

UV Investigations

Student Resource

Name: _____

Overview

This resource supports students in engaging the RLC Presents: Art + Science video, [In the Lab: UV Investigations](#). Complete the activities using the worksheets below to investigate the electromagnetic spectrum. Use the vocabulary you learn in station one to complete the additional stations.

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**Your teacher may provide additional prompts to explore the collection and respond creatively.*



This material is based upon work supported by the National Science Foundation under Grant No. OISE 1743748.

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“SEE, THINK, WONDER”

Look at the two images of museum artworks under different lighting and complete the chart below. Sentence starters are provided to help you get started.

<p>What do you see when looking at the objects under standard light?</p> <p><i>I see ...</i> <i>I notice ...</i></p>	<p>What do you think about when looking at the objects under ultraviolet (UV) light?</p> <p><i>I think... because I see ...</i> <i>Seeing... makes me think ...</i></p>	<p>What questions do you have while looking at the objects under different light sources?</p> <p><i>Seeing ... makes me wonder...</i> <i>I wonder why ...</i></p>

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INITIAL MODEL/EXPLANATION

Initial Model/Explanation

In the photos provided by your teacher, you will see that certain areas of works of art appear to glow under UV light and others do not. In the space below, explain as best you can why you think some things glow under UV light.

Why do you think some things appear to glow (fluoresce) under UV light?

Explain your answer in words, pictures, or a combination of both. This is an educated guess, you will have an opportunity to revise your response after learning more.

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STUDENT INQUIRY STATIONS

UV Investigations Inquiry Stations

Complete the activities below to investigate the electromagnetic spectrum and how certain materials are able to fluoresce.

Station 1: Electromagnetic Spectrum Vocabulary

1. Using the cards at the station, match the terms with the correct definition.
2. Complete the definition column below and create an image or memory clue for each vocabulary word to help you remember its meaning.

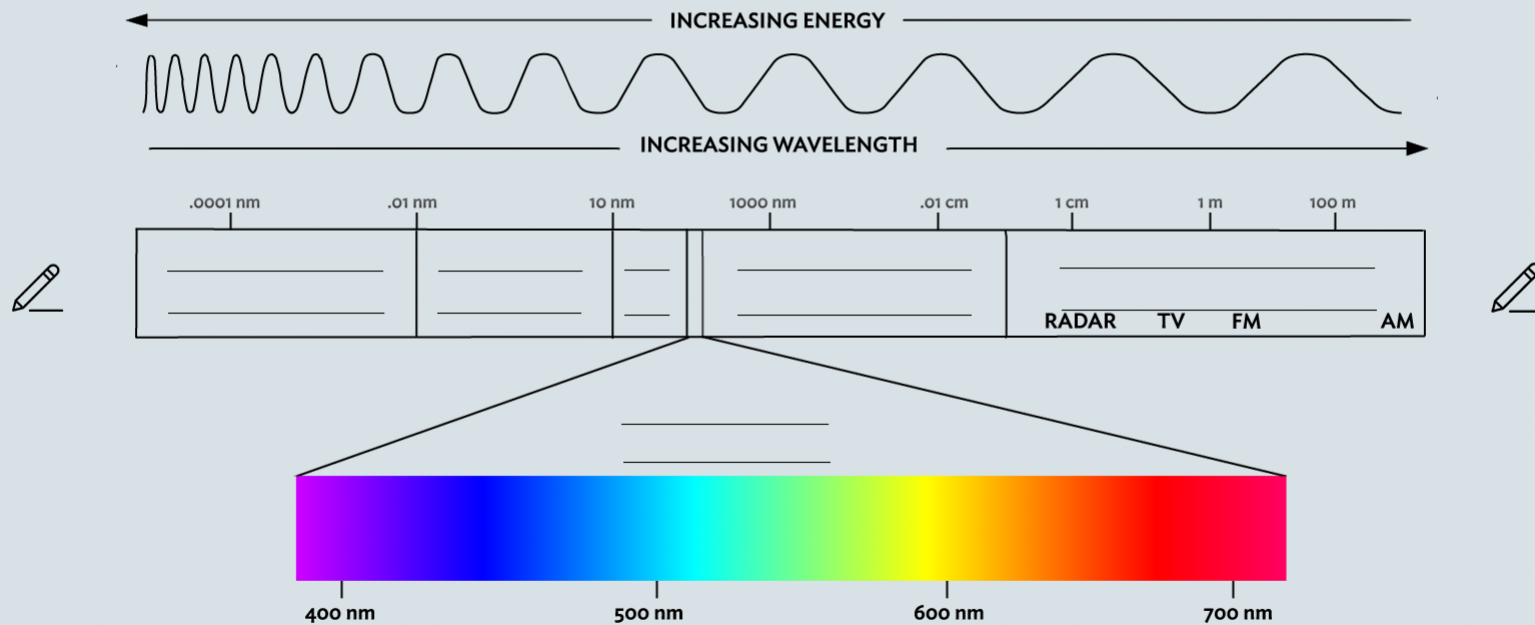
Term	Definition	Image or Memory Clue
Electromagnetic Spectrum		
Electromagnetic Radiation		
Visible Light		

Ultraviolet Light		
Frequency		
Wavelength		

Station 2: Electromagnetic Spectrum

1. Read the descriptions of the different types of electromagnetic radiation on the Electromagnetic Spectrum Text group document.
2. Match the correct name and wavelength range to each section of the document. Each section should have two sticky notes.
3. Record the name and wavelength range on your electromagnetic spectrum below.

ELECTROMAGNETIC SPECTRUM



4. What types of electromagnetic radiation had you heard of before doing this activity? Explain how or where you encountered them.

5. What patterns do you notice on the electromagnetic spectrum as the energy changes?

6. Write two questions you still have about the electromagnetic spectrum.

Station 3: Wavelengths and Energy

1. What do waves that have high energy look like? Use one string on your desk to demonstrate this referencing the electromagnetic spectrum. The height of each wave should be the same as the ones next to it.
2. What do waves that have low energy look like? Use another piece of string on your desk to demonstrate this referencing the electromagnetic spectrum. The height of each wave should be the same as the ones next to it.
3. Draw the waves you created in the appropriate box below.

High Energy Waves	Low Energy Waves
Distance between the top of each wave = cm	Distance between the top of each wave = cm

4. Scientists measure the distance between waves to determine wavelength. Using a ruler and either your string creation or drawing, measure the distance from the top of one wave to the top of the next wave in centimeters. Record the measurement in the appropriate box above.

**Light wavelengths are typically measured in nanometers, but because lightwaves and nm are so tiny, we are measuring with string in centimeters.*

5. What differences do you notice in how the high energy and low energy waves look?

What similarities do you notice between the two kinds of waves?

6. Wavelength is the distance from the top of one wave to the top of the next wave.

Which type of wave has the longest wavelength?

High Energy Waves

Low Energy Waves

7. Gamma Rays have the shortest wavelength on the electromagnetic spectrum.

Do you think they are high energy or low energy waves?

High Energy Waves

Low Energy Waves

Why did you choose this answer?

8. Radio waves have the longest wavelength on the electromagnetic spectrum.

Do you think they are high energy or low energy waves?

High Energy Waves

Low Energy Waves

Why did you choose this answer?

9. What do you notice about the waves as you move from Gamma rays to Radio waves?

Station 4: Fluorescence

Conservator Lisa Ackerman uses a black light, a type of UV light, to investigate a work of art. Use a black light to investigate a selection of objects under normal and UV light.

1. Write down the names of the items at the station in the “Item” column of the data table.
2. Look at all of the materials at the station under normal light and describe their color and appearance. Record your observations in the “Under Standard Light” column of the data table.
3. Your teacher will turn off the standard lights and turn on the black light. Look at the materials and describe their color and appearance. Record your observations in the “Under UV Light” column.

Item	Under Standard Light	Under UV Light

4. **Fluorescence, or the appearance of glowing, happens when materials absorb radiation with short wavelengths, like UV light, and give off light with longer visible wavelengths.**

Which items did you see fluorescing under UV light?

5. UV light is 10 nm–400 nm. If an item fluoresces, what wavelength of light will it give off?

400nm–740 nm or 5 nm–10 nm

Why did you choose this answer?

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FINAL MODEL/EXPLANATION

Final Model/Explanation

Revise your model on page 3 or create a new model below after you have completed the inquiry stations.

Why do you think some things appear to glow (fluoresce) under UV light?

Explain your answer in words, pictures, or a combination of both. Be sure to include details you learned from the inquiry stations.

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REFLECTING ON MY LEARNING

Choose one question from each column and respond to it in the box below.

What was the most challenging part of today's learning? Be sure to explain.	What activity did you like the best? Why?	How can you apply what you learned today in the real world?	Write two questions you still have after completing today's learning.
What did you do today that helped you learn best? Be sure to explain.	Which activity did you like the least? Why?	What does today's learning help you understand better?	