

The background features a dark red, stylized volcano erupting with bright yellow and orange sparks and smoke. A large, semi-transparent clock face is positioned behind the main title. The overall color palette is dominated by shades of red, orange, and yellow, creating a warm and energetic atmosphere.

# Rock Around the Earth!

## Geology & Earth Science

WinterPromise

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# Rock Around the Earth

## Geology & Earth Science for 3rd-7th Grade

### Welcome to Your Science Program!

Each week your student will work through several resources. These resources are designed to be done orally together with the parent, but could be done independently if the student is older and accustomed to working on their own. Most students should be able to complete “Lab Reports” in “This One-of-a-Kind Planet Earth” on their own, and can complete science activities and experiments together with a parent or sibling. Younger students may be able to dictate “Lab Report” answers to a parent. These journal assignments are a necessary part of reinforcement for what students are learning, although younger students can do just those assignments that seem most suitable. An answer key for the journal, as well as weekly comprehension questions for “Our Planet Earth” are included in the back of this guide.

Each week there are suggested activities, some of which should be completed. There is a lot of content in the activities, so we encourage you to try to do at least one or two of them each week. Many of them are very simple to complete and require limited supplies.

This program has been deliberately designed to be an easy-to-accomplish program, one whose content is a good complement to the breadth of our themed programs.

### Book List:

Rock Around the Earth: Science Program Guide  
This One-of-a-Kind Planet Earth (includes journaling)  
Our Planet Earth  
Rocks, Gems, and Minerals  
The Case of the Missing Mountain

### Recommended Additional Purchase

**Used in Week 15:** Toysmith Mineral Science Kit - Purchase Details in Week 15.

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# Rock Around the Earth



## Science for 3rd-7th Grade

### **BASICS OF EARTH SCIENCE**

- Week 1: One-of-a-Kind Planet Earth
- Week 2: What is Geology?

### **LOOKING INTO THE PAST**

- Week 3: History Written in the Earth
- Week 4: The Genesis Flood
- Week 5: The Great Ice Age
- Week 6: Glaciers on the Move

### **ROCKS**

- Week 7: Inside the Earth
- Week 8: All About Rocks
- Week 9: The Rock Cycle
- Week 10: Igneous Rocks
- Week 11: Sedimentary Rocks
- Week 12: Fossils in the Rocks
- Week 13: Fossil Fuels
- Week 14: Metamorphic Rocks

### **MINERALS**

- Week 15: What Are Minerals?
- Week 16: Identifying Minerals
- Week 17: Sparkle & Glitter

### **EARTHQUAKES**

- Week 18: Plate Tectonics
- Week 19: Mountains All Over
- Week 20: Quaking & Shaking
- Week 21: Detecting & Predicting

### **VOLCANOES**

- Week 22: What is a Volcano?
- Week 23: Spewing & Spurting
- Week 24: Plate Boundaries
- Week 25: Two Types of Eruptions
- Week 26: Volcanic Eruptions
- Week 27: One More Type of Eruption
- Week 28: Explosion of Mt. Saint Helens
- Week 29: Looking at Lava
- Week 30: Lava Formations

### **WEATHERING**

- Week 31: Geysers & Weathering
- Week 32: Erosion by Land & Streams

### **IN THE GROUND**

- Week 33: Soil Under Your Feet
- Week 34: Awe-Inspiring Grand Canyon
- Week 35: Caves, Dark & Damp
- Week 36: Collecting Rocks & Minerals



# Rock Around the Earth

## Our One-of-a-Kind Earth

### Week 1

DAY 1	DAY 2
<p><b>READ &amp; COMPLETE:</b></p> <p><b><u>Our Planet Earth</u></b> Introduction to Earth Science Read - Pages 8-9</p> <p><b>Go Over:</b> What Did We Learn? and Taking It Further</p>	<p><b>READ &amp; COMPLETE:</b></p> <p><b><u>This One-of-a-Kind Planet Earth</u></b> Only One Earth Read - Pages 4-5</p> <p><b><u>Our Planet Earth</u></b> Is Evolution Scientific? - Page 10 (Recommended for older students.)</p>
<p><b>JOURNALING:</b></p> <p><b><u>This One-of-a-Kind Planet Earth</u></b> Complete Lab Report - Page 6 Earth Sciences</p>	<p><b>JOURNALING:</b></p> <p><b><u>This One-of-a-Kind Planet Earth</u></b> Complete Lab Report - Page 7 Spot the Treasure</p>
<p><b>YOUR CHOICE OF ACTIVITIES:</b></p> <p><b><u>Our Planet Earth</u></b> The Earth is Reliable - Page 9 Supplies: tennis ball, masking tape, a string</p>	<p><b>YOUR CHOICE OF ACTIVITIES:</b></p> <p><b><u>Watch a Video</u></b> You can watch an interesting video by searching for "Moody Science Videos - 06 - God of Creation" on Youtube.</p>
<p><b>Notes</b></p>	

#### **Journaling**

This year your student will gather information or write about (a form of narrating back) what they have learned. These interactive journaling pages are included in the resource, "This One-of-a-Kind Planet Earth." These pages allow

them to keep track of experiment results, data and information, discoveries, activities, etc. This resource is consumable, so you need one per student. The answer key to this resource is in the back of this guide.



# Rock Around the Earth

## What is Geology?

### Week 2

DAY 1	DAY 2
<p style="text-align: center;"><b>READ &amp; COMPLETE:</b></p> <p><b><u>Our Planet Earth</u></b> Introduction to Geology Read - Pages 12-14</p> <p><b>Go Over:</b> What Did We Learn? Taking It Further</p>	<p style="text-align: center;"><b>READ &amp; COMPLETE:</b></p> <p><b><u>This One-of-a-Kind Planet Earth</u></b> Many Different Studies Read - Pages 8-9</p>
<p style="text-align: center;"><b>JOURNALING:</b></p> <p><b><u>This One-of-a-Kind Planet Earth</u></b> Complete Lab Report - Page 10 Geology Scavenger Hunt</p>	<p style="text-align: center;"><b>JOURNALING:</b></p> <p><b><u>This One-of-a-Kind Planet Earth</u></b> Complete Lab Report - Page 11 Geology Studies</p>
<p style="text-align: center;"><b>YOUR CHOICE OF ACTIVITIES:</b></p> <p><b><u>See Pictures of Dinosaurs on the Earth</u></b> See depictions of what the earth may have looked like when dinosaurs still roamed about. There are evolutionary references laced throughout, so we recommend this site be seen with a parent. However, the pictures are cool, and well worth stopping in to see! Go to: <a href="http://douglasshendersononehi.com/Artist.asp?ArtistID=41192&amp;Akey=4YBGL8Xg">http://douglasshendersononehi.com/Artist.asp?ArtistID=41192&amp;Akey=4YBGL8Xg</a></p>	<p style="text-align: center;"><b>YOUR CHOICE OF ACTIVITIES:</b></p> <p><b><u>Watch a Video</u></b> You can watch an interesting video by searching for "Moody Science Videos - 07 - God of the Atom" on Youtube.</p>
<p><b>Notes</b></p>	

# THIS One-of-a-Kind Planet Earth!



## Geology Journal of our Rocking, Rolling, Erupting Planet !

### WinterPromise

**Ebook Version:** This resource is designed to be printed double-sided. A section in the back should be printed in color.

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# CHAPTER 1

# One-of-a-Kind Planet Earth



## Only One Earth

In all the searches that have taken place in our beyond-the-Earth space travel, and in all the places the Hubble Telescope has focused its lens, not a single other planet in the discovered universe has been found to be a suitable home for human beings. Our one-of-a-kind planet Earth has been “fine tuned” to perfectly support human life and all of the plants and animals. It has been fine tuned to maintain the healthy and innumerable complexity of habitats such as rainforests and savannahs: places where each animal and plant, each predator and grazing animal, and each bird and bug rely on the entire biome to function together as if by design. But not just “as if” by design. Everything in us tells us there must be a design. And if there is design, then there is, in fact, a Designer. That designer is God.

This year you will learn about how our one-of-a-kind planet Earth functions. You’ll discover amazing things about the earth’s geologic history, about rocks and the rock cycle and minerals, and about the forces that shape the earth: weathering, earthquakes, and volcanoes.

As you journey through this year, you will want to take note of any evidence that our earth has been finely tuned to support life on Earth. Let’s start you off by mentioning these evidences of our planet being a fine-tuned, one-of-a-kind place!



➤ The size of our Sun is just right: if it were larger, its luminosity would be too erratic, but if it were smaller, its UV radiation would not be enough for photosynthesis.

➤ Earth’s surface gravity is perfect: if it were stronger than it is, Earth’s atmosphere would hold on to too much ammonia and methane for life, but if it were any weaker, our atmosphere would lose too much water for life!

➤ The tilt of the Earth on its axis is just where it must be: if it were greater than it is, or lesser than it is, the difference in surface temperatures would not support diverse lifeforms.

➤ Earth’s rotation takes just the right amount of time: if it took longer, temperature differences would be too great for life, but if it were a shorter time, then the earth would rotate faster, and atmospheric wind would move too fast for life to exist.

➤ Even the thickness of Earth’s crust is just what it needs to be: if it were thicker, then our crust would rob our atmosphere of the oxygen that is needed for life, but if it were thinner, then volcanic and tectonic activity would destroy life on earth.

All these designed elements (and many more), make our planet one of a kind!

# Scientists Can't Avoid the Obvious Design of the Universe

"There is for me powerful evidence that there is something going on behind it all . . . It seems as though somebody has fine-tuned nature's numbers to make the Universe . . . The impression of design is overwhelming."

-- Paul Davies,  
British astrophysicist

"Astronomy leads us to a unique event, a universe which was created out of nothing, one with the very delicate balance needed to provide exactly the conditions to permit life, and one which has an underlying (one might say 'supernatural) plan."

-- Arno Penzias,  
Winner of Nobel  
prize in physics

"I would say that the universe has a purpose. It's not there just somehow by chance."

-- Roger Penrose,  
Mathematician  
and author

"This type of universe . . . seems to require a degree of fine tuning of the initial conditions that is in apparent conflict with 'common wisdom'."

-- Drs. Zehavi and  
Dekel, cosmologists

"It now seems to me that the findings of more than fifty years of DNA research have provided materials for a new and enormously powerful argument to design."

-- Antony Flew,  
Professor of Philosophy  
and former atheist

"I find it quite improbable that such order came out of chaos. There has to be some organizing principle."

-- Alan Sandage,  
Winner of the Crawford  
prize in astronomy





# Lab Report



## Earth Sciences

Under each picture, write the area of earth science, along with its description. Select them from the word bank.



Science: \_\_\_\_\_

Description: \_\_\_\_\_



Science: \_\_\_\_\_

Description: \_\_\_\_\_



Science: \_\_\_\_\_

Description: \_\_\_\_\_



Science: \_\_\_\_\_

Description: \_\_\_\_\_

### WORD BANK

astronomy

oceanography

geology

meteorology

study of the earth itself

study of the space in which the earth exists

study of the atmosphere surrounding the planet

study of the oceans of the earth



# Lab Report



## Spot the Treasure

Look around your house. Find the items below, and name what their major components are made of.

Light Bulb

---

Soda Can

---

Thumbtack

---

Penny

---

Margarine Tub

---

Baking Pan

---

Coffee Mug

---

Nail

---

As you look at your list above, you can see that the thing these items have in common is that they are made of materials that come from the earth. Some come straight out of the earth, like the copper in your penny. But glass is made out of sand, so it is processed into a final glass product. Can you find other things around you that are made out of metal, glass, iron, or plastic, like those on this list?

## CHAPTER 2

# What Is Geology?



## Many Different Studies

Geology is made up of many different studies: geophysics, physical geography, sedimentology and paleontology, mineralogy, and environmental geology. Geophysics is the study of the physical processes and properties of the Earth, including Earth's gravitational field, its magnetic field, the Earth's internal structure and composition, plate tectonics, volcanoes and magma, and earthquakes. We will spend most of this year studying areas taken from geophysics, but we will also discover a little from most other areas, too.

Physical geology is an area that we often think of first when we think of geology; it is the study of land formations that we see around us, and the study of rocks and the rock cycle. Not only do physical geologists study how rocks change from one type of rock to another, but they also study the forces that put the rock cycle into motion -- forces such as plate tectonics and erosion.

Sedimentology is the study of sandy, silt, and clay sediments, as well as the processes that form and shape them. Erosion and weathering shape sediments, and so does the transportation and depositing of sediments by water, wind, or by landslides and mudslides, or even glaciers. Sedimentary rocks surround you all the time, as they are used to create sculptures and beautiful buildings; historic ceramics and pottery; and bricks, cement, and lime. Sedimentary rocks surround deposits of copper, gold, lead, silver, gems, and more. These rocks are also where miners find petroleum deposits and coal ore that we use to fuel industries and transportation. And -- perhaps most importantly -- most of the water stored underground is in aquifers (layer of water-holding, permeable rock) in sedimentary rock layers.

Mineralogy studies the crystal structure of minerals, their chemistry, and their physical properties. Mineralogists identify minerals by examining a mineral's physical properties, such as a specimen's density, hardness, cleavage, luster, color, luminescence, streak, and more. Minerals are used by humans in many different ways, and new uses are always being found for minerals. People use minerals as building materials, for creating components in technology and specialized industries, and for fertilizing crops -- not to mention in jewelry and for making appliances or packaging for products you enjoy every day. Like soda cans!

Environmental geology is a science that has become more important since the Industrial Revolution. This study looks at how humans interact with the surface of the earth; the earth's ecosystems; the earth's waters in oceans, lakes, and streams; and earth's atmosphere. Environmental geology is very practical. This study helps people to manage earth's resources -- water, land, fossil fuels, and minerals. It also helps manage waste from industries or homes and cut down on our pollution of the earth.



### **STORAGE**

Pliny the Elder, a Roman geologist who lived in ancient times, described minerals and metals, and -- ironically -- died in the eruption of Mt. Vesuvius.

# Specialized Areas of Applied Geology

Some geologists specialize in applied geology. They study geology as it relates to a specific, practical application like these:

## Engineering Geology

These geologists apply geologic principles to engineering challenges. As buildings or bridges are constructed, the land and geologic forces can affect how something must be designed, constructed, or reinforced. These geologists make sure buildings can safely make it through earthquakes, that bridges and tall buildings have the right kind of foundations for the type of land underneath them, ensure tunnels don't collapse, and make sure that buildings will not settle into clay or be overtaken by mud.

## Hazard Geology

These geologists study areas related to natural hazards such as flooding and debris flows, the movement of rivers, sinkholes and landslides, earthquakes, avalanches, tsunamis, and volcanoes. They even study liquefaction -- how wet soil loses cohesion when shaken and acts like a liquid! These geologists make sure good building codes are created for areas prone to these kinds of natural disasters.

## Hydrogeology

These geologists work on problems related to water. They help restore streams, if they have been affected by human activity, locate groundwater for drilling wells, and monitor contamination of existing wells. They can also specialize in studying ice cores to collect data about earth's geologic history, climate, and sea level.

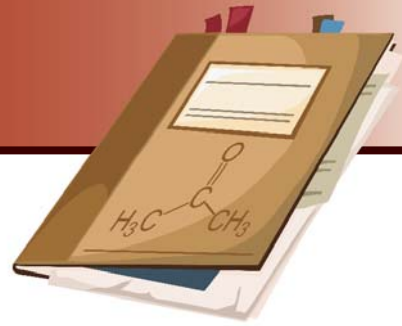
## Economic Geology

These geologists study how minerals are used to fulfill the needs of humans, usually for the mining and petroleum industries.





# Lab Report



## Geology Scavenger Hunt

Identify the following items made from common minerals and metals by their not-so-common descriptions:

1. A gallon of hydrogen, oxygen and calcium \_\_\_\_\_
2. A tube of fluoride \_\_\_\_\_
3. Box of sodium chloride \_\_\_\_\_
4. Box of O-shaped phosphorus, iron, zinc, copper and calcium \_\_\_\_\_
5. Wooden tubes filled with graphite \_\_\_\_\_
6. Sticks of limestone or gypsum \_\_\_\_\_
7. Box of phosphorus and sulfur-tipped sticks \_\_\_\_\_
8. Talc used on babies \_\_\_\_\_
9. Nickel-cadmium rechargeable units \_\_\_\_\_
10. Gypsum board used for home construction \_\_\_\_\_
11. Silicon squares \_\_\_\_\_
12. Disks of copper-covered zinc \_\_\_\_\_
13. Electricity-conducting copper lines \_\_\_\_\_
14. Mercury-filled medical instrument \_\_\_\_\_
15. U-shaped iron for holding papers together \_\_\_\_\_





# Lab Report



## Geology Studies

Under each picture, write the area of geology studies, along with what it studies. Select them from the word bank.



Study: \_\_\_\_\_

Study of: \_\_\_\_\_



Study: \_\_\_\_\_

Study of: \_\_\_\_\_



Study: \_\_\_\_\_

Study of: \_\_\_\_\_



Study: \_\_\_\_\_

Study of: \_\_\_\_\_



Study: \_\_\_\_\_

Study of: \_\_\_\_\_

### WORD BANK

mineralogy

study of minerals and crystals

sedimentology/paleontology

study of land formations, rocks

geophysics

study of sediment and fossils

environmental geology

study of magnetism, gravity, seismology

physical geology

study of effect of humans on environment