

# HIGH SCHOOL PHYSICS LABS

Wednesdays, September 10-December 10 (no class Oct 15, Nov 26; 12 weeks) 11:15am-12:45pm Ages 14+

Students conduct labs related to matter, motion, changes through space and time, energy, and force to investigate fundamental concepts in physics. Students explore physics in theoretical and real-life situations to better understand relationships within this field of science. Note: Math equations will be used to illustrate relationships among variables in these labs. All lab costs are included in the registration fee.

Instructor: Ashley Blocker, BSc Location: STEM Lab (suite 21) Course fee: \$275 OR \$25/lab 10% off sibling discount

## LAB SCHEDULE:

**VELOCITY AND ACCELERATION** – Wednesday, September 10 Students use physics principles to design and build aerodynamic LEGO<sup>®</sup> cars, and determine which features of the vehicle are important in maximizing speed, velocity and acceleration.

#### MOTION IN DIMENSIONS - Wednesday, September 17

We study motion through space this week as we conduct experiments with 3dimensional projectile trajectories.

#### LAWS OF MOTION LAB – Wednesday, September 24

Students learn how work, force and energy are related using force diagrams, and build simple machines with LEGO<sup>®</sup> to demonstrate the advantage of using simple machines.

## CALCULATING FORCE – Wednesday, October 1

This week, we apply Newton's Laws to calculate force and study the effects of friction and drag with airplanes.

#### **COLLISIONS** – Wednesday, October 8

Students study linear momentum, balance and distribution of mass as they design a vehicle to protect an egg from breaking upon impact.

#### KINETIC AND POTENTIAL ENERGY – Wednesday, October 22



We experiment with kinetic and potential energy, motion and momentum, and effects of mass and force to design, construct and test a roller coaster.

### MASS AND GRAVITY LAB – Wednesday, October 29

Students explore the relationship between the forces gravity and friction as we conduct experiments and complete balance challenges designed to resist these forces.

#### **PROPERTIES OF MATTER** – Wednesday, November 5

We investigate the properties of different states of matter, observe unexpected state changes, and experiment with different elements to observe their characteristics.

#### OSCILLATIONS – Wednesday, November 12

This week, students study periodic motion, including properties of waves and oscillations of springs.

#### THERMODYNAMICS – Wednesday, November 19

Students investigate thermal properties of matter as they conduct experiments to study heat and temperature, and how these are related to energy and work.

#### **ELECTRICITY** – Wednesday, December 3

Investigate the science of circuits and currents, and how solar cells convert light into electricity.

#### MAGNETIC FIELDS – Wednesday, December 10

Students explore permanent and temporary magnets, and create electromagnets to study electric and magnetic fields.

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