

LIGHT- GUIDED NOTES ON LIGHT SOURCES AND REFLECTION

Our major light source is _____.

Natural light sources:

Artificial light sources:

Objects that are not light sources _____ light from other sources.

Light travels VERY FAST, around _____.

Light travels _____ than sound.

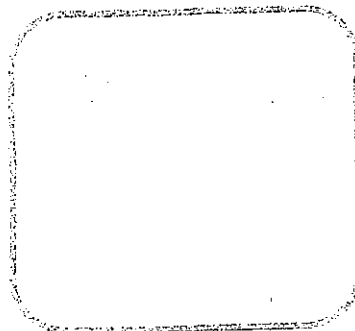
We see things because they _____ light into our eyes.

Light rays travel in _____ from the light source.

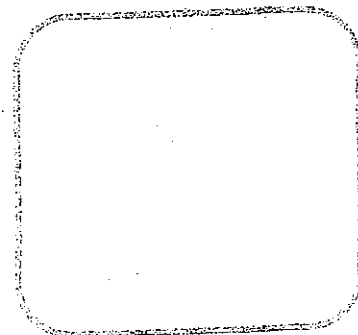
Draw what the straw looked like when you observed it through the three different surfaces:



CLEAR CUP
TRANSPARENT



FROSTED GLASS
TRANSLUCENT



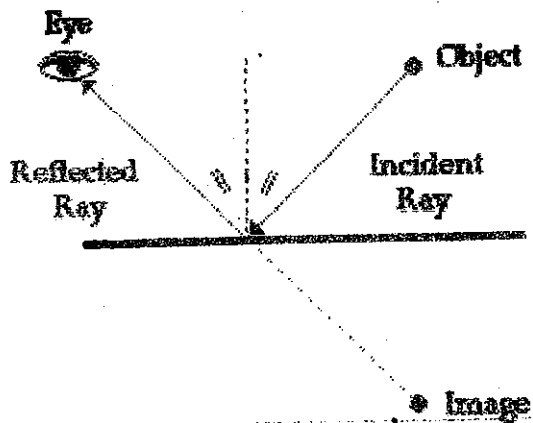
STYROFOAM CUP
OPAQUE

When light hits a transparent object, light rays _____.

When light hits a translucent object, some light rays can pass through but the rest will be _____.

When light hits an opaque object, some light is _____ and some light is _____.

LAW OF REFLECTION:



The angle of incidence is always _____ to the angle of reflection.

Smooth shiny surfaces have a _____ reflection.

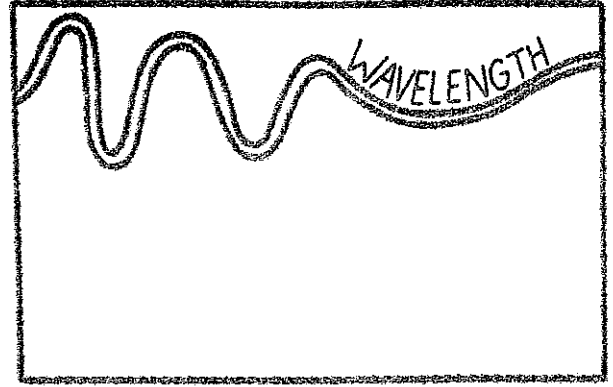
Rough, dull surfaces have a _____ reflection. In diffuse reflection, light scatters in different directions.

If light rays are blocked by an opaque object, a _____ forms where the light cannot reach.

If the light source is moved closer to the object, _____ light is blocked and a _____ shadow is formed.

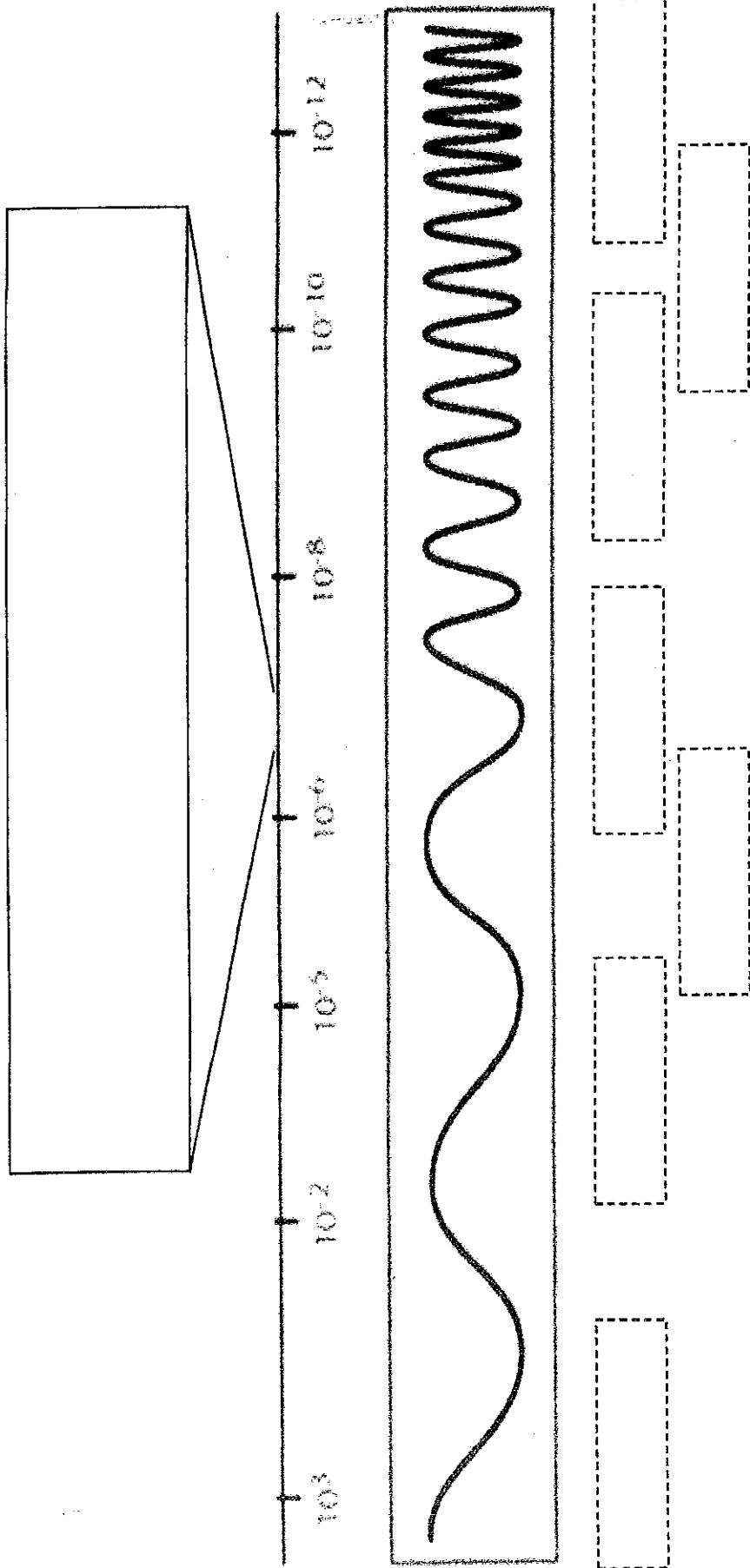
THE ELECTROMAGNETIC SPECTRUM

WHAT IS THE ELECTROMAGNETIC SPECTRUM?



HOW DO *scientists* USE THIS INFO? ↓

Long wavelength =			= High energy			
RADIO	MICROWAVE	INFRARED	VISIBLE	ULTRAVIOLET	X-RAY	GAMMA RAY
↓	↓	↓	↓	↓	↓	↓



Directions:

1. Cut out and paste terms in correct location on electromagnetic spectrum.
2. Color in the visible light spectrum with the proper order of color wavelengths.
3. Paste into Science Interactive Notebook.

Microwaves

Infrared

Visible Light

Radio waves

Gamma Rays

X Rays

Ultraviolet

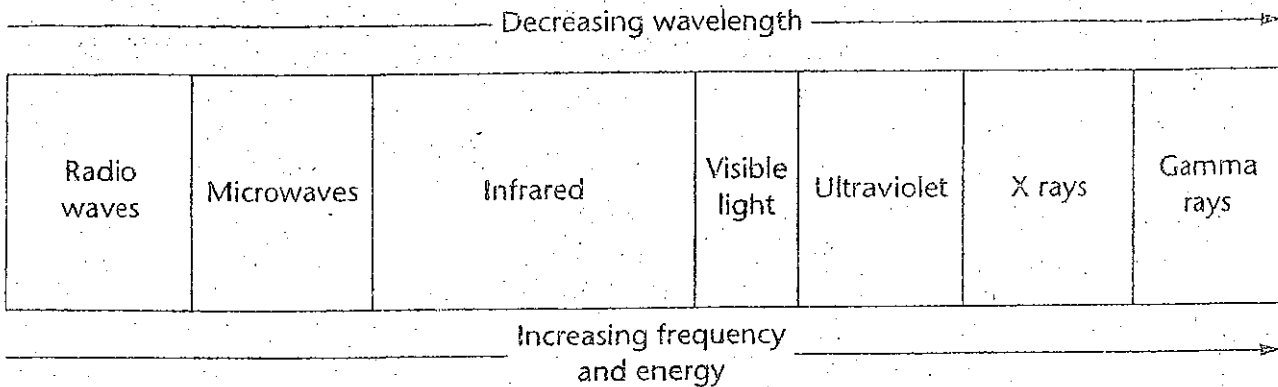


CHAPTER 18

Study Guide for Content Mastery

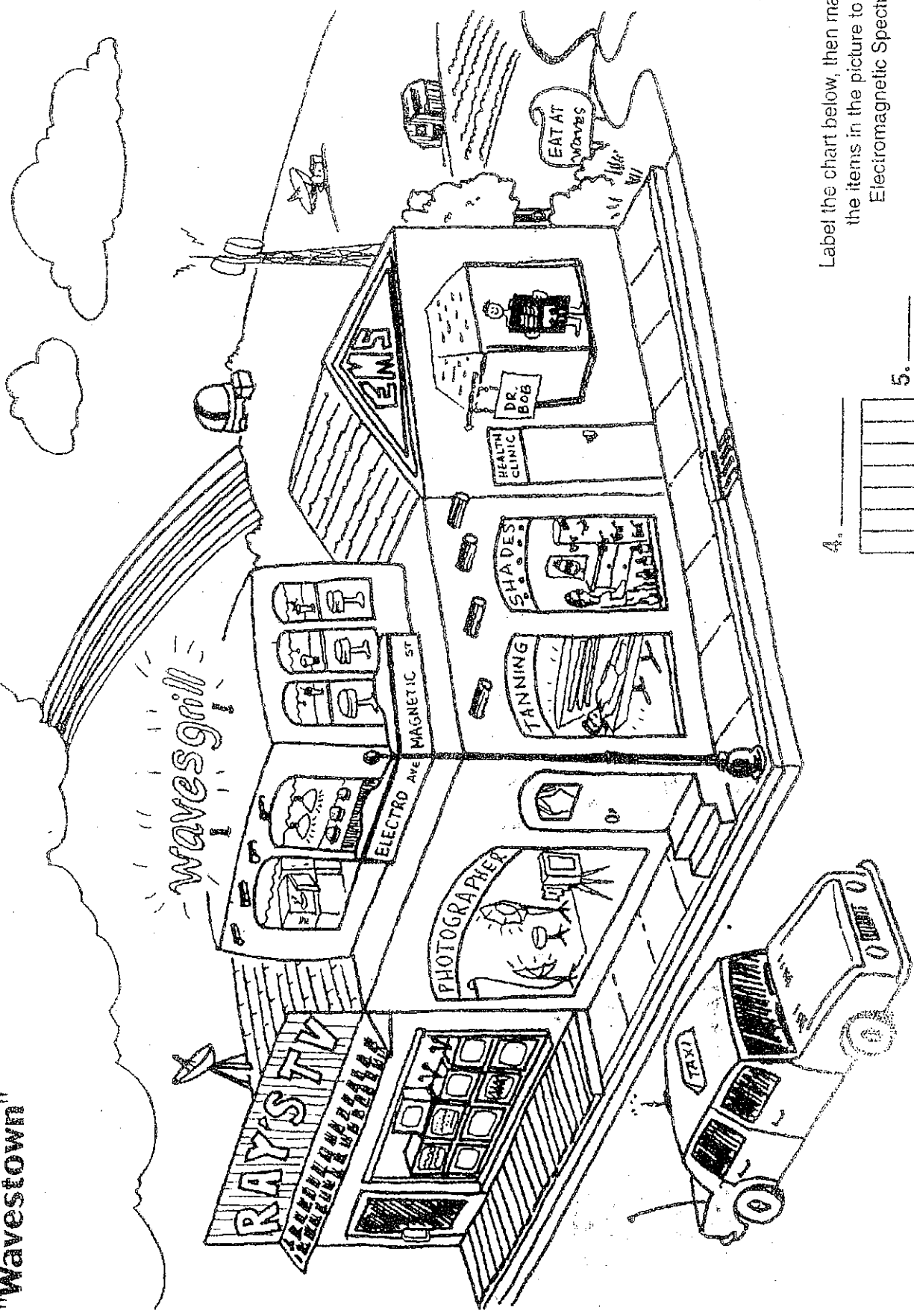
Section 18-1 Properties of Light

Directions: Use the diagram to answer the questions below.

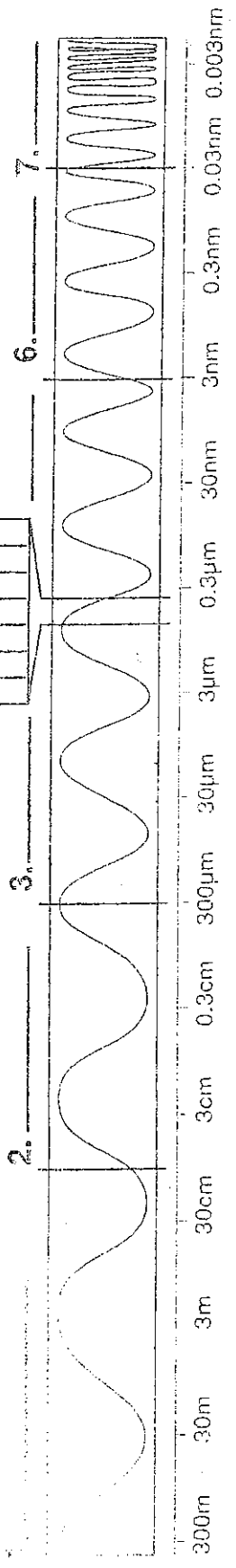


1. These waves carry the least amount of energy.
2. These waves carry more energy than radio waves but less than infrared waves.
3. These invisible waves are sensed as heat.
4. These waves have the highest frequency.
5. Exposure to these waves over a long period of time can cause skin cancer.
6. The only part of the electromagnetic spectrum that humans can see
7. These waves, which are used in medicine, can penetrate skin but not bone.

"Wavestown"



Label the chart below, then match the items in the picture to the Electromagnetic Spectrum



NAME: _____
DATE: _____
PERIOD/TEAM: _____

Exploring Light Stations

Part 1

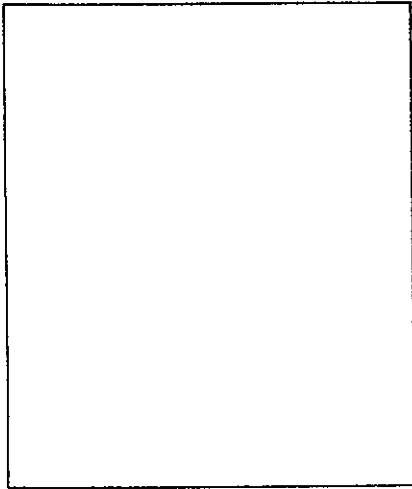
Purpose: To explore refraction using water

Materials: Pencil, Beaker, Water

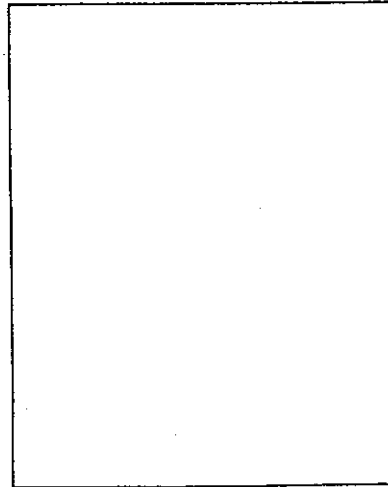
Procedure:

1. Fill the beaker 2/3rds full of water and take it to your group.
2. Place the pencil in the glass holding it straight up and down, not at an angle.
3. Sketch the pencil's appearance as it appears through the side of the beaker in the box below labeled "**straight**".
4. Place the pencil so that it leans against the side of the beaker at an angle. Now look through the side of the beaker and sketch the pencil as it appears in the box below labeled "**angle**".

STRAIGHT



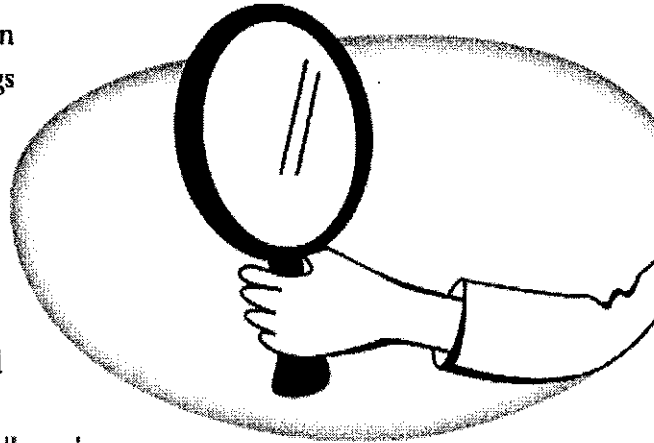
ANGLE



5. You should have noticed that the pencil appears to be "broken" when viewed at an angle through the glass. Think about how waves of energy travel differently through solids, liquids, and gases in terms of their speed. Based on this fact, what do you think causes the pencil to look broken?

Can It Reflect Light?

What types of objects or materials can reflect light? Put an X next to the things you think can reflect light.



- | | | |
|-----------------------------------------|------------------------------------------|--------------------------------------------------------|
| <input type="checkbox"/> water | | |
| <input type="checkbox"/> gray rock | | |
| <input type="checkbox"/> leaf | | |
| <input type="checkbox"/> mirror | <input type="checkbox"/> dull metal | |
| <input type="checkbox"/> glass | <input type="checkbox"/> red apple | |
| <input type="checkbox"/> sand | <input type="checkbox"/> rough cardboard | |
| <input type="checkbox"/> potato skin | <input type="checkbox"/> the Moon | <input type="checkbox"/> milk |
| <input type="checkbox"/> wax paper | <input type="checkbox"/> rusty nail | <input type="checkbox"/> bedsheet |
| <input type="checkbox"/> tomato soup | <input type="checkbox"/> clouds | <input type="checkbox"/> brand new penny |
| <input type="checkbox"/> crumpled paper | <input type="checkbox"/> soil | <input type="checkbox"/> old tarnished penny |
| <input type="checkbox"/> shiny metal | <input type="checkbox"/> wood | <input type="checkbox"/> smooth sheet of aluminum foil |

Explain your thinking. Describe the "rule" or the reasoning you used to decide if something can reflect light.

Name:
Core:
Date:

Check List for Light Activity

Objects	Transparent	Translucent	Opaque	What Colors Are being Absorbed	What Color Is being Reflected	Is Light Being Transmitted	
1.						Y	N
2.						Y	N
3.						Y	N
4.						Y	N
5.						Y	N
6.						Y	N
7.						Y	N
8.						Y	N
9.						Y	N
10.						Y	N

Questions:

1. What happens to the light that strikes and object?
2. What determines the color of an opaque, transparent, or translucent object?
3. How does a straw seen through a transparent glass compare with a straw seen through a translucent glass?
4. During the activity were there any outcomes different then your expected results? If YES please explain which ones, if NO what objects around the room might have different results then you think?

Light

Choose a word from the box below to complete each sentence correctly.

reflection	absorbed	light ray	translucent	color
opaque	refraction	reflected	medium	transparent

- When light strikes an object and bounces off, it is called _____.
- A narrow beam of light that travels in a straight line is a _____.
- A _____ is the material a wave travels through.
- Each different _____ of light is a different wavelength.
- Only some light can pass through _____ material. Objects on the other side of the material can be seen but not clearly.
- Light can pass through _____ material. Objects on the other side of the material can be seen clearly.
- No light can pass through _____ material. An object on the other side of the material can't be seen.
- The colors we see are the colors _____ by an object.
- Our eyes cannot see the colors of visible light that are _____ by an object.
- During _____ light changes speed and bends.

Write your responses in the blanks below.

- When an object absorbs all light waves, what color does it appear to be? _____
- When an object reflects all light waves, what color does it appear to be? _____
- Write an example of an object that is opaque. _____
- Write an example of an object that is translucent. _____
- Write an example of an object that is transparent. _____

Write reflection or refraction in each blank to indicate which light behavior is described.

- _____ You are wading in the ocean and you see a seashell. When you reach into the water to pick up the shell from the ocean floor, the shell is not where you thought it would be.
- _____ You quickly get a sunburn while snow skiing on a sunny day.
- _____ When you are driving a car on a foggy night, you find it harder to see when you turn on your high beams.
- _____ A beam of white light passes through a prism then spreads out to reveal colors.

MATCH-UP

Match each term on the left to the best example on the right.

- | | |
|------------------------------|-------------------------------------------------|
| 1. Absorption | A scarf that filters some light, but not all |
| 2. Reflection | Light rays hit a camera lens and bend |
| 3. Transparent Material | Sunlight falls on black pavement, making it hot |
| 4. Translucent Material | A gas, such as oxygen |
| 5. Opaque Material | Light falls on a mirror and bounces off |
| 6. Refraction | Ultraviolet light |
| 7. Medium | A piece of clear glass |
| 8. Electromagnetic Wave Type | A piece of brown construction paper |

Name _____

The Eye

Use the words from the list below to label the following diagram of the eye in the lines provided.

Word Bank

Anterior Chamber - Choroid - Cornea - Fovea - Iris - Lens

Optic Nerve - Pupil - Retina - Sclera - Vitreous Humor

Below is a list of different parts of the eye. On the lines following each word, write out what that structure does for the neuron (its function) and where it is located on the neuron.

Aqueous Humor: _____

Cones: _____

Cornea: _____

Iris: _____

Lens: _____

Pupil: _____

Retina: _____

Rods: _____

Vitreous Humor: _____

[\[Answer Sheet\]](#) | [\[Back to Worksheets\]](#)

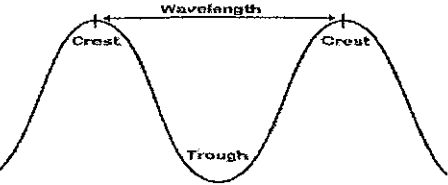
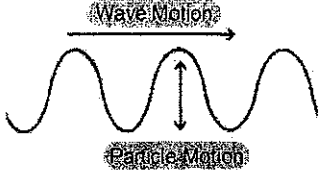
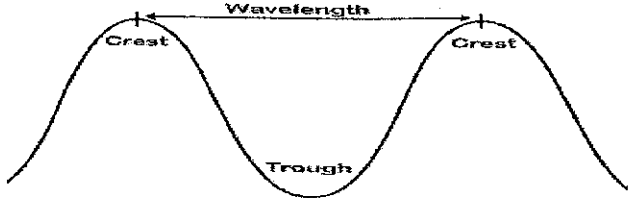
EYE DISSECTION LAB REPORT

1. Describe the path that light takes through the eye to eventually form a signal that our brain interprets as an image. Use the words below.

CORNEA, LENS, PUPIL, RETINA, BRAIN, OPTIC NERVE, CONES, RODS

2. Did you learn anything from this dissection that you would not have been able to learn from just looking at a diagram? Explain.
3. Did you enjoy the cow eye dissection? Why or why not?

Light Study Guide

<p>What is light?</p>	<p>Light is fast moving electromagnetic radiation that travels in straight paths and is made of tiny photons.</p>
<p>How is the size of a light wave measured?</p>	 <p>The size of a light wave is determined by its wavelength.</p>
<p>What are transverse waves?</p>	<p>Waves that oscillate (move up and down) in a way that is opposite to the direction of energy travel.</p> 
<p>How does the frequency of a wave affect the amount of energy it has?</p>	<p>Frequency is the # of waves passing a given point each second. High frequency light has high energy and low frequency light has low energy.</p>
<p>Sort the following from most energy to least energy (see electromagnetic spectrum): Infrared, Visible light, Radio waves, X-ray, Gamma ray</p>	<p>Gamma, X-ray, Visible light, Infrared, Radio</p>
<p>Sort the colors of visible light in order from least energy to most energy.</p>	<p>Red, Orange, Yellow, Blue, Violet (ROYGBV)</p>
<p>What are the parts of a transverse wave?</p>	
<p>What is the electromagnetic spectrum?</p>	<p>Its shows the entire range of electromagnetic radiation from high energy to low energy.</p>
<p>Are black and white spectral colors?</p>	<p>No. Black is when a material absorbs all visible light and white is a reflection of all visible light.</p>

Study Guide: Sound and Light

1. A _____ is any disturbance that transmits energy through matter or space. The maximum distance a wave _____ from its rest position is called _____. The distance between _____ or _____ in a wave is called _____. The number of waves produced in a second is called the _____: 1 Hertz = 1 wave per _____.

2. Sound is created by _____ that move through air or water. The range of _____ is between 20 Hz and 20,000 Hz. Sounds below 20 Hz are called _____ while sounds above 20,000 Hz are called _____. Sound is measured in _____ or dB.

3. When a wave bounces back after hitting a surface, it is called _____ or an _____ if it is a sound wave. _____ occurs when a light wave is bent. Starlight traveling near the Sun is an example of this. When an object _____ at or near the same _____ as another object it is called _____. The _____ occurs when a sound changes frequency as a sound moves away or toward the listener.

4. Light is an _____ wave made of changing electric and magnetic fields. _____ are produced by the _____ of an electrically charged particle. A _____ is tiny piece of energy released when an _____ changes energy levels.

5. If light passes through a substance easily it is _____ while if the light _____ it is _____. If no light passes through, the substance is _____. We see _____ when part of the light _____ is reflected back to the eye while others are _____.

- vibrates
- troughs
- wave
- second
- crests
- wavelength
- frequency
- amplitude

- infrasonic
- human hearing
- decibels
- vibrations
- ultrasonic

- echo
- vibrates
- refraction
- reflection
- Doppler Effect
- resonance
- frequency

- EM waves
- vibration
- electromagnetic
- photon
- electron

- colors
- opaque
- absorbed
- spectrum
- translucent
- transparent
- scatters