Creation Lens
Exploring the World, Discovering God

Grade Level: **Grade 1**

Title:

Sun As Light Source & Light of the World

Denomination: **Catholic**

Lesson ID: **ES-G1-02-CA**

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Note: Web sites referenced in this lesson were valid at time of publication.





EARTH SCIENCE – GRADE ONE - CATHOLIC
LESSON 2: The Sun and We are Light to the World.

NOTE: SCHEDULE THIS LESSON EARLY IN THE SCHOOL YEAR TO ALLOW FOR CLOUDY DAYS.

GENERAL CONCEPT: The Sun and Light

SCIENCE LESSON CONCEPT
The sun is the light source for all living things.

GOAL OF SCIENCE LESSON

Student will know that the sun provides light for the earth.

OUTCOME EXPECTED

Student will be able to identify and describe the earth's source of light

MATERIALS NEEDED

- Models of the sun and earth (paper or scale models)

RELIGION LESSON CONCEPT
God created the sun to give us light. We are called to be light for our world because God lives in our hearts

GOAL OF RELIGION LESSON

Student will know that God created the sun to give light to the world and that He calls us to reflect His light.

OUTCOME EXPECTED

1. Student will be able to explain that God created the sun to give the earth light.

2. Student will be able to plan ways to reflect His light to others.

MATERIALS NEEDED

- Creation Story of land and light

- Science Journal Page: THE SUN
- Pencils
- Facts about the sun
- Piece of colored paper
- Thermometer
- Cup of water

SCIENCE METHODOLOGY

- **SHARE** some facts about the sun with the student: size, distance from the earth, substance of the sun, power of the sun, etc. See last section. Use the solar models – check with partner teachers who might have one. Put it on your "wish list".
- **OBSERVE** the color of a piece of paper and record on Science Journal Page.
- **PLACE** the piece of paper with several ordinary objects on it in the sunshine.
- **OBSERVE** the temperature of the thermometer and record on Science Journal Page.
- **OBSERVE** the cup of water. Have several students feel it and tell how it feels? Cool? Cold? Record on Science Journal Page.
- CD Player and song: This Little Light of Mine
- Drawing paper
- Crayons or markers

RELIGION METHODOLOGY

- **READ** the Creation Story parts about the creation of the land and the sun.
- **TALK** about how good God was to give us light and why we need it. (See, be warm, have plants and animals grow)
- **PLAY** the song: This Little Light of Mine
- **STUDENT** shares what was heard.
- **PLAY** the song again. Student sings along.
- **TEACH** the hand and finger motions to the song.
- **EXPLAIN** how these motions tell the job God has given us.
- **SING** the song with the motions.

- **CHECK** the temperature of the cup of water: warmer? Why? Why not?

- **CHECK** the piece of paper- Any changes?

- **LET** the paper, thermometer, and cup of water be in the sun only a few minutes. Check the thermometer first.

- **RECORD** any changes on the Science Journal Page.

- **POSIT:** The light of the sun is very powerful. The sun's light can cause reactions on the earth.

- **POSIT:** God created the sun to us light. We are called to be light for our world because God lives in our hearts.

- **NOTE:** Every lesson need not be difficult.

RESOURCES, LINKS AND COMPUTER LESSONS.

Science Links

(Student) Why does the sun shine song
http://www.kidsknowit.com/educational-songs/play-educational-song.php?song=Why%20Does%20The%20Sun%20Shine

(Student) a list of a few facts about the sun
http://www.frontiernet.net/~kidpower/sun.html

(Student) http://www.beaconlearningcenter.com/Weblessons
Scroll down to “Sunrise, Sunset” – an on-line interactive reading activity with audio available for pre-readers.

(Teacher) http://www.eyeonthesky.org
Our Star the sun” – a link on the left side of the page. It includes 15 lesson plans on the sun.

Religious Links

(Student) - Allows the student to drag symbols and create a picture including the sun.
http://www.faithfirst.com/html/kidClub/games/signsGodsLove.html

(Teacher) Printable coloring page “God Created the Heavens and the Earth.”
http://www.coloringcastle.com/sun_coloring_pages.html

FACTS ABOUT THE SUN

What is the Sun?

Believe it or not, the Sun is just a **star**, just like those we see **twinkling** at night. The Sun, however, is so much closer to us on Earth that it looks much bigger, much brighter, and we can even feel heat coming from it.

Scientists know great deal about the stars that shine at night. Compared to these other stars, the Sun is actually quite average. Many of the stars that appear so small in the night sky are actually much bigger than our Sun. Others, however, are quite tiny in comparison. Some are much hotter, and some are so cool and dim we can barely see them. But for us on Earth, the Sun is just right!

What is the Sun made of?

The Sun is made of hot **gases**, containing many of the same materials we find here on the Earth. These materials, called **elements**, include hydrogen, helium, calcium, sodium, magnesium, and iron. You can find all of these on any **periodic table** of elements.

Did you know that most of the atoms in our bodies were made inside stars? As the famous scientist and educator Carl Sagan says, we are "star stuff."

How big is the Sun?

The Sun is **HUGE**! Even though it looks small in the sky it is actually bigger than you might imagine. It only looks small because it is 93 **million** miles away. (That's about 150 million km.) The Earth is very tiny compared to the Sun. In fact, if you think of the Sun as a basketball, the Earth would only be the size of the head of a pin -- a mere speck.

The Earth is about 13 thousand kilometers (8000 miles) wide, whereas the Sun is roughly 1.4 million kilometers (900,000 miles) across. This means it would take more than 100 Earths to span the width of the Sun! If the Sun were a hollow ball, you could fit about one million Earths inside of it!

How far away is the Sun?

The Sun is **very** FAR from Earth. In fact, it is **93 million miles** away. (That's about 150 million km.) If the Sun were the size of a basketball, and Earth the size of the head of a pin, the basketball and the pin would be separated by about 100 feet -- a third of a football field (30.5 meters). If you were standing at the basketball (and didn't have a telescope to help you), you wouldn't even be able to see the pinhead Earth.

Another way to understand the distance is to think of driving to the Sun in a car. If you actually could do this, and drove really fast, say 60 miles an hour (80 km/hr), it would take you **176 years** to get there! Light from the Sun takes about 8 minutes to reach the Earth. If you understand how fast **light travels**, you can recognize that the Sun must be very far away.

How heavy is the Sun?

Although we cannot actually **weigh** the Sun with a scale, we can compute its weight by studying the way it affects other objects, like

the Earth. We do know that it contains virtually **all** the mass in our solar system! We can also understand this better by making some comparisons. Since the Sun is so much more massive than the Earth (over 300,000 times heavier) its gravitational pull is also much larger. A child that weighs 75 pounds on Earth would weigh about **a ton** on the Sun. The weight increases by a factor of 30. (Of course, we cannot really stand on the Sun, for it is too hot and has no solid surface.)

How old is the Sun?

The Sun is about **4 1/2 billion** years old. Humans have only been around for a tiny, tiny fraction of this time. As a comparison, if you think of 4.5 billion years as the length of a 12 inch ruler, then the time humans have existed wouldn't even be the width of the lines marking the inches. (Metric equivalent is 30.5cm and it would still be just the width of the markings.)

The Sun will remain more or less the way it is now for about another 5 billion years. After that, it will exhaust the hydrogen it currently "burns" and will enter a new phase of existence. During this phase the Sun will begin "burning" helium and will expand to about 100 times its current size and become what is called a **red giant**. Once it runs out of helium it will collapse into a much smaller object called a **white dwarf**.

How hot is the Sun?

The Sun is extremely **HOT**! The middle of the Sun is at least **10 million** degrees. The "surface" of the Sun (what we see) is only 5800 degrees. This is cool for the Sun, but is actually about 16 times hotter than boiling water (ouch!). The outer atmosphere of the Sun (which we don't really see with our eyes) gets extremely hot again, about 1.5 to 2 million degrees. These huge temperature changes are very interesting to scientists.

Can the Sun be dangerous?

Never look directly at the Sun, even with sunglasses. The human eye is not made to look at an object that bright. It is so bright it could easily **blind** you in just a few seconds. Have you ever looked at a bright light bulb and then had to look away after a short time? Well, the Sun is about a million times brighter than a household light bulb. This is why you can injure your eyes: if you look directly at the Sun, the inside of your eyes can burn severely and may never heal again. You could lose your sight permanently. In order to study the Sun, scientists look directly at the Sun **only** with the aid of special instruments that are made to tolerate the extreme brightness.

The Sun also emits harmful ultraviolet (UV) radiation, which can damage your skin and eyes. In fact, any tan is a sign of damage to your skin! A sunburn may hurt for a while, but damaging your skin over many years can cause many problems, including **skin cancer**. That is why you should always wear sunscreen of **SPF** 15 or higher when you will be out in the Sun for more than a few minutes. This applies even for cloudy days -- though not as bright as sunny days, much of the harmful UV light still comes through. Note that having a tan is little protection from skin damage, providing an SPF of only about 2.

To help protect your eyes, use sunglasses that filter 100% of UV light. When you buy glasses, check for labels that say **100% UV Protection**. People who don't protect their eyes when they are young run the risk of loss of sight when older, including getting **cataracts** .

Why do we study the Sun?

Without the Sun, **life** on Earth would not exist. Our planet would be a frozen dark ball, drifting dead in space. We need the Sun for light, heat and energy. With the Sun, plants can grow, and animals can eat. The Sun's output changes over time. These changes affect not only our daily lives and climate, but also our **communications**, such as by satellites. The more we know about the Sun, the better we can deal with these changes.

In the past, we know the Sun was a little different than it is now, and at those times the Earth experienced **ice ages**. During the most recent ice age, almost all of Canada and the Northern US was covered in a huge sheet of ice about a mile thick! (That's about 1.6 km.) Even recently (the late 1600s) Europe and North America were a bit cooler than they are now, experiencing a **little ice age**, and changes in the Sun were most likely responsible.

The **ozone hole** is something different. **Ozone** is important to humans because it shields us from harmful ultraviolet radiation from the Sun. The chemicals from leaky refrigerators and air conditioners make their way up in to highest part of the Earth's atmosphere. Way up there, these chemicals destroy **ozone**, and scientists have noticed recently that the layer of ozone in the upper atmosphere is becoming thin in some places. Scientists must study this so we can understand why it is occurring, and to take action **now** to protect it. It is interesting, however, that ozone is considered a pollutant when it is close to the ground. It hurts plants and trees, and our lungs. But we need it way up high to shield us from the UV.

Also, learning more about the Sun helps us to understand better **other stars**. And this helps us understand better **the universe** in which we live.

How do scientists study the Sun?

Studying the Sun and how it affects the Earth is a very complicated process. In order to successfully do this, scientists approach the problem in many different ways. They separate their scientific efforts into categories and usually specialize in specific areas, such as **How the amount of light from the Sun varies over time**, or **How the Sun's light affects the Earth's climate**.

Some scientists study the Sun using computers to predict what the Sun may do in the future. Others build special instruments which look at the Sun and make measurements; they use computers both to collect and later make sense of the measurements.

KEY WORDS
EARTH SCIENCE – LESSON 2 –GRADE ONE - CA

SUN

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LIGHT

THERMOMETER

EXPERIMENT

RECORD

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