

# Crave the Wave, Wifi Lab & Sounds of Music Notes

## Use with Property of Waves Powerpoint

Name \_\_\_\_\_ Period \_\_\_\_\_

### Waves

A disturbance that transfers \_\_\_\_\_ from place to place.

Energy is the ability to do \_\_\_\_\_.

Example: The energy carried by a wave can lift a large ship. \_\_\_\_\_

### What Causes Waves

Waves are generated when a source of \_\_\_\_\_ forces the matter in a medium to vibrate.

\_\_\_\_\_ - A repeated back-and-forth or up-and-down motion.

### Mechanical Waves

Waves that must travel through a medium.

Examples of waves through media:

Ocean waves travel through \_\_\_\_\_ (liquid)

Sound waves travel through \_\_\_\_\_ (gas)

A wave can travel along a \_\_\_\_\_ (solid)

### Electromagnetic Waves

Example: Waves that can travel through empty space

X-rays

\_\_\_\_\_

Microwaves

\_\_\_\_\_

\_\_\_\_\_



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### **Properties of Waves**

#### **Amplitude**

The distance from the rest position to a crest or to a trough in a \_\_\_\_\_ wave.

A measure of how compressed or rarefied the medium becomes in a \_\_\_\_\_ wave.

#### **Wavelength**

The distance between two \_\_\_\_\_ parts of a wave.

Crest to crest or trough to trough in \_\_\_\_\_ waves.

Distance from one compression to the next in \_\_\_\_\_ waves.

#### **Frequency**

The number of complete waves that pass a given point in a certain amount of \_\_\_\_\_

Number of \_\_\_\_\_ per second

Measured in units called \_\_\_\_\_ (Hz)

1 vibration per second = \_\_\_\_\_

#### **Speed**

How far the wave travels in one unit of \_\_\_\_\_, or \_\_\_\_\_ divided by time.

The speed, wavelength, and frequency of a wave are related to each other by mathematical formulas.

Unit for speed is meters per second, or m/s

\_\_\_\_\_ = Wavelength x Frequency

\_\_\_\_\_ = Speed / Wavelength

\_\_\_\_\_ = Speed / Frequency

# Crave the Wave, Wifi Lab & Sounds of Music Notes

*Use with Sound Waves Powerpoint*

Name \_\_\_\_\_ Period \_\_\_\_\_

## **Sound**

\_\_\_\_\_ that travel through the air or other media

When vibrations reach the air near your ears, you hear \_\_\_\_\_.

## **How Sound Travels**

Sound waves carry \_\_\_\_\_ through a medium (solid, \_\_\_\_\_, \_\_\_\_\_) without the particles of the medium traveling along.

Sound travels as a \_\_\_\_\_ wave.

## **How Sounds are Made**

Longitudinal waves are generated when a source of energy forces the matter in a medium to \_\_\_\_\_.

This back-and-forth motion pushes air particles together, generating a \_\_\_\_\_ or moves the particles apart, generating a \_\_\_\_\_.

## **Medium**

Sound waves must have a medium to travel through.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

In outer space there are no molecules to compress or rarefy. So sound does \_\_\_\_\_ travel through outer space.

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## Use with Sound Waves Powerpoint

### **Speed of Sound**

Depends on the \_\_\_\_\_ of the medium it travels through.

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At room temperature, sound travels through air at about \_\_\_\_\_ m/s.

### **Physical Properties of Media**

Elasticity - the ability of a material to \_\_\_\_\_ back after being disturbed

\_\_\_\_\_ materials are usually more elastic than liquids or \_\_\_\_\_.

Particles of a \_\_\_\_\_ do not move very far so they bounce back and forth quickly as the

vibration travels through the object, allowing \_\_\_\_\_ motion.

Density – how much \_\_\_\_\_ there is in a given amount of space

The \_\_\_\_\_ of sound depends on how close together the particles of the substance are in the medium.

Temperature – degree or intensity of \_\_\_\_\_ present in a substance or object

In a given media (solid, liquid, gas), sound travels more \_\_\_\_\_ at \_\_\_\_\_ temperatures.

### **Properties of Sound Waves**

Intensity

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## Use with Sound Waves Powerpoint

Intensity – the amount of energy the wave carries per second through a unit of area.

\_\_\_\_\_ increases with increased energy

Measured in \_\_\_\_\_ per square meter \_\_\_\_\_

Loudness – describes what you actually hear.

Though not the same as \_\_\_\_\_, the greater the intensity of a sound wave, the louder it is.

Measured in \_\_\_\_\_ (dB)

Maximum \_\_\_\_\_ level is 85 dB

Frequency – the \_\_\_\_\_ of vibrations that occur per second

\_\_\_\_\_ changes with frequency

Measured in \_\_\_\_\_ (Hz)

50Hz = 50 vibrations per sec.

Pitch – a description of how \_\_\_\_\_ or \_\_\_\_\_ the sound seems to a person.

High frequency = \_\_\_\_\_ pitch

Low frequency = \_\_\_\_\_ pitch

### **Doppler Effect**

The apparent change in \_\_\_\_\_ as a wave source moves in relation to the listener

Sound moving toward a person – Waves are at a \_\_\_\_\_ frequency, so pitch appears to increase (High)

Sound moving away from a person – Waves are at a lower frequency, so pitch appears to

\_\_\_\_\_ (Low)

# Crave the Wave, Wifi Lab & Sounds of Music Notes

*Use with Visible Light Powerpoint*

Name \_\_\_\_\_ Period \_\_\_\_\_

## **Visible Light**

The part of the \_\_\_\_\_ spectrum, between infrared and ultraviolet, that is \_\_\_\_\_ to the human eye.

Shorter waves - \_\_\_\_\_ frequency and energy

Longer waves - \_\_\_\_\_ frequency and energy

## **Visible Light Spectrum**

Produced when light passes through a \_\_\_\_\_, slowing the wavelength into each separate \_\_\_\_\_.

ROY G BIV - \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, blue, \_\_\_\_\_, violet

## **Colors**

We see these waves as the colors of the \_\_\_\_\_.

Each color has a different \_\_\_\_\_ and \_\_\_\_\_.

Red has the \_\_\_\_\_ wavelength and \_\_\_\_\_ frequency.

Violet has the \_\_\_\_\_ wavelength and \_\_\_\_\_ frequency.

Seen together, they make \_\_\_\_\_ light.

## **Visible Objects**

For an object to be visible it must \_\_\_\_\_ its own light or \_\_\_\_\_ light.

Produces own light - \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Reflects light - \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

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*Use with Visible Light Powerpoint*

## **Vocabulary**

\_\_\_\_\_ - a material that reflects or absorbs all of the light that strikes it. \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_ - transmits light \_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ - scatters light as the light passes through

\_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_

## **How Light Travels**

Light travels in \_\_\_\_\_ lines.

This straight line motion can be:

Reflected

\_\_\_\_\_

\_\_\_\_\_

Absorbed

## **Reflection**

Occurs when parallel rays of light hit a \_\_\_\_\_ surface.

All the rays are reflected at the same \_\_\_\_\_.

Law of \_\_\_\_\_: the angle of reflection equals the angle of incidence.

Angle of \_\_\_\_\_ - measure of the angle of a ray to the surface normal (90° to the surface)

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## *Use with Visible Light Powerpoint*

### **Refraction**

When light waves enter a new medium at an angle, their \_\_\_\_\_ changes.

The change in speed causes them to \_\_\_\_\_, or change direction.

Index of \_\_\_\_\_ - a measure of how much a ray of light bends when it enters that material.

### **Refraction cont.**

#### Lenses

When light traveling in straight parallel lines passes through an object that is

\_\_\_\_\_ like a lens, the light is refracted at different angles.

\_\_\_\_\_ or converging lenses bend light toward a central focal point.

\_\_\_\_\_ or divergent lenses bend light outward away from a focal point.

### **Absorption**

Light does not pass through or reflect from material, but remains in the material as \_\_\_\_\_.

What happens to the black surface?

### **Color of Objects**

Color - Objects reflect colored light that is not \_\_\_\_\_.

We see objects color as the reflected color.

### **Colors of Light**

Primary

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

When combined in equal amounts, primary colors produce \_\_\_\_\_ light.

If combined in \_\_\_\_\_ amounts, they can produce any other color.

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## **Colors of Light (cont.)**

Secondary

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Primary colors combined in varying amounts.

Complementary – form when a primary color and a \_\_\_\_\_ color

combine to make white.

Yellow and blue = white

## **Brightness**

A relative expression of the \_\_\_\_\_ of the energy output of a visible light source.

Brightness is determined by the light wave's \_\_\_\_\_.

The \_\_\_\_\_ the amplitude, the \_\_\_\_\_ the light.

\_\_\_\_\_ from light source also affects brightness.