

Light and Optics Unit

- **Covers: Properties of Light, Electromagnetic Spectrum, Reflection, and Mirrors**
- **Lesson & Engaging Activities**
- **Daily Teaching Schedule**



Light and Optics

Unit - Light and Optics

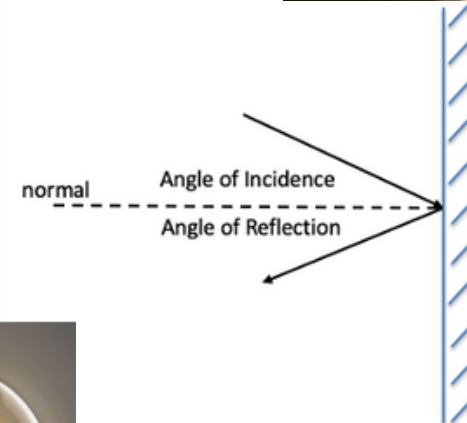
- 4 Lessons & 1 Activity

Properties of Light

- Properties of light
- Luminous and non-luminous objects
- History of light
- The electromagnetic spectrum
- Prisms
- Color & Color Blindness
- Incandescence, LED
- Light-Emitting Diode (LED)
- Fluorescent and Compact Fluorescent lights (CFLs)
- Electric Discharge
- Phosphorescence and Fluorescence
- Chemiluminescence and Bioluminescence

Reflection and Mirrors

- Terminology of Reflection
- Reflection from a mirror
- The Law of Reflection
- Types of Reflection
- Ray Diagrams
- Locating an Image in a Mirror
- Lateral Inversion
- Properties of an image



Lesson Includes Teacher and Student Versions - Videos Embedded in Lessons

Light

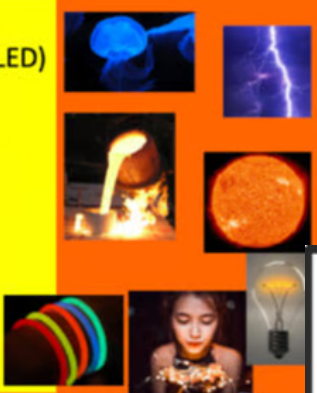
- Overview of light
- Properties of light
- Luminous and non-luminous objects
- History of light
- The electromagnetic spectrum
- Prisms
- Colour & Colour Blindness



This digital presentation includes both Google Office resources and is **Google Classroom Ready**

The Production of Light

- Incandescence
- Light-Emitting Diode (LED)
- Fluorescent lights
- Compact Fluorescent lights (CFLs)
- Electric Discharge
- Phosphorescence
- Fluorescence
- Chemiluminescence
- Bioluminescence



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Google Access

Thank you for your purchase. Clicking the link button below will automatically create a copy of the Google resources and place them into your Google Drive. You'll find the folder inside the 'Shared with me' section on the left side of your Drive.

Important: Before you click, make sure you're signed in to the Google account you'd like the resources placed into. If the resources are added to the wrong account, simply sign out and then into the correct one and repeat the process.

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Google Classroom Ready
Google Slides Access

Introduction to Reflection and Plane Mirrors

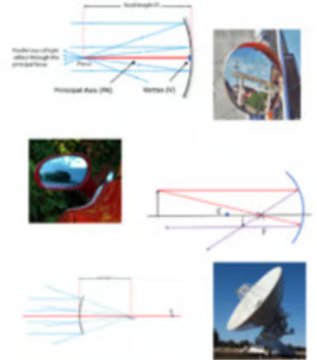
- Reflection
- Terminology
- Types of Mirrors
- Law of Reflection
- Types of Reflection
- Ray Diagrams
- Locating Images in a Mirror
- Lateral Inversion
- Describing Images



This digital presentation includes both Google Office resources and is **Google Classroom Ready**

Reflection in Curved Mirrors

- Terminology
- Focal Point – Concave Mirrors
- Concave Mirror Diagram Rules
- Ray Diagrams – Concave Mirrors
- Images in Concave Mirrors
- Uses of Concave Mirrors
- Convex Mirror Rules
- Ray Diagrams – Convex Mirrors
- Images in Convex Mirrors



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Types of Reflection

- Clear (Specular) Reflection
- Diffuse Reflection



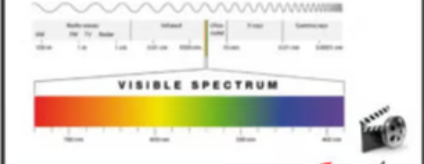
Clear Reflection

Diffuse Reflection

Student and presentation

Modern Electromagnetic Waves

We have identified many types of electromagnetic waves which makes up our **electromagnetic spectrum**



VISIBLE SPECTRUM

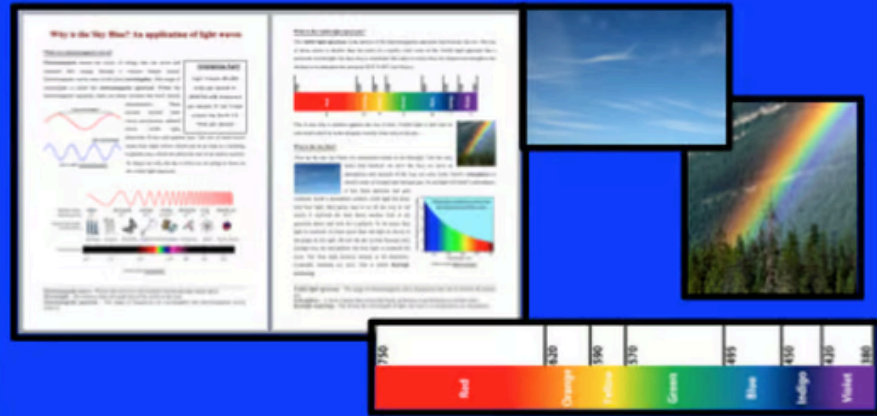
4

Videos embedded directly into the slides. One-click access

Engaging Activity

Why is the Sky Blue? An application of light waves

Scientific Reading Comprehension Article



Improve your students **Scientific Literacy** and **Analysis Skills**, use as an **Emergency Substitute Plan** or create **Applicability** in your classroom

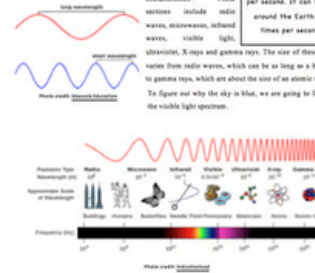
Why is the Sky Blue? An application of light waves

What are electromagnetic waves?

Electromagnetic waves are waves of energy that can move and transport their energy through a vacuum (empty space). Electromagnetic waves come in all sizes (wavelengths). This range of wavelengths is called the electromagnetic spectrum. Within the electromagnetic spectrum, there are many sections that have similar characteristics. These sections include radio waves, microwaves, infrared waves, visible light, ultraviolet, X-rays and gamma rays. The size of these waves varies from radio waves, which can be as long as a building, to gamma rays, which are about the size of an atomic nucleus. To figure out why the sky is blue, we are going to focus on the visible light spectrum.

Interesting Fact!

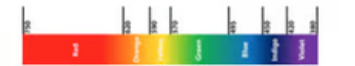
Light travels 184,000 miles per second or 299,792,458 kilometers per second. It can travel around the Earth 7.5 times per second!



Electromagnetic waves - Waves that can move and transport energy through empty space.
Wavelength - The distance from one peak (top) of the wave to the next.
Electromagnetic spectrum - The range of frequencies (or wavelengths) that electromagnetic waves cover in.

What is the visible-light spectrum?

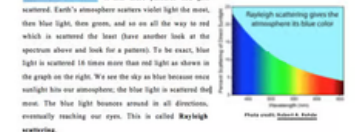
The visible-light spectrum is the portion of the electromagnetic spectrum that humans can see. The size of these waves is smaller than the point of a needle. Each color in the visible light spectrum has a particular wavelength. An easy way to remember the order of colors from the longest wavelength to the shortest is to remember the acronym ROY G BIV (see below).



This is also why a rainbow appears the way it does. Visible light is split into its individual colors by water droplets (usually from rain) in the sky.

Who is the sky blue?

First up, the sky isn't blue, it's transparent (clear or see-through). The sky only looks blue because we have the Sun, we have an atmosphere and because of the way our eyes work. Earth's atmosphere is mostly made of oxygen and nitrogen gas. As sunlight hits Earth's atmosphere,



Visible light spectrum - The range of electromagnetic wave frequencies that can be seen by the human eye.
Atmosphere - A layer of gases that surrounds Earth, protecting it and keeping our planet warm.
Rayleigh scattering - The shorter the wavelength of light, the more it is scattered by our atmosphere.

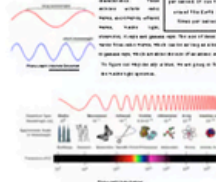
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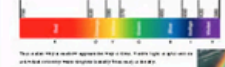
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Daily Teaching Schedule

UNIT 9 – Light and Optics **16 DAYS TOTAL**

Properties of Light and the Electromagnetic Spectrum – 4 days

Number of Day(s)	Course Content	Teaching Resources	NGSS
2	• Overview of light • Properties of light • Luminous and non-luminous objects • History of light • The electromagnetic spectrum • Prisms • Color & Color Blindness	Light - Properties & Characteristics - Lesson	HS-PS4-1 HS-PS4-3 HS-PS4-4 HS-PS4-5 HS-PS3-3 HS-LS1-2
1	• Incandescence • Light-Emitting Diode (LED) • Fluorescent lights • Compact Fluorescent lights (CFLs) • Electric Discharge • Phosphorescence • Fluorescence • Chemiluminescence • Bioluminescence	The Production of Light - Lesson	
1	Review activity	Why is t - Science	
Assessments	There are multiple assessments included throughout this unit		

Reflection and Mirrors – 3 days	
Number of Day(s)	Course Content
1	• Terminology of Refl

Reflection and Mirrors – 3 days

Number of Day(s)	Course Content	Teaching Resources	NGSS
1	• Terminology of Reflection • Reflection from a mirror • The Law of Reflection • Types of Reflection • Ray Diagrams • Locating an Image in a Mirror • Lateral Inversion • Properties of an image	Ray Diagrams, Reflection and Plane Mirrors - Lesson	HS-PS4-1 HS-PS4-3 HS-PS4-5
2	• Terminology of Reflection • Reflection from a mirror • The Law of Reflection • Types of Reflection • Ray Diagrams • Locating an Image in a Mirror • Lateral Inversion • Properties of an image	Reflection & Ray Diagrams in Curved Mirrors - Lesson Includes • practice problems with video-guided answer walkthrough • additional practice problems	
Assessments	There are multiple assessments included throughout this unit portion.		

The Following Resources are Included

- [Light - Properties & Characteristics - Lesson](#)
- [The Production of Light - Lesson](#)
- [Reflection & Ray Diagrams in Curved Mirrors - Lesson](#)
- [Ray Diagrams, Reflection and Plane Mirrors - Lesson](#)
- [Why is the Sky Blue? An application of light waves - Science Reading Article](#)

Who's It For?

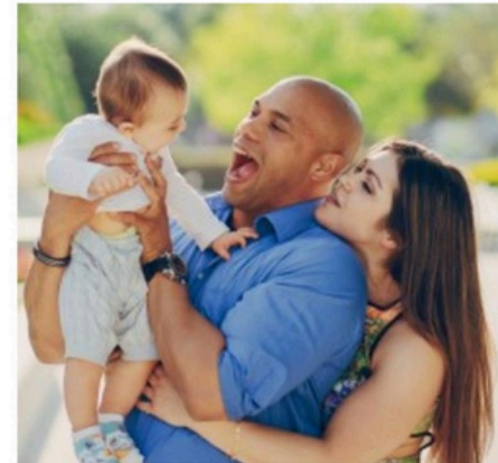
- **High School Physical Science Teachers**
- **Teachers using NGSS**
- **Teachers who want to increase their student's engagement and retention**
- **Teachers not looking to reinvent the wheel**

Save yourself the **STRESS AND TIME**



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Spend your time WISELY



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