**![C:\Users\Shelley\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\D0H1HR50\MC900064950[1].wmf]()Sound and Light Study Guide**

**Sound**

**Sound** is a form of energy that travels through the air. It is made when something vibrates. The vibrations cause sound waves that travel through the air as waves. Sound CANNOT travel through empty space.

**How is sound produced and how does it travel?:** Sound is made of vibrations- the back-and-forth movement of matter. They cause the air to vibrate and make the sound that you hear. Any kind of matter can be made to vibrate and carry sound. Sound CANNOT travel in space though because there is no air or matter to carry it.

**Speed of Sound-** Sound is fast. In dry air the speed of sound is 1100 feet per second. The speed of sound depends on the medium through which it is moving. Sound travels faster in warm air, solids, and liquids. It is slower in cold air and gases.

**What are the qualities of sound?**

|  |  |
| --- | --- |
| **Name** | **Definition** |
| **amplitude** | **The height of a sound wave** | **Taller waves are louder, shorter waves are softer.** |
| **frequency** | **The number of vibrations per second.**  | **High frequency = higher number of vibrations = higher pitch**  |
| **loudness/****softness** | **The volume of a sound.** | **The taller –higher- the wave, the louder the sound.** |
| **pitch** | **This is how high or low a sound seems. A bird makes a high pitch. A lion makes a low pitch.** | **A low pitch has a long wavelength. A high pitch has a short wavelength.** |
| **sound wave** | **The way sound travels in an up and down motion.** | **The wave can differ in height (Amplitude) and length (wavelength.) Changes in amplitude and wavelength will change the quality of the sound.** |
| **tone** | **A musical sound having a definite pitch.** |  |
| **vibration** | **A quick back and forth movement of matter.** | **The number of vibrations will change the pitch.** |
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| **volume** | **The loudness of a sound.** | **The height of the wave shows the loudness.** |
| **wavelength** | **The length of the wave- the distance from crest to crest.** | **The length of the wave determines the pitch.** |

 





**High Pitch Low Pitch**

**Technology and Hearing-** Many people with hearing problems benefit from sophisticated hearing aids. In addition, scientists have developed a type of bionic ear called a cochlear implant. This device has allowed many people to regain their ability to hear.

**![C:\Users\Shelley\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6SMN3837\MM900254441[1].gif]()Light**

**Light** is a form of energy. Light rays normally travel in straight lines. Unlike sound, light can travel through empty space. It is very fast…..very, very fast !!!!!!!!!!! It travels at about **186,000 thousand miles per second!** (That would be about 1, 860 trips to Atlanta in one second!) **Question**: Do we hear the thunder or see the lightening first? WHY???

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**Absorption, Reflection, Refraction**

When light hits an object, the object affects the path of the light. An object can absorb some or all of the light, make it bounce off, or let it pass through.

**Absorbing light**- Objects of different colors absorb different amounts of light. Dark objects absorb more light than light colored objects. That is why dark colored clothes keep you warmer on a bright summer day.

**Reflecting light**- the bouncing of light from the surface of an object. The reflected light reaches your eyes and lets you see the object.

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**Refracting light**- The bending of light as it moves from one object to another. The speed of the light changes and the object can look like it is in two parts. Example: Flower stem in water.

**Concave Lens, Convex Lens, and Prisms**

|  |  |  |
| --- | --- | --- |
| **Concave Lens** | A lens that is thicker at its edges than at the center. Spreads light waves apart. Makes objects appear smaller. Example: camera viewfinder lens | **http://www.hscripts.com/freeimages/icons/instruments/concave-lens/concave-lens3.gif** |
| **Convex Lens** | A lens that is thicker at the center than at the edges. Brings light waves together. Makes objects appear bigger. Example: Magnifying glass | **http://www.hscripts.com/freeimages/icons/instruments/convex-lens/convex-lens3.gif** |
| **Prism** | A transparent solid body, often having triangular bases, used for spreading light into a spectrum. | prism (in... |

**How light travels through an object that is:**

|  |  |  |
| --- | --- | --- |
|  | **Definition** | **Example** |
| **opaque** | **No light travels through it.**  | **wood** |
| **translucent** | **Allows some light to pass through it.** | **wax paper** |
| **transparent** | **Allows light to pass through it.**  | **glass** |

**![C:\Users\Shelley\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\M4OK3D75\MC900440406[1].png]()Rainbows- ROY G BIV--**The white light from the sun contains the colors we can see. When there is rain, sunlight passes through drops of water in the air. The light refracts as it enters and leaves the water droplets. The droplets act like tiny prisms. Each color bends in a slightly different way. The colors separate and form a rainbow. The order of the colors is: Red, Orange, Yellow, Green, Blue, Indigo, Violet

**Color**-The color of an object is determined by what colors an object reflects. Grass appears green because all of the colors in the rainbow are absorbed into the leaves of the grass except green. We see the green color that is reflected. We do not see the other colors because they were absorbed.

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