

TGUP's SCIENCE LAB IN A BOX

BIOLOGY EXPERIMENTS SUPPORTED

1. DNA Extraction	Students extract DNA from fruit using mechanical and chemical techniques.
2. Classifying Plant & Animal Cells	Students compare & contrast plant and animal cells collected using plankton nets from a natural water source.
3. Solute Concentration Effect On Cells	Students will vary concentrations of solute to determine the approximate molarity of a vegetable.
4. The Cell Cycle	Students observe plant cells in different stages of the cell cycle.
5. Photosynthesis	Students submerge sprigs of freshwater plants and measure oxygen release as a function of distances from a light source.
6. Fermentation	Students will determine the rate of fermentation by yeast as a function of sugar concentration.
7. Bacterial Growth	Students will culture bacteria from different environments comparing and contrasting the growth observed from the swabs of each environment.
8. Natural Drug Discovery	Students extract compounds from a variety of plants to determine their antimicrobial properties.
9. Food Web Using Owl Pellets	Students dissect an Owl Pellet and Identify the prey species.
10. Water Quality Testing	Students look to a local freshwater source and measure pH, dissolved oxygen, nitrate, and ammonia levels to determine the health of an aquatic ecosystem.

CHEMISTRY EXPERIMENTS SUPPORTED

1. Mass, Volume and Density	Students determine the identity of an unknown metal by measuring its mass and volume then calculate its density.
2. Chemical Reactions & Limiting Reagents	Students predict and verify the yield of a chemical reaction using stoichiometry.
3. Identifying Cations	Students investigate the presence of cations found in household chemicals.
4. Acid-Base Titration	Students neutralize a hydrochloric acid solution with Sodium Hydroxide.
5. The Universal Gas Constant.	Students collect gas from a chemical reaction of Magnesium and Hydrochloric Acid, measure its temperature, volume, pressure and determine the number of moles.

CHEMISTRY EXPERIMENTS SUPPORTED

6. Specific Heat of Metals	Students use a calorimeter to determine the specific heat capacity of different metals.
7. Acid / Base Reactions	Students create invisible ink using sodium hydroxide and gas in the air to produce a solution that appears to disappear.
8. Products Of Combustion	Students observe the presence of water and carbon dioxide in the products of hydrocarbon combustion.
9. Temperature vs. Reaction Rate	Students investigate the effect of temperature on the rate of reaction between sodium thiosulfate and hydrochloric acid.
10. Temperature vs. Solubility	Students investigate the effect of temperature on solubility using Ammonium chloride and ice.

PHYSICS EXPERIMENTS SUPPORTED

1. Free Falling Projectiles	Students predict then experimentally verify relationships between a projectile's launch velocity, time in free fall, vertical height and horizontal range.
2. Newton's Laws In Equilibrium	Students decompose force vectors in two dimensions and apply Newton's laws of motion to a two dimensional system in static equilibrium.
3. Circular Motion	Students apply Newton's laws of motion with centripetal acceleration to a mass undergoing circular motion.
4. Work & The Conservation of Energy	Students investigate the relationship between work done by conservative and nonconservative forces and the resultant change in kinetic energy.
5. Simple Harmonic Oscillators	Students investigate the oscillation period as a function of mass, length and amplitude using springs and a simple pendulum.
6. Impulse & The Conservation of Momentum	Students investigate the relationship between impulse and change in linear momentum.
7. Sound and Light Wave Phenomenon	Students investigate wave interference, sound wave resonance in tubes, standing waves & the Doppler effect.
8. Electrostatics, Ohm's Law & Circuits	Students investigate polarization, induction and triboelectric charging, experiment with voltage, current and resistance using serial and parallel combinations of wired electric circuits.
9. Magnetism & Electromagnetic Induction	Students investigate magnetic fields, forces and electromagnetic induction.
10. Geometric Optics - Mirrors & Lenses	Students investigate the use of ray diagrams to predict image characteristics from mirrors and lenses. They use Snell's law to measure the index of refraction of various liquids and solids..