Important Information

This engaging unit features a variety of excellent digital and physical resources. The guide contains clickable links that will take you to videos, games, pictures, projects, activities and printable pages for your child to complete. Prior to beginning the unit I highly recommend reading the detailed day plans for five days at a time so that you have the opportunity to print off any needed materials.
Welcome!

Welcome to the amazing world of fossils and time. This unit takes a look into the amazing world of fossils, as well as exploring the eras in which these fossils walked the earth. Students will be invited to explore this fascinating subject through reading, interactive assignments, videos, games and interactive websites. Students will have the opportunity to conduct research, defend their beliefs, and practice writing strong, well-supported opinion pieces. Students will be encouraged to present their ideas and research in dynamic ways using 21st century digital literacy skills. Opportunities to experiment with a variety of applications and websites are included throughout the unit.

Students will be covering the following concepts and content:

- Geologic time
- The age of the earth
- The fossil record
- Type of fossils
- Rock formations and layers
- Dinosaurs
- Environmental changes throughout history
- Much, much more

I hope you will enjoy learning about the mysteries of our planet and the amazing world of fossils!
Provincial Learning Outcomes Met
The following learning outcomes are taken from the new British Columbia Education Plan.

**Core Competencies**
- Fossil records provide evidence of geologic and environmental change

**Curricular Competencies**
- Make observations aimed at identifying their own questions about the natural world
- Identify a question to answer or a problem to solve through scientific inquiry
- Formulate alternative "If... then..." hypotheses based on their questions
- Make predictions about what the findings of their inquiry will be
- Collaboratively plan a range of investigation types, including fieldwork and experiments, to answer their questions or solve problems they have identified
- Construct and use a range of methods to represent patterns or relationships in data, including tables, graphs, key, scale models, and digital technologies as appropriate
- Seek patterns and connections in data from their own investigations and secondary sources
- Use scientific understandings to identify relationships and draw conclusions
- Reflect on their investigation methods, including the adequacy of controls on variables and the quality of the data collected
- Identify possible sources of error and suggest improvements to their investigation methods
- Demonstrate an awareness of assumptions and identify information given and bias in their own work and secondary sources
- Demonstrate an understanding and appreciation of evidence
- Exercise a healthy, informed skepticism and use scientific knowledge and findings for their own investigations to evaluate claims in secondary sources
- Consider social, ethical, and environmental implications of the findings from their own and others’ investigations
- Communicate ideas, findings, and solutions to problems using scientific language, representations, and digital technologies as appropriate

**Concepts and Content**
- fossil records and geological dating
Biblical Worldview Exploration

HCOS students are encouraged to develop a Biblical worldview and to explore a variety of areas of study from a Christian perspective. Students are encouraged to think critically about a wide-variety of issues and how they pertain to us as Christians. Each unit is designed to encourage students to read the word of God in order to gain a deeper understanding of our Creator and His plan for humanity. This unit focuses on connecting Biblical texts to the study of the fossil record and geologic time. Students are encouraged to work towards a Biblical perspective throughout the unit, however, there are specific lessons designed to emphasize Biblical content.

The fossil record and geologic time can be controversial issues. This kit presents multiple perspectives on geologic time and the fossil record so that students gain the complete picture needed to form their own opinion. Students will have opportunities to search scripture and incorporate Biblical passages and scripture references into the work they do. They will read Genesis 1, and have the opportunity to explore information provided by Christian organizations such as BioLogos and Answers in Genesis.

**Note:** there may be Evolutionary content included in some of the videos and readings. Feel free to include or exclude in your discussions.
Fossils

Digital Resources for Use With This Kit:

Note: you are only able to borrow three books at a time from the HCOS digital library.

To learn more about the different types of digital PDF resources, and how to download them the help page has excellent instructions.

Investigating Minerals, Rocks and Fossils by Britannica Educational Publishing

Fossils, Uncovering the Past by Tom Greve

What are Fossils? by Natalie Hyde

Online Resources

Note: You will need to contact your child’s teacher in order to get login information for the following sites.

Discovery Education

Learn 360

Explora
## Unit Overview

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Day Plans

Day One:

*Investigating Minerals, Rocks and Fossils* Chapter 1: Earth’s Building Materials

**Recommended Activities:**

Watch [Fossils](#) from Learn 360.

- Why might some organisms have left no fossil evidence?
- Why do you think so many of the fossilized organisms and animals are no longer alive today?
- Why do you think God created so many different creatures?
- What are the main theories behind the age of the earth? Why do you think people disagree about the age of the earth?
- How do scientists determine what an animal may have looked like? Do you think the drawings they create are always correct? Why or why not?

Watch [Radiometric Dating](#) from Discovery Education.

Day Two:

*Investigating Minerals, Rocks and Fossils* Chapter 2: Types of Minerals

**Recommended Activities:**

Watch [Dino Autopsy](#) from Learn 360.

Play [Exploring Fossils and the Fossil Record](#).

To complete this assignment you will be keeping a field journal. Your field journal could be a physical notebook, a [Google Doc](#), a [Glog](#), a [Weebly page](#), or video logs—you may want to use a variety of photographs, drawings, sketches, and “collected samples” in your field journal as well as notes about what you see and hear. This assignment is one part imagination and one part fact finding mission. You are a paleontologist living in the year 2240. You and your colleagues have developed a machine that will allow you to journey back in time to walk with the dinosaurs in the Jurassic period. This will aid you significantly in your study of the fossil record. You and a partner have been chosen for this unique information gathering mission. Your assignment will last one week. During that time you will be keeping notes and a journal describing your journey into the past. What you see, hear, smell, and experience. In order to create a journal that is factual as
possible. You will need to conduct research about the time period to which you are traveling including plant life, animal life, geography, and climate. I suggest choosing two to three animals that you would like to “observe” in depth. To conduct your research use a combination of these resources; Advanced Google, World Book Student, and Explora. Your field journal should have a minimum of seven entries to a maximum of fourteen entries. Be creative and use your imagination. Consider watching the BBC documentary Walking With Dinosaurs to complement your research.

Day Three:

*Investigating Minerals, Rocks and Fossils* Chapter 3: Types of Rocks

**Recommended Activities:**

Work on your field journal started on day two. Watch *Becoming a Fossil*.

- Why do most living things not leave fossils behind?
- How are fossils formed?
- How are fossils found?
- How do scientists determine the age of fossils?

Read about fossil formation from Answers in Genesis. Watch *Dinosaurs* from Answers in Genesis.

Watch *Dinosaur Baby: The North American Story* from Learn 360.

Day Four:

*Investigating Minerals, Rocks and Fossils* Chapter 4: Fossils

**Recommended Activities:**

Work on your field journal started on day two.

Watch *Super Croc* from Learn 360.

View *Getting into the Fossil Record* from UC Berkeley.

While Christians may have differing perspectives about the development of life on earth and the age of our planet and universe, an area on which most Christians agree is that we and our universe have a Creator. Read *Genesis 1*. 
Day Five:

*Investigating Minerals, Rocks and Fossils* Conclusion

**Recommended Activities:**

Work on your field journal started on day two.

Watch *Dino Deathtrap* from Learn 360.

Press ‘Student Start’ to explore this interactive explanation of geologic time.

Day Six:

*Fossils, Uncovering the Past* Chapter 1

**Recommended Activities:**

Work on your field journal started on day two.

Watch *Prehistoric Hunters: Sabre-Toothed Cat* from Learn 360.

View a geologic time chart.

Day Seven:

*Fossils, Uncovering the Past* Chapter 2

**Recommended Activities:**

Work on your field journal started on day two.

Watch *Reconstructing T-Rex* from Learn 360.

Read a BioLogos article about what the fossil record shows.

Day Eight:

*Fossils, Uncovering the Past* Chapter 3

**Recommended Activities:**
Work on your field journal started on day two.

Watch The Rock Cycle from Learn 360.

Read a BioLogos article about determining the age of things.

**Day Nine:**

*Fossils, Uncovering the Past Chapter 4*

**Recommended Activities:**

Finish your field journal started on day two.

Watch Uncovering the Past from Learn 360.

Watch an Introduction to the Geologic Time Chart from Kahn Academy. Then, complete the geologic time scale—use Google Images to find an example if you are unsure. Read this Answers in Genesis article for a different perspective on the geologic time scale.

**Day Ten:**

*Fossils, Uncovering the Past Chapter 5*

**Recommended Activities:**

Watch Natural Phenomena: Rocks, Fossils and Earth History from Discovery Education.

Use this interactive geologic time scale to tour through time.

There a wide variety of opinions about the age of the earth. Some people and scientists believe that the earth is billions of years old. Others believe that the earth is a maximum of 10,000 years old. As you have seen throughout this unit, this issue comes directly into play when we are learning about the fossil record and geologic time. Both sides of this debate work hard to find evidence to support their claims. Your family probably has a belief about the age of the earth. Spend some time talking with your parents about what they believe. Then, consider what you believe about the age of the earth. Once you have decided where you stand on the issue, you are going to conduct some research to support your opinion. One of the most important skills you can learn is to defend your opinions. Use Advanced Google and Explora to conduct research. For more specific information about a young-earth perspective you may wish to visit Answers in Genesis. Can you find scripture that you feel supports your argument?
Remember, that Wikipedia can be a good starting point to read about a topic, however, it is not a good academic source of information. Read about The Five W’s of Website Evaluation for more information about finding good sources. Be sure to create a bibliography listing your sources. Once you have gathered evidence to support your opinion, create an opinion piece. You may choose from a variety of formats including: a PowerPoint presentation, a Prezi, a written newspaper article, a multimedia presentation, a Glog, an audio recording, or a video recording. Share your presentations with friends and/or family.

Day Eleven:

_Fossils, Uncovering the Past_ Chapter 6

**Recommended Activities:**

Watch Real World Science: Fossils and Dinosaurs from Discovery Education.

Play the radioactive dating game.

Read Psalm 148. Why do you think the Psalmist thinks it is important to praise God for creation? What are some of the ways in which our world is perfectly designed to meet our needs? How are we designed to suit our world? What are some ways that you can express gratitude for God’s creation?

Day Twelve:

_Fossils, Uncovering the Past_ Chapter 7

**Recommended Activities:**

Watch Discover Magazine: Living Fossils from Discovery Education.

Read about fossilization from the Canadian Fossil Discovery Centre.

Day Thirteen:

_What are Fossils?_ Once Upon a Time Pages 4-5

**Recommended Activities:**

Watch Fossil Life: An Introduction from Discovery Education.
Read about *fossil excavation* from the Canadian Fossil Discovery Centre.

**Day Fourteen:**

*What are Fossils?* The Raiders of the Past Pages 6-7

**Recommended Activities:**

Watch *Bonehead Detectives of the Paleoworld: Flying Fossils* from Discovery Education.

Read about *fossil preparation* from the Canadian Fossil Discovery Centre.

**Day Fifteen:**

*What are Fossils?* Stay in Shape Pages 8-9

**Recommended Activities:**

Watch *Fossils: Windows Into the Past* from Discovery Education.

Watch *Bonehead Detectives of the Paleoworld: The Wandering Dinos* from Discovery Education.

Read about *fossil replication* from the Canadian Fossil Discovery Centre.

**Day Sixteen:**

*What are Fossils?* Traces in Stone Pages 10-11

**Recommended Activities:**

Watch *When Dinosaurs Ruled: South America* from Discovery Education.

**Day Seventeen:**

*What are Fossils?* Ancient Bones Pages 12-13

**Recommended Activities:**

Watch *When Dinosaurs Roamed America* from Discovery Education.
Day Eighteen:

*What are Fossils?* Golden Traps Pages 14-15

**Recommended Activities:**

Watch [Basics of Geology: All About Rocks and Minerals](#) from Discovery Education.

Read about the [Burgess Shale](#) (and [here](#)) in British Columbia. Take a [virtual submarine tour](#) to view the creatures who lived in the Burgess Shale--be sure to click on the links underneath the video player to see all of the creatures. Then, choose one of the [creatures that has been found in the Burgess Shale](#) (and [here](#)). Use Advanced Google and [Explora](#) to investigate your animal. Write a brief report on your animal that answers the following questions:

- How has the animal been classified? What is the meaning of its name?
- What role did it play in its habitat?
- How did its anatomy help it to survive in its environment?
- Which animals living today is it most similar to?
- Why do you think there are similarities between the living things God created?

After you have completed your research, build a model of your chosen animal using clay. Create a diorama featuring your creature as it would have looked in an ocean long ago. Include an information table explaining the features of your creature.

Day Nineteen:

*What are Fossils?* Frozen Sections Pages 16-17

**Recommended Activities:**

Watch [Bonehead Detectives of the Paleoworld: Beasts of the Sahara](#) from Discovery Education.

Work on your diorama begun on day eighteen.

Day Twenty:

*What are Fossils?* That Sinking Feeling Pages 18-19

**Recommended Activities:**

Watch [Dinosaur Eggs and Babies](#) from Discovery Education.
Work on your diorama begun on day eighteen.

Day Twenty-One:

*What are Fossils?* Rock Gardens Pages 20-21

**Recommended Activities:**

Watch *Fearless Planet: Grand Canyon* from Discovery Education.

Read about *Atopodentatus* from National Geographic. Then, *Excavate sea monsters* with National Geographic.

- Many of the creatures of the ancient oceans had strange and complex body shapes. What explains their body shapes? What features did God give these animals to help them survive?
- Why do you think scientists study ocean creatures so carefully?
- Brainstorm how life on our planet would differ today if a different set of organisms (not including vertebrates) had survived the Cambrian period.
- What are the advantages of living in the ocean? The disadvantages?
- What are the advantages of living on land? The disadvantages?

Work on your diorama begun on day eighteen.

Day Twenty-Two:

*What are Fossils?* Unusual Animals Pages 22-23

**Recommended Activities:**

Watch *Bonehead Detectives of the Paleoworld: The Dino Killers* from Discovery Education. *Dig for a virtual dinosaur fossil* and learn about the process.

Work on your diorama begun on day eighteen.

Day Twenty-Three:

*What are Fossils?* Not Dragons Pages 24-25

**Recommended Activities:**
Watch when Dinosaurs Ruled: Australia from Discovery Education. Read about Dinosaur National Monument from Answers in Genesis.

Finish your diorama begun on day eighteen.

Day Twenty-Four:

What are Fossils? Great...Great...Grandparents Pages 26-27

Recommended Activities:

Watch when Dinosaurs Ruled: Africa from Discovery Education. Follow the instructions from National Geographic to make your own fossils.

Day Twenty-Five:

What are Fossils? Bone Hunting Pages 28-30

Recommended Activities:

Watch Bonehead Detectives of the Paleoworld: The Headless Dinosaur from Discovery Education. Present your diorama to family and/or friends.
Bibliography