

Sundials https://www.twinkl.ch/teaching-wiki/sundial#:~:text=A%20sundial%20is%20a%20device,this%20shadow%20shows%20the%20time. (4:53 mins)

Strategies that Support the OECS Curriculum and Assessment Framework

Elements of the Essential Education Competencies that are addressed:

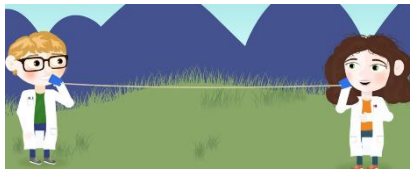
An educated person in the OECS will demonstrate that they have:	**Where might this competency be promoted/developed in this learning outcome and associated lessons?**
Developed Citizenship Competencies	Having discussions about their observations of the teacher's demonstrations.
Developed Critical Thinking and Ethical Communication Competencies	Why do objects act differently when placed in a light path?
Developed Well-being Competencies	Protecting our eyes.
Developed Knowledge and Entrepreneurial Competencies	Where does glass come from and how can we use it to solve problems?

Waves Light and Sound **Essential Learning Outcomes 4**
Purpose of the Subject
The study of science encompasses knowledge, processes and values. Scientifically literate persons will foster an attitude of caring not only for themselves, but as responsible citizens, for the world around them. Their decision making will be enhanced by a systematic study of the structure and behavior of the physical and natural world, through observation and experiment. In learning science, students benefit from leveraging and evaluating available technological tools to study and therefore understand the world and their relationship to it.
Strand: Waves Light and Sound **Essential Learning Outcomes (ELO-4)**
Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]
Grade Level Guidelines: Refer to grade level expectations at the beginning of this curriculum document

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:

Learners are expected to:
 	
<u>Knowledge</u>
 	
• Define the terms:
  ○ warning
  ○ communicating
  ○ siren
  ○ emergency vehicle
  ○ traffic lights
 	
• Demonstrate they understand the concept of warning sounds.
 	
• Give examples of communicating with sound.
 	
• Give examples of communicating with light.
 	
• Recognize that communication in cities and rural areas maybe be different.
 	
• Recognize that communication technologies have varied over the last century (light and sound inventions) .
	Introductory Questions
	
	What does it mean to communicate?
	
	(*send messages between two animals using light and/or sound*)
	
	Give me some examples of warning sounds in your community. (*Car door alarms, phones, sirens, church bells, doorbells, animal barking etc.*)
	
	Where do you see lights in your community that communicate messages? *(car signal's lights, flashing lights on emergency vehicles, traffic lights, oven lights etc.)*
	
	Communicating Over a Distance
	
	"Students even though we have telephones to talk today, many years ago there were other ways to
		"Students, have you ever walked by a house with a fence, and a dog inside begins barking? Why do the bark when they hear you go by?" (*they are warning me, they are afraid or threatened by me being there*)
		
		"Some animals make sounds to **warning** us to stay away."
		
		Teacher may want students to watch these videos of animals communicating with their young. Think about why and how they are using these sounds:
		
		Animals issue warning sounds
		
		>Turkey https://www.youtube.com/watch?v=u3a19ujBq-Q (3.4 min**)**
		
		>Squirrel https://www.youtube.com/watch?v=8b-2TFrx3fg (1 min)
		
		Other Types of Sound Warnings.
		
		The alarm clock rings to tell us to get up and get ready for school!
		
		"Students, what do we hear when smoke enters a house, or a home catches on fire?" (*a smoke detector may sound and a fire truck might come to the house*)

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
Skills • Observe and identify light and sound communication in video accounts. • Infer certain messages from the type of sound heard. • Infer certain messages from the light patterns detected. • Construct a simple sound communication device (cup phones). • Formulate models of communication devices that use sound or light or both. • Practice new vocabulary in discussions.	communicate using simple sound makers." A system of beeps and pauses was developed just like our alphabet to make whole words. This was called the Morse Code. Listen to what it sounded like here: https://www.youtube.com/watch?v=4NdETLNglhc (0:22 mins) **Simple Sound Signals Communicate Something** Maybe we could communicate that way too! Let say that striking a bell three times means "school is starting." Maybe striking a bell once means "it is lunch time." And finally striking the bell twice means "school is over, time to go home."	"When we see a police car or ambulance going down the street, there is often a **siren** sound. Can you make a **siren** sound children?" Listen here: https://www.youtube.com/watch?v=M7IdXA23JVI (1:11 mins) "What does the siren sound mean?" (*the police, fire truck or ambulance are dealing with a dangerous situation; we should get off the road so they can help the people in danger)* Maybe someone in your family has a cell phone. These phones can make funny sounds that tell us that someone is calling or someone is sending a text message. We say that the person is **communicating** with us. In other words, they are sending us a message. In the more rural areas of the world - many years ago, things like loud drums or clouds of smoke were used for communicating messages like danger or special meetings or events. **Using Lights to Send Messages** "What else do we see on the fire truck, police car and ambulance?" *(flashing lights)*

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
Attitudes/Values • Appreciate that different sounds and light have different meanings/significance. • Show inventiveness in designing a communication device that accesses sound or light • Collaborate to make models of communication devices that use light or sound or both to communicate messages. • Recognize that light and sound are used as safety and warning signals to protect people. • When conducting practical and group work, display sensitivity and offer assistance to peers who may have physical or learning challenges. • Participate actively in classroom discussions. • Demonstrate interest and curiosity regarding the ways in	What could we do with the bell to signal "it is recess time"? You decide what would work the best! What could we do with the bell to signal "there is an emergency in the school, listen carefully"? What are your ideas about that? **Making a Simple Telephone** This activity is meant to be done with the teacher's assistance. Students can try different size cups and lengths of string to see what works the best. 	See Here: https://www.youtube.com/watch?v=jHTX_XVWhyo (3:09 mins) These special cars and trucks are called **emergency vehicles.** What do the flashing lights mean? (*Stay out of the way!an emergency vehicle is coming towards you.*) In towns and cities we often see lights where roads cross over. These are called **traffic lights** and they help us to make sure that drivers cross in an organized fashion, avoiding accidents. 

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
which communication devices have evolved over history. • When conducting practical and group work, display sensitivity and offer assistance to peers who may have physical or learning challenges. • Participate actively in classroom discussions.	Watch video on sound, vibrations and cup phone here: Retrieved from https://www.youtube.com/watch?v=3yqB2KFwJCo (4:37 mins) **Class Debate** How do the light and sound warnings assist the blind and deaf in our community? How can we improve these systems? **Differentiation** ➢ Animal Sounds: think of the sounds that 5 different animals make to communicate a message (e.g. fear, hunger, happiness) to other animals including humans. Can you make those sounds?	Retrieved from: https://www.freepik.com/search?format=search&query=traffic%20light The red light means stop! The green light means go. The yellow light means proceed carefully as the red light is about to shine. Ships can also use flashing lights to send messages across the water. 

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	➢ Create a picture poster of the communication devices that have been developed over the last 100 years *(e.g. telegraph, lighthouses, Braille, traffic lights, clocks, dial telephones, hearing aids, alarms, computers, iPad, cellphones etc.)* ➢ Light Communication Challenge: You want to use a torch (flashlight) to send four different messages to your friend across the street at night time. You can use quick and slow on/off light flashes. How will you communicate the following? o Come over to play. o I am going to bed o Our favorite TV show is on now o Did you have dinner yet?	See video of ship communication here: https://www.youtube.com/watch?v=WOt83AouoGU (1.44 min)

Useful Content Knowledge for the Teacher about the Outcome*:* (Links to professional sources that connect back to the Curriculum and Assessment Principles of Learning and Principles of Assessment) Communication Using Light and Sound : https://www.youtube.com/watch?v=Er0lHlXVCIE (3:26 mins) Worksheet Resources: https://www.primarythemepark.com/2019/07/communicating-with-light-and-sound/ Demonstrations and Experiments: https://www.generationgenius.com/videolessons/communication-over-distances-video-for-kids/
Inclusive Resources and Materials From Regional Specialists Use of multisensory activities and materials to assist all learners. (texts, family &community knowledge and resources, contextually relevant professional web resources) Guess the sounds that communicate: https://www.youtube.com/watch?v=8jXfNvlSZEQ (1:17 mins) Hands-on materials: String, cups, scissors, tape Torch (Flashlight)
Additional Resources: Old telephone Braille book Alarm clock Hearing aid Cell phone Smoke detector

Opportunities for Subject Integration: (How the inclusive learning strategies might be adapted and/or applied to include other subjects in the curriculum)

Mathematics: coding & patterns - Morse code and flashlight concerns dots and pauses in a particular pattern to generate words.

Social Studies: maintaining order in communities with warning and emergency signals/how do warnings assist the blind & deaf?

Language Arts: reading books about light and sound communication/learning new vocabulary/expressing ideas through posters.

TVET: appreciation for inventiveness of humans around communication technologies/designing communication systems.

Health: how do warning systems protect us against great injury***?***

Elements from Local Culture: communication in rural settings by traditional means

Resources for a learner who is struggling: (Links to earlier learning activities for similar knowledge, links to resources for special education needs)

Interactive Read-Alouds linked to outcomes: NGSS-Interactive-Read-Alouds.pdf

- During the series of questions, explicitly model content and discussion by using objects, body gestures, and demonstrations. For example, for beginning and intermediate ELs, you might use explicit gestures as you say, "Show me who the tallest student in the room is." For advanced ELs, you might say, "Explain the T-chart results to me."
- Watch your pacing (use a slower rate of delivery) as you ask students questions and guide discussion.
- Provide ELs with opportunities to speak and get engaged by asking recall questions and using language frames.
- Intermediate ELs may need the same support as beginners as both groups are learning new concepts.
- During question and discussion sessions, pair ELs at different English proficiency levels and have the pairs engage in think-pair-share activities (e.g., "Tell your partner what you saw when. . .").

Use language frames to support responses from students (e.g., "If I move farther away from the sound, the sound will ____.").

Resources for a learner who needs challenge: (Links to learning activities and resources in later grades)

Investigate use of Morse code more deeply.
Investigate the importance of lighthouses to local communities.

Strategies that Support the OECS Curriculum and Assessment Framework

Elements of the Essential Education Competencies that are addressed:

An educated person in the OECS will demonstrate they have::	**Where might this competency be promoted/developed in this learning outcome and associated lessons?**
Developed Citizenship Competencies	Warning lights must be obeyed - developing obedience patterns.
Developed Critical Thinking and Ethical Communication Competencies	How do we students interpret and respond to light and sound warnings?
Developed Well-being Competencies	Warning signals protect against danger and accidents & assist in responding to accidents that involve health issues.
Developed Knowledge and Entrepreneurial Competencies	Developing new tools that warn of danger in communities.

Structure, Function, and Information Processing

Purpose of the Subject
The study of science encompasses knowledge, process skills and values. Scientifically literate persons will foster an attitude of caring not only for themselves, but as responsible citizens, for the world around them. Their decision making will be enhanced by a systematic study of the structure and behaviour of the physical and natural world, through observation and experiment. In learning science, students benefit from leveraging and evaluating available technological tools to study and therefore understand the world, and their relationship to it.
Structure, Function, and Information Processing **Essential Learning Outcome (ELO-1)**
Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow and meet their needs. [Clarification Statement: Examples of human problems that can be solved by mimicking plant and animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal's scales; stabilising structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animals quills; and, detecting intruders by mimicking eyes and ears.]
Grade Level Guidelines: Refer to the grade level expectations at the beginning of this curriculum document.

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
Learners are expected to: **<u>Knowledge</u>** • Define the terms ○ Mimic/mimicking ○ Protection ○ Living things ○ Non-living things ○ Defence ○ Camouflage ○ Grow ○ Nutrients ○ Predators • Name and describe some **living** and **non-living things** in the environment • Identify and name some characteristics of living things (e.g. they grow, need nutrients and reproduce).	**Mimicking Activity** :Students: Please tell me a sentence that includes the word **mimic.**" Engage the class in a design challenge where we are demonstrating how humans **mimic** plants and animals to solve problems based on the following scenario: **Scenario:** John is standing under the mango tree and wants to reach a ripe mango high in the tree. He knows he cannot climb or fly into the tree to reach the mango. What else can he do to reach the mango? Focus questions: How can John reach the mango, without climbing the tree? Sometimes we can look for examples from plants and animals to help us solve problems. Can you think of any animal that may be able to reach high into a tree without climbing or flying? (A giraffe) What	**Introduction** Animals and plants can be found all around us. "Students can you name a few?" *(dog, cat, cow, papaya, breadfruit, coconut etc.)* In order to grow, they need special parts. A plant has roots to hold it firmly in the ground when the wind blows. The roots also bring water and nutrients up the stem to feed the plant. But the plant also needs sunlight to grow. That is what the leaves are for; they gather the sunlight. In order to grow again next season, most plants have flowers that make seeds that can grow a brand new plant. Animals like you and I also have special parts. Let's play a game: I will say a part of your body and you tell me what it helps us do. Ears? (*help us hear*) Eyes? (*help us see*) Nose? (*help us smell*)

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
• Name and describe the external parts of local animals and plants and discuss their functions. • Identify and describe natural defences that local animals use to help them survive (spines, camouflage etc.). • Describe **mimicking** in their own words (possibly copy). • Give examples of how humans mimic plants and/or animals to solve problems. • Identify some human problems that have been solved by mimicking how plants and /or animals use their external parts. .	body part of the giraffe helps it to reach things that are very high? (Its long neck and legs). John does not have a neck as long as a giraffes, but he has a broomstick, a roll of tape or screws and screwdriver and a plastic cup/bottle, tool for cutting. Can you help him by designing and building a tool to reach something high that mimics the giraffe's neck? Using cut outs of the pictures below, carry out a matching activity. Instructions: Match each picture of an animal or plant to the technology which it mimics best. **Animal or Plant** | **Technology**  	Mouth? (*helps us eat and breath*) Hands? (*help us pick up and hold things*) Feet? (*help us stand and walk*) Legs? (*help us run fast and stand*) Arms? (*let us hold up things or reach high above our heads)* **Humans are Good at Solving Problems** Although humans have these external features, they sometimes need help doing certain things such as reaching things from a tall shelf, protecting themselves from harm, staying warm, etc. They also have problems with keeping their home clean, well-lit, and preparing their foods. To solve some of these problems humans have come up with several ideas. Do humans need help from devices? Give some names of devices that were designed to help us meet our needs *(helmets, cars, planes, cell phones, computers, etc.)* Have you ever thought about where humans got the ideas for some of these devices? A lot of the devices or tools we use are copied from the plants and animals in nature. After studying how plants and animals use their external parts we then copy or **mimic** the

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
Skills • Classify some common things as either: living or non-living. • Observe examples of how plants and/or animals use their external parts for survival, growth and to meet their needs. • Communicate properties of mimicked plants and animals by observing and describing. • Use simple materials to design a solution to a human problem using examples from the external parts of plants and or animals. • Construct a simple model of a gadget designed to	     Mangrove https://pixabay.com/photos/mangrove-trees-aquatic-plants-4901145/   	external parts of plants and animals to help us solve problems. Students, when we want to reach something that is really high and our legs and arms just aren't tall enough, we use a ladder. A ladder is an invention that mimics an animal with long legs. Do you know an animal with long legs? (*a giraffe*) Ask students to look at the images of the cyclist with the helmet and the turtle (teacher may use live examples as well).   Helmet: Retrieved from: https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcSLVamSmBu-P-DfnJoi-y1zS8ncDNc7OrKjBw&usqp=CAU Tortoise: Retrieved from: https://upload.wikimedia.org/wikipedia/commons/f/f3/Red_Footed_Tortoise_%288681088466%29.jpg

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:

solve the problem and test its effectiveness.

Attitudes/Values

- Appreciate that the external parts of plants and animals have inspired technological designs.
- Demonstrate a continuing interest and more informed curiosity in the link between nature and technological design.
- Willingly participate in classroom discussions and group activities with peers.
- Show a respect for living things while making observations of any live animal or plant specimen.

Shameplant (mimosa pudica): mimosa plant	
House gecko	Insert pic of suction cups/

Discuss your choice of pairs.

Which of the above pairs show an example of protection?

Extension Activities:

- Identify and name the **living** and **non-living** things from the pictures above.
- Sort the pictures above into the categories of living and non-living things.

Identify a human problem you wish to solve and an animal/plant that can be mimicked to solve the problem.

Based on the shameplant activity, students can record their observations by making a

Ask students to identify anything that is the same in the photo.

Cyclist	**Turtle**
Helmet covers the head	Shell covers the turtle

Why is the cyclist wearing a helmet? (*to protect the head)*

Why does the turtle have a shell? (*to protect the turtle)*

Both are for **protection** (to keep them safe).

We say that the helmet is copying the turtle's shell by keeping our head protected. Another word for copying is **mimicking.**

Let us use that in a sentence. "The helmet is mimicking the turtle's shell." (repeat with me)

Look at the image of the bird and the aeroplane.

Do they have anything that is the same?

(They both have wings)

What are the wings used for in each case? (to fly in the sky)

How are they different? (The bird is a **living thing - eats, grows & breaths, and the** aeroplane **is non-living - it doesn't do any of these things.**

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
• Observe all applicable safety measures when interacting with plant/animal specimens or using tools. • Display sensitivity and offer assistance to peers who may have physical or learning challenges when conducting practical and group work.	simple drawing to represent the plant's leaves before and after being touched. Students mimic the movement of the shameplant through the open/close motion of their hands. Activity can be done in pairs where a partner taps the student, and the student responds to the stimuli by opening and closing their hands. Have a class discussion on how humans mimic the flamingo (shown below).  Retrieved from: Netta Thomas 1) What is he standing on? (*stilts*) 2) Why does he need to wear stilts? (*to reach high places while working, e.g. to plaster a ceiling.*) Click on the link below to see him using the stilts to plaster a ceiling.	 Plane: Retrieved from: https://rb.gy/dmxulu Bird: Retrieved from: https://rb.gy/5rbjuz We would say the aeroplane is **mimicking** the bird because humans built the aeroplane to copy the bird's wings. "Children, look at the following pictures. What do you see that makes these pictures look the same?" (Long neck of the giraffe and the tall crane.)   Crane: Retrieved from: https://upload.wikimedia.org/wikipedia/commons/9/99/Old_crane_truck.jpg Giraffe: Retrieved from: https://rb.gy/2lpgby Which one of these is a **living** thing? (Giraffe)

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	https://www.youtube.com/watch?v=gk-iIIbaCMQ (7:18 mins) 3) What animal(s) is he mimicking by wearing stilts? (*Any animal with long legs, e.g. flamingo, crane, stork, egret, giraffe, etc.*) **Defence and Camouflage** Ask students to discuss how some animals mimic other animals as a means of **defence**. Make certain to include in the discussion, how humans use **camouflage** to hide themselves (e.g. when fighting war, hunting, etc).  Retrieved from: https://www.heraldledger.com/uncategorized/camouflage-the-art-of-being-there-but-looking-like-you-aren-t/article_1a9c76ec-e3e2-57dd-a082-69f5e05f9fe6.html	Why is it important for the giraffe to have a long neck? (to reach leaves or food in tall trees) Why is it important for the crane to reach high? (it can help with constructing high buildings or moving things that need to be lifted high) Students, if you looked at the base of a coconut tree you might see that the roots spread out to help keep it standing firmly upright. Look at this picture of a camera tripod. We call it a tripod because it has three legs (tri means three) How is the tripod **mimicking** the mangrove tree? (it has legs that spread out that give it a stable base to hold the camera up)   Root system of a mangrove tree: Retrieved from: https://pixabay.com/photos/mangrove-trees-aquatic-plants-4901145/ Tripod: Retrieved from: https://rb.gy/rabruj

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	Children may find it interesting to learn about the Lionfish and its use of spines for defence. (see: https://oceanservice.noaa.gov/facts/lionfish-facts.html) How have humans used pointed armour for protection? Ask them to compare the pictures below and tell you what they notice. How did humans mimic the lionfish?  Retrieved from: https://t3.gstatic.com/licensed-image?q=tbn:ANd9GcTUUaTBR6Jg3FvbP7XvC6kJl_CLNb4ZemS1jADlc4TOkYDGIGY5-BOrucCC14BuyTb4lmDCPHRYK1GkvjE	You can see that humans are very good at **mimicking** or copying the features of **living things** in order to solve real human problems. Activity: Take a nature walk to observe the shameplant (*mimosa pudica)*. Touch it and see what happens (the plant leaves close). This plant responds to touch. Can you think of any device(s) that **mimic** this plant? (cell phones, keypad, and other touch screen devices) See a video of the plant response here: https://commons.wikimedia.org/wiki/File:Mimosa_pudica (1:00 mins) **Sometimes Animals Mimic Each Other** Roleplay: Have pairs of students face each other and match each other's facial expressions and gestures. Example: ***An animal mimics another animal to protect itself*** The Atlas moth scares away **predators** (animals that want to eat it**)** by mimicking a snake. See Video of lifecycle here: https://www.youtube.com/watch?v=4tlvYJNZKVE (3:02 mins) 

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	Retrieved from: https://fristartmuseum.org/exhibition/knights-in-armor/#lg=1&slide=2  The invention of 'barbed wire' is another way that humans have mimicked the lionfish. Can the children notice this from looking at the picture below?  Retrieved from: https://www.jacksons-fencing.co.uk/fencing/agricultural-fencing/wire-fencing-barbed-wire	Retrieved from: https://assets.iflscience.com/assets/articleNo/64970/aImg/61294/atlas-moth-s.jpg

Specific Curriculum Outcomes	Inclusive Assessment Strategies:	Inclusive Learning Strategies:
	Ask children to observe these pictures and tell you how humans have mimicked the lizard?	
	 Retrieved from: https://octopuslesson.weebly.com/lizards.html	

Useful Content Knowledge for the Teacher about the Outcome*:* (Links to professional sources that connect back to the Curriculum and Assessment Principles of Learning and Principles of Assessment)

Some important definitions:

Stems:

Stems grow above the ground. Stems can be green or brown in colour. They hold the plant upright. They bear branches, leaves, buds, flowers and fruits. They also help in sending water and minerals to the leaves. Some plants have soft stems while others have hard stems.

Roots

Roots lie below the surface of the soil and hold the plant firmly in the soil. Their main function is to take in water and nutrients for the plant. They also store food and nutrients and provide support to the plant.

Leaves

Leaves are usually flat, green and blade-like. They are attached to a stem. Leaves are of different shapes, sizes and texture. Some leaves are wide and hairy while other leaves are small and shaped like needles. Leaves make food for plants through a process called photosynthesis.

Flowers

Flowers are usually the most attractive part of a plant. Each flower type has a different structure, colour and scent from those of other plants. Petals and the scent of flowers attract insects and bees to the flower.

Fruits

The fruit is a fleshy or dry part of a plant that the seed/seeds is/are contained in.

Other points:

Students should be encouraged to examine their local environment in order to discover what kinds of plants and animals live there. Students should be encouraged to look for ways in which the non-living elements in the environment (sunlight, soil, air, water, and temperature) provide the living organisms with food, water, space, and shelter.

Students may have trouble distinguishing between living, and non-living things, as they may consider everything that moves to be alive, including cars and clouds. Often children pretend that objects are alive so that they can talk to them. Living and non-living are scientific terms. Children are more used to hearing alive or dead. By exploring various objects and organisms, your students can begin to distinguish between things that are living, things that were once-living, and things that are non-living.

Characteristics of Living Things

We are surrounded by living and non-living things. All animals and plants are living things. If something is living it will display all of the following characteristics:

Reproduce

All living things produce young. Humans make babies, cats produce kittens and pigeons lay eggs. Plants also reproduce. Many make seeds which can germinate and grow into new plants.

Feed

All living organisms need to take substances from their environment to obtain energy, to grow and to stay healthy.

Movement

All living organisms show movement of one kind or another. Some move from place to place by walking, flying or swimming. Although it is believed that plants do not move, plants do move through various means. However, the movement is often very slow. For example, when a plant is placed such that, it is getting sunlight from one direction only, it will grow towards the light. A quick response in a plant is seen in the Mimosa plant, which closes its leaves when touched.

React to stimuli in the environment

Living things react to changes around them. We react to sound, light, heat and temperature, as do other living things.

Breathing or Respiration

All living things exchange gases with their environment. Animals take in oxygen and breathe out carbon dioxide.

Excretion

Excretion is the removal of certain types of waste from the body. All living things need to remove waste from their bodies. As humans, we produce a liquid waste called urine. We also excrete waste when we breathe out.

Growth

When living things feed, they gain energy. They use this energy to grow. Living things become larger and more complex as they grow.

Some non-living things show one or two of the seven characteristics of living things. For something to be living it has to show *all* of the seven characteristics of living things.

Animals have all kinds of features that help them to survive. These include: eyes, hands, eyes, feet, ears. An animal's features help them to survive by helping them to stay safe, move from place to place, build shelters, find food, stay warm, fight other animals that may want to eat them, hide from predators and keep their young safe.

For example, some animals have sharp claws. Claws are good for climbing trees. Other examples of external features that animals may have include the following:

Spikes, hard shells, different colours and patterns, beaks and thick fur.

Plants also have different features (prop roots, thick stems, leaves with spikes, flowers, fruits with wings, thorns, etc.) that help them survive and grow.

Humans can **mimic** or copy the ways animals survive to help us as well. Porcupines raise their quills when a predator approaches to scare them away or even stick them if they get too close. **Humans use sharp strips on the ground to pop car tires and warn drivers to stop**. We are mimicking animals to solve problems.

https://www.varsitytutors.com › solve-a-human-problem-...

https://www.facebook.com/kungbaji/posts/attacus-atlas-is-the-amazing-butterfly-that-disguises-as-a-snake-is-the-largest-/416119660073906

Inclusive Resources and Materials From Regional Specialists Use of multisensory activities and materials to assist all learners (texts, family & community knowledge and resources, contextually relevant professional web resources).

Additional Resources:

The concrete materials for this lesson would be best to support student grasp of the concept of mimicking. Therefore, include materials such as a live turtle and helmet, observe a real or toy plane and a bird, feathers, a sample of aluminium metal, observe a Mimosa plant in nature, touch screen device, camera tripod stand, observe a crane, etc.

https://media.ride.ri.gov/eeie/Resources/RIModelCurr/UnitsofS/1st_Units_of_Study/RIDE_NGSS_Gr01_Unit3_2014may9_final.pdf

Opportunities for Subject Integration: (How the inclusive learning strategies might be adapted and/or applied to include other subjects in the curriculum)

Mathematics: counting the number of pieces of material used, writing numbers, gathering numerical data on how many devices worked or didn't work.

Social Studies: parrots squawk - humans talk.

Language Arts: new vocabulary (protection, mimicking, defence, camouflage).

TVET: materials used in construction (crane, drywall stilts), mimicking animals in presentation of foods (e.g. a designer cake shaped like a cute puppy).

Agriculture: introduction to local trees and their roots and local weeds.

Health: tools used in safety.

Elements from Local Culture:

Mimicking movement and sounds of local animals to send coded messages.

Natural hairstyles which mimic vines.

The choices of patterns, colours and textures used in local fabric, art and craft mimic the colours, textures and patterns found in nature.

Carnival costumes mimic the vibrant colours of local plants and animals.

Retrieved from: https://live.staticflickr.com/280/19235262559_c42c12fc9c_b.jpg

Owner: Alex Barth, Men on Stilts

Retrieved from: https://openverse.org/image/fca2cc77-eb59-4cbc-9380-bfdf27f23176?q=carnival%20man%20 stilts

Retrieved from: https://www.indiamart.com/proddetail/brown-coconut-shell-purse-23369731533.html

Retrieved from: https://pixabay.com/photos/soldier-the-war-the-army-conflict-4763675/m

Resources for a learner who is struggling: (Links to earlier learning activities for similar knowledge, links to resources for special education needs)

1. Videos, pictures, models, tactile materials, etc.

Resources for a learner who needs challenge: (Links to learning activities and resources in later grades)

Construction kits to build devices

Software and hardware to design and 3D print a model/device that mimics a plant/animal.

Enrichment for differentiation:

Research (find out about):

- Animals with quills/spikes and how they are mimicked. Examples: pufferfish, lionfish, sea urchins, hedgehogs and porcupines.
- Plants with thorns/briars and how they are mimicked. Examples: citrus trees, rose bushes, aloes, horse nettle, and pineapple. (Quills/spines/thorns/briars are used for keeping out intruders such as barbed wire and also velcro)

1. Detecting intruders by mimicking eyes and ears (360-degree security camera) examples spiders, flies, etc.

Strategies that Support the OECS Curriculum and Assessment Framework

Elements of the Essential Education Competencies that are addressed:

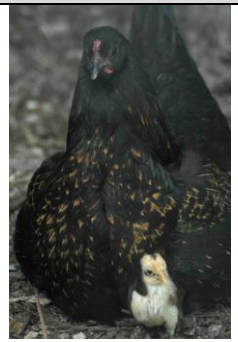
An educated person in the OECS will demonstrate they have::	**Where might this competency be promoted/developed in this learning outcome and associated lessons?**
Developed Citizenship Competencies	In this lesson students are encouraged to respect and care for plants and animals
Developed Critical Thinking and Ethical Communication Competencies	Students will be observing pictures and using critical thinking to compare them, and answer the question - why one thing might mimic another.
Developed Well-being Competencies	In this lesson, humans design products to protect their health (helmets, armour).

Developed Knowledge and Entrepreneurial Competencies	The lesson considers how humans solve problems (cranes, stilts, reaching sticks) that could be linked to jobs in the community, and the design of products that could be sold.
Purpose of the Subject	
The study of science encompasses knowledge, process skills and values. Scientifically literate persons will foster an attitude of caring not only for themselves, but as responsible citizens, for the world around them. Their decision making will be enhanced by a systematic study of the structure and behaviour of the physical and natural world through observation and experiment. In learning science, students benefit from leveraging and evaluating available technological tools to study and therefore understand the world, and their relationship to it.	
Structure, Function, and Information Processing **Essential Learning Outcome (ELO-2)**	
Read texts and use media to determine patterns in behaviour of parent and offspring that help offspring survive. [Clarification statement: examples of patterns of behaviours could include the signals that offspring make (such as crying, cheeping, and other vocalisations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]	
Grade Level Guidelines: Refer to the grade level expectations at the beginning of this curriculum document	

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
Learners are expected to: **Knowledge** ● Define the terms: ○ Protect ○ Signal ○ Offspring ○ Survive ○ Behaviour ○ Parents ○ Respond ● Name and identify the offspring of some common animals. ● Identify signals offspring make (crying, chirping, whining, and other vocalisations). ● Describe how different patterns in behaviour teach survival skills. **Skills** ● Observe (either first-hand or through media) how	**Which is the Parent?** Using a matched set of cards, get your students to pair the animal parent with its baby (offspring). **Categorizing Behaviours** Students are placed into small groups. A bag is provided to each group containing photos of animals caring for their babies in different ways; some protecting, some feeding, some carrying. (See table) The students' job is to make observations about each picture and decide how to categorise the pictures by placing them into groups based on how the parents are helping their babies. No group titles are provided at the beginning of the activity to see if the students can come up with the groups on their own. After students have had some time to organise their photos into categories, the teacher calls on different groups to have them share how they decided to categorise, and which photos they put in each category.	***Learners are expected to:*** **Whole Class Discussion: How Parents Support Children** Give students a picture/model of a new-born baby/baby doll.  Retrieved from: https://commons.wikimedia.org/wiki/File:Baby_%2829146496966%29.jpg Working in pairs, ask students to discuss some of the things that the parents of a new born baby will have to do to care for and protect the baby. What does it mean to **protect**? (*keep from danger, nourish, promote growth, be present for needs*) After some time, ask each pair of students to share with the class some of the things they came up with. The ideas they share should include: ● *Feeding the baby*

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
parents and offspring behave to help them to survive. • Demonstrate through role play the patterns of behaviour that offspring make and the parent's responses. • Infer from the offspring's signal, the parent's response (e.g. feeding, comforting and protecting the offspring) • Interpret sounds and pictures to make judgements about parent/offspring behaviours. • Communicate their observations of parent-offspring behaviours. **Attitudes/Values**	Teacher passes out paper to each group and has them fold the paper into thirds. At the top of each column, is written 'Feeding' 'Carrying' and 'Protecting'. Advanced students can write the words for themselves. Students will now sort using these categories and then glue the pictures in the column it belongs to. **How do parents and offspring behave to survive?** Listen to the following sounds and identify the baby animal making the sound. **"30 Chicks and 1 Hen Feeding.mp3" by stujun is marked with CC0 1.0. (6:10)** **"Puppy Scream and Whine so Loud" by Alexadiaz12 is marked with CC0 1.0. (1:36)** **"Porsas röhkii ja kiljuu / A piglet oinking and squealling in the pen" by YleArkisto is licensed under CC BY 4.0. (1:33)**	• *Changing the baby's clothes/ diapers* • *Carrying the baby from place to place* • *Rocking the baby to sleep* • *Bath the baby* "Why is it important for the parents of the baby to do these things to the baby?" (*the baby can't take care of themselves)* "What will happen if the parents of the baby do not do these things?" (*The baby will cry*) Segue to the lesson by telling students that today they will be observing ways that animals take care of their babies. Ask them if the parents will have to do this for a short time or for a long time. Also ask them to state ways in which their parents are still caring for them. What are some of the things that a baby will do to let its parents know that it is in pain, full, is wet, is hungry, etc. What are some of the things that you do to let your parents know some of the same things you are feeling? We say that you are trying to signal your parents that you are somehow unhappy. **Signal** is a word that means 'let them know somehow' Name one way that you can let your parents know how you are feeling, if you are in danger, etc. that the baby cannot? (*cry out or tell parents the problem*)

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
• Appreciate that parents and offspring work together to survive. • Show respect for the parents & offspring, observed by treating them with care. • While making observations students will show concern for safety. • Appreciate what human parents do for their children to make sure they thrive. • When conducting practical and group work, display sensitivity and offer assistance to peers who may have physical or learning challenges. • Participate actively in classroom discussions.	**"Bird-Like-Chair-Squeak-4.flac" by dland is marked with CC0 1.0. (0:03)** **"20081230.bleating.01.flac" by dobroide is licensed under CC BY 4.0. (3:00)** **"Hevonen hirnuu / Horse neighing on the pasture" by YleArkisto is licensed under CC BY 4.0. (1:06)** For each sound, show/tell us how you think the parent would respond. *(parents respond by feeding, cleaning, cuddling, comforting, protecting.)* Students will role play to show how parents and offspring behave in each scenario provided.	Without interruption, move to the next section of the lesson by telling the students that like humans, other animals also take care of their young. **Whole Class Discussion on human signals and responses *(actions taken after receiving a message)*:** Students, how do you **signal to** *(tell/show)* your parents that you are_____? • Hungry • Hurt • Sick • Lonely • Happy • Full • Angry How do they **respond** to you? *What do your parents do to help you in each case? (feed, soothe, comfort, laugh, stop feeding, etc)* **Introduction: Field Trip** Take class on a field trip to a farm or zoo or on a nature walk to observe the **behaviours** *(responses to signals)* of animal **parents** ***(****the mother or father)* and their **offspring** *(animal's young/baby/child).* Students should make at least three observations on the signals that offspring make and three responses of the parents. Students

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	 **Photo of "Hen and Chick" by cheetah100 is licensed under CC BY 2.0.** Look at each picture and say what behaviour the mother hen is using to keep her baby safe. **Literacy Connections- Recognizing New Words** In your book, complete the following words/verbs to show some common animal behaviours. E_t (eat) C_y (cry) R_n (run) Hu__ (hug)	should be able to identify the animals by names, sound and identify the name of their young. Students can also identify animal features. Questions: 1. From your observations, how does the parent know the **offspring** *(baby)* is hungry, sleepy, needs comfort, scared, etc.? *(Possible answers: Offspring cries, whines, chirps, fusses, etc.)* 2. How does the parent respond to each signal? (*Answer: By feeding, comforting, training young to hunt/find food/fly/flee/fight),* AND/OR **In-Class Observation Option** Divide class into groups. Provide each group with a picture or video showing parents and offspring behaviours in different situations to **survive**. See suggestions below: Scenario 1: What sound does a baby bird make to let its parents know it is hungry and needs food? (*crying with a chirping sound*) Role play a scenario of a baby bird chirping hungrily to be fed and a parent offering the baby bird food.

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	B__ r__ (bark) G__ow__ (growl) F ___ ___ d (feed) T__ ee __ (tweet) ___ ____ irp (chirp) **Cat Mother Caring for Young**  Screen capture from: https://www.youtube.com/watch?v=oaYXHAmVJio (3:05 mins) Why would this cat show its babies how to climb a tree? 	 **Video: https://www.youtube.com/watch?v=oW3stAEpfzA (0:47)** **Video of bird feeding and cleaning chicks** **Retrieved from:** **https://www.youtube.com/shorts/WnCLf3kf8B** **Scenario 2:** Baby wants to sleep. He's fussing. Role play some ways mommy/daddy can comfort the baby. (*hug the child, pat the back for burping, feed the baby, sing to the child, change the diaper etc.*) 

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	Retrieved from: https://upload.wikimedia.org/wikipedia/commons/1/1f/Cat_climbing_tree%2C_Uchimaki_Park.jpg Explanation: This behaviour that the cat shows is a way to stay safe and to find food. The babies (kittens) have to learn how to do this in order to survive or stay safe. Mother cat will show the kittens how to climb the tree, the different kinds of foods in the tree to eat, and also, whenever they are in danger, they can escape by climbing the tree to safety. **How are These Parents Responding to their Offspring?**	Retrieved from: https://www.gettyimages.se/fotografier/mother-comforting-baby Students take a look at this video and tell us what signal the offspring is making and how is the parent responding? Video option 1: cat feeding the young. https://www.youtube.com/watch?v=oaYXHAmVJio (3:05 mins) Video option 2: The Angry Kitten https://www.youtube.com/watch?v=kFuPrIjztPg (1:11) "How does the cat help its kittens to **survive**?" ***(****continue to live or exist)*? Answer: It feeds them, protects them, teaches them survival skills, like how to hunt, climb a tree, bite, etc. Some animal parents help their offspring grow up. They protect them, feed them and teach them survival skills. For example, when the kittens are old enough, the mother cat will teach them how to hunt for food, climb trees, and flee (quickly to get away) from danger. Many animal parents pass on patterns

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	 Retrieved from: https://image.shutterstock.com/image-photo/african-toddler-baby-girl-crying-260nw-2166765075.jpg *(feeding a hungry offspring in response to crying)*  Photo retrieved from: https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQs9zCIgYBF8p7pWRgmx-4VTzIKwZBpRYWXbyzEdRmW8A&s *(Comforting a nervous offspring by holding close)*	of behaviour to their offspring so they can survive and grow into adults. Read the following text and discuss with the students. Mommy dog gave birth to five puppies. She loves her pups so much. She licks them, cleans them, feeds them and cuddles with them. Now, mommy dog is hungry and has to leave her pups to find food. She will be back soon. While she is away a stranger comes too close. The pups start to whine (cry)/growl/bark. *Let me hear you whine/growl/bark like a frightened puppy.* Mommy comes running. "Students!", ● "Why did the puppies whine/growl/bark?" *(to call their mommy, to warn the stranger not to come closer, to show they were afraid or felt threatened)* ● "Why did mommy dog run to her pups?" *(she heard the noises they were making and knew they needed her help)* ● "What do you think mommy dog will do next?" *(Respond to the puppies sounds by sending a warning to the stranger by growling, barking, snarling (show her teeth to the stranger), she may even bite the stranger.)* **Creating Shelter: A Parents' Response** Have students watch this video and draw a picture of one type of shelter built by parents to protect their offspring. **https://www.youtube.com/watch?v=7Sc2sOIXhOc (10:46 mins)**

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	 Photo retrieved from: https://i.pinimg.com/originals/4c/0b/08/4c0b08031b429595842024587a82d570.jpg (*covering offspring to protect from other animals)*  https://youtu.be/b9nZOIUAycY (2:35 mins) (*centipede feeding its offspring*)	Alternatively, teachers can bring in pictures of different shelters and have students make observations in a discussion-based format**.** **Extension:** Students could build a simple shelter for a caterpillar using coffee sticks, toothpicks, paper and glue. They should be asked to explain how the shelter protects, and what it protects the caterpillar from. (i.e. *predators, rain, sunshine, etc.)*

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	 Photo retrieved from: https://external-preview.redd.it/6c5TY4UvHG4xIdKpYKHHqMcBUq9rPiqxqCxMqIcWtvw.jpg?auto=webp&s=66bf32d52c686c5303da094e818dc1c98149a668 (*parent cleaning the offspring*) **Story Time Scenario for Children to Respond To** Mama Hen lives on a farm with her three (3) chicks. The chicks follow their mommy everywhere she goes. While out getting food with their mum, a sly mongoose was watching them from the bush nearby. Whoosh! The mongoose darted out of the bush to grab one of the chicks. Cheep! Cheep! Cluck! Cluck! All the chicks and Mama Hen started running wild and kicking	

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	up dust. Mama Hen fluffed up her feathers angrily. 1) What do you think would happen next? What else might Mama Hen do? 2) What did the chicks do that made Mama Hen respond by fluffing up her feathers? 3) Why did the mongoose dart out after the chicks? 4) Do you think the mongoose was able to catch a chick? Why/why not? **Finding Sounds Outside the Classroom** With a parents' assistance, find or make a sound recording of an animal and its offspring. Bring the recording to school and play it for your friends. Can they guess the animal? Ask your classmates what this animal is likely to do to protect its young?	

Useful Content Knowledge for the Teacher about the Outcome*:* (Links to professional sources that connect back to the Curriculum and Assessment Principles of Learning and Principles of Assessment)

When the young of some animals are born, they do not need to be cared for by their parents. They are ready to live on their own. On the other hand, some animals have to be cared for and protected by their parent/parents in order for them to survive. For example, sea turtles break their way out of their shells and are able to walk immediately to the sea/ocean. On the other hand, when the young of birds called chicks, hatch from their eggs, they stay in the nest for many weeks, where they are cared for and protected by their parents. They fly out of the nest when they are strong enough to do so.

Animals protect their young from danger in a number of ways.

Using Physical Force: Some animals, such as mother bears or male lions, will use their size and strength to intimidate or attack any threats to their babies. Mother bears usually protect their young ones from any threat using their size and aggression. When threatened or attacked, dolphins use their speed and agility to hit predators. To keep their young safe from harm, cheetahs use their incredible speed and agility to outrun predators and defend themselves with their sharp claws and teeth.

Hiding The Young: Many animals will try to hide their young from predators by carrying them to a safe location or by hiding them in a nest or den. Examples include bears and foxes. Foxes often dig dens in the ground and use them to give birth and raise their offspring. Cheetah mothers, unlike the mothers of most of the animals, raise their babies of two to six cubs in isolation and relocate their den every four days. Why do you think they do this?

Teaching Survival Skills: Mother animals often teach their young important survival skills, such as how to find food, how to hide from predators, and how to defend themselves. Animals like wolves, teach their young the necessary survival skills that they need to live around. Baby orangutans are entirely dependent on their mother, and breastfeed up to eight years in some cases. Orangutans teach their young where to find food, what to eat, and how to avoid predators.

Communicating Danger: Many animals have developed vocalisations or other forms of communication that alert their young to potential dangers, such as the presence of predators. Birds usually communicate danger with some kind of song or sound to their babies, and these babies eventually learn to respond to these sounds. Orangutans use their vocalisations to alert other family members of potential danger and to keep their families together.

Inclusive Resources and Materials From Regional Specialists Use of multisensory activities and materials to assist all learners. (texts, family & community knowledge and resources and/or contextually relevant professional web resources)

Story telling/scenarios
Video
Pictures
Sounds

Additional Resources:
Pictures and books that the teacher may bring to class showing pictures of parent/offspring nurturing.
Family pictures that children may contribute showing their own parent supporting them.

Opportunities for Subject Integration: (How the inclusive learning strategies might be adapted and/or applied to include other subjects in the curriculum)

Mathematics: counting, grouping, sets

Social Studies: Families, role of parents,

Language Arts: vocabulary words- offspring, survive, protection, behaviour, names of animals and the words for their sounds (e.g. dog-bark, mouse-squeak).

TVET: students can build a model of how a parent might create protection in the form of safe shelter.

Agriculture: animal rearing

Health: family Bonding

Elements from Local Culture: Using local animal sounds to send signals to: call pets, scare away unwanted animals, etc.

Resources for a learner who is struggling: (Links to earlier learning activities for similar knowledge, links to resources for special education needs)
Picture books/video/ hands-on building materials.

Resources for a learner who needs challenge: (Links to learning activities and resources in later grades)
Pose the question: How can parents/caretakers of physically challenged animals assist them to survive?
Resource to address this: https://www.youtube.com/watch?v=J7gk8H-FV9g&list=PLjv53_Y4tw4W6IW_UWyRdZMm39o-KlmGF (2:34 mins

Strategies that Support the OECS Curriculum and Assessment Framework

Elements of the Essential Education Competencies that are addressed:

An educated person in the OECS will demonstrate that they have:	**Where might this competency be promoted/developed in this learning outcome and associated lessons?**
Developed Citizenship Competencies	In these lessons students will learn how some animal parents care for their offspring (including humans). They will appreciate how important the family unit is and that it is built on the pillars of love and trust. They will also begin to appreciate the role of the human family in shaping the society.
Developed Critical Thinking and Ethical Communication Competencies	Students will develop their critical thinking skills by examining the different ways in which animals communicate and care for their young and why each approach is appropriate to meet the needs of their species. There is an old adage that the 'apple doesn't fall too far from the tree' and in this unit students will have a better understanding of how parent animals train their offspring to have characteristics which are typical of their species.
Developed Well-being Competencies	Health and well-being is explored with concepts of the parents caring and comforting its offspring.
Developed Knowledge and Entrepreneurial Competencies	Understanding animal behaviours allow us to be better at nurturing animals in our care. For farmers this is important knowledge to grow and sell best livestock etc.

Purpose of the Subject
The study of science encompasses knowledge, process skills and values. Scientifically literate persons will foster an attitude of caring not only for themselves, but as responsible citizens, for the world around them. Their decision making will be enhanced by a systematic study of the structure and behaviour of the physical and natural world through observation and experiment. In learning science, students benefit from leveraging and evaluating available technological tools to study and therefore understand the world and their relationship to it.
Structure, Function, and Information Processing **Essential Learning Outcome (ELO-3)**
Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like their parents. [Clarification statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size: and, a particular breed of dog looks like its parents but is not exactly the same. [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]
Grade Level Guidelines: Refer to the grade level expectations at the beginning of this curriculum document

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies

Learners are expected to:
 	
<u>Knowledge</u>
 	
• Define the terms:
  ○ parent
  ○ roots
  ○ Leaves
  ○ Stems
  ○ Fruits
  ○ flowers
	Ask students to draw <u>or</u> use playdough to make a model of their favourite plant/animal, as a parent and as a baby *(young offspring)*. What animal/plant did you draw/make? What are some of the differences and similarities between the parent and the baby?
	Focus questions:
	1. Are baby animals/plants the same as their parents?
	2. How are the young offspring *(babies)* of plants
		My Favourite Animal
		Ask students to draw their favourite animal as a parent and a baby. Students present drawings to class, and classmates share their knowledge about the animal and how they think the baby and **parent** are alike or different.

- body coverings

- Identify the properties of plants that allow you to distinguish between parents and offspring.
- Identify the properties of animals that allow you to distinguish between parents and offspring.

Skills

- Observe and compare (either first-hand or media) how young animals and plants are like, but not exactly like their parents.
- Collect and record evidence that young plants and animals are like, but not exactly like, their parents.
- Compare and contrast parents and offspring who don't have the same features.
- Work collaboratively with peers as you observe physical features of living things.

different from, and similar to their parents?

(Differences: The young plants are smaller; tender; weaker stems, leaves, roots; lack certain parts; have fewer leaves and roots)

Similarities: have roots, leaves, stems)

3. How are the young offspring *(babies)* of animals different from their parents?

(Differences: The young animals are smaller, tender, physically weaker, lack certain skills

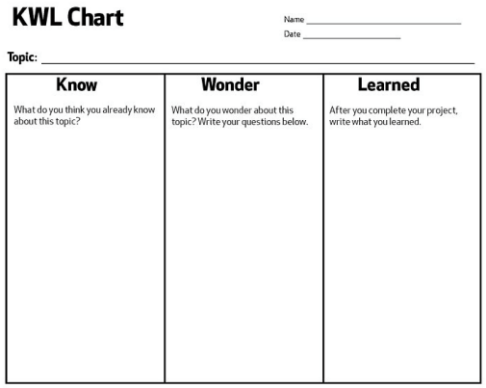
Similarities: The young animals have similar body parts to the adult.)

Matching exercise

Match the parts of young animals/plants to the adult plants/animals.

Match the Animal Activity

Look at the pictures of the adult plant/animal and circle two things that are different from the young plant.



Retrieved from: https://commons.wikimedia.org/wiki/File:KWL_Chart.jpg

Use the KWL chart (shown above) to find out what students already know about young animals and their parents. The chart will be revisited at the end of the lesson to see if their questions have been answered.

Have students discuss whether human babies look and act like adults. What are some features that are the same? What are some features that are different?

Similarities of Baby and Adult Humans	***Differences of Baby and Adult Humans***
Same body parts: eyes, ears, nose, head, feet,	*Adults:*

- Communicate ideas with new vocabulary.

Attitudes/Values

- Respect for evidence arising in experiments and demonstrations.
- Care and respect for living things.
- When conducting practical and group work, display sensitivity and offer assistance to peers who may have physical or learning challenges.
- Participate actively in classroom discussions.
- Appreciation that young plants and animals are like but not exactly like their parents.
- Work in the classroom with concerns for safety

Retrieved from: https://www.turito.com/ask-a-doubt/science-what-similarities-are-there-between-the-young-plant-and-the-adult-plant-both-a-and-b-they-have-the-same-f-qc4ff8e33

Photo Young Mango Tree

Retrieved from:https://pixabay.com/photos/mango-plant-tree-seedling-5425476/

arms, etc.	*Have larger bodies and body parts,* *Are physically stronger,* *Have more skills* *Young:* *Have smaller bodies and body parts,* *Are physically weaker,* *Lack certain skills*

Activity: Comparing Young and Adult Plants Students observe the young and adult forms of at least three plants (e.g. the young mango plant vs. mango tree; young and adult tomato plant, hibiscus) by visiting a farm/viewing live specimens/watching videos or viewing pictures. Students will then use a T-chart to identify the similarities and differences between the young and adult plants. Make certain to compare the main external parts (e.g. leaves, stem, roots, fruits/flowers/pods/nuts (if any)).

1. Observe a young and adult animal and compare the main external parts

See video of young and adult plant comparison activity here: https://www.youtube.com/watch?v=z-PVxDd3cD0 (4:03 mins)

Example of T-chart:

Adult Mango Tree

Retrieved from: https://wikifarmer.com/mango-tree-fertilization/

Photographed by Clyornique Durrant, Teacher, CC

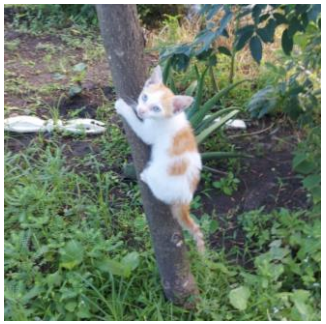
Alike	Different

Now that you have observed both young and adult plants, let us complete the following checklist:

a. What was the same about the young and adult plants?
   - both have roots
   - both have leaves
   - both have stems
   - both have fruits
   - both have flowers

b. What was different about the young and adult plants?
   - The roots
   - The leaves
   - The stems
   - The fruits
   - The flowers

c. Based on your findings, would you agree that young plants are like, but not exactly like, their parents?
   - Yes, I agree
   - No, I do not agree

	Young Coconut Tree Plant  Photograph by Clyornique Durrant **Teacher Note:** To see more pics of young and adult coconut trees visit: https://www.dkfindout.com/us/animals-and-nature/plants/tropical-trees/ Two dogs – puppy and adult dog	**Learning experience to show how animal offspring and parents are like, but not exactly like each other.** Students observe the young and adult forms of at least three animals (e.g. cat and kitten; goat and kid; bird and chick) by visiting a farm/viewing live specimens/watching videos or viewing pictures. Students will then use a T-chart to identify the similarities and differences between the young and adult animals. Make certain to compare the main external parts (e.g. **body coverings** *(fur, feathers, skin)*, number, type and size of limbs, body structures *(body shape, wings, horns, hooves, etc)* and way of moving *(walking on all fours, flying, swimming. crawling)*.  Photo of a Kitten Retrieved from: Clyornique Durrant

Retrieved from: https://www.pxfuel.com/en/free-photo-jwfiw

Photo retrieved from: https://i.pinimg.com/originals/4c/0b/08/4c0b08031b429595842024587a82d570.jpg

a. Humans – baby and adult male

Photo of an Adult Cat

Retrieved from: Clyornique Durrant

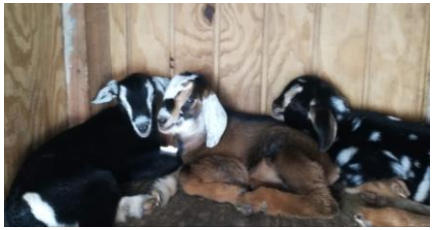


Photo of Kids Taken by Clyronique Durrant

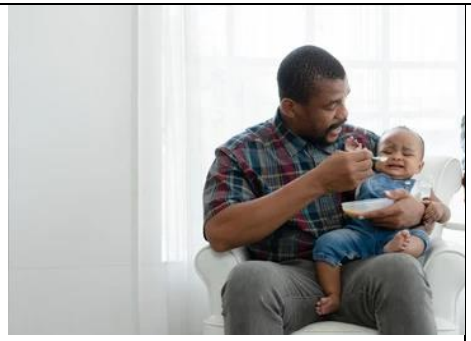


Photo retrieved from: https://image.shutterstock.com/image-photo/african-toddler-baby-girl-crying-260nw-2166765075.jpg

Retrieved from: "Parents and child born in safety" by Julien Harneis is licensed under CC BY-SA 2.0.

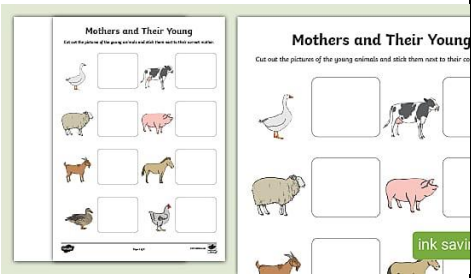
Drawing a Matching Offspring

Photo of a Goat

Photograph by Clyornique Durrant

Alternative photo of a mature goat

Retrieved from: https://www.stockvault.net/photo/121597/goat

	Look at the picture of the adult animal and draw what you think the baby (or vice versa) would look like:  Note: this not a creative commons image Retrieved from: https://www.twinkl.co.uk/resource/t-t-5679-mothers-and-their-young-farm-animals-matching-activity **Comparing Parents and Offspring** Instructions: Students actively watch the following video two times and choose one animal to report on. **Baby Animals That Grow Up to Look Totally Different** https://www.youtube.com/watch?v=-0TkOoakcP0 (2:18 mins)	 Photo of a Baby Parrot Retrieved from: https://media.tradeholding.com/attach/hash250/181498/mmmmmmmmmmmm.jpg

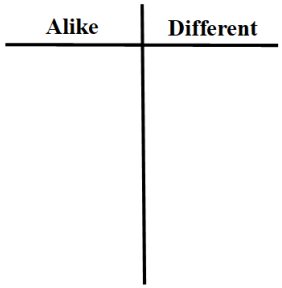
	• The first time they watch the video, they look for ways that the parent and offspring are the same. • The second time they watch the video, they look for ways that the parent and offspring are different. **Now complete the following checklist about the animal you chose:** 1. What was the same about the young and adult animals? • Same type of body covering (fur, feather, skin) • Same size • Same body structures (e.g. limbs, beaks, legs, etc.) • Same number of eyes, ears, limbs • Same colours	 Adult Amazona Guildingii Parrot Retrieved from: https://upload.wikimedia.org/wikipedia/commons/4/42/Amazona_guildingii_-Botanical_Gardens_-Kingstown_-Saint_Vincent-8a.jpg Example of a T-chart:

2. What was different about the young and adult animals?
   - The type of body covering (fur, feather, skin)
   - The size
   - The body structures (e.g. limbs, beaks, legs, etc.)
   - The number of eyes, ears, limbs
   - The colours

3. Based on your findings, would you agree that young animals are like, but not exactly like, their parents?
   - Yes, I agree
   - No, I do not agree

Who Do I Most Look Like?

Students could be invited to bring in pictures of themselves and their parents. They could then explain what characteristics they felt best matched each parent.



Now complete the following checklist:

4. What was the same about the young and adult animals?
   - Same type of body covering (fur, feather, skin)
   - Same size
   - Same body structures (e.g. limbs, beaks, legs, etc.)
   - Same number of eyes, ears, limbs
   - Same colours

5. What was different about the young and adult animals?
   - The type of body covering (fur, feather, skin)
   - The size
   - The body structures (e.g. limbs, beaks, legs, etc.)
   - The number of eyes, ears, limbs
   - The colours

6. Based on your findings, would you agree that young animals are like, but not exactly like, their parents?
   - Yes, I agree

	Note: A teacher should exercise sensitivity in recognizing that some children may have mixed parenthood and/or be adopted or raised by grandparents. The teacher in getting to know their children, may decide to draw on examples from the child's extended family that allow for comparisons.	• No, I do not agree **How Can You Tell These Are Parent and Offspring?** Students should watch the following video with this as their task: 1) Choose a favourite parent/offspring pair. 2) Be prepared to state two similarities in the pair. 3) Be prepared to state two differences in the pair. https://www.youtube.com/watch?v=8EQKVHHVR6c (2:24 mins)

Useful Content Knowledge for the Teacher about the Outcome*:* (Links to professional sources that connect back to the Curriculum and Assessment Principles of Learning and Principles of Assessment)

Plants and animals begin as young and grow into adults. Most of the time, these young animals and plants look like their parents. In some situations, they do not; however, even when young look like their adults there are still some differences among them. Students will be encouraged to observe different young animals and their parents. They will learn that young plants and animals are like, but not exactly like, their parents.

Vocabulary

- **Offspring:** a plant or animal's child or children
- **Observe:** using your senses to notice everything you can about something
- **Different:** not the same as something
- **Alike:** basically the same as something
- **Similar:** nearly the same as something
- **Identical:** exactly the same as something

Inclusive Resources and Materials From Regional Specialists Use of multisensory activities and materials to assist all learners. (texts, family & community knowledge and resources, contextually relevant professional web resources)

Hands-on pictures

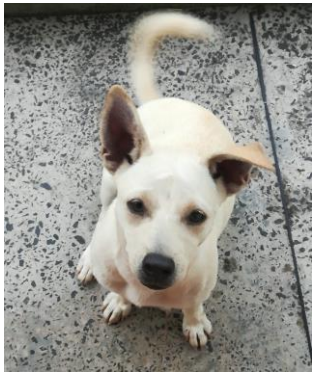
Video

Pictures from home

Additional Resources:

Additional photos:

Photograph of adult dog taken by Clyornique Durrant



Photograph of pup taken by Clyornique Durrant

Photo of young Indian-almond/tropical almond plant taken by Clyornique Durrant

Photo of mature Indian-almond/tropical almond plant taken by Clyornique Durrant

Photo of adult coconut plant besides young coconut tree taken by Clyornique Durrant


Photos Of mature Melo cactus besides young Melo cactus taken by Clyornique Durrant

<u>Baby Chicks</u>

Video of chicks recorded by Clyornique Durrant

<u>Teen chicks</u>

Video of chicks recorded by Clyornique Durrant

<u>Adult chickens</u>

Video of chickens recorded by Clyornique Durrant

Photos and videos provided by Clyornique Durrant, Teacher, CC.

Visit a farm in the community to observe different animals and their young ones. Students will tell how the young look like, or do not exactly look like their parents.

Students look at plants and observe to tell how young plants look, or do not exactly look like their parents.

Opportunities for Subject Integration: (How the inclusive learning strategies might be adapted and/or applied to include other subjects in the curriculum)

Mathematics: data collection, counting, finding patterns, analyzing traits, compare and contrast.

Social Studies: natural resources, self-identity and relation as an offspring of parents and grandparents.

Language Arts: vocabulary.

TVET: students use an idea from an animal to design and build a tool that would help them pick up food.

Students look at classroom tools to think about what animal each tool could have been modeled after; students discuss ideas with classmates and record answers in their Evidence Notebook.

Agriculture: our natural environment, diversity of plants and animals, how inherited traits advantage plants and animals to grow and prosper. Cuttings are a common way of propagating plants in which case the offspring are identical. Link this to effective farming processes.

Health: our natural environment.

Elements from Local Culture:

Consider the features of adults across the indigenous and landed immigrant races to see which physical characteristics seem to be held in common. (eye & hair colour, average size, etc.)

Resources for a learner who is struggling: (Links to earlier learning activities for similar knowledge, links to resources for special education needs)

- Videos, pictures, models, tactile materials, etc.

Resources for a learner who needs challenge: (Links to learning activities and resources in later grades)

Develop more extensive word lists and gauge book resources to higher levels with regard to fluency.

Have these children investigate the idea of heredity and how traits get passed down through generations.

This has implications of genetic diseases etc.

Strategies that Support the OECS Curriculum and Assessment Framework

Elements of the Essential Education Competencies that are addressed:

An educated person in the OECS will demonstrate they have:	Where might this competency be promoted/developed in this learning outcome and associated lessons?
Developed Citizenship Competencies	This ELO reinforces the need for us to be good citizens in a national and regional context. Students will learn that the offspring is like but not exactly like the parent, and so too are we as Caribbean people. We share similarities but we are still different. Through this study our students will learn to appreciate that similarities may serve to unite us and differences make us unique and special.
Developed Critical Thinking and Ethical Communication Competencies	Comparing and contrasting parent and offspring characteristics.
Developed Well-being Competencies	Developing more extensive vocabulary for better communication.
Developed Knowledge and Entrepreneurial Competencies	Understanding characteristics of parents and offspring can lead to better control of hereditary diseases and problematic lifestyles (diet etc.)

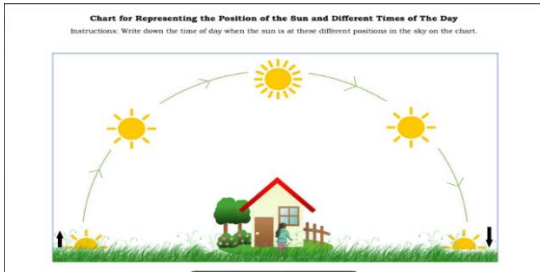
Space Systems: Patterns and Cycles

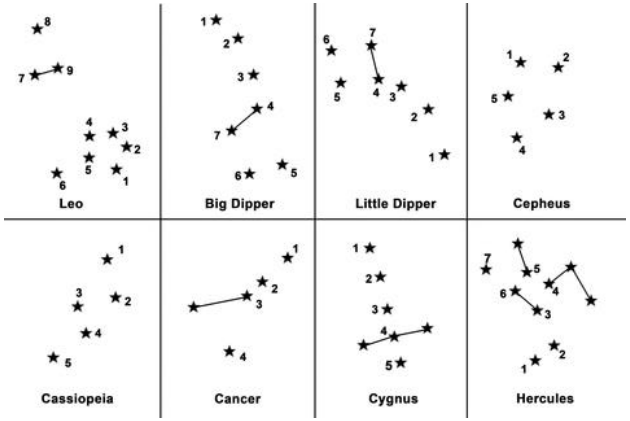
Purpose of the Subject
The study of science encompasses knowledge, process skills and values. Scientifically literate persons will foster an attitude of caring not only for themselves, but as responsible citizens, for the world around them. Their decision making will be enhanced by a systematic study of the structure and behavior of the physical and natural world through observation and experiment. In learning science, students benefit from leveraging and evaluating available technological tools to study and therefore understand the world and their relationship to it.
Essential Learning Outcome (ELO-1)
Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night, but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]
Essential Learning Outcome (ELO-2)
Make observations at different times of the year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.] NOTE: This ELO is covered only briefly in extension activities to make students aware that ***outside*** the Caribbean region, the seasonal temperature variations are much larger because of the tilt of the earth as it rotates around the sun.
Grade Level Guidelines: Refer to the grade level expectations at the beginning of this curriculum document

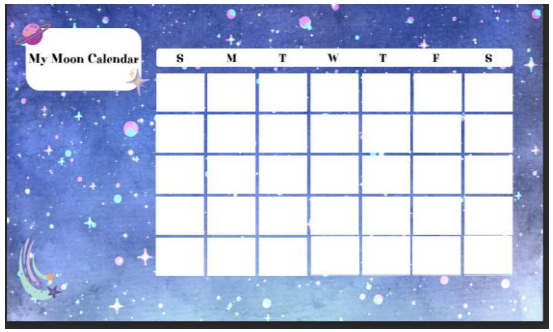
Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies

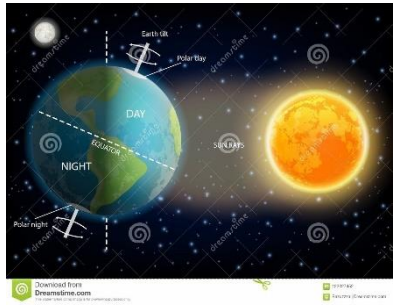
Learners are expected to:
 	
<u>Knowledge</u>
 	
• Define the terms:
  ○ <u>day</u>
  ○ <u>night</u>
  ○ <u>pattern</u>
  ○ <u>path</u>
  ○ <u>full moon</u>
  ○ <u>crescent moon</u>
  ○ <u>half moon</u>
  ○ <u>constellation</u>
  ○ <u>astronomer</u>
 	
• Demonstrate an understanding that the clock is a measure that allows us to keep track of day and night patterns.
 	
• Identify objects found in the day sky and the night sky.
 	
• Compare the position of the sun at different times of the day.
 	
• Describe the different shapes of the moon at different times within a month.
	Pre assessment activity:
	
	Students are presented with two pictures and they will:
	State what time of day they think it is based on the clues presented.
	
	Guessing Games:
	For the following pictures, have students guess whether it is normally a night or day activity.
	
	Retrieved from: https://pixabay.com/photos/kid-boy-swinging-young-swing-386642/
	
	 
	
	Retrieved from: https://www.freepik.com/free-photos-vectors/garden-work
	
	 
		Recognizing a Pattern - How the Clock Helps Us
		
		Students, did you ever notice that the clock has numbers one (1) to twelve (12)?
		
		 
		
		Retrieved from: https://www.american-time.com/product/clock-america-allset-15-round-surface-black-110vac-ch-4-wr/
		
		If we were to watch that clock, when we wake up in the morning the little hand is probably pointing to the 7. Do you know what the little hand points to at lunch time? (*12*)
		
		What time do we leave to go home from school? (after lunch – when the little hand points at 3)
		Can anyone tell me what the clock shows when they go to bed? (7) So you are telling me the clock shows 7 again?

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
Skills • Observe the day and night sky. • Interpret pictures. • Build communication skills by contributing to classroom discussions using new words. • Actively engage in discussion of teacher-led classroom demonstrations. • Draw the patterns of the moon over a period of time. • Actively retrieve ideas from educational videos. • Infer the time of day using the position of the sun. • Collaborate with peers in projects. • Keep track of the position and shape of celestial bodies in a simple journal.	Retrieved from: https://www.freepik.com/premium-photo/black-african-american-baby-sleeping-white-mattress_17742049.htm#query=black%20child%20sleeping%20bed&position=17&from_view=search&track=ais  Retrieved from: https://www.freepik.com/premium-photo/man-with-astronomy-telescope-looking-stars-man-telescope-starry-sky-night-sky-milky-way-galaxy_20684491.htm#query=looking%20through%20telescope%20night&position=28&from_view=search&track=ais 	How is that 7 different from when you got up in the morning? (*In the morning the sun is shining at 7 and at night at 7 it is dark*) So you are telling me there is two times that the clock can show the same number. We have **day** when there is sunshine and we have **night** when it is dark**.** Does it always happen that way? (yes teacher) When things happen over and over again, we say that is a **pattern.** Maybe that is why the clock is so useful. It shows us a **pattern** of day and night. Did you know we get day and night because our earth rotates while the sun shines on it?  **Video**: Earth Spins on Axis as the sun shines on it.

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
• Develop number and hands-on dexterity by completing pictures of constellations. **Attitudes/Values** • Appreciate how day and night can influence the activities we engage in and the clothes we wear. • Display interest/curiosity in studying objects found in the sky. • Maintain safety when observing the sun and being exposed to the sunlight. (Avoid gazing at the sun directly with the naked eye, use sunscreen when spending time outdoors.) • Work collaboratively in groups. • When conducting practical and group work, display sensitivity and offer assistance to peers who may have physical or learning challenges.	**Drawing the Patterns in the Sky (Day and Night)** In the formative assessment in the lesson, they have drawn pictures of the objects in the sky. As a review, they can create models of the sky using available materials and share with their peers. Possible materials (cotton, styrofoam, construction paper, crayons, markers, star, moon and sun cut outs). **Orientation of the Earth and Sun** Ask children which of the following is true: A) It is daytime in the Caribbean when the earth rotates to face away from the sun. B) It is daytime in the Caribbean when the earth rotates to face towards the sun. (True) **Patterns of the Moon** Children should have a simple home journal/scrapbook where you ask them to draw the shape of the moon in the night sky at regular intervals (4-6 times over a month)	See video at 1:01 min point https://www.youtube.com/watch?v=Wr-CRKsTYGs (2:46 mins) (*or show model if available*)** **The Sun Repeats the Same Path Across the Sky Each Day** Ask students to draw a picture of the school on a piece of paper. In the morning, ask them to go out and notice where the sun is located. Have them draw the morning sun on their page in relation to the school. In the afternoon before they are dismissed, have students go outside again and draw the new position of the sun on that same page. **Emphasize** that the sun always tracks a similar **path** (define this by drawing an arc on the board) across the sky each day. Ask them to check their work the next day by doing another observation.  Created courtesy of: C. Regis

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
• Participate willingly in classroom discussions.	They can label their pictures as full, crescent and half moon. **Integration With Mathematics** In the following pictures join the dots in order of the numbers to create a common constellation.  Retrieved from: https://www.supercoloring.com/dot-to-dots/constellation-map	**What Do We See in the Sky?** "Students, I want you to draw me two pictures." *Picture 1*: "Draw me what you see in the sky in the daytime." (*sun, clouds, rainbow, birds, raindrops airplanes, etc.*) *Picture 2*: "Draw me what you see in the sky in the nighttime." (*moon, stars, night birds, bats, airplanes etc.)* I see in your pictures that you have drawn the moon in the night sky. I also noticed that some of you drew the moon differently. That is interesting. Is the moon always the same shape? (*no teacher*) Draw me a picture of the different shapes we see of the moon. (**teach children the names of the simplest shapes: full, crescent, half moon**)  Full Moon Crescent Half Moon

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	The Sun's Regular Path In order to track the Sun's path in the sky, have students go outside at regular intervals and draw (and/or measure) the shadow the sun makes as it shines on a tree or building. **<u>Extension Activities</u>** **What is the job of an astronomer?** Students will pretend to be an astronomer for the day. With books made available in the classroom, a guest speaker or video https://www.youtube.com/watch?v=mtkEFY_ki2A (4:59 mins) have the children collectively create a poster where they add a picture to suggest what astronomers do as a job or hobby. Children can also choose to describe in spoken words what an astronomer does. **Daylight Hours** Students, did you ever notice that at certain times of the year that the sun seems to shine longer and it is later, before the sun goes down and it becomes dark?	Did you ever notice in the night sky that every month we get all the different shapes of the moon? We say that the shapes of the moon follow a **pattern** too! **For a review** the teacher may choose to watch the following read aloud book: https://www.youtube.com/watch?v=8RHl9KoVeW8 (7:15 mins) *Students should be encouraged to actively watch for patterns of things in the day sky and the night sky.* Note: The teacher may decide to supply the children with the following journal template to draw the moon throughout the period of a month.  Created courtesy of: M. Charles

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	This is caused because the earth not only rotates, it rotates on an angle (*best to show a model or picture below).*  Retrieved from: https://www.dreamstime.com/hours-day-night-cycle-diagram-vector-illustration-sun-planet-earth-rotating-its-axis-educational-poster-scientific-image122027452 The Caribbean countries are close to the center (called the equator) so the difference in daylight hours throughout the year is small, but in countries in the north (Canada/USA) and the south (Australia) the difference in daylight can be several hours. Teacher Note: If you have a globe and a torch (flashlight), place a piece of plasticine on the globe in different places and demonstrate how living in	**Interesting Things in the Night Sky** "Students if you look in the night sky you can see many stars. In different parts of the world, people join these stars to make a sky picture we call a **constellation."** This is a picture of the **constellation** called the big dipper. See how they join the stars to make the picture? At different times of the year, in different parts of the world, there is a **pattern** of **constellations**.  Retrieved from: https://science.howstuffworks.com/big-dipper.htm

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies
	that location could make a small or large difference in daylight as the earth rotates around the sun. Because of the tilt of the earth as it rotates, we see big differences in seasons (cold and hot) when you go far north or south on the earth. ***Students we will talk more about this in later grades.***	

Useful Content Knowledge for the Teacher about the Outcome*:* (Links to professional sources that connect back to the Curriculum and Assessment Principles of Learning and Principles of Assessment)

- We live on Earth and see the sun, moon and stars in the sky.
- These objects are often called heavenly bodies.
- The stars form patterns in the sky.
- The sun is a star.
- The Earth moves around the Sun.
- The moon moves with the Earth.
- Unlike the sun, the moon does not have its own light.
- The moon reflects light from the sun.
- This is how we are able to see the moon shining at night.
- The moon is usually visible at night and sometimes during the daytime.
- At different times of the month, the shape of the moon will be varied.
- The part of the moon that we see shining in the sky at night is called a phase of the moon.
- We can see the stars at night but not during the day.
- Day and night happen in the same way.
- One follows the other.
- There are times when we can see the moon during the day.
- On a clear night, we can see the moon and the stars in the night.

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies

Inclusive Resources and Materials From Regional Specialists: Use of multisensory activities and materials to assist all learners. (texts, family & community knowledge and resources, contextually relevant professional web resources)

- Models of the earth and sun
- Torch (flashlight)
- Books related to day/night/moon/stars

Additional Resources:

Wonderwall: link to games that assesses the students' understanding of the day and night sky as well as activities done in the day and the night;
https://wordwall.net/en-us/community/day-and-night-sky

Sky Patterns: Sun Moon and Stars.
www.pbslearningmedia.org/resource/buac18-k2-sci-ess-skypatterns/sky-patterns-sun-moon-and-stars/?student=true

Changing Position of the Sun in the Sky.
www.pbslearningmedia.org/resource/buac18-k2-sci-ess-sunposition/changing-position-of-the-sun-in-the-sky/?student=true

Moon Phases Worksheet
https://www.kidsacademy.mobi/printables/moon-phases/#google_vignette

Oreo Cookies (Phases of the Moon)
https://sciencebob.com/oreo-cookie-moon-phases/

How to make a simple sundial:
https://littlebinsforlittlehands.com/how-to-make-a-sundial/

How to make a pinhole camera
https://www.jpl.nasa.gov/edu/learn/project/how-to-make-a-pinhole-camera/

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies

Opportunities for Subject Integration: (How the inclusive learning strategies might be adapted and/or applied to include other subjects in the curriculum)

Mathematics:.

1: *Name the days of the week in order, and recognize the names (The students will use the days of the week to record patterns).*

2: *Represent numbers up to twenty in a variety of ways (in words, in numbers, using counting blocks/rods; drawings/pictures, etc.) - use numbers to interpret charts with recorded information.*

3: Use time vocabulary appropriately (e.g., now, later, soon, earlier) relative to year, month, week, day and hour. (Students will use the vocabulary to discuss the variation in the position of the sun).

Social Studies:

1. *Share ideas with other pupils in group/class.*
2. *Participate in group activity willingly.*

Language Arts:

1. *Use strategies when listening to make and simplify meaning, including asking questions, recalling ideas, focusing on the speaker, preparing for listening.*
2. *Listen to identify the order of events in a selection.*
3. *Describe people, places and things and events with relevant details, expressing ideas and feelings clearly.*
4. *Engage in oral activities organized for the class.*
5. *Use newly acquired words in meaningful contexts during discussion.*

Elements from Local Culture:

- river lime on a sunny day/weekend/holiday.
- washing clothes by the river.
- drying clothes on the stone/line.
- drying fish and meats for preservation.
- drying of cashew nuts on a sunny day.

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies

- telling old folk tales at night.
- planting according to the phases of the moon (old farmers almanac).
- using the phases of the moon to select dates to get hair cuts or ear piercings.
- bathing outside in the rain.
- talks from fisherfolk and farmers on their use of the sun to tell time.
- use of the phases of the moon to plant.

Resources for a learner who is struggling: (Links to earlier learning activities for similar knowledge, links to resources for special education needs)

Oreo Cookies (Phases of the Moon)
https://sciencebob.com/oreo-cookie-moon-phases/

Day and Night
https://www.k5learning.com/worksheets/science/grade-1-day-night-sun-a.gif

Moon phases
https://www.k5learning.com/worksheets/science/grade-1-moon-phases.gif

Phases of the Moon
- https://www.k5learning.com/worksheets/science/grade-1-moon-phases.pdf

Resources for a learner who needs challenge: (Links to learning activities and resources in later grades)

Sky Patterns: Sun Moon and Stars
https://www.generationgenius.com/videolessons/patterns-in-the-sky-video-for-kids/

Day and Night: Live worksheet
https://www.liveworksheets.com/worksheets/en/Science/Day_and_Night/Day_and_Night_Worksheet_for_Grade_1_ke1609621cd

Phases of the Moon
https://www.k5learning.com/worksheets/science/grade-2-phases-moon-a.pdf

Specific Curriculum Outcomes	Inclusive Assessment Strategies	Inclusive Learning Strategies

Strategies that Support the OECS Curriculum and Assessment Framework

Elements of the Essential Education Competencies that are addressed:

An educated person in the OECS will demonstrate they have:	**Where might this competency be promoted/developed in this learning outcome and associated lessons?**
Developed Citizenship Competencies	Students will be working collaboratively in groups and supporting each other during the role play and other instructional activities. Students will show respect for each other by listening to each other as they share ideas and experiences.
Developed Critical Thinking and Ethical Communication Competencies	This activity stimulates critical thinking as the students may have to justify the placement of the object under 'day' or 'night' heading.
Developed Well-being Competencies	Safety when being exposed to the sun. This includes not looking directly at the sun and using sunscreen to minimize the harmful effects of ultraviolet light on the skin.
Developed Knowledge and Entrepreneurial Competencies	Multiple literacies will be used to understand and appreciate the outcome.