Physics: Flash! (Wave Motion & Optics)
Syllabus

Students continue their study of physics by exploring the properties of wave motion and optics, including the characteristics of sound and light. The class will examine types, properties, and movement of waves, and special features of sound waves such as compression, loudness, pitch, and speed. With a conceptual understanding of wave qualities, students will next explore the properties of light including the visible spectrum and colors. The class will learn about lenses and prisms while discussing mirrors, concave and convex surfaces, reflection, refraction, and diffraction. Finally, the class will be introduced to the electromagnetic spectrum and scientific uses of the spectroscope.

Each class begins with a brief lesson, demonstrations, and includes one or more hands-on activities, labs, or experiments to illustrate the day's concepts. Course themes include: waves: type, properties, velocity, sound waves, characteristics of sound, light spectrum, visible light, behavior of light, mirrors and lenses, reflection, refraction, and diffraction.

Week 1: Waves
- Types of waves: transverse and longitudinal
- Properties of waves
- Velocity of waves

Week 2: Properties and propagation of sound waves
- Compression waves
- Characteristics of sound: loudness, speed and pitch

Week 3: Standing waves
- Reflection of waves
- Traveling waves
- Superposition of waves

Week 4: Behavior of light
- The visible spectrum
- Introduction to the behavior of light
- What is color?

Week 5: Reflection
- Flat mirrors
- Concave and convex mirrors
- Exploring reflection with a periscope

Week 6: Refraction
- Flat lens
- Converging and diverging lenses
- Exploring refraction with a telescope

Week 7: The Electromagnetic Spectrum

- Introduction to the electromagnetic spectrum
- Exploring the electromagnetic spectrum with a spectroscope

Week 8: Diffraction

- Introduction to diffraction
- Exploring diffraction with a pinhole camera