

# CC Cycle 2 Science Experiments & Projects: In-Class Lesson Plans & Visuals

*I hope these make all the hard work you do a little easier!  
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## Notes to the Tutor/Teacher:

**I have included the Foundations Guide information needed to do each project. My teaching notes are placed within the instructions to help students learn about the topics while they work on the projects.**

## **What to Do Each Week in Class:**

Always stress the **Scientific Method** in each experiment by getting the students to orally state what the purpose, hypothesis, materials etc. are in your experiment.

- State the Scientific Method

(ie: sing it to the tune of *Happy Birthday*- "Scientific Method, Purpose, Hypothesis, Materials, Procedure, Results, Conclusion.)

Purpose – stated in the Van Cleeve experiment verbiage

Hypothesis – Typed out as the first of my "More Talking Points".

Materials – Hold them up to the students and ask them to name the materials

Procedure – Go through the steps listed in the experiment together

Results – The "what happened?" of the experiment. Talk about what you saw and if your hypothesis was right or wrong.

Conclusion – The "why did that happen?" of the experiment. Found partially in the Van Cleeve "Why?" segments, and explained more fully in my talking points and images.

*Relate it back to Cycle 2: mention how we are studying Ecology, Astronomy and Physics in our experiments and our new grammar pegs. I have done some for you in blue. Find your best way to explain how learning about God's creation is learning more about God's character and what He's done for us.*

## Week 9

### Project: Sun Prints

*(\*Do this project on a sunny day. Switch with another week, like week 12, if needed)*

**Purpose:** To create sun prints and to learn about the Sun's light spectrum and UV light .

**Materials Needed:**

Interesting Objects to have the students bring in: peacock feather, leaves, buttons, rubber bands, cookie cutters, keys, necklaces, gears

Sun print Paper

Trays of water

Paper towels and paper plates/cardboard to dry the sun print on

(Clear Acrylic Sheet to press the object down and sharpen the edges of your print)

**Procedure:**

- Inside, without the sun's light or too much ambient light reaching your paper, arrange interesting objects over your paper.

*What's happening: The paper has blue molecules embedded in it that are sensitive to the Sun's ultra-violet light.*

- If you have a flat object, place a clear acrylic sheet over it to press it down. It will prevent light from getting under the object and blurring your lines.
- Take the sun print outside in the sun for 2-5 minutes (5-20 minutes on a cloudy day).

*What's happening: When most of the paper fades from blue to white, it has been fully exposed. When wavelengths of the Sun's ultra-violet light reach the paper, they cause 2 molecules in the paper to interact and form a new colorless molecule. So the white paper base begins to show through. Under your object, the original chemical hasn't changed with ultra-violet light, and it will remain blue.*

- Rinse your sun print in water, leave it in 1-5 minutes to create the deepest blues.

*What is happening: Now you will see the colors reverse when they react with water. The original blue chemical is water soluble and will wash away, leaving white paper. The new colorless compound made by the ultra-violet light however is not water soluble, and experiences another chemical change in the water. Water causes an oxidation that turns it a deep blue!*

- Place it on a flat paper towel, paper plate or piece of cardboard to help absorb the water and avoid water spots.

*What is happening: The paper will continue oxidizing and turn a deeper blue even after you take it out of the water.*

- Show the following 2 pages of sun print samples and explanations of how the Sun's UV light fits into the electromagnetic spectrum.

# Week 9

## Project: Sun Prints

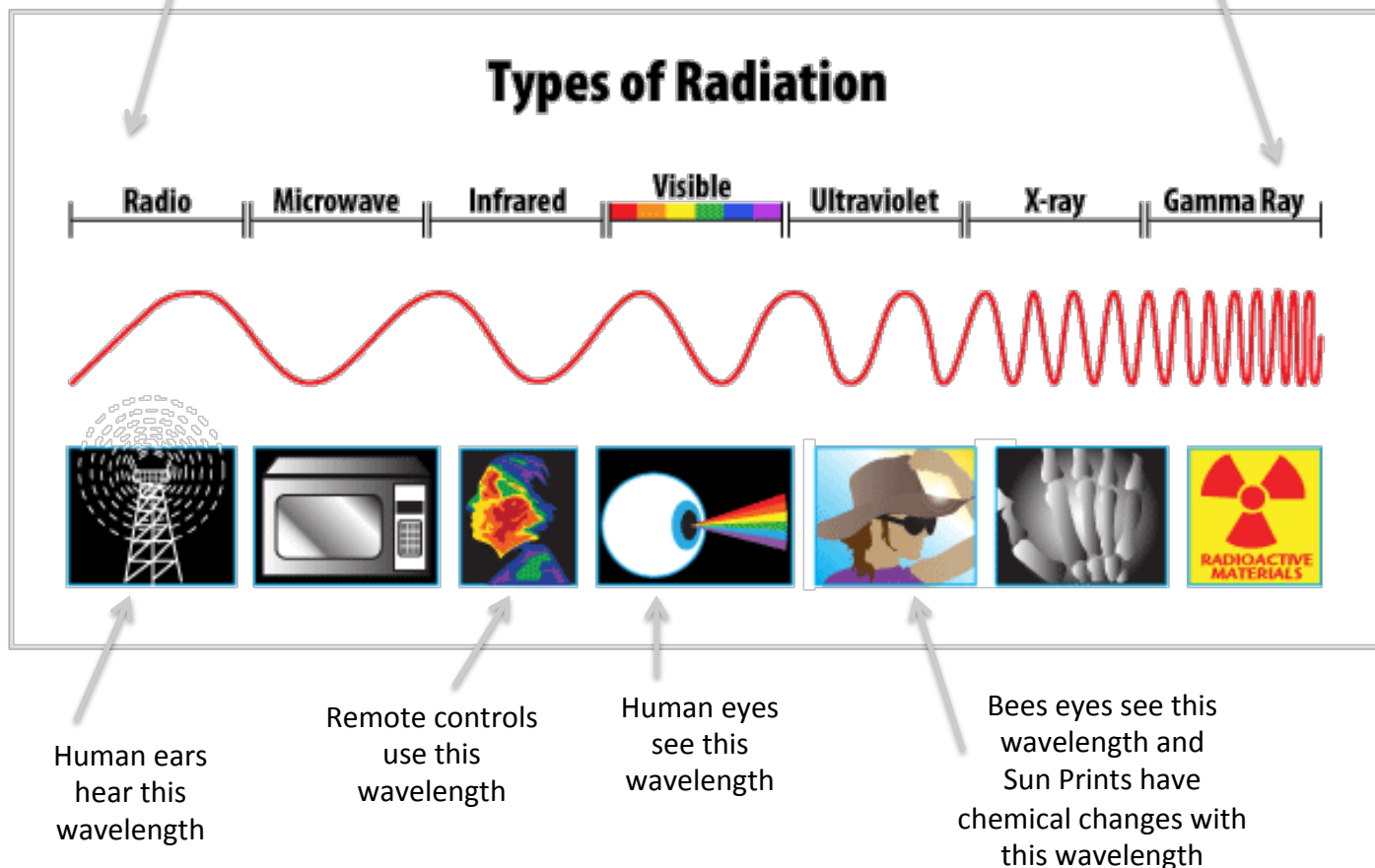
### More Talking Points:

- The Electromagnetic Spectrum shows us Radiation (or radiated energy). That is energy traveling in the form of a wave. The Sun, lightbulbs, fire, and stars are some things that can give off radiant energy.
- Ultraviolet light is 1 form of radiation on the electromagnetic spectrum, and is invisible to the human eye. It has shorter wavelengths than the visible light we can see. Bees are able to see it though, just as dogs can hear sound waves humans can't.
- Only 10% of sunlight is UV. The sun gives off different kinds of UV rays: UV-A, B, and C rays. UV-C and B rays are harmful but are mostly absorbed by our ozone and atmosphere. UV radiation has enough energy to break chemical bonds (as we saw on our sun print paper). UV-B rays can cause cellular and DNA damage, giving us sunburns. And so we protect our skin with shade and sunblock.
- *Relating it to Cycle 2: Astronomy teaches us about our Sun – a producer of light and heat. In Week 22 we'll memorize the characteristics of light (reflection, refraction, spectrum), and in Week 23 we'll memorize how heat flows (radiation, conduction, convection).*

Decreasing Energy  
with  
Longer Wavelengths

## The Electromagnetic Spectrum

Increasing Energy  
with  
Shorter Wavelengths



# Week 9

## Project: Sun Prints

CC Science Cycle 2

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