Physical Science
SCI0800

Course Description
Physical Science is an introduction to chemistry and physics with an emphasis on utilizing the scientific method. God’s love for balance in the world He has created will be evident. Students will be introduced to scientists who built their theories on the Bible and through observations of the world around them. Student experiments are woven through the lessons so they can experience the thrill of science and develop an understanding of the “new language” being learned.

Rationale
Physical science offers students a deeper examination of the building blocks of nonliving materials and processes they can undergo. Knowledge of the way these items are combined shows the design and purpose of an intelligent God, who created the earth and its laws through His son, Jesus Christ. Students will learn the process of discovering and explaining the order of the physical world and how its parts connect to one another.

Prerequisite
None

Biblical Integration Outcomes
A. The student will identify and describe Creation and The Universe from a Biblical worldview

Measurable Learning Outcomes
A. Apply the scientific method and analyze data through this
B. Perform metric unit conversions
C. Investigate and understand the nature of matter, its properties, and the four phases of matter
D. Investigate and understand the historical and modern models of the atomic theory
E. Investigate and understand the organization of the periodic table
F. Investigate and understand chemical bonding
G. Investigate and understand the different forms of energy
H. Perform temperature scale conversions
I. Investigate and understand the difference between temperature and heat
H. Investigate and understand longitudinal waves (sound waves) and transverse waves (light)
I. Investigate and understand work, force, motion, and their associated calculations
J. Describe and analyze the different types of simple machines
K. Investigate and understand the principles of electricity and magnetism

Course Materials
See LUOA’s Systems Requirements for computer specifications necessary to operate LUOA curriculum. Also view Digital Literacy Requirements for LUOA’s expectation of users’ digital literacy.

This course contains additional physical materials. See the materials page toward the end of this syllabus for a listing of course materials.

Note: Embedded YouTube videos may be utilized to supplement LUOA curriculum. YouTube videos are the property of the respective content creator, licensed to YouTube for distribution and user access. As a non-profit education institution, LUOA is able to use YouTube video content under the YouTube Terms of Service and the provisions of the TEACH Act of 2001. For additional information on copyright, please contact the Jerry Falwell Library.

Course Grading Policies
The students’ grades will be determined according to the following grading scale and assignment weights. The final letter grade for the course is determined by a 10-point scale. Assignments are weighted according to a tier system, which can be referenced on the Grades Page in Canvas. Each tier is weighted according to the table below. Items that do not affect the student’s grade are found in Tier 0.

<table>
<thead>
<tr>
<th>Grading Scale</th>
<th>Assignment Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 90-100%</td>
<td>Tier 0 0%</td>
</tr>
<tr>
<td>B 80-89%</td>
<td>Tier 1 25%</td>
</tr>
<tr>
<td>C 70-79%</td>
<td>Tier 2 35%</td>
</tr>
<tr>
<td>D 60-69%</td>
<td>Tier 3 40%</td>
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<tr>
<td>F 0-59%</td>
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</table>

Course Policies
Students are accountable for all information in the Student Handbook. Below are a few policies that have been highlighted from the Student Handbook.

Types of Assessments
To simplify and clearly identify which policies apply to which assessment, each assessment has been categorized into one of four categories: Lesson, Assignment, Quiz, or Test. Each applicable item on the course Modules page has been designated with an identifier chosen from among these categories. Thus, a Quiz on the American Revolution may be designated by the title, “1.2.3 Quiz: The American Revolution.” These identifiers were placed on the Modules page.
to help students understand which Honor Code and Resubmission policies apply to that assessment (see the Honor Code and Resubmission policies on the pages to follow for further details).

- **Lesson:** Any item on the Modules page designated as a “Lesson”
  These include instructional content and sometimes an assessment of that content. Typically, a Lesson will be the day-to-day work that a student completes.

- **Assignment:** Any item on the Modules page designated as an “Assignment”
  Typical examples of Assignments include, but are not limited to, papers, book reports, projects, labs, and speeches. Assignments are usually something that the student should do their best work on the first time.

- **Quiz:** Any item on the Modules page designated as a “Quiz”
  This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Quizzes cover a smaller amount of material than Tests.

- **Test:** Any item on the Modules page designated as a “Test”
  This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Tests cover a larger amount of material than Quizzes.

**Resubmission Policy**

Students are expected to submit their best work on the first submission for every Lesson, Assignment, Quiz, and Test. However, resubmissions may be permitted in the following circumstances:

- **Lesson:** Students are automatically permitted two attempts on a Lesson. The student may freely resubmit for their first two attempts without the need for teacher approval.

- **Assignment:** Students are intended to do their best work the first time on all Assignments. However, any resubmissions must be completed before the student moves more than one module ahead of that Assignment. For example, a student may resubmit an Assignment from Module 3 while in Module 4, but not an Assignment from Modules 1 or 2. High School students may not resubmit an Assignment without expressed written permission from the teacher in a comment.

- **Quiz:** Students may NOT resubmit for an increased grade.

- **Test:** Students may NOT resubmit for an increased grade.

If a student feels that he or she deserves a resubmission on a Lesson, Assignment, Quiz, or Test due to a technical issue such as computer malfunctioning, the student should message his or her teacher to make the request, and that request will need to be approved by a Department Chair.

**Consequences for Violations to the Honor Code**

Every time a student violates the Honor Code, the teacher will submit an Honor Code Incident Report. The Student Support Coordinator will review the incident and allocate the appropriate
consequences. Consequences, which are determined by the number of student offences, are outlined below:

- **Warning**: This ONLY applies to high school Lessons and elementary/middle school Assignments and Lessons. These will be taken as a teaching moment for the student.
  - **Lessons**: A zero will be assigned for the question only.
  - **Elementary/Middle School Assignment**: The student must redo their work. However, they may retain their original grade.

- **1st Offense**:
  - **Lesson, Quiz, or Test**: The student will receive a zero on the entire assessment.
  - **Assignment**: The student will either:
    - Receive a 0% on the original assignment
    - Complete the Plagiarism Workshop
    - Retry the assignment for a max grade of 80%

- **2nd Offense**: The student will receive a zero and be placed on Academic Probation.

- **3rd Offense**: The student will receive a zero and the Faculty Chair will determine the consequences that should follow, possibly including withdrawal from the course or expulsion from the academy.
Materials List

Module 1

1.2.5
- Ruler
- Meter stick with millimeters and centimeters
- Tape Measure

1.3.4
- A beaker (or kitchen measuring cup with metric measurements or you can use a relatively large mouthed graduated cylinder that has millimeters clearly marked on the side)
- You will also need a number of items that will fit into your beaker or graduated cylinder that won't be ruined after you submerge them in water. If possible try some of the following items:
  - two or three different size rocks or pebbles
  - a ball (golf ball if it will fit)
  - a colored pencil
  - regular pencil
  - two different length pencils
  - something unique you have chosen (sea shell, toy car, etc. )

1.4.1
- Graph paper (helpful but not necessary)

Module 2

- 2.5.1
  - Plastic glass
  - 1 small ball or marble
  - Smooth floor

- 2.5.4
  - 1 clear glass
  - 1 pencil
  - Water
  - 1 working flashlight
  - 1 square of aluminum foil large enough to cover the beam of a flashlight plus 3 centimeters
  - 1 rubber band
  - 1 needle
  - 1 glass two third full of water just enough water to make water cloudy
  - 1 very dark room

- 2.6.3
  - 2 different sized balls (examples: golf ball, ping pong ball, tennis ball, racquetball, softball, baseball)
  - 2 cookie sheets
  - Camera
2.7.1
- 2 toy cars (hot wheels will work)
- Cardboard
- Towel or fabric
- Tape
- Yardstick
- 2 large textbooks
- 2 large plastic bottles exactly alike
- Water
- Measuring cup
- Meter tape or stick
- Playground with tall slide or long smooth slope
- Masking tape or sidewalk chalk

2.7.2
- Tube sock
- 1 ball that will fit into the sock (do not use a rock)
- 1 Rope 1.5-2 meters in length (twine or heavy duty string will work)
- Large outside space

2.7.3
- 1 meter stick
- 3 different lengths of heavy duty string (25 cm, 50 cm, and 97.5 cm)
- 2 metal washers or metal nuts from a nut and bolt set
- 1 clothes hanger or ceiling hook
- 1 watch with a second hand or stopwatch
- 1 piece of white paper or cardboard
- 1 pencil or marker
- Masking tape

2.8.1
- 1 fifteen cm square of heavy duty aluminum foil, (flat is preferred)
- 75-100 pennies
- Large Bowl, or sink full of water

Module 3

3.10.2
- Table
- Broom
- Chair with back as tall as the table
- Scissors
- Meter/yardstick
- String
- Brick or heavy stone
- Masking tape
- Paper
- Pencil
3.10.4
- Ruler
- Scissors
- Long pencil or rod
- 1 piece of paper
- Marker
- Tape

3.11.3 – Will need to calculate work and put it in logbook.
- Empty ribbon spool
- Hole punch
- Scissors
- 3 meters of string
- Masking tape
- Plastic cup
- Small item to put in the cup
- 2 pencils or chopsticks that will fit through the hole in the spool

3.12.1
- 2 high back chairs with an opening in the back (can be metal)
- 4 heavy books
- 1 spool of heavy string
- 1 spool of lighter string
- Masking tape
- Scissors
- Meter stick
- 5 meters of thin cardboard
- Hole punch
- Marker

3.12.2
- Circular tube 8 to 20 cm in diameter (an oatmeal box, peanut butter jar, or large can of fruit works well)
- 12-30 small stones depending on how big the cylinder is.
- 1 block of play-doh to use as mortar
- 1 medium size piece of cardboard to build on and attach the arch to
- Masking tape.

Module 4

4.14.1
- Pizza box
- Two clear sheet protectors
- Black construction paper
- Duct tape
- Clear masking or packing tape
- Box knife
- Scissors
- Thermometer (optional)
- Wooden skewer
- Glue stick
- Tin foil
- Ruler
- Pen

4.14.4
- 1 cooking pot or kitchen sink with a stopper
- 1 small glass or plastic bottle that is shorter than the water level in the pot or sink
- 3 marbles or small, clean stones
- Food coloring or water colors

4.15.3
- 2 or 3 chicken eggs
- 2 liters of fresh water
- 1 tall glass container large enough for at least one egg to fit in
- 1 box of table salt
- 1 spoon

Module 5

5.16.1
- Medium sized cardboard box with lid
- Marbles (enough to fill box)
- Scissors

5.16.4
- One piece of bubble gum
- Kitchen scale that measures grams
  - If not available then:
    - 12 inch ruler
    - Pencil
    - 2 pieces of cardboard (3inch squares)
    - Tape
    - US coins/dollars

5.17.1
- Several paper towel sheets or coffee filters
- 3 clear plastic or glass drinking glasses
- 3 different kinds of black markers,
- 13 paper clips
- 1 hole punch
- 1 black pen
- 1 pencil
- 1 ruler
- 1 piece of tape for every strip of paper towel or coffee filter being tested, and water

Module 6

6.19.3
Comb  
Balloon  
Piece of tissue paper

6.20.2
Ceramic magnet  
3 paper clips  
Pencil  
15 cm of string  
Ruler  
Penny  
Tape  
Table with wooden top  
Cookie sheet or thin flat piece of metal  
Paper bag  
Plastic bag  
Three items of your choosing

6.20.3 (This Lab is optional)
1 meter of insulated 22 or 24 gauge wire  
1 D-Cell battery  
Wire strippers or scissors  
Permanent marker  
Plastic cup  
2 disc magnets  
2 large paper clips  
2 large rubber bands  
4 alligator cable clips

Module 7

7.22.2 This Lab is optional. It is more for hands on experience with magnets, if materials can be acquired.
2 bar magnets  
Meter of string  
Marker

7.22.3
Small ceramic magnet  
1 medium-sized ceramic magnet  
1 large ceramic magnet  
1 box of 100 metal paper clips  
1 pencil  
A piece of paper to record the findings

7.22.4
Paper  
string

7.23.1 (This Lab is optional)
1 bowl ⅓ full of water
- 1 long thick sewing needle
- 1 strong ceramic bar magnet
- Styrofoam peanut or paper that will float on the water and keep the needle afloat

### 7.23.4 (This Lab is optional)
- 1 meter 25 gauge copper wire
- 1 very large nail or screwdriver
- 1 AA battery
- Utility Knife
- Utility Scissors
- Matte knife
- Insulation tape

### 7.23.5
- 1 extra-large steel nail (at least 3 ¾ inches or 9 ½ centimeters long)
- 1 strong ceramic bar magnet
- 2 or 3 paper clips
- Safety goggles
- Hard surface outside the home

### Module 8

#### 8.26.2
- 1 clear drinking glass (not plastic)
- 1 sheet of white typing paper
- Clear water
- 1 meter stick
- 1 ruler
- 2 fingers

#### 8.27.1
- Drinking straw
- Glass or cup of water
- Scissors

#### 8.27.2
- Toy boat
- 20 cm string
- 1 pool of water (can be bathtub)

### Module 9

#### 9.29.3
- 10 different colored pencils or crayons

#### 9.30.4
- Colored pencils or crayons
Module 10

10.33.4
- Option 1
  - One balloon
  - Wool scarf or sweater
  - Water faucet
- Option 2
  - Food coloring
  - Water
  - Stalk of celery

10.35.1
- Purple cabbage liquid
- Paper towel
- 9 clean containers (can be plastic cups)
- 1 pH scale (included in curriculum)
- Enough clean waxed paper or aluminum foil to cover the tops of each of the containers
- Rubber bands or masking tape.
Scope and Sequence
Physical Science

Module 1: Measurement and Scientific Investigation
Week 1
Week 2
Week 3
Week 4

Module 2: Force and Motion
Week 5
Week 6
Week 7
Week 8

Module 3: Work and Power
Week 9
Week 10
Week 11
Week 12

Module 4: Energy
Week 13
Week 14
Week 15

Module 5: Matter
Week 16
Week 17
Week 18

Module 6: Electricity
Week 19
Week 20
Week 21

Module 7: Magnets
Week 22
Week 23
Week 24

Module 8: Light and Waves
Week 25
Week 26
Week 27
Week 28

Module 9: Nuclear and Atomic Theory
Week 29
Week 30
Week 31
Week 32

Module 10: Chemical Reactions
Week 33
Week 34
Week 35
Week 36

**Science Fair project starts in Module 7 and is submitted in Module 9.**