



## Physics

1. **Mechanics:** Concepts of motion, forces, and Newton's laws of motion.

**Phet Links:**  
[Forces and Motion: Basics](#)  
[Pendulum Lab](#)  
[Projectile Motion](#)  
[Friction](#)  
[Collision Lab](#)

**LabXchange Links:**  
[Properties of Water](#)  
[Energy and Phase Changes](#)  
[Dynamics: Force and Newton's Laws of Motion](#)  
[Motion in Two Dimensions](#)  
[Forces and Vectors](#)  
[Linear Momentum and Collisions](#)  
[Kinematics](#)

2. **Energy:** Understanding different forms of energy, conservation of energy, and energy transformations.

**Phet Links:**  
[Energy Forms and Changes](#)  
[Energy Skate Park](#)  
[Energy Skate Park: Basics](#)

**LabXchange Links:**  
[Energy and Phase Changes](#)  
[Energy in Cells](#)  
[Energy Storage in the 21st Century](#)  
[Work, Energy and Simple Machines](#)  
[Excellent Energy Engineering](#)

3. **Waves:** Properties of waves, types of waves, and wave behavior.

**Phet Links:**  
[Sound Waves](#)  
[Wave Interference](#)  
[Wave on a String](#)  
[Waves Intro](#)

**LabXchange Links:**  
[Waves](#)  
[Waves and Energy Transfer](#)  
[Sound](#)

4. **Optics:** Light and its properties, reflection, refraction, and lenses.

**Phet Links:**  
[Geometric Optics](#)  
[Geometric Optics: Basics](#)  
[Bending Light](#)

**LabXchange Links:**  
[Light](#)  
[Wave Optics](#)  
[Geometric Optics](#)

5. **Electricity:** Basics of electric circuits, Ohm's law, and electrical safety.

**Phet Links:**  
[Circuit Construction Kit: DC](#)  
[Circuit Construction Kit: DC - Virtual Lab](#)  
[Ohm's Law](#)  
[Resistance in a Wire](#)  
[Capacitor Lab: Basics](#)

**LabXchange Links:**  
[Electric Circuits](#)  
[Electric Current, Resistance, and Ohm's Law](#)

6. **Magnetism:** Properties of magnets, magnetic fields, and electromagnetic induction.

**Phet Links:**  
[Faraday's Law](#)

**LabXchange Links:**  
[Magnetic Fields](#)  
[Magnetism](#)  
[Electromagnetic Induction, AC Circuits, and Electrical Technologies](#)

7. **Thermodynamics:** Laws of thermodynamics, heat transfer, and thermal properties of matter.

**Phet Links:**  
[Under Pressure](#)

**LabXchange Links:**  
[Thermodynamics](#)  
[Heat and Heat Transfer Methods](#)

8. **Sound:** Properties of sound waves, sound propagation, and its applications.

**Phet Links:**  
[Sound Waves](#)

**LabXchange Links:**  
[Sound](#)

9. **Modern Physics:** An introduction to quantum mechanics and relativity.

**LabXchange Links:**  
[Introduction to Quantum Physics](#)  
[Black Holes: The Meeting of Gravity and Quantum Physics](#)

10. **Nuclear Physics:** Basics of nuclear reactions, radioactivity, and nuclear energy.

**Phet Links:**  
[Isotopes and Atomic Mass](#)  
[Build a Nucleus](#)

**LabXchange Links:**  
[Radioactivity and Nuclear Physics](#)

11. **Astronomy:** Introduction to the solar system, stars, and galaxies.

**Phet Links:**  
[Gravity and Orbits](#)  
[My Solar System](#)  
[Blackbody Spectrum](#)

**LabXchange Links:**  
[The Origin of Stars and Planets](#)  
[Galaxy Formation and Evolution](#)

12. **Scientific Instruments:** Understanding and using scientific instruments like microscopes and telescopes.

## Chemistry

1. **Atomic Structure:** Fundamentals of atomic structure, subatomic particles, and the periodic table.

**Phet Links:**  
[Build an Atom](#)

**LabXchange Links:**  
[Chemical Bonding](#)  
[Molecular Shapes](#)  
[The Atom](#)  
[Atomic Physics](#)  
[Organizing Atoms and Electrons: The Periodic Table](#)

2. **Chemical Bonding:** Types of chemical bonds and their properties.

**Phet Links:**  
[Molecule Shapes: Basics](#)  
[Build a Molecule](#)

3. **Chemical Reactions:** Types of chemical reactions, balancing equations, and reaction rates.

**Phet Links:**  
[Balancing Chemical Equations](#)  
[Reactants, Products and Leftovers](#)

4. **Acids and Bases:** Properties of acids and bases, pH scale, and neutralization reactions.

**Phet Links:**  
[pH Scale](#)  
[pH Scale: Basics](#)  
[Acid-Base Solutions](#)

**LabXchange Links:**  
[Acids and Bases](#)  
[What Is pH Again?](#)  
[How Can We Measure pH?](#)

5. **States of Matter:** Understanding different states of matter (solid, liquid, gas) and phase changes.

**Phet Links:**  
[States of Matter](#)  
[States of Matter: Basics](#)  
[Gases Intro](#)

**LabXchange Links:**  
[Building Blocks and States of Matter](#)  
[Energy and Phase Changes](#)

6. **Organic Chemistry:** Basics of organic compounds and their properties.

**LabXchange Links:**  
[Organic Chemistry](#)

7. **Chemical Equilibrium:** Understanding reversible reactions and dynamic equilibrium.

8. **Environmental Chemistry:** Examining chemical processes affecting the environment.

**Phet Links:**  
[Greenhouse Effect](#)

## Biology

1. **Cells and Cell Functions:** Understanding cell structure, organelles, and their functions.

**Phet Links:**  
[Diffusion](#)

**LabXchange Links:**  
[Cells](#)  
[Cell Structure I](#)  
[Cell Structure II](#)  
[Cell Structure and Function](#)  
[Cellular Structure and Function](#)  
[The Cellular Basis of Inheritance](#)  
[Diversity of Microbes, Fungi, and Protists](#)

2. **Genetics and Heredity:** Basic concepts of genetics, inheritance, and genetic variation.

**Phet Links:**  
[Natural Selection](#)

**LabXchange Links:**  
[DNA Structure and Function I](#)  
[DNA Structure and Function II](#)  
[Patterns of Inheritance](#)  
[Modern Understandings of Inheritance](#)

3. **Human Anatomy and Physiology:** In-depth study of human body systems, organ functions, and homeostasis.

**LabXchange Links:**  
[The Cardiovascular System: Blood](#)  
[The Cardiovascular System: Blood Vessels and Circulation](#)  
[The Cardiovascular System: The Heart](#)  
[The Circulatory System](#)  
[The Immune System and Disease](#)  
[The Immune System I](#)  
[The Immune System II](#)  
[The Muscular System](#)  
[The Musculoskeletal System](#)  
[Anatomy of the Nervous System](#)  
[The Nervous System I](#)  
[The Nervous System II](#)  
[The Nervous System III](#)  
[The Nervous System IV](#)  
[The Reproductive System](#)  
[The Respiratory System I](#)  
[The Respiratory System II](#)  
[The Respiratory System III](#)  
[The Sensory System](#)  
[Animal Nutrition and the Digestive System](#)

4. **Ecology and Biodiversity:** Exploring ecological interactions, food chains, and energy flow in ecosystems.

**Phet Links:**  
[Greenhouse Effect](#)

**LabXchange Links:**  
[Ecology](#)  
[Population and Community Ecology](#)  
[Ecosystems](#)  
[Ecosystems and the Biosphere](#)  
[Conservation and Biodiversity](#)  
[Conservation Biology and Biodiversity](#)

5. **Evolution:** Mechanisms of evolution, evidence for evolution, and its impact on biodiversity.

**Phet Links:**  
[Natural Selection](#)

**LabXchange Links:**  
[Evolution](#)

6. **Animal Biology:** The physiology, anatomy, and behavior of animals, exploring how they survive, reproduce, and adapt to their environments.

**LabXchange Links:**  
[Animal Reproduction and Development](#)  
[Diversity of Animals](#)  
[The Body's Systems](#)

7. **Plant Biology:** The processes of photosynthesis, plant anatomy, growth, and reproduction, highlighting the ecological roles of plants.

**LabXchange Links:**  
[Diversity of Plants](#)  
[Photosynthesis](#)  
[Healthy Eating, Plant Foods and Vitamins](#)