

# Thursday High School Science Lab Program

## 30 Total Labs | Biology, Earth Science, and Physical Science

To provide meaningful hands-on science experiences that complement our MasterBooks curriculum and support high school laboratory requirements, we are proposing a 30-week Thursday Science Lab Program. The labs have been selected to provide a balance of scientific skill development, observation, experimentation, data collection, critical thinking, and student engagement.

### Biology Labs (12)

Biology labs will emphasize microscope skills, cellular biology, anatomy, classification, physiology, and life science concepts.

1. pH and Hydrogen Bonding of Molecules
2. Cell Membrane and Nucleus Investigation (Microscope Lab)
3. Cell Membrane and Cell Division (Mitosis) Investigation (Microscope Lab)
4. Photosynthesis Investigation
5. Cell Division and Growth Investigation
6. Taxonomy and Classification – Earthworm Dissection
7. Taxonomy and Classification – Grasshopper Dissection
8. DNA Extraction from Strawberries
9. Enzyme Activity Investigation
10. Heart Rate and Exercise Physiology Lab
11. Owl Pellet Dissection and Food Chain Analysis
12. Frog Dissection and Comparative Anatomy Study

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### Earth Science Labs (9)

Earth Science labs will focus on geology, meteorology, astronomy, mapping, and Earth systems.

1. Rock and Mineral Identification and Classification Lab
  - o Testing hardness, streak, luster, and mineral properties
2. Crystal Formation and Growth Investigation
  - o Observing crystal structure development and mineral formation processes
3. Topographic Mapping and Landform Analysis Lab
  - o Reading contour maps and constructing three-dimensional landform models
4. Stream Table Investigation: Water Erosion and Landform Development
  - o Modeling erosion, deposition, floodplains, and river systems
5. Soil Composition and Sediment Analysis Lab
  - o Examining soil horizons, particle size, permeability, and composition

6. Meteorology Lab: Weather Instruments and Forecasting
    - Using barometers, weather maps, and atmospheric data to predict weather patterns
  7. Atmospheric Pressure and Air Mass Investigation
    - Demonstrating pressure systems, fronts, and weather formation
  8. Moon Phases, Eclipses, and Lunar Cycle Modeling
    - Investigating Earth-Moon-Sun relationships and seasonal patterns
  9. Solar System Scale Model and Planetary Distances Lab
    - Exploring relative size, distance, orbit, and planetary characteristics
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## Physical Science Labs (9)

Physical Science labs will focus on chemistry, physics, motion, energy, electricity, engineering design, and scientific experimentation.

1. Density Investigation and Density Column Construction
    - Calculating density and comparing physical properties of matter
  2. Chemical Reactions and Evidence of Change Lab
    - Investigating temperature change, gas production, precipitates, and color change
  3. Catalysts and Reaction Rates: Elephant Toothpaste Lab
    - Exploring exothermic reactions, decomposition, and catalytic activity
  4. Newton's Laws of Motion Investigation
    - Measuring force, mass, inertia, acceleration, and motion
  5. Egg Drop Engineering Design Challenge
    - Applying concepts of force, momentum, impact, and energy transfer
  6. Electrical Circuits and Conductivity Lab
    - Building series and parallel circuits while testing conductors and insulators
  7. Electromagnetism and Magnetic Field Investigation
    - Constructing electromagnets and exploring magnetic forces and electrical current
  8. Energy Transfer and Heat Investigation
    - Measuring conduction, convection, and radiation through controlled experiments
  9. Pendulum Motion and Variables Investigation
    - Testing how length, mass, and release height affect periodic motion and energy transfer
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## Skills Developed Throughout the Program

- Microscope Skills
- Scientific Method
- Observation and Data Collection
- Laboratory Safety Procedures
- Scientific Drawing and Documentation

- Classification and Taxonomy
- Dissection Techniques
- Experimental Design
- Measurement and Analysis
- Weather and Geological Observation
- Engineering Design and Problem Solving
- Electricity and Circuit Construction
- Force and Motion Investigation
- Critical Thinking and Collaboration

## **Program Summary**

<b>Subject Area</b>	<b>Number of Labs</b>
Biology	12
Earth Science	9
Physical Science	9
<b>Total Labs</b>	<b>30</b>

These labs were selected to provide a rich laboratory experience that complements the MasterBooks curriculum while offering students access to equipment, demonstrations, dissections, investigations, and collaborative learning opportunities that are often difficult to replicate in a home setting. This schedule is tentative and may be adjusted based on tutor availability, instructional needs, and laboratory materials.