



# Express Science Middle School Science Physics

## Curriculum Features

*The Express Science Middle School curriculum is designed as a survey of science topics in order to provide a solid foundation in all of the Sciences. Important concepts are developed in a sequential and stepwise manner that is understandable by all students. The modules are written to increase student interaction by providing a readable, engaging, and informative instructional curriculum that is ready for use in the classroom.*

### Physics

Physics identifies and explains the interactions of matter and energy and the resulting energy transformations that occur. Physics units contain specific topics that include an explanation of mechanics, thermodynamics, electricity and magnetism, and wave interactions. Students will connect physics and mathematics to verify and explain a variety of physics principles.

Formative assessments are included with each module as a valuable instructional strategy. Summative assessments are included with each unit as a confirmation of student success.

## **A. Mechanics**

This unit contains an explanation of motion using the relationships drawn from the interaction of time, distance, velocity, and acceleration. The modules cover related topics such as speed, force, and Newton's Laws of Motion. Students will integrate mathematical applications to learn in specific detail the physics behind the mechanics of motion, such as velocity, simple machines, and gravitational force.

1. Speed
2. Velocity
3. Acceleration
4. Newton's First Law
5. Newton's Second Law
6. Newton's Third Law
7. Mass and Weight
8. Gravitational Force
9. Potential and Kinetic Energy
10. Force and Work
11. Simple Machines

## **B. Thermodynamics**

This unit describes the movement of heat by radiation, conduction, and convection. Individual modules address the types of heat movement and factors that affect the system. The students will learn thermodynamics at the molecular level and apply their understanding to the reason for insulators and energy transformations.

1. Conduction
2. Convection
3. Radiation
4. Types of Energy Transformations
5. Insulators and Conductors
6. Law of Conservation of Energy

## **C. Electricity and Magnetism**

This unit provides instruction to support the concept that electricity can be generated from a variety of sources and can be transformed into almost any other type of energy. A study of the energy interaction links electricity with magnetism. The modules address electrical transformations, circuitry, and Ohm's Law. The students will know the flow of electricity, different types of circuitry patterns, and how electromagnets harness the power of electricity.

1. Energy Transforming Devices
2. Transformations Involving Electricity
3. Conductors and Insulators
4. Series Circuits
5. Parallel Circuits
6. Ohm's Law
7. Magnetic Fields
8. Electromagnets
9. Batteries

## **D. Wave Interactions**

This unit identifies and describes the characteristics of the various types of waves. Each module explains the important concepts associated with wave types such as frequency, wavelength, amplitude, and loudness. The students will learn how waves transfer energy, how to distinguish wave types, and how to relate their knowledge to the visible spectrum, sound, and earthquakes.

1. Waves Transfer Energy
2. Wavelength
3. Frequency
4. Amplitude
5. Doppler Effect
6. Light
7. Sound
8. Earthquake
9. Pitch and Vibration
10. Frequency, Wavelength and Pitch
11. Amplitude and Loudness
12. Reflection
13. Refraction
14. Color
15. Visible Spectrum
16. How You See