

5th Grade Science

SCI0500

Course Description

The fifth-grade standards emphasize the importance of selecting appropriate instruments for measuring and recording observations. The organization, analysis, and application of data continue to be an important focus of classroom inquiry. Science skills from preceding grades, including questioning, using and validating evidence, and systematic experimentation, are reinforced at this level. Students are introduced to more detailed concepts of sound and light and the tools used for studying them. Key concepts of matter, including those about atoms, molecules, elements, and compounds, are studied, and the properties of matter are defined in greater detail. The cellular makeup of organisms and the distinguishing characteristics of groups of organisms are stressed. Students learn about the characteristics of the oceans and Earth's changing surface. The fifth-grade standards focus on student growth in understanding the nature of science. This scientific view defines the idea that explanations of nature are developed and tested using observation, experimentation, models, evidence, and systematic processes. The nature of science includes the concepts that scientific explanations are based on logical thinking; are subject to rules of evidence; are consistent with observational, inferential, and experimental evidence; are open to rational critique; and are subject to refinement and change with the addition of new scientific evidence. The nature of science includes the concept that science can provide explanations about nature, can predict potential consequences of actions, but cannot be used to answer all questions.

Rationale

The Liberty University Online Academy's 5th Grade Science course provides students with an opportunity to study and explore scientific topics through interactive and engaging activities and lessons. Students will learn about both God's world and Christian values. The truths of creation and God's design will be continuously woven into the entire course, allowing students to gain solid scientific knowledge with a biblical worldview. Students will explore a wide range of topics which include: creation, cells, body systems, sound, earth, scientific methods, plants, color and light, chemistry, and the ocean.

Prerequisite

4th Grade Science

Biblical Integration Outcomes

- A. Students will develop an understanding of God's design in creation and be able to link everything they learn back to what the Bible says.

Measurable Learning Outcomes

- A. The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations.
- B. The student will investigate and understand how sound is created and transmitted, and how it is used.
- C. The student will investigate and understand basic characteristics of visible light and how it behaves.
- D. The student will investigate and understand that matter is anything that has mass and takes up space; and occurs as a solid, liquid, or gas.
- E. The student will investigate and understand that organisms are made of one or more cells and have distinguishing characteristics that play a vital role in the organism's ability to survive and thrive in its environment.
- F. The student will investigate and understand characteristics of the ocean environment.

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.

This course makes use of third-party digital resources to enhance the learning experience. LUOA staff and faculty have curated these resources. Students can safely access them to complete coursework. Please ensure that internet browser settings, pop-up blockers, and other filtering tools allow for these resources to be accessed. See Technologies and Resources Used in this Course below for a specific list.

- 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 educational institution, LUOA is able to use YouTube video content under the YouTube Terms of Service. For additional information on copyright, please contact the [Jerry Falwell Library](#).

Course Grading Policies

The student's 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.

Grading Scale		Assignment Weights	
A	90-100%	Tier 0	0%
B	80-89%	Tier 1	25%
C	70-79%	Tier 2	35%
D	60-69%	Tier 3	40%
F	0-59%		

In order for students to receive credit for a course, the following conditions have to be met:

1. All semester exams and module tests have to be completed,
2. All Tier 3 projects or papers have to be completed, and
3. Fewer than 10 zeros exist in the gradebook for blank submissions in a full credit course and 5 zeros for blank submissions in a semester course.

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.W 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 that 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 his or her 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. Students may freely resubmit for their first two attempts without the need for teacher approval.
- **Assignment:** Students should 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 a computer malfunction, 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 offenses, are outlined below:

- **Warning:** This ONLY applies to high school Lessons and elementary/middle school Assignments and Lessons. Students should view these actions as learning opportunities.
 - **Lessons:** A zero will be assigned for the question only.
 - **Elementary/Middle School Assignment:** The student must redo his or her work; however, the student may retain his or her original grade.
- **1st Offense:**
 - **Lesson, Quiz, or Test:** The student will receive a 0% 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 maximum grade of 80%
- **2nd Offense:** The student will receive a 0% and be placed on academic probation.
- **3rd Offense:** The student will receive a 0% and the Faculty Chair will determine the consequences that should follow, possibly including withdrawal from the course or expulsion from the academy.

Materials List

5th Grade Science

The following materials are required to successfully complete this course.
Any items marked with * are provided by LUOA through the Canvas course.

All other materials must be purchased separately.

Module 1

none

Module 2

2.4.M Edible Cells

**If students have allergies or do not eat sweets, other food products may be used. Be creative!

1. PLANT CELL:

1. Cell Wall - cupcake wrapper
2. Cell Membrane - could do a dark green circle around outer edge of cupcake
3. Cytoplasm - sprinkles
4. Nucleus – malt ball or gumballs (1)
5. Golgi Apparatus - extreme sour strips – (1-2 very short pieces)
6. Endoplasmic Reticulum - gummy worms (1)
7. Ribosomes - circular sprinkles
8. Central Vacuole - blue and purple Mike & Ike (1-2)

2. ANIMAL CELL ORGANELLES:

1. Cell Membrane - cupcake wrapper
2. Cytoplasm - sprinkles
3. Nucleus – malt ball or gumball (1)
4. Golgi Apparatus - extreme sour strips (1-2 very short pieces)
5. Endoplasmic Reticulum -gummy worms (Smooth ER), sour gummy worms (Rough ER) (1 each)
6. Vacuoles - green Dots or Gobstoppers (1)
7. Lysosomes - M&Ms (2-3)

2.5.W Microorganism Activity

1. 1 packet of active dry yeast (can be found in grocery store)
2. 1 cup very warm water
3. 2 tablespoons sugar
4. A large rubber balloon
5. A small (1 pint to 1 liter) empty water bottle

Module 3

3.8.M What's in Blood?

1. Large clear bowl, measuring cup, funnel, and an empty, clean quart container
2. 2 cups water (representing the water in plasma)
3. Several drops of yellow food coloring (protein)
4. Dash of salt (salt in plasma)
5. Splash of vegetable oil (fat)
6. Dash of sugar (glucose)
7. Squirt of honey (hormones)
8. Splash of steak sauce (waste)
9. Ketchup
10. Milk
11. Hot sauce

3.9.W Building a Lung and Diaphragm

1. Plastic bottle
2. Straw
3. Elastic band
4. Scissors
5. 2 balloons
6. Playdough

Module 4

4.13.T Project: Nervous System

Long sheet of paper the length of a parent, a sibling, or a friend. You may use wrapping paper or tape sheets of paper together.

Module 5

5.15.M Sounds and Vibrations Experiment

1. Balloon
2. Coffee can with both ends removed
3. Large rubber band
4. Sugar
5. Metal pan
6. Metal spoon

5.17.T Project: Traveling Sound

1. A large bowl - metal works best
2. Water
3. Two metal objects, such as spoons, to knock together

Module 6

none

Module 7

7.23.W Steps of the Scientific Method

Lollipop, Blow Pop, or Tootsie Roll Pop (Any lollipop-type of candy with something different in the center)

Module 8

8.26.M Color and Light Activities

1. Opaque casserole dish
2. Small stone
3. Pitcher of water
4. Glass cup
5. Spoon

8.27.T Project: Make Your Own Periscope

1. Paper towel roll
2. 2 toilet paper rolls
3. Scissors
4. Tape
5. 2 small mirrors

Module 9

none

Module 10

10.36.T There are Algae in Your House!

In this lesson, you are going to take a field trip to the grocery store or the pantry in your kitchen. You will be searching for products containing algae. You do not need to purchase them, only locate them and examine the ingredient list. Look for the following food items:

1. Brownie mix
2. Chocolate milk
3. Coffee creamer
4. Cottage cheese
5. Evaporated milk
6. Frozen yogurt
7. Ice cream
8. Margarine
9. Mayonnaise
10. Multiple vitamins
11. Relishes
12. Salad dressing

Scope and Sequence

5th Grade Science

Module 1: Creation

Week 1: Days 1-5

Week 2: Days 6 & 7, Were There Really Dinosaurs?

Module 2: Plants and Animal Cells

Week 3: Cell Introduction

Week 4: Plant & Animal Cell Descriptions

Week 5: Edible Cell Project & Microorganisms

Week 6: Animal Classification & Cell Test

Module 3: Body Systems I

Week 7: Introduction & Circulatory System

Week 8: What's in Blood? & Bones System

Week 9: Respiratory System

Week 10: Muscular System & Body Systems

Part I Test

Module 4: Body Systems II

Week 11: Digestive & Excretory Systems

Week 12: Endocrine System & Immune System

Week 13: Nervous System

Week 14: Body Systems Review & Body Systems Part II Test

Module 5: Physics and Sound

Week 15: Introduction & Sound Energy

Week 16: Vibrations

Week 17: Speed of Sound and Sound Waves

Week 18: Echolocation & Test

Module 6: The Earth

Week 19: Introduction & Erosion

Week 20: Layers of the Earth & Rock Cycle

Week 21: Earthquakes, Aftershocks, and Tsunamis

Week 22: Volcanoes & Test

Module 7: Scientific Method and Plants

Week 23: Scientific Method

Week 24: Investigation Habits & Plants Introduction

Week 25: Plants & Test

Module 8: Color and Light

Week 26: Transparent, Translucent, or Opaque

Week 27: Light Energy

Week 28: Concave and Convex Lenses & Test

Module 9: Chemistry

Week 29: Introduction, Atoms, and Matter

Week 30: States of Matter

Week 31: Chemistry Concoction

Week 32: Chemical Reactions, Marie Curie, & Test

Module 10: The Ocean

Week 33: Introduction & Weather

Week 34: The Ocean Floor

Week 35: Currents & Tides

Week 36: Algae & Test