

Syllabus **5th Grade Science** **Semester A & B**

Teacher: Teacher Name

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Class meeting: 8:00 to 8:50 MTWThF

Office Hours: 10:00-12:00 T & Th

Course Overview

A classical school science curriculum begins in the elementary grades with a content rich program covering important ideas in the natural sciences in a coherent and orderly way. This approach to science seeks to present science steeped in historical context, including the reading of primary sources. This will allow students to avoid purposeless generalization and the reduction of scientific knowledge to a list of scientific facts. By developing background knowledge and skills in the early grades, we can push students to high achievement in science during their middle and upper school years. Through this process we can maintain enthusiasm for science throughout primary and secondary education, fostering curiosity and wonder, encouraging hard and careful work, and molding deep thinkers on their way to being liberally educated citizens.

Teaching students through virtual reality allows an instructor to transcend both space and time. It allows for students to connect on a personal level across an infinite distance. Building upon a foundation of educational research in the area of experiential learning. The virtual reality for participants in this class will be coupled with both pre-experience and post experience learning opportunities outside of the VR environment. This marriage of both the learning management system and the VR delivery of instruction creates an unparalleled school experience for students of all ages and of all backgrounds.

Course Goals

Upon completion of this course students will develop a deep appreciation for Science. This includes a robust understanding of not only how science works but the value of scientific knowledge. Students will actively participate in scaffolding activities that develop their understanding of science process skills while simultaneously helping them dig deep into scientific content. Our constant goals include developing the students' understanding of processes of science, the organization and development of living organisms, the interdependence of organisms within an ecosystem, the transfer of energy within earth's systems, properties of abiotic factors, forms of energy and forces and motion.

General Skills

Students will build upon and develop skills that are found at the foundation of a classical education. In the science classroom this specifically targets not only the use of scientific instrumentation and the development of student centered investigations, but also effective strategies for questioning and interpreting data to derive and interpret results. Additionally, interdisciplinary pedagogical strategies and assessments build on a student's ability to apply skills being taught synchronously across other fifth grade disciplines, such as essay writing, communication and critical thinking.

Credit Value

Florida 5020060 Science - Grade Five

Course Materials

Science notebook, VR headset, Computer, Stand alone VR experiences, VR Classroom Materials, Assessment in Canvas, and supplies for independent student investigation.

Measures of Student Achievement

All assessments are aligned to the recommended levels of complexity as indicated by the Florida state standards for science and comply with an age appropriate readability index. Students participate in ongoing and frequent assessments, allowing for maximum flexibility and differentiation to accommodate individual student needs. Each unit leverages the same measures for both formative and summative assessment. This consistency has been shown to maximize student achievement and provide clear measures of expectations and student progress. Measures of student achievement include:

- **Lesson activities** which encourage investigation and provide practice to students prior to lesson exams. These activities provide an answer key for student use as needed. For open-ended questions, instructors will monitor students using the answer key to ensure students are using fidelity based on the example provided.
- **Online discussions** encourage students to communicate and reflect on concepts, ideas, and respond to their classmates. Discussions help assess students' ability to communicate regarding the target subject. Each week has a predefined discussion topic along with a standard rubric for grading responses. Instructors can include additional discussion topics.
- **Pretests** are available for each unit to determine if the student has any prior knowledge on the content within the unit. If the student scores the prescribed percentage on a unit pretest, he or she may be exempted from completing the related courseware. Students earning the credit for the first time are not allowed to "test out" of course lessons, this pretest is for those repeating a course.

- **Mastery tests** are given at the end of each lesson and provide specific data on areas of growth where the student and instructor have to work together towards mastery of the standards within the lesson. These formative assessments include drag and drop, short answer, multi-level responses.
- **Unit activities** provide students with an opportunity to show how the coursework learned throughout the unit has been mastered. They will turn in these activities to receive a grade and feedback by their instructor.
- **Unit posttests** provide students with an opportunity to show how they have mastered the content within the unit. The tests are provided online.
- **End-of-semester tests** assess the major standards covered in the course and give the instructor (by reviewing the pretests and midterm) a clear idea of how the student has progressed throughout the course with mastery of the standards.
- **Statewide Science Assessment Grade 5:** Each student will take the **Florida Statewide Science Assessment Next Generation Sunshine State Standards (NGSSS)** tests in a school in their district of residence. Optima Domi will coordinate with each district for a school that will host the students taking the assessment.

Academic Integrity

Students are expected to comply with all aspects of the academic integrity policy outlined in the [Family Handbook](#).

Course Pacing Guide

This course description and pacing guide is intended to help you keep on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class, provide additional enrichment and/or remediation.

Unit 1: Plant Structures and Processes

Summary

Students will focus on plant structures and processes as found in the Fifth Grade section of the Core Knowledge Sequence. The study will include hands-on experience and observations based on the scientific method. Students will develop a basic knowledge of vascular and nonvascular plants, the basic need for photosynthesis, and the importance of reproduction and germination.

Day	Activity/Objective	Type
1 day: 1	Syllabus and Student Orientation	Course Orientation

	Review the Student Orientation and Course Syllabus at the beginning of this course. Introduce students to the VR experience.	
2 days: 2-3	<p>Lesson 1: Plant Structures</p> <p>Observe plants and recognize how they are alike in the way they look. Identify features of common plants that enable them to survive in different habitats (environments).</p>	Guided Inquiry, VR experience and hands on activity
2 days: 4-5	<p>Lesson 2: Non-Vascular Plants</p> <p>Recognize ways that plants can be affected by changes in their habitats, such as lack of food or water.</p>	Guided Inquiry, VR experience and hands on activity
2 days: 6-7	<p>Lesson 3: Vascular Plants Special Structures</p> <p>Identify functions of plant and animal structures; for example, plant stem transports food to leaves.</p>	Guided Inquiry, VR experience and hands on activity
2 days: 8-9	<p>Lesson 4: Parts and Function of Vascular plants</p> <p>To understand the roles of phloem and xylem in plants. Identify ways that plants and animals can be affected by changes in their habitats, such as lack of food or water, disease, or reduced space.</p>	Guided Inquiry, VR experience and hands on activity
10 days: 10-19	<p>Lesson 5: Photosynthesis</p> <p>Students are introduced to the role of plants in carbon cycling, and recognize ways that scientific evidence can be collected, such as by observing or measuring.</p>	Guided Inquiry, VR experience and hands on activity
5 days: 20-24	<p>Lesson 6: Photosynthesis Extension and Animal Kingdom Comparison</p> <p>Ask a question about the natural world, use selected reference materials to find information, work with others to carry out a simple experiment, and share results.</p>	Guided Inquiry, VR experience and hands on activity

12 days: 25-36	Lesson 7: Plant Reproduction Students explore the importance of reproduction and germination. Students will compare and contrast the processes of sexual reproduction and asexual reproduction.	Guided Inquiry, VR experience and hands on activity
6 days: 37-42	Lesson 8: Asexual Reproduction Students explore the process of self pollination.	Guided Inquiry, VR experience and hands on activity
3 days: 43-45	Lesson 9: Sexual Reproduction by Spore-bearing plants Students Explore	Guided Inquiry, VR experience and hands on activity
3 days: 46-48	Lesson 10: Sexual reproduction of non-flowering seed plants	Guided Inquiry, VR experience and hands on activity
5 days: 49-53	Lesson 11: Sexual reproduction of flowering plants Students will identify differences in angiosperms and gymnosperms and understand that angiosperms also have two types of seeds: monocots and dicots.	Guided Inquiry, VR experience and hands on activity
2 day: 54-55	Unit Activity “Big Idea Challenge” and Discussion—Unit 1 Students share results from a scientific investigation. They explain the basic purpose of their investigation and interpret the result of a simple experiment.	Student presentations
1 day: 56	Posttest—Unit 1	Assessment

Unit 2: Classifying living things

Summary

This unit will help us understand the value of scientific observations, and reasoning through the exploration of Taxonomy and classification.

Day	Activity/Objective	Type
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1 day: 56	Introduction to Classification	Student centered discussion and lecture
3 days: 57-59	Lesson 12: Domains: Bacteria, Archaea, Eukarya	Guided Inquiry, VR experience and hands on activity
3 days: 60-62	Lesson 13: Kingdoms within Domain Eukarya	Guided Inquiry, VR experience and hands on activity
3 days: 63-65	Lesson 14: Kingdoms of prokaryotes	Guided Inquiry, VR experience and hands on activity
3 days: 66-68	Lesson 15: Each Domain is divided into smaller groupings	Guided Inquiry, VR experience and hands on activity
3 days: 69-71	Lesson 16: Scientific Names	Guided Inquiry, VR experience and hands on activity
3 days: 72-74	Lesson 17: Classification	Guided Inquiry, VR experience and hands on activity
4 days: 75-78	Lesson 18: Different classes of vertebrates and major characteristics	Guided Inquiry, VR experience and hands on activity
3 days: 79-81	Lesson 19: Examples of how an animal is classified	Guided Inquiry, VR experience and hands on activity
4 days: 82-85	Lesson 20: Biography: Carl Linnaeus	Guided Inquiry, VR experience and hands on activity
2 day: 86-87	Unit Activity “Big Idea Challenge” and Discussion—Unit 2	
1 day: 88	Posttest—Unit 2	Assessment

Unit 3 Cells: Structures and Processes

Summary

This unit will help us understand the cell as the basic unit of life. This will include not only a detailed exploration into the functionality of each organelle but also the organization of cells into complex tissues.

Day	Activity/Objective	Type
1 day: 1	What are Cells?	Student centered discussion and lecture
2 day:	Lesson 21: All living things are made up of cells	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 22: Structure of cells	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 23: Plant cells, unlike animal cells, have cell walls and chloroplasts	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 24: Prokaryotes (bacteria)	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 25: Some organisms consist of only a single cell	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 26: Cells are shaped differently in order to perform different functions	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 27: Organization of cells into tissues, organs, and systems	Guided Inquiry, VR experience and hands on activity
4 days:	Lesson 28: Biography: Ernest Just	Guided Inquiry, VR experience and hands on activity
2 day:	Unit Activity “Big Idea Challenge” and Discussion—Unit 3	Student presentations
1 day: 20	Posttest—Unit 3	Assessment

Unit 4: Life Cycles & Reproduction

Summary

This unit will help us understand elements of a life cycle and the significance of reproduction. Students will compare and contrast different reproductive strategies and explore how each is uniquely suited to an organism and its environment.

Day	Activity/Objective	Type
1 day: 1	Introduction: Studying life and heredity	Student centered discussion and lecture
1 day:	Lesson 29: The Life Cycle and Reproduction	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 30: Life cycle	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 31: All living things reproduce themselves. Reproduction may be sexual or asexual.	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 32: Examples of asexual reproduction	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 33: Sexual reproduction	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 34: Sexual Reproduction in Animals	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 35: Reproductive organs	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 36: External fertilization	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 37: Internal fertilization	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 38: Development of the embryo	Guided Inquiry, VR experience and hands on activity

1 day:	Lesson 39: Biography: Percy Lavon Julian	Guided Inquiry, VR experience and hands on activity
2 day:	Unit Activity “Big Idea Challenge” and Discussion—Unit 4	Student presentations
1 day: 20	Posttest—Unit 4	Assessment

Unit 5: The Human Body

Summary

This unit will help us understand the organs in the human body and describe their functions, including the skin, brain, heart, lungs, stomach, liver, intestines, pancreas, muscles and skeleton, reproductive organs, kidneys, bladder, and sensory organs. This exploration will highlight specific changes during Adolescence by focusing on the functionality of individual body systems.

Day	Activity/Objective	Type
1 day:	Introduction to the human body	Student centered discussion and lecture
2 day:	Lesson 40: Changes in Human Adolescence	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 41: The Endocrine System	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 42: The human body has two types of glands	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 43: Endocrine glands secrete chemicals called hormones. Different hormones control different body processes.	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 44: Pituitary gland	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 45: Thyroid gland	Guided Inquiry, VR experience and hands on activity

1 day:	Lesson 46: Pancreas	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 47: Adrenal glands	Guided Inquiry, VR experience and hands on activity
2 day:	Lesson 48: The Reproductive System	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 49: Females: ovaries, fallopian tubes, uterus, vagina, menstruation	Guided Inquiry, VR experience and guided discussion
1 day:	Lesson 50: Males: testes, scrotum, penis, urethra, semen	Guided Inquiry, VR experience and guided discussion
1 day:	Lesson 51: Sexual reproduction	Guided Inquiry, VR experience and guided discussion
2 day:	Unit Activity “Big Idea Challenge” and Discussion—Unit 5	Student presentations
1 day:	Posttest—Unit 5	Assessment

Unit 6: Chemistry Matter & Change

Summary

This unit will help us understand atomic theory by recognizing that all matter is composed of atoms. We will explore both physical and chemical changes through investigations that support scientific thinking.

Day	Activity/Objective	Type
1 day: 1	Introduction to Chemistry	Student centered discussion and lecture
1 day:	Lesson 52: Atoms, Molecules, and Compounds	Guided Inquiry, VR experience and hands on activity

1 day:	Lesson 53: Basics of atomic structure	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 54: Atoms are constantly in motion	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 55: Atoms may join together to form molecules and compounds	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 56: Common compounds and their formulas: H ₂ O, NaCl, CO ₂	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 57: Elements	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 58: Elements have atoms of only one kind, having the same number of protons.	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 59: The Periodic Table	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 60: Some well-known elements and their symbols	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 61: Two important categories of elements: metals and non-metals	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 62: Biography: John Dalton	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 63: Chemical and Physical Change	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 64: Chemical change	Guided Inquiry, VR experience and hands on activity
1 day:	Lesson 65: Physical change	Guided Inquiry, VR experience and hands on activity

2 day:	Unit Activity “Big Idea Challenge” and Discussion—Unit 6	Student presentations
1 day:	Posttest—Unit 6	Assessment

Unit 7: Earth and Space

Summary

This unit will help us understand the cosmos. Our investigation will focus on not only the processes that shape our earth but also the forces that explain interactions across space and the known universe.

Day	Activity/Objective	Type
1 day: 1	Lesson 66: Earth and Space	Student centered discussion and lecture
2 day	Lesson 67: Earth features	Guided Inquiry, VR experience and hands on activity
2 day	Lesson 68: Weather and erosion	Guided Inquiry, VR experience and hands on activity
2 day	Lesson 69: Space	Guided Inquiry, VR experience and hands on activity
2 day	Lesson 70: Forces and Motion	Guided Inquiry, VR experience and hands on activity
2 day	Unit Activity “Big Idea Challenge” and Discussion—Unit 7	Student presentations
1 day: 180	Posttest—Unit 7	Assessment