**Waves: Sound and Light Unit Book List**

Waves

1. Waves: The Electromagnetic Universe by Gloria Skurzynski
2. Waves: From Surfing to Tsunami by Drew Kampion
3. How Do Waves Form? by Wil Mara

Sound

1. Changing Sounds by Peter Riley
2. Sound & Vibration by Gerard Cheshire
3. Sound by Simon de Pinnacle
4. Exploring Sound by Ed Catherall
5. Investigating Sound by Sally M. Walker
6. Sound Waves by Ian F. Mahaney
7. Secrets of Sound by April Pulley Sayre

Light

1. LIGHT Investigating Visible and Invisible Electromagnetic Radiation by Bhris Woodford
2. Investigating Light by Sally M. Walker
3. Light by Ian F. Mahaney
4. Eyewitness Science: Light by David Burnie
5. Light Fundamentals by Robert W. Wood
6. The Facts About Light by Rebecca Hunter
7. Light and Seeing by Peter Riley
8. Animal Eyes by Beth Fielding
9. Flicker Flash by Joan Bransfield Graham

Inventions

1. How the Future Began: Communications by Anthony Wilson
2. Eureka! Great Inventions and How They Happened by Richard Platt
3. Great Inventions: Microscopes and Telescopes by Rebecca Stefoff
4. Close Encounters: Exploring the Universe with the Hubble Space Telescope by Elaine Scott

General Readings

1. Funtastic Science Activities for Kids by Robert W. Wood
2. Discover Light and Sound by Francis Reddy

**Waves: Sound and Light Unit App List**

Sound

Lesson 2: Video Physics, String

Lesson 3: String, Explain Everything

Extension apps if there is time:

GarageBand: Used to record and mix sounds. Students can explore the different sounds and effects created by different instruments.

Sketch Explorer page 3: Students can view the relationships between the amplitude and frequency of a wave and the sound this wave creates.

Exploratorium: Sound: Students can explore various other applications, properties, and cool facts about sound.

n-Track Tuner: Students can use this app to compare the pitches of different sounds.

Light

Lesson 4: Bobo & Light

Lesson 5: Bobo & Light

Extension apps if there is time:

Bobo & Light: Students can explore various other applications, properties, and cool facts about light.

Creatures of Light: Students can explore the properties of and examples of bioluminescence.

Exploratorium: Color: Students can explore various other applications, properties, and cool facts about color.

Munsell DG: Used to compare different shades of color and to see the make-up of each color.

Presentation apps

Explain Everything: Used to make presentations that can include other media and has a record and drawing function.

VideoPix: Used to record and then analyze a video for the path of motion of an object in the recorded video.

iMotion HD: Used to record and edit, frame by frame, a video or series of photos like in stop motion.

Animator: Used to make flip books to present information.

Snapguide: Used to make how-to presentations, includes pictures and materials.

Notability: Used to take notes for presentations.

**Waves Unit Vocabulary**

**Sound/Ears Vocabulary**

**Amplitude** – The height from the resting position to the crest of the transverse wave. *(Lesson 3)*

**Cochlea** – The part of the ear that is filled with a watery liquid, which moves in response to the vibrations coming from the middle ear. As the fluid moves, thousands of “hair cells” are set in motion and covert that motion to electrical signals that are communicated via neurotransmitters to many thousands of nerve cells. *(Lesson 6)*

**Crest** – The highest part of a transverse wave. *(Lesson 3)*

**Eardrum** – The part of the ear that transmits sound from the air to the ossicles in the middle ear. *(Lesson 6)*

**Inner Ear** – The innermost part of the ear, which houses the cochlea and a system for balance. *(Lesson 6)*

**Longitudinal Wave** – A wave that moves across a medium in a direction parallel to the direction in which the wave travels. *(Lesson 2)*

**Medium** – A substance – solid, liquid, or gas – through which something can travel. *(Lesson 1)*

**Middle Ear** – The part of the ear that transmits energy from sound waves in the air to fluid-membrane waves in the cochlea. The middle ear houses the eardrum and ossicles. *(Lesson 6)*

**Ossicles** – The three smallest bones in the human body. They are located in the middle ear. *(Lesson 6)*

**Pinna** – The visible part of the ear that resides outside of the head and collects sound waves. *(Lesson 6)*

**Pitch** – A measure of the speed of the vibrations. Faster vibrations create a high pitch while slower vibrations create a low pitch. *(Lesson 4)*

**Sound** – Vibrations that travel through air or another medium and can be heard when they reach an ear. *(Lesson 4)*

**Transverse Wave** – A wave that moves across a medium in a direction perpendicular to the direction in which the wave travels. *(Lesson 2)*

**Trough** – The lowest part of a transverse wave. *(Lesson 3)*

**Wave** – A disturbance in a medium that transfers energy from place to place. *(Lesson 1)*

**Wavelength** – The distance between one crest and the next in a transverse wave. *(Lesson 3)*

**Light/Eyes Vocabulary**

**Absorption** – When light enters a medium and is retained rather than reflected. *(Lesson 5)*

**Angle of incidence** – The angle at which a ray of light strikes a mirror. *(Lesson 3)*

**Angle of reflection** – The angle at which a ray of light leaves a mirror. *(Lesson 3)*

**Ciliary muscle** – Controls the shape of the lens. *(Lesson 6)*

**Color** – A property of visible light waves that is determined by its wavelength. *(Lesson 5)*

**Concave lens** – A lens that is thinner at the center and thicker at the edges and causes rays of light to spread out when they pass through. *(Lesson 6)*

**Cones** – Allows the eye to sense color. There are three types, one for each of the primary subtractive colors (red, green, and blue). *(Lesson 6)*

**Convex** **lens** – A lens that is thicker at the center and thinner at the edges and causes rays of light to converge when they pass through. *(Lesson 6)*

**Cornea** – Outermost transparent layer of the eye, begins the focusing process. *(Lesson 6)*

**Iris** – Controls the size of the pupil. The part of the eye that is colored. *(Lesson 6)*

**Lens** – A curved piece of glass whose shape causes light to bend. *(Lesson 6)*

**Lens (part of eye)** – Focuses image of objects. *(Lesson 6)*

**Light** – A form of energy that travels as a wave and reflects off of objects into our eyes, allowing us to see. *(Lesson 1)*

**Luminous objects** – Objects that directly emit light; light source. *(Lesson 1)*

**Non-luminous objects** – Objects that can only be seen when they reflect light from a light source. *(Lesson 1)*

**Opaque** – Allows no light to pass through. *(Lesson 2)*

**Optic nerve** – Transmits information to the brain. *(Lesson 6)*

**Pigment** – A property of an object that is determined by the wavelengths of light that it reflects. *(Lesson 5)*

**Pupil** – Opening to the inner eye. *(Lesson 6)*

**Reflection** – When light hits a surface and bounces back. *(Lessons 3, 5)*

**Refraction –** The bending of a light wave caused by a change in the speed of light when moving through different mediums. *(Lesson 4)*

**Retina** – Contains cells that detect light. *(Lesson 6)*

**Rods** – Allows the eye to sense black, white, and gray light. *(Lesson 6)*

**Shadow** – A dark area created when something blocks light. *(Lesson 2)*

**Translucent** – Allows some light to pass through. *(Lesson 2)*

**Transparent** – Allows light to pass through completely; clear. *(Lesson 2)*