Kindergarten Science

By Nancy Willis

American Heritage School

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About the Instructor

Mrs. Willis has over 25 years of experience teaching kindergarten through fourth grade children. She grew up in Provo where she attended Brigham Young University and graduated with a bachelor's in Elementary Education. After serving an LDS mission and teaching for three years in Utah she and her husband moved to Alaska where she lived for the next 24 years until moving back to Utah in August of 2008. She has taught Kindergarten for two years at American Heritage School and began teaching Elementary Science in the fall of 2010. In Alaska, Mrs. Willis taught for 20 years in public schools. While there, Mrs. Willis also completed a Masters degree in Educational Leadership and spent two years as an Elementary School principal. After retiring, she volunteered with the Alaska PTA, taught piano lessons, and home-schooled her youngest child. She and her husband have eight children and three grand children. In her spare time, Mrs. Willis enjoys spending time with her family, going for walks, playing games, reading, doing family history research, baking, and playing and listening to music, and traveling. During her years in the classroom, Mrs. Willis taught science curriculum to all of her classes as there were no science specialists in elementary public schools. Over the years she has helped her own children raise a variety of pets, including dogs, cats, guinea pigs, hamsters, gerbils, birds, fish, a rabbit, and snakes. She has a love of nature and a deep love and appreciation for its Creator. "I am grateful for the opportunity to share my love of learning and the wonders of God's creations with the children in the K-4 science classes at American Heritage."

How to Use This Book

Teacher Information Page

The Teacher Information Page at the beginning of each lesson is an important resource in helping your teaching to be success

Lesson 00 – Sample Teacher Instruction Page

> *". . . all things denote there is a God; yea, even the earth, and all things that are upon the face of it, yea, and its motion, yea, and also all the planets which move in their regular form do witness that there is a Supreme Creator."*
> *~Alma 30:44*

Leading idea: All of God's creations are evidence of His goodness and power; a scientist studies God's creations and the ways they interact.

Outcome: Student will be able to describe the job of the course teachers, the job of the student, and what a scientist does.

Materials you will need for this lesson:

- A one-inch binder with a clear pocket on the front and a clear pocket on the back
- Six tabbed dividers
- A pencil
- Coloring materials (crayons, colored pencils, or markers)
- Record sheets: Classroom Constitution, Notebook Cover page

Lesson preparations: Try the Lab experiment once before doing it with your student so that you are confident in giving the directions and know the expected outcome.

Lab instructions: Take your student to the "fishing pond" you created. Ask him/her to predict which objects the magnet will catch. Allow him/her to explore by "catching" objects from the "pond." Discuss what items were caught and why. Help him/her come to the conclusion that magnets attract metal objects. Have the student draw some of the metal items on the record sheet.

Additional resources: A Seed is a Promise by Claire Merrill ; From Seed to Plant by Gail Gibbons; The Reason for a Flower by Ruth Heller; The Tiny Seed by Eric Carle

Preparations for the next lesson: In the next lesson you will need several samples of leaves. Collect leaves that have different shapes, colors, edges, and vein patterns during the week to be ready for the next lesson.

Each instruction page begins with a Scripture that compliments the content of the lesson. Share this scripture with your student; invite him/her to reason and relate how the scripture applies to the lesson.

The Leading Idea states the main focus of the lesson.

The Materials section lists all of the materials you will need for the lesson.

The Outcome states what the student should be able to do having completed the lesson.

Some lessons require preparations prior to teaching. When that is the case, the Lesson preparations section describes those needs.

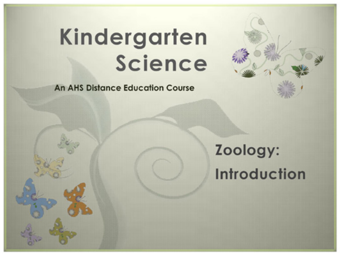
Some lab directions will be given within the content of the lesson; others labs activities will be teacher-directed and the instructions are found in Lab instructions.

On occasion Additional resources are provided for you to give you ways to extend or expand the lesson.

Some lessons require advanced preparation of more than one or two days. In those instances, Preparations for the next lesson will be indicated in the preceeding lesson to give you plenty of time to have materials ready.

Lesson Slides

The Lesson Slides contain the content of the lesson to share with your student. You will read these pages directly to the student. When a question is posed, give your student time to respond. Ask additional questions and discuss the concepts further as prompted.



PowerPoint Presentations

Some of the lessons direct you to watch a PowerPoint presentation. These presentations provide more instruction and visuals to enhance the learning experience for your student. Some of these presentations are narrated; others are not and require that you read the information to the student. The Table of Contents will indicate which are narrated and which are not.

Record Sheets

Most lessons will have a page on which your student will record thoughts and perceptions about the lesson. At the Kindergarten level, it will be necessary for you to read the directions to the student and to sometimes assist in the completion of the page. The record sheet is a learning tool, not a test.

Grading Sheet

After the Table of Contents you will find a Grading Sheet on which you will grade each lesson's work. The directions for grading are found in the Syllabus on page 4.

Elementary Science Syllabus / Kindergarten / Full Year

> *". . . all things denote there is a God; yea, even the earth, and all things that are upon the face of it, yea, and its motion, yea, and also all the planets which move in their regular form do witness that there is a Supreme Creator." ~Alma 30:44*

Course Description

The goal of this kindergarten science course is to help students to recognize the hand of God in all of His creations, to develop observation and describing skills, and to become familiar with the scientific process. Students will gain an understanding of the Principle of Individuality as it is demonstrated in all of God's creations. They will recognize God's principle of Unity with Diversity in its applications in zoology, astronomy, geology, anatomy/physiology, and botany. Students will also receive an introduction to physics and the laws and principles that govern the interactions between objects.

God's Principle of Individuality is the main principle of focus in the Kindergarten curriculum. This principle is the truth that Heavenly Father has created each of us as unique individuals with our own missions to fulfill. He has given every person individual talents and gifts to develop in order to serve Him and His other children as we fulfill our personal missions. In addition, the Principle of Unity with Diversity will also be seen, particularly in Anatomy/Physiology and Botany. This principle teaches that diverse entities – whether people, body systems, or plant parts – have their own missions; as they unify and work together with others, sharing their talents and "working their programs," they create a greater whole than if they operated independently.

Course Objectives

Students will demonstrate their understanding of the science curriculum through participating in class instruction and completing the following tasks:

1. Students will be able to compare and contrast animals, distinguishing between vertebrates and invertebrates. Students will be able to classify animals into families by physical attributes.

2. Students will be able to describe the basic workings of the solar system, including explaining why the earth is the "just right" place for us to live.

3. Students will use the scientific method to explore force and motion, chemistry, and magnets.

4. Students will describe the three states of matter.

5. Students will sort rocks by various attributes.

6. Students will describe the purposes of the major body systems.

7. Students will describe how to be good stewards of their bodies.

8. Students will grow plants and make observations to discover the purpose of roots, stems, leaves, flowers, and seeds.

9. Students will memorize and recite a scripture for each unit of study.

10. Students will demonstrate their learning by recording in their notebooks and through demonstrations of learning in lab experiences.

Course Format

Independent Study Course

American Heritage School's copyrighted online or print curricula (materials that are not licensed to share or re-sell) will be provided for family use.

Course Methodology

For you and your student to have a successful, positive experience with this course, it will be helpful for you to understand the methodology used at American Heritage.

"4 R-ing"

Your child will experience four parts to each lesson, although each one may not be specifically pointed out:

- Research – you and your student will obtain information from a variety of sources
- Reason – your student will be asked to think and talk about the main principles of truth found in the research.
- Relate – your student will relate those principles to his/her own life and/or to other events, people, or truths found in the world.
- Record – your student will record his/her learning. This recording will be done in various ways—writing, drawing, creating a project, and/or teaching someone else.

The Notebook Method

Your student will create a notebook for this course that will be a record of his/her learning. Your student will complete record sheets throughout the course to put into the notebook. It is important to talk with your student about the purpose of the notebook; it will help him/her feel greater ownership and a desire to do well on the work. Take a few minutes to assist your student in establishing a standard for his/her notebook. The following questions may assist you as you and your student get started and throughout the course as reminders:

- Where do you want to keep your notebook when we are not using it so it is always easy to find and so that it is protected from being damaged in any way?
- What are some words you would want used to describe the work in your book when you or others are looking at it? (i.e.--excellent, colorful, neat) What will you want to do when you are completing your work so that can happen?
- Heavenly Father is a God of Order—you will see that clearly in your study of science. To follow His example, what could you do with your papers when you finish them?

Encourage your student to share his/her notebook with friends and family throughout the course. This will give your student a real audience for his/her work, and it will improve his/her learning—teaching others is a powerful way to solidify learning.

Course Texts

The following titles are books used within lessons in the curriculum. They may be purchased or you may find them at your local library.

Title	Author	ISBN	Annotation
Charlie the Caterpillar	Dom Deluise and Christopher Santoro	9780671796075	
If You Find a Rock	Peggy Christian	0-15-239339-0	
The Skeleton Inside You	Philip Balestrino		A "Let's Read-and-find-out" book.
Frog and Toad Together	Arnold Lobel		The story "The Garden" will be used.

Course Assignments

The assignments consist of notebook pages, experiments or activities (referred to as "labs"), and memorizations.

Notebook Pages

The notebook of each student is not just an organized compilation of assignments; rather, it is a product of his/her creativity, insights, and progress. It is a permanent record of the researching, reasoning, relating, and recording that causes a student to become an "active producer" rather than a "passive consumer." The assignments outlined in this course are designed to guide students on this journey.

Labs

The lab activities are hands-on explorations of the topic being studied which could be in the form of an experiment, an observation and explanation, or a partner activity.

Memorizations

In this course students will memorize the following scriptures:

Zoology: "And I, God, made the beasts of the earth after their kind, . . . and everything which creepeth upon the earth after his kind; and I, God, saw that all these things were good." ~ Moses 2:25

Astronomy: "The heavens declare the glory of God; and the firmament showeth his handiworks." ~Psalms 19:1

Physics: "Let all things be done decently and in order." ~ 1 Corinthians 14:40

Geology: ". . . I am the good shepherd, and the stone of Israel. He that buildeth upon this rock shall never fall." ~Doctrine and Covenants 50:44

Anatomy/Physiology: "What? Know ye not that your body is the temple of the Holy Ghost which is in you… and ye are not your own? ~1 Corinthians 6:19

Botany: "… every seed bringeth forth unto its own likeness." ~Alma 32:31

Grading:

Grading at the Kindergarten level is based upon participation as well as notebook work and memorizations. Grades will be given by the Independent Study teacher as follows for each lesson:

Participation		5 Points	(total of 36 lessons = 180 points)
Notebook Assignment / Lab		5 Points	(total of 36 assignments = 180 points)
Unit Memorizations		10 Points	(total of 6 scriptures = 60 points)
	TOTAL	**420 Points Possible**	

A grading worksheet will be provided for the teacher to use. The teacher will use his/her best judgment to score the student's participation, notebook assignment or lab, and memorization using the following grading scale:

Grading Rubric:

5	.	.	.	.	.	1

<u>Participation</u> Actively participates, asks questions, is focused	Minimal focus and attentiveness to lesson
<u>Notebook</u> Work is done neatly, carefully, and shows thought	Work is done sloppily and lacks neatness or thought.
<u>Lab</u> Actively participates, asks questions, is focused	Minimal focus and attentiveness to lesson

10	.	.	.	.	.	1

<u>Memorizations</u> Scripture is recited with confidence and with no help.	Scripture is not memorized at all.

Grading: Scale

EP = Excellent (100-90%)
CP = Consistent Progress (89-80%)
SP = Slow Progress (79-70%)
LP = Limited Progress (69-60%)
NP = Not Passing (59-0%)
* = With Special Accommodation

Materials and Supplies

- 1" Binder with 6 tabbed dividers
- Writing pencils and eraser
- Coloring supplies such as markers, colored pencils, and crayons
- Creating supplies: Scissors, glue sticks, tape
- Construction paper (various colors)
- A Loupe and lanyard – you can get a loupe and lanyard, or you may want to purchase the small kit; both can be purchased from the following supplier: http://www.theprivateeyestore.com/servlet/StoreFront

- Live butterfly kit – such as Insect Lore Live Butterfly Garden from Amazon.com
- A model of the solar system (kits can be found at various websites and stores, or you can use a plan to create your own, such as the one at this website: http://www.enchantedlearning.com/crafts/astronomy/solarsystemmodel/
- A yardstick or meter stick
- A package of medium-sized balloons
- Three or four different kinds of magnets, including two bar magnets with the poles clearly marked
- Samples of igneous, metamorphic, and sedimentary rocks
- A small package of Plaster of Paris

Helpful Hints

Teaching the lessons – The first page of each lesson contains a scripture and instructions for the teacher. Read over the instructions at least one day prior to teaching the lesson as many lessons contain preparations that need to be completed before you begin teaching the lesson. Read the scripture and be prepared to share it with your student at the beginning of the lesson. At some point during the lesson, help your student reason how the scripture applies to the concept(s) being taught in the lesson. I would also recommend that you begin each lesson with prayer and invite the Holy Ghost to be present; He is the master teacher. Finally, be sensitive to the Spirit and take the opportunity to bare testimony whenever the opportunity arises. Help your student recognize he/she is known and loved by Heavenly Father and Jesus Christ and that all Their creations are evidence of that love.

Managing the binder -- an easy way to help your student put record pages in the correct place is to grab the tab behind the current topic—i.e. grab Astronomy while working on Zoology lessons-- then flip it to the left (which will put all the pages on the left side of the binder, face down); then turn the tabbed divider back to the right side of the binder and place the new record page on top of the tabbed page.

Cutting—make sure your student holds the scissors with his/her thumb on top; hold the paper to be cut in the other hand; make sure he/she points the scissors away from his/her body to begin cutting; use the "holding" hand to turn the paper while the scissors continue to point away from the body.

Gluing – a small dot of liquid glue goes a long way! Also, point out that a few dots of glue from a glue stick is sufficient—a glue stick is not a coloring tool.

The Private Eye Loupe – take 30 minutes to explore using the Loupe. Discuss proper handling of the tool, emphasizing the importance of not touching the glass. Handle the Loupe by the sides. Place the large end at one eye, close the other eye, then experiment looking at a variety of objects. Practice bringing the object closer to the eye, rather than the eye closer to the object. The powerful thing about the Private Eye Loupe is that when used correctly, it closes out vision of everything except for the object being observed, making for a more focused study experience.

Instructor Contact Information

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Kindergarten Science Grading Sheet

Lesson	Participation (5)	Lab/Notebook Assignment (5)	Scripture Memorization (10)
1			
2			
3			
4			
5			
6			
7			
8			
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32			
33			
34			
35			
36			
Totals:			

Total Points: ___________/420

Lesson 1: Foundations of Science

> *". . . all things denote there is a God; yea, even the earth, and all things that are upon the face of it, yea, and its motion, yea, and also all the planets which move in their regular form do witness that there is a Supreme Creator." ~Alma 30:44*

Leading idea: All of God's creations are evidence of His goodness and power; a scientist studies God's creations and the ways they interact.

Outcome: Student will be able to describe the job of the course teachers, the job of the student, and what a scientist does.

Materials you will need for this lesson:

- A one-inch binder with a clear pocket on the front and a clear pocket on the back
- Six tabbed dividers
- A pencil
- Coloring materials (crayons, colored pencils, or markers)
- Record pages: Classroom Constitution, Notebook Cover page

Preparations for this lesson: Label each divider: Zoology, Astronomy, Physics, Geology, Anatomy/Physiology, and Botany. Place the dividers in the binder.

Information to assist you in the discussion with your student about the statements in the Classroom Constitution:

1. Be respectful. What does it look like to be respectful?

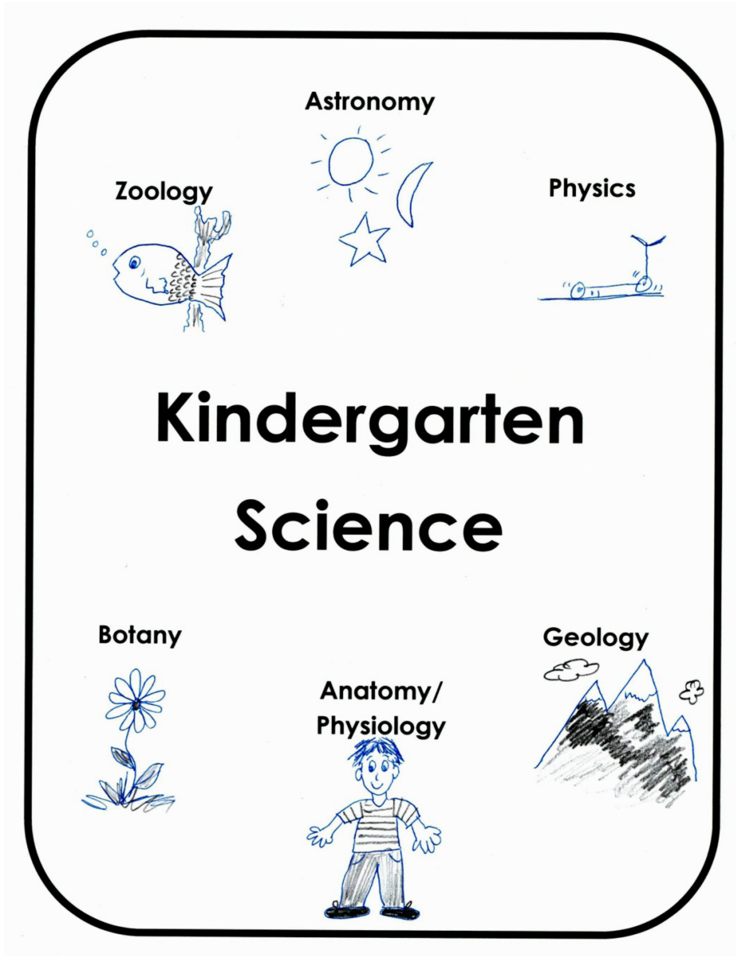
2. Be responsible. What can you do to show you are responsible?

3. Take pride in your work. Have you ever made a beautiful picture? How did it make you feel? That's how you should always feel when you finish your work, whether it is writing or drawing or creating something. This is YOUR learning—do your best so you can enjoy it and share it!

4. Be a good steward. What are some things you will need to take care of for your science class?

5. Desire and be willing to learn. What would that look like? Why is that important?

Example of finished cover page:



Kindergarten Science

An AHS Distance Education Course

Introductory Lesson

Welcome to Kindergarten Science!
This year you will come to know and understand many of Heavenly Father's amazing creations. There are a few things that will help you in the journey:

- Know your teachers and their jobs
- Know your job
- Be a great scientist

Your Teachers & Their Jobs

You will have two teachers this year.

1. Your classroom teacher will share many exciting materials, activities, and information with you. This teacher's job is to give you many things to think about and to explore, to lead you into understanding new ideas, and to help you be your best.

Your Teachers & Their Jobs

2. The Holy Ghost will also be your teacher.

"…and by the power of the Holy Ghost ye may know the truth of all things." ~Moroni 10:5

"And this is my gospel—repentance and baptism by water, and then cometh the baptism of fire and <u>the Holy Ghost, even the Comforter, which showeth all things, and teacheth the peaceable things of the kingdom</u>." ~D&C 39:6

The Holy Ghost will touch your heart and bare witness to truth as you learn about science this year.

Your Job

Your teachers will have much to share with you, but they cannot make you learn. You have the exciting job of receiving their teaching and the joy of learning new things as you follow their directions and answer their questions. Your job is to learn new ideas, truths, and principles to add to what you already know. There are some behaviors that will help you be successful in your job: be respectful, responsible, present, take pride in your work, be a good steward, and have a desire to learn.

Your Job

To help you remember the different things that will help you be successful in your job, there is a "Classroom Constitution" for you and your classroom teacher to read through and discuss together.

Take out your Classroom Constitution and talk about it with your teacher. What does each statement mean?

The Classroom Constitution

After discussing the Constitution with your teacher, sign it. Signing the Constitution means you agree to be a scholar and do those things you talked about.

Your teacher also signs it. This means your teacher is going to help you be a good scholar.

Then put your Constitution in the back pocket of your Notebook as a reminder of what you will do to be a successful learner.

Be a Great Scientist

A scientist is someone who studies the creations of God and how they work and interact.

"In the beginning God created the heaven and the earth." ~Genesis 1:1

God created everything on the earth, in the earth, and above the earth. And He created all of these for us because He loves us. He wants us to understand His creations and to use them to learn, to have joy, to help each other, and to come to know Him.

To be a great scientist you will be a good listener, a good observer, and a good recorder.

During this year, you will learn about six areas of science. Take out the record page for this lesson.

Now you will learn a little bit about and draw a picture for each of the six areas. This paper will slide into the front pocket of your Notebook to be the cover of your Science Notebook.

First you will explore zoology. What is the beginning part of this word? (That will give you a clue about what zoology is.) Zoology is the study of animals. Draw a picture of an animal under the word "zoology" on your paper.

Next, you will learn about astronomy. Astronomy is the study of the universe. What are some objects that are out in space? Draw one of them on your record page.

After astronomy you will learn about physics. Physics is the study of how non-living objects interact. You could draw a ball bouncing, a car, a magnet, a scooter, a bicycle, or something similar.

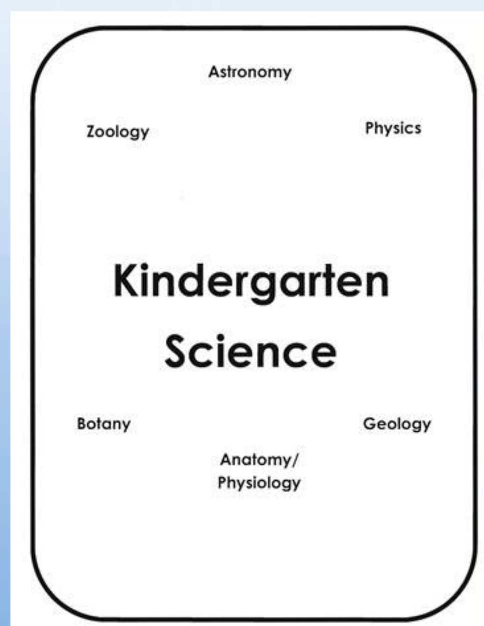
Next, you will study geology. Geology is the study of the earth and what it is made of. Draw a picture of a mountain, a rock, or a volcano under the word "Geology" on your paper.

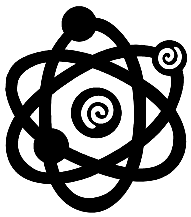
Fifth, you will learn about your body, the different parts that are in it, and how they work. That is called anatomy and physiology. Draw a picture of a person or a skeleton.

Last, you will investigate botany. Botany is the study of plants. What is one of your favorite kinds of plants? Draw it under the word "Botany."

Put your finished cover page in the front pocket of your Notebook.

Are you excited to start being a scientist?!





Science Classroom Constitution

I am an American Heritage Scholar

1. I am respectful: I listen, show courtesy to my teacher and classmates, and speak at appropriate times.
2. I am responsible: I finish class and homework assignments; I come prepared to learn.
3. I take pride in my work: I do my best, I care about the quality and completeness of my work, and I keep my Notebook tidy.
4. I am a good steward: I take care of materials and use my time well.
5. I desire and am willing to learn—I listen, I participate, I invite learning.

Student Signature

Teacher Signature

Astronomy

Zoology

Physics

Kindergarten Science

Botany

Geology

Anatomy/ Physiology

Lesson 2: Zoology - Introduction

And I, God, made the beasts of the earth after their kind, and cattle after their kind, and everything which creepeth upon the earth after his kind; and I, God, saw that all these things were good."
~Moses 2:25

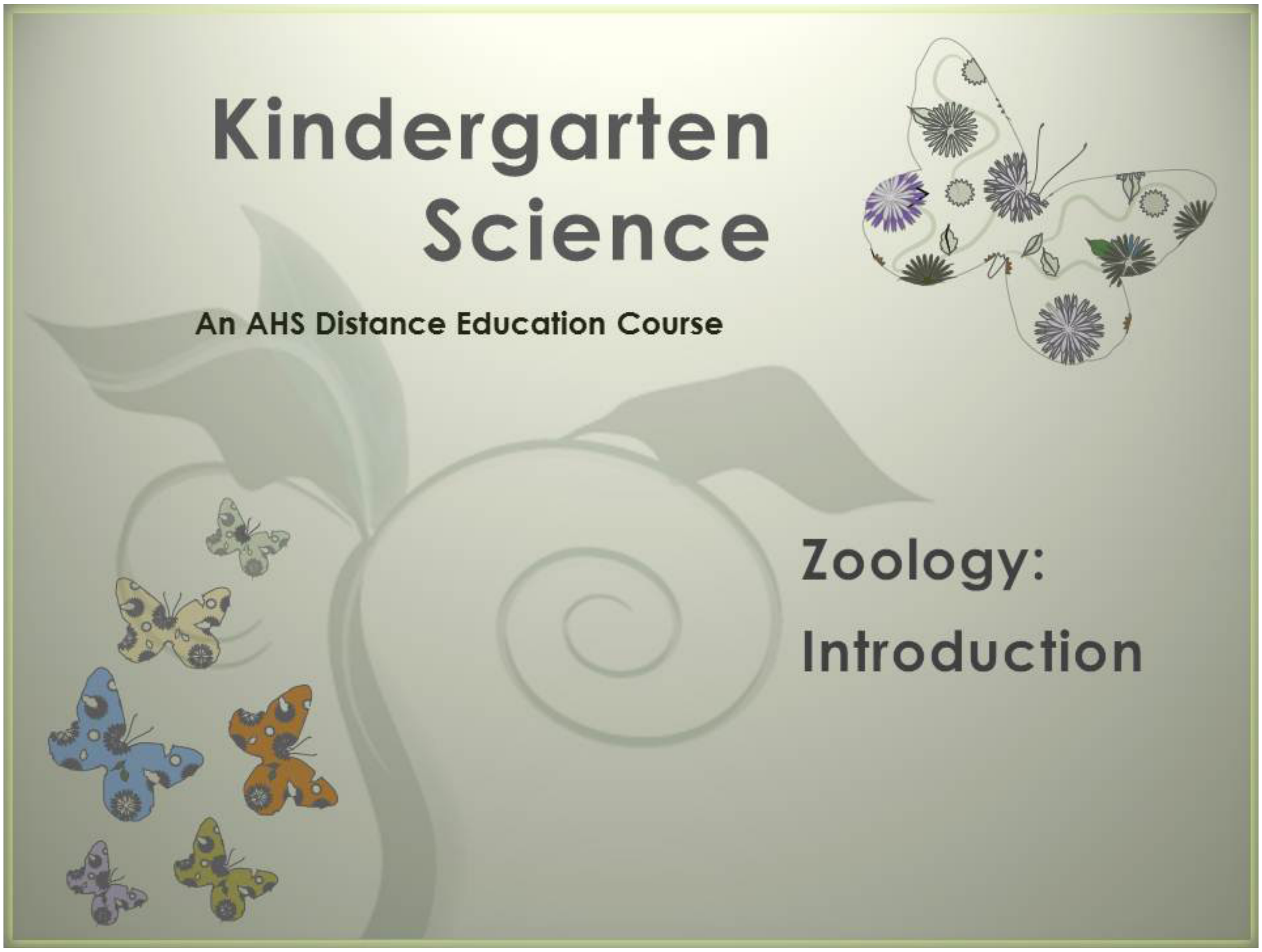
Leading idea: All of God's creations are evidence of His goodness and power; He created animals on the 5th day of creation.

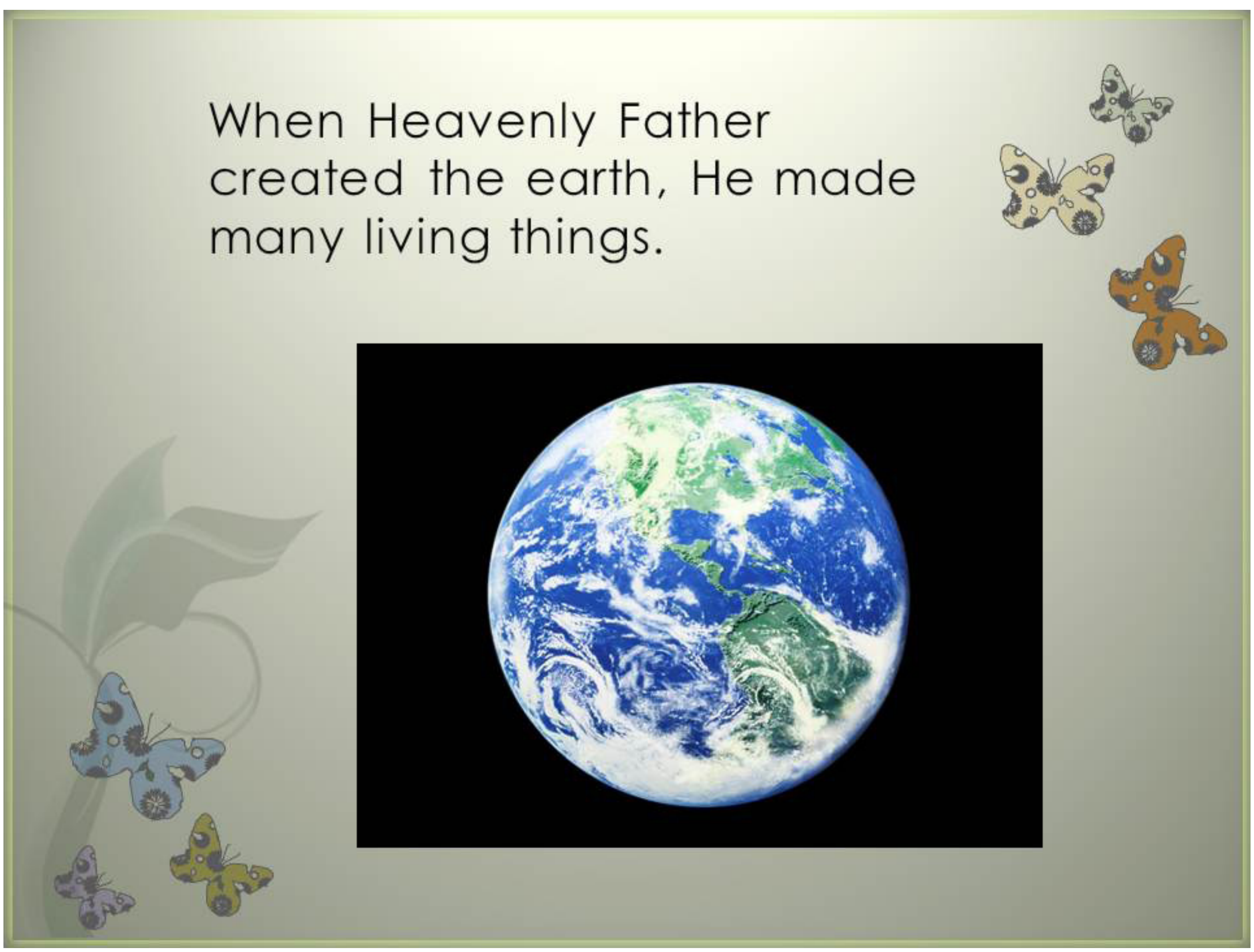
Outcome: Student will be able to define zoology and distinguish the main difference between vertebrates and invertebrates. Student will begin to memorize Moses 2:25.

Materials you will need for this lesson:

- A pencil
- Scissors
- Glue
- Coloring tools (crayons, colored pencils, or markers)
- Record page: Zoology: Invertebrates and Vertebrates

Helpful hints: An easy way to help your student put record pages in the correct place is to grab the tab behind the current topic—i.e. grab Astronomy tab while working on Zoology lessons-- then flip it to the left (which will put all the pages on the left side of the binder, face down); then turn the tabbed divider back to the right side of the binder and place the new record page face up on top of the tabbed page you were holding.


Kindergarten
Science
An AHS Distance Education Course
Zoology:
Introduction


When Heavenly Father
created the earth, He made
many living things.

All of the living things Heavenly Father created are divided into two groups:

plants or animals.

On the 5th day, Heavenly Father created the animals.

"And I, God, said: Let the waters bring forth abundantly the moving creature that hath life, and fowl which may fly above the earth in the open firmament of heaven.
And I, God, created great whales, and every living creature that moveth, which the waters brought forth abundantly, after their kind, and every winged fowl after his kind; and I, God, saw that all things which I had created were good.
And I, God, blessed them, saying: Be fruitful, and multiply, and fill the waters in the sea; and let fowl multiply in the earth;
And the evening and the morning were the fifth day.
And I, God, said: Let the earth bring forth the living creature after his kind, cattle, and creeping things, and beasts of the earth after their kind, and it was so;
And I, God, made the beasts of the earth after their kind, and cattle after their kind, and everything which creepeth upon the earth after his kind; and I, God, saw that all these things were good."
~Moses 2:20-25

The study of animals is called "zoology." A person who studies zoology is called a "zoologist." You will be studying zoology for the next few weeks—you are a zoologist!

Let's get started!
Animals can be divided into two groups:
vertebrates

and invertebrates.

Vertebrates are animals with backbones.

Invertebrates are animals without backbones.

Feel your back. Are you a vertebrate or an invertebrate? Why?

Do you have a pet? Feel your pet's back. Is it a vertebrate or an invertebrate? Why?

Reason, Relate, Record

- Look at the pictures of animals on the notebook assignment page. Talk with your teacher about each animal. Does it have a backbone? Is it a vertebrate or an invertebrate?
- Cut out the pictures and glue them onto the record page in the correct section on the page - "Invertebrate" or "Vertebrate."

Reason, Relate, Record

- Remember to cut carefully and to glue neatly.
- Put your materials away.
- Share your record page with a friend or family member; teach him/her what you know about vertebrates and invertebrates.
- File your record page behind the Zoology tab in your Notebook.

Scripture

With each unit of science you study, you will get to memorize a scripture. The scripture for zoology is:

"And I, God, made the beasts of the earth after their kind, . . . and everything which creepeth upon the earth after his kind; and I, God, saw that all these things were good."

~ Moses 2:25

Begin working to memorize this scripture so you will be ready to recite it at the end of your zoology studies.

Enrichment:

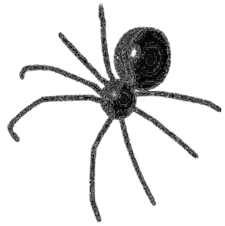
Use your observation skills; watch for animals inside and outside this week. Are they vertebrates or invertebrates?

Zoology: The study of animals

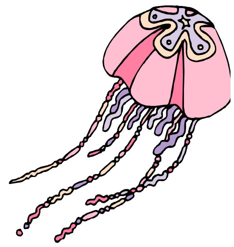
Invertebrate: An animal without a backbone.

Vertebrate: An animal with a backbone.

spider

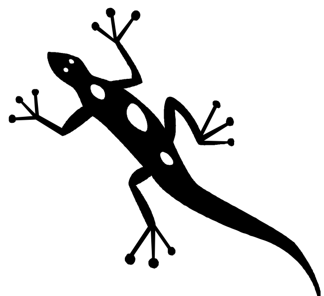


jellyfish



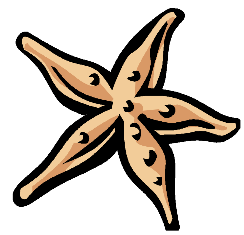
cat

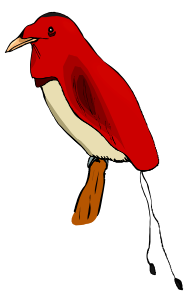
fish



lizard

starfish



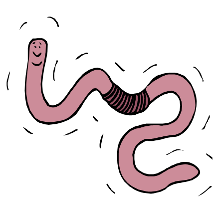


bird

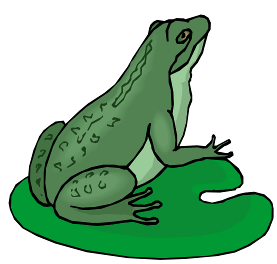
housefly

octopus

worm



frog



crab

Lesson 3 – Invertebrates: Arthropods (emphasis on Insects)

> *" . . . and insects shall pester their land also, and devour their grain." ~Mosiah 12:6*

Leading idea: All animals are an expression of God's character and nature and are a witness to His Principle of Individuality.

Outcome: Students will be able to tell the characteristics of insects and recognize God's Principle of Individuality in insects.

Materials you will need for this lesson:

- Pencil
- Coloring tools
- Record page: Arthropods
- Pictures of insects from the computer, internet or magazines (or live insects)
- Optional: a jar or other container for catching insects to observe

Preparations for the next lesson: Order your butterfly kit. Kits can be obtained through Amazon.com

Helpful hints: An easy way to help your student put record pages in the correct place is to grab the tab behind the current topic—i.e. grab Astronomy while working on Zoology lessons-- then flip it to the left (which will put all the pages on the left side of the binder, face down); then turn the tabbed divider back to the right side of the binder and place the new record page on top of the tabbed page.

Kindergarten Science

An AHS Distance Education Course

Zoology: Arthropods

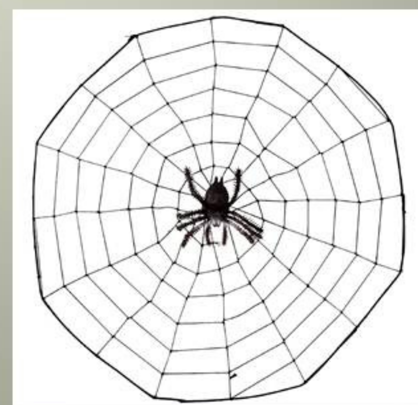
Today you will learn about arthropods. Arthropods are one of the groups in the Invertebrate family. Do you remember what an invertebrate is? What makes an invertebrate different from a vertebrate?

An arthropod has a hard exoskeleton (skeleton on the outside) and a segmented body to which jointed arms and legs are attached in pairs.

Arthropods include several families; some of them are:

insects, like dragonflies, bees, and butterflies;

arachnids, like spiders;



myriapods, like centipedes;

and **crustaceans**, like crabs and lobsters.

We are going to focus today's studies on insects.

Here are the main characteristics of all adult insects:

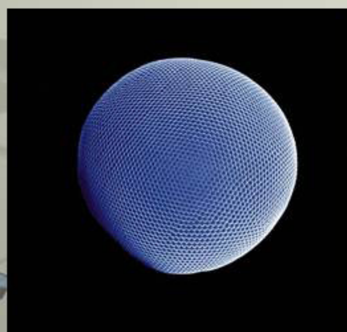
•An exoskeleton – an insect's skeleton is on the outside of its body to protect the soft insides.

•A three-part body – most insects have a head, thorax, and abdomen

•Three pairs of jointed legs – "jointed" means they can bend

•Two antennae (used to sense touch, heat, vibrations, and especially to smell)

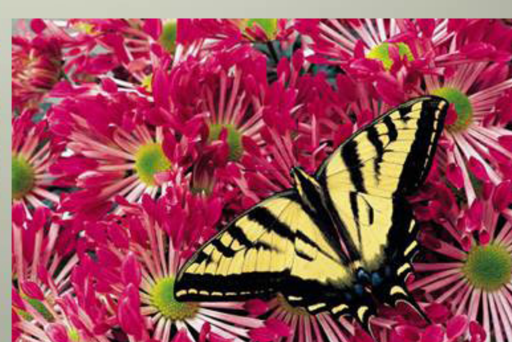
•Compound eyes – compound eyes are like having lots of little eyes next to each other. They can detect fast movement and can look in various directions at the same time.



The eye of an Antarctic krill

The eyes of a fly

Often, baby insects do not look like their parents. You've probably seen caterpillars before. They grow up to be butterflies.



Reason, Relate, Record

Here is a song to help you remember the important parts that make an insect different from other arthropods. Try it out!

(sung to the tune of "Head, Shoulders, Knees, and Toes" – point to your corresponding body parts as you sing; make antennae with your fingers)

Head, thorax, abdomen, abdomen, abdomen,
Head, thorax, abdomen, 6 legs to help me move.
Compound eyes and jointed legs,
jointed legs, jointed legs,
Compound eyes and jointed legs,
Antennae help me learn.

Reason, Relate, Record

Think about the parts of an insect's body.

- How is its skeleton different from yours?
- How is its body different from yours?
- Try walking without bending your legs. Now try sitting down on a chair without bending your legs. Why do you think Heavenly Father gave people and insects jointed legs?

Reason, Relate, Record

•Keeping your head still, move your eyes all around and see what you can see. If you had compound eyes, you could see above, to the side, below, and even a little behind you without moving your head. How might that be helpful to insects in getting food and staying alive?

Reason, Relate, Record

•What are some insects you've seen? Do they all look the same? Even though they are all insects, Heavenly Father created them to look different and to do different things. This shows Heavenly Father's Principle of Individuality.

•Do all people look the same and have the same talents? How is this like the insects?

Reason, Relate, Record

- Get your Arthropod record page, a pencil, and your coloring things.
- Your teacher will help you read the directions. Draw your insect larger than it is in real life.
- When you have finished drawing and labeling an insect, make your picture complete by drawing a place for your insect to be – is it on the ground, in the grass, in the air, on a flower or leaf?
- File your paper in the Zoology section of your Notebook.

Scripture

Continue to practice your scripture:

"And I, God, made the beasts of the earth after their kind, . . . and everything which creepeth upon the earth after his kind; and I, God, saw that all these things were good."

~ Moses 2:25

Enrichment:

Look for insects in your house or yard. Catch one or two. Put the insect in a jar or other container that has holes punched in the lid. Use your Loupe to observe your insect closely. Is it really an insect? How can you tell? Draw a picture of the insect to put in your Notebook. Let the insect go free after you have observed it.

Arthropod

An arthropod has a hard exoskeleton and a segmented body to which jointed arms and legs are attached in pairs. Arthropods include insects, arachnids, myriapods, and crustaceans.

This is an insect: (Draw an insect; label the head, thorax, abdomen, jointed legs, and antennae)