

LIGHT WAVE REFLECTION, ABSORPTION, TRANSMISSION Science Reading



Scroll Through

To take a peek inside!

Help students learn about Light wave transmission, reflection, and absorption and test their comprehension with these easy to read science reading passages.

Why? SCIENCE READING PASSAGES?

- ✓ Increase science literacy in the classroom
- ✓ Simple passages to help students comprehend the information
- ✓ Note-taking template to help students interact with the reading
- ✓ Worksheets to review and apply their knowledge
- ✓ Reinforcement task cards to continue their understanding

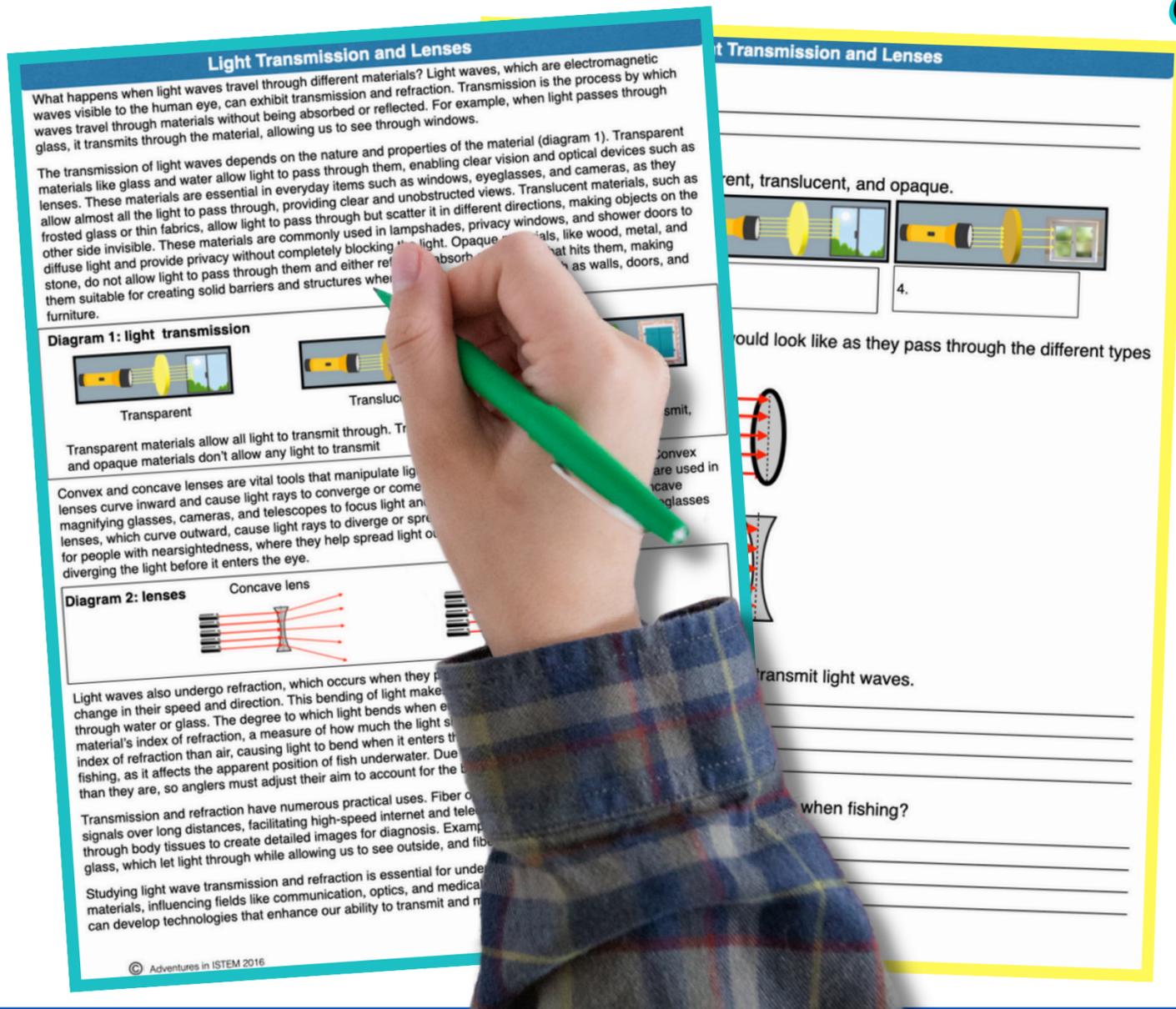


“This resource was absolutely perfect for when I was out sick with covid for multiple days. The content is exactly what I wanted to cover with my students, easy for a substitute to implement, and I was happy knowing my students’ time was being used productively!

Thank you! “- Emily

LIGHT WAVE REFLECTION, ABSORPTION, TRANSMISSION

Science Reading



What Are *students* Doing?

- ✓ **Marking the text**
- ✓ **Filling in the guided note-taking template**
- ✓ **Reviewing and applying their knowledge**
- ✓ **Reinforcing their understanding**

LIGHT WAVE REFLECTION, ABSORPTION, TRANSMISSION Science Reading

Light Absorption

Define and Describe:

1. Define absorption.

2. What is the difference between wearing a white shirt and a black shirt on a summer day?

Explain:

3. If you were a fish living in the ocean, what color would you be and why?

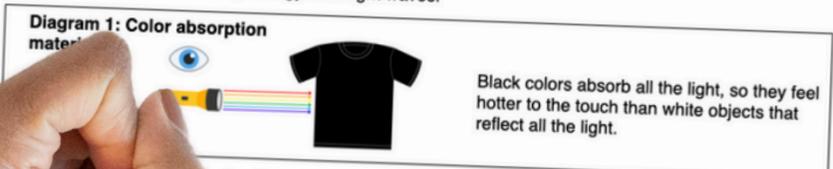
4. A resort is building a walkway with red brick, and white brick. Which color would be better for the climate and why?

5. How do we use absorption in our everyday lives?

Light Absorption

What happens when light waves hit a surface and seem to disappear into it? Light waves, which are forms of visible electromagnetic radiation that move through space and can be detected by our eyes, exhibit a process called absorption. Absorption occurs when the energy from light waves is taken in by a material instead of being reflected or transmitted. This process is like how a sponge soaks up water, but in this case, materials soak up energy from light waves.

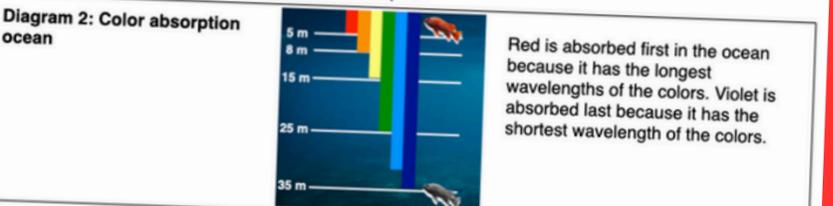
Diagram 1: Color absorption



Black colors absorb all the light, so they feel hotter to the touch than white objects that reflect all the light.

When light waves hit a surface, they are either absorbed, reflected, or transmitted when they encounter a material. Absorption occurs when the energy from the light wave being taken in by the material, transferring its energy to the material, such as heating up or emitting light. Depending on their properties, different materials absorb light waves differently (diagram 1). Dark colors, like black and navy, absorb light waves more readily than light colors. This is why wearing a black shirt on a sunny day can feel warmer than wearing a white one, which reflects more light and absorbs less heat. Light-colored fabrics and pastels, absorb less light and thus remain cooler. In the ocean, light absorption is also affected by wavelength (diagram 2). Sunlight penetrates the water near the surface, and all colors are present. However, as depth increases, different light colors are absorbed at different rates. Red light is absorbed quickly and can only penetrate a few meters below the surface. Orange and yellow light reach deeper but are still significantly absorbed within the upper layers. Green and blue light penetrate the deepest, so the ocean appears blue at greater depths. This selective absorption of light in the ocean impacts how marine organisms are adapted to their environments, influencing their coloration and behavior. For example, many deep-sea creatures are red or black to remain hidden in low-light conditions, as red light does not penetrate those depths.

Diagram 2: Color absorption ocean



Red is absorbed first in the ocean because it has the longest wavelengths of the colors. Violet is absorbed last because it has the shortest wavelength of the colors.

Absorption has numerous practical applications. In solar panels, materials are designed to absorb sunlight, converting the absorbed light energy into electricity. Microwave ovens use absorption to heat food, as microwaves are absorbed by water molecules in the food, causing them to vibrate and generate heat. In X-ray imaging, different tissues in the body absorb X-rays to varying degrees, creating contrast in the images and helping doctors diagnose conditions.

When you think about absorption, it's easy to see how it impacts our daily lives. Fabrics like cotton absorb sweat, keeping us dry and comfortable, while building insulation materials help maintain a stable temperature by absorbing heat. Cookware efficiently absorbs heat from stoves, ensuring food is cooked evenly. Absorption also powers advanced technologies like solar panels, which convert sunlight into electricity, and medical imaging, which relies on the absorption of waves to create detailed images. Absorbing energy from waves is vital for harnessing energy and improving various aspects of our daily lives.

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Different ways to use the *science readings*

- ✓ Substitute plan on days you will be out
- ✓ Introduction of the material at the beginning of the unit
- ✓ During the explain phase of the 5E model
- ✓ As part of a science station
- ✓ For reteach to reinforcing their understanding
- ✓ During the review at the end of the unit

LIGHT WAVE REFLECTION, ABSORPTION, TRANSMISSION

Science Reading

Light Reflection and Mirrors

Define and Describe:

1. What is reflection?
2. Explain the law of reflection.

What happens when you look into a mirror or see the light reflecting off a shiny surface? Light waves, which are electromagnetic waves that travel through space and can be seen by the human eye, exhibit a fascinating process called reflection. This occurs when light waves bounce off surfaces and return to their source. Light waves can either pass through, be absorbed, or bounce back when they encounter a boundary or surface. Reflection refers to the light wave bouncing off the surface and changing direction.

The laws of reflection (diagram 1) dictate that the angle at which a light wave hits a surface called the incident angle, equals the angle at which it bounces off, known as the reflected angle. For example, if a light beam strikes a flat mirror at a 30-degree angle, it reflects off at the same 30-degree angle. Light reflection can be regular or diffuse (diagram 2). Regular reflection occurs on smooth surfaces like mirrors, producing clear images because the light bounces off uniformly. Diffuse reflection happens on rough surfaces, scattering light in various directions and making it hard to see clear images, which is why textured walls don't reflect light as mirrors do.

Diagram 1: Law of reflection

Angle of incident : reflection

Diagram 2: Types of reflection

Regular reflection Diffuse reflection

Reflection has numerous applications in our daily lives. Mirrors reflect light waves, with flat mirrors reflecting light uniformly and curved mirrors focusing or distorting reflections. Convex mirrors, which bulge outward, spread out light rays and are commonly used in security and vehicle mirrors to provide a wider field of view. Concave mirrors, which curve inward, converge light rays and are used in applications like telescopes and shaving mirrors for magnification. Reflection is also crucial in devices like telescopes and microscopes, which use mirrors to focus light for better observation.

Diagram 3: Concave and Convex mirrors

Convex mirrors create a larger viewing area

Concave mirrors magnify images

Reflection helps us see how light behaves and drives technological advancements that enhance our lives. From mirrors to optical devices like telescopes and microscopes, the principles of reflection are essential for improving our ability to observe and understand the world around us. By studying and applying these principles, we can develop new technologies that enhance our lives and expand our understanding of the natural world.

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Check out what teachers just like you have said about these product:



“I have incorporated these into my regular lessons and could not be more pleased. They are thorough, engaging and fun. I am very pleased with this purchase.” Rahim



“Perfect sub activities! Bought the bundle so I would have something for every unit. If there was nuclear section that would be icing on the cake! :) Maybe in the future?” Karis



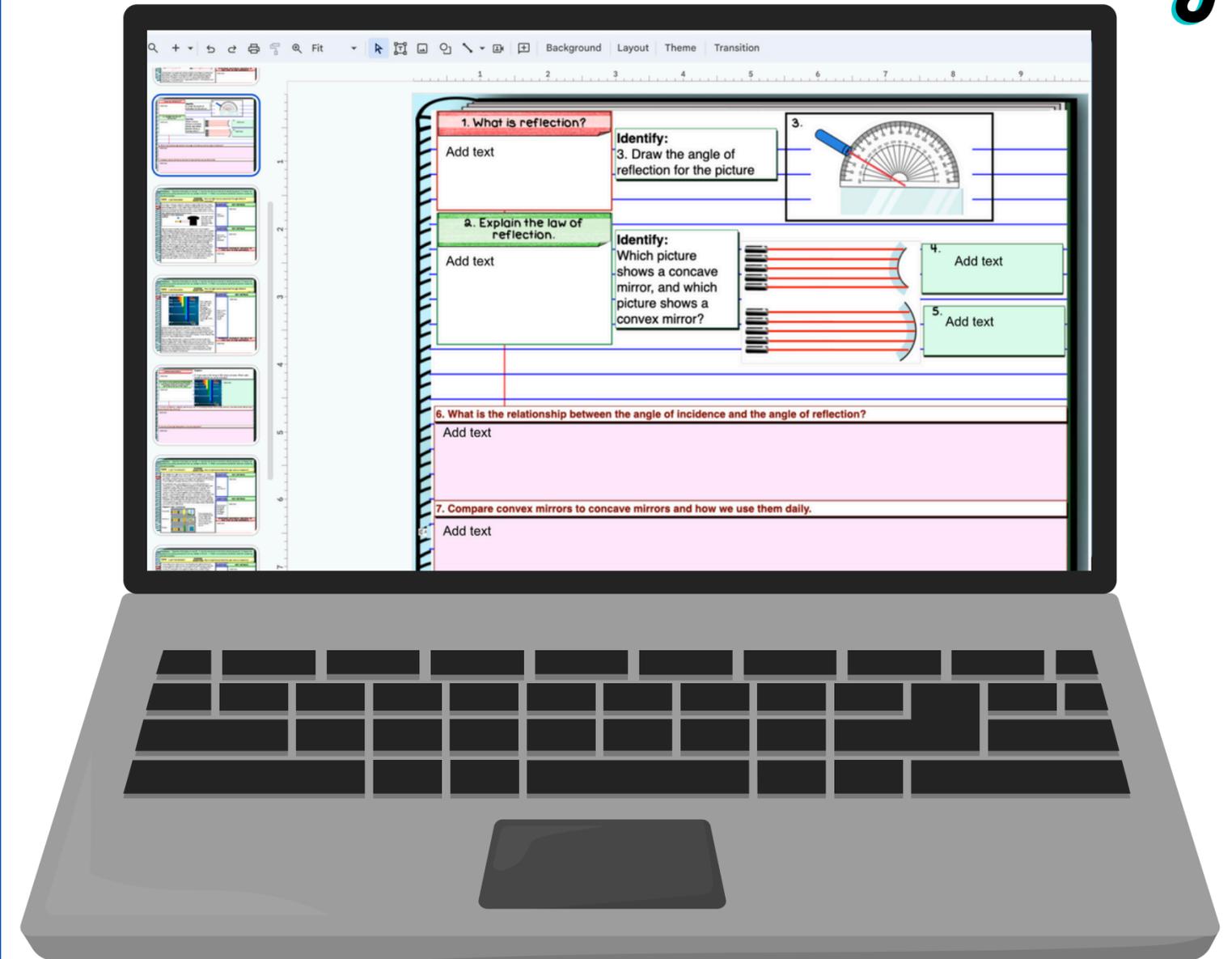
“This was a wonderful and engaging resource. My students were able to take a lot from it, and I loved how easy it was to prep it out.” – Christine

Resource *includes*

- ✓ **3 Reading Passages**
- ✓ **3 Note-taking guides**
- ✓ **3 Comprehension Worksheets**
- ✓ **4 Task cards**
- ✓ **Answer key**
- ✓ **Digital version**

LIGHT WAVE REFLECTION, ABSORPTION, TRANSMISSION

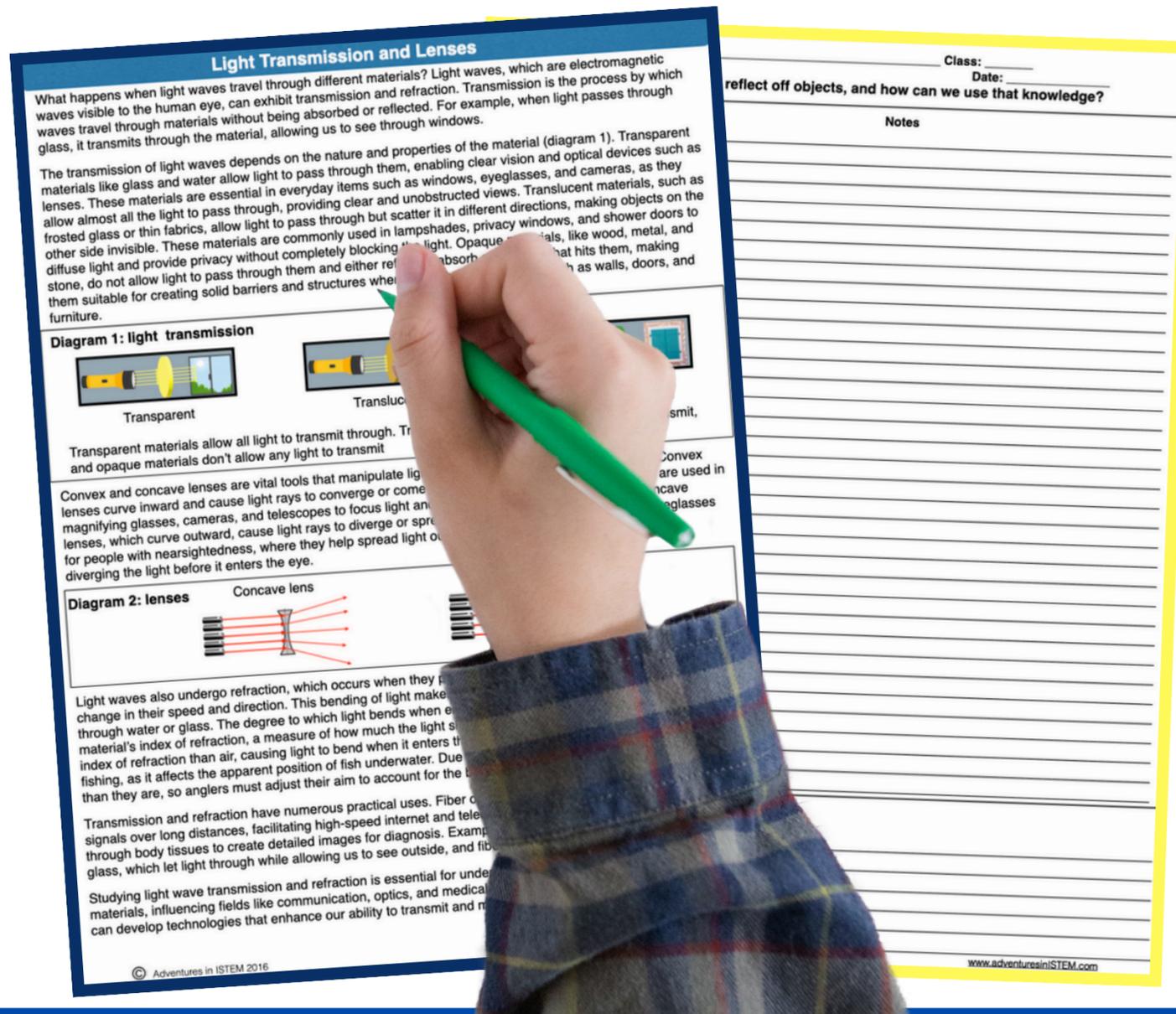
Science Reading



LIGHT WAVE

REFLECTION, ABSORPTION, TRANSMISSION

Science Reading



Topics Included

- ✓ Reflection including Mirrors (convex and concave)
- ✓ Absorption
- ✓ Transmission including angle of refraction and lenses (convex and concave)

HOW TO USE THE RESOURCE IN

3 simple steps

1

Print the PDF version, make copies, and hand out to students

2

Use the digital version by clicking the titles in the RED BOX to make your own copy (found at the end of the PDF)

3

Share the resource with your students using your favorite LMS (Google Classroom, Powerschool (schoolology), Canva...)

Interactive Digital Flip Book

Teachers Guide

What You Will Need To Get Started:

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Cell Energy Digital Flip Book Teacher
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Physical Science Readings

Physical Science Reading Comprehension Passages Units Covered:

- Chemistry
- Matter
- Force
- Motion
- Energy
- Waves

I have incorporated these into my regular lessons and could not be more pleased. They are thorough, engaging and fun. I am very pleased with this purchase.- Rahim

Physical Science

Big Idea Question: What effect does friction have on the motion of an object?

You are playing soccer and kick a ball at a wall. The ball rolls past and eventually comes to a stop. What force eventually makes it stop? This force is called friction.

Diagram 1

Friction causes the ball to slow down and eventually stop.

Friction is a force that opposes the motion of an object. It can be kinetic friction and static friction. If you have ever pushed a heavy box, you know that it is difficult to get it moving. This is because of static friction. Once the box is moving, it is easier to keep it moving. This is because of kinetic friction.

Diagram 2

The man is pushing, but the cabinet does not move because static friction is acting against his push.

The amount of friction a substance encounters depends on the surface. Some substances, like sleds, slide across the surface. Substances that roll experience less friction. The wheels on the hand truck make it easier to move than those that are rough. The smooth surface of the ice produces less friction than the rough surface of the ice.

Big Idea Question: How is thermal energy transferred through radiation?

Radiation is the only way of transferring thermal energy that does not require matter. Radiation transfers through electromagnetic waves. When the wave hits the object, it transfers its energy to the object causing the object to heat up.

The sun heats the Earth through radiation. The sun's rays travel through space and hit the Earth. The particles in the atmosphere and the ground absorb the energy. There is a reason summer temperatures are higher than winter temperatures. More light rays hit the Earth at an angle. This increases the amount of energy that is absorbed through radiation.

Radiation is also how thermal energy from the fire reaches the particles in the food. This, in turn, cooks the food.

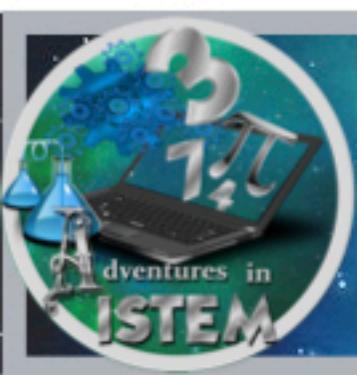
Radiation can also be used to cook food. The microwave oven uses electromagnetic waves. The thermal energy from the fire reaches the particles in the food and increase their kinetic energy. This, in turn, cooks the food.

Digital and Print

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

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Science Reading Comprehension Worksheets Bundle



Free Sample

You can print the following pages for a free sample of what a science reading looks like and how you could use it in your classroom. Click the title in the red box for the digital version of the reading.

What You Will Need To Get Started:

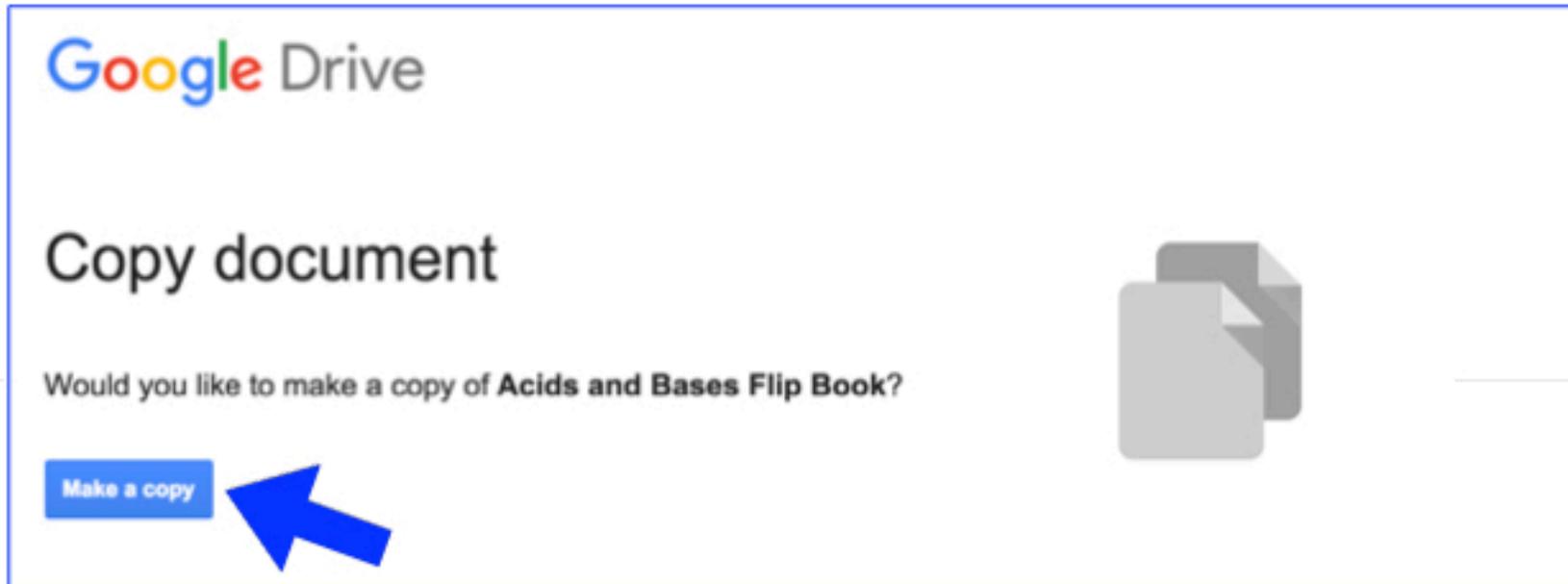
1. Download link for the Google Resource by clicking on the titles in the red box

Outer Planets Guided Reading Digital Notes

2. Access to the Internet and a Google Account (Free)

3. Google accounts or Microsoft OneDrive accounts for your students to save their work

4. Open the file on your Google Drive. The link will prompt you to make a copy



5. This new copy is now yours to edit and share with your students

6. Printer access if you choose to print the finished product as an actual flip book

Outer Planets

Big Idea Question: *Why are they called gas giants? What are some key characteristics?*

The outer solar system is made up of four gas giants. They are Jupiter, Saturn, Uranus, and Neptune. Since they are so far away from the Sun, they are able to hold onto their gas atmospheres and are made up mostly of gas but have solid rocky cores. Because they are so massive, they have a greater gravity than the terrestrial planets. They are also much colder than the terrestrial planets since they are so far away from the Sun. They also all have rings, and many planetary satellites.

Basic facts:

Jupiter: Largest planet in our solar system. Its mass is twice as much as the other seven planets combined. Now that's massive! It is made up mostly of hydrogen gas, and it is known for its massive storm—which is more like a hurricane that is the size of three Earths put together. Since it is made up of mostly gas, it is able to spin around pretty quickly. In one Earth day, Jupiter will have had three days. Now that's fast! It also has the most planetary satellites. To date, the number is at 67. It has the most gravity of all the planets.

Saturn: This planet is known for its many rings that circle it which are made of gas and ice. It is the least dense of all planets. In fact, if you put Saturn in a tub of water, it would actually float. It's amazing that something that massive could actually float. Crazy. Its atmosphere is mostly helium and hydrogen and its gravity pull could tear a comet apart if one got close enough.

Uranus: This planet does not reflect much light since it is so far from the sun. We know about it from our space probes that we sent out into space. The methane gas in its atmosphere is what gives it its greenish color. The rotation of Uranus is unique because it is so tilted it actually spins on its side. Its poles would be found in the same location as our equator, weird. This rotation causes one pole to be in complete darkness for half of its revolution. Could you imagine having night last half a year and a day lasting the other half?

Neptune: The outermost planet in the solar system. Its blue color is caused by its methane gas in its atmosphere. There is a hurricane-like storm that is the size of Earth. It has the fastest winds of any of the planets moving at more than 1,000 km/h (a high wind on Earth is considered 100km/hr).

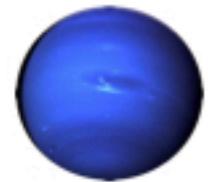
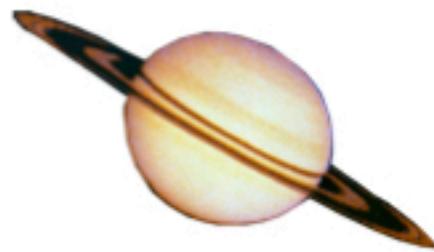
				
Distance from Sun	5 AU	9 AU	19 AU	30 AU
Rotation (day/night)	9 hours	10 hours	17 hours	16 hours
Revolution (year)	11 Earth years	29 Earth years	83 Earth years	163 Earth years
Diameter (size)	142,984 km	120,536 km	51,118 km	49,528 km
Density	1.33 g/cm ³	0.69 g/cm ³	1.27 g/cm ³	1.64 g/cm ³
Gravity	236% of Earth's	92% of Earth's	89% of Earth's	112% of Earth's
Planetary Satellites	67	62	27	14

The planet information is current as of April 2015

Outer Planets

1. Comparing the planets: Fill in the data table

	1	2	3	4
place the planets in order from closest to the Sun to furthest from the Sun				
place the planets in order from shortest day to longest day				
place the planets in order from shortest year to longest year				
place the planets in order from smallest size to largest size				
place the planets in order from least dense to most dense				
place the planets in order from least amount of planetary satellites to most amount of planetary satellites				



2. **Using Patterns:** Compare the number of planetary satellites to the diameter, location from the Sun, and the density. Which characteristic do you think has the most influence on how many planetary satellites an outer planet will have?

3. Why do you think the characteristic you choose in question 2 has more influence on the number of planetary satellites than the other characteristics? Explain.

4. Thinking beyond the table, what is another factor that could be influencing the number of planetary satellites the outer planets have? Explain.



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