

# FOSSILS, ROCK LAYERS, AND GEOLOGIC TIMELINE Science Reading

# Scroll Through

## To take a peek inside!

Help students learn about how scientists use fossils and rock layers to create a geologic time scale of the Earth and then test their comprehension with these easy to read science reading passages.

## Fossils and Rock Dating

**Fossils and Rock Layers**  
You ever wondered how scientists know what Earth was like millions of years ago? Fossils and rock layers give us important clues. Fossils are the remains or traces of ancient organisms, while rock layers, known as strata, help scientists understand the order of events in Earth's history.

**Faults and Intrusions**  
Have you ever noticed a crack running through layers of rock or a section of rock that looks different from the layers around it? These features are known as faults and intrusions, and they offer valuable clues about Earth's geological past.

**Geologic Time Scale**  
Earth is about 4.6 billion years old, and it has undergone many big changes over that time. To help make sense of this long history, scientists use a tool called the geologic time scale. This time scale divides Earth's history into smaller parts based on major events, such as the appearance of new life forms or mass extinctions. The earliest part of Earth's history is called Precambrian time. After that, Earth's history is divided into three main eras: the Paleozoic, Mesozoic, and Cenozoic (Diagram 1).

**Diagram 1: The Precambrian time makes up about 88% of Earth's geological history, with simple life beginning toward the end of that time. Afterward, during the Paleozoic Era, life evolved and diversified rapidly—geologically speaking.**

| ERA         | PERIOD        | LIFE FORMS |
|-------------|---------------|------------|
| Cenozoic    | Quaternary    | Mammals    |
|             | Neogene       | Mammals    |
| Mesozoic    | Paleogene     | Dinosaurs  |
|             | Cretaceous    | Dinosaurs  |
|             | Jurassic      | Dinosaurs  |
| Paleozoic   | Triassic      | Dinosaurs  |
|             | Permian       | Reptiles   |
|             | Mississippian | Reptiles   |
|             | Devonian      | Reptiles   |
|             | Silurian      | Reptiles   |
| Precambrian | Ordovician    | Reptiles   |
|             | Cambrian      | Reptiles   |

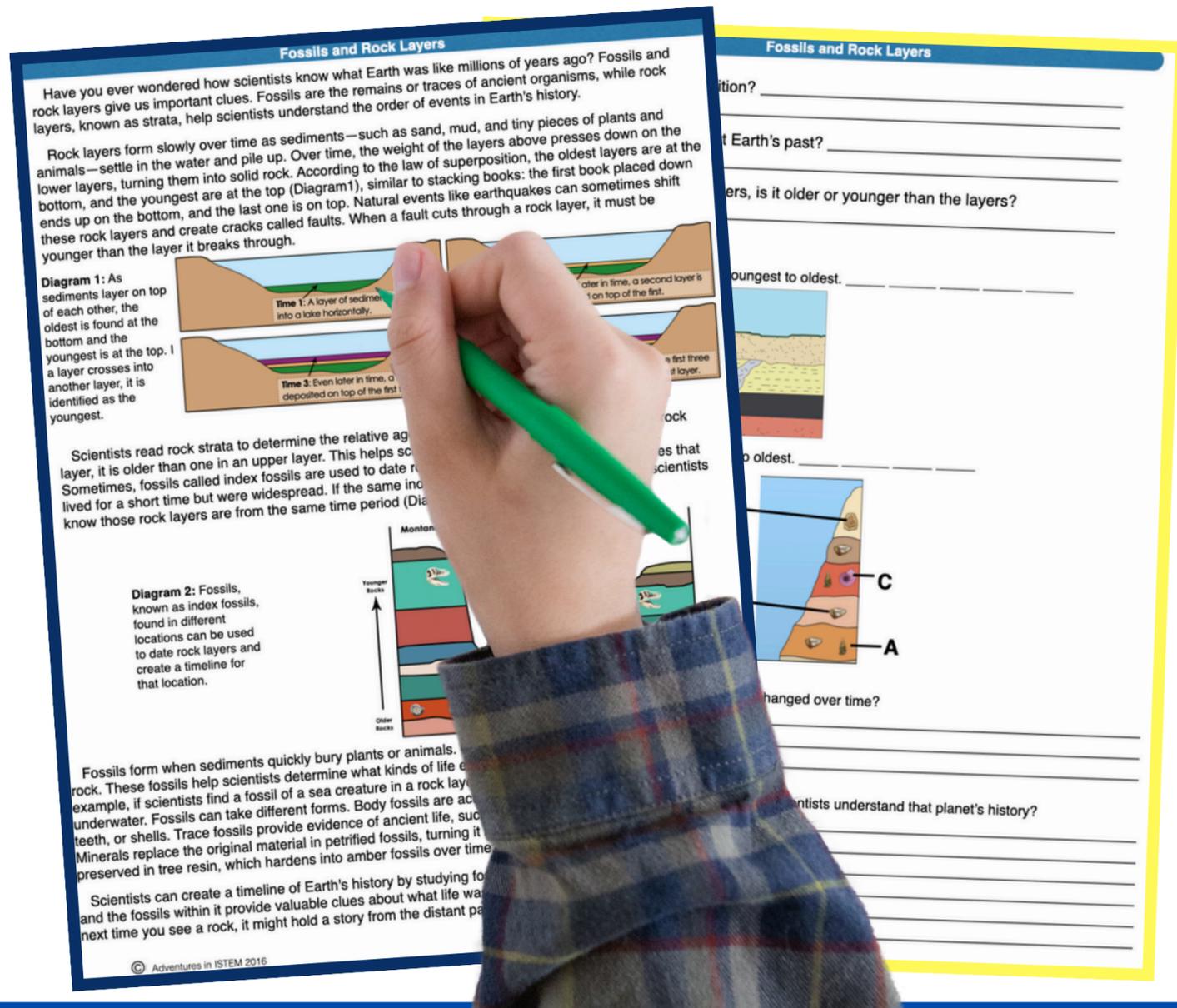
**Worksheet Questions:**

1. What is the law of superposition?
2. What can fossils tell us about Earth's past?
3. If a fault cuts through rock layers, is it older or younger than the layers?
4. How do scientists know that the Earth has changed over time?
5. What could happen in the future to mark the end of the Cenozoic Era?

## Readings with Questions

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

# FOSSILS, ROCK LAYERS, AND GEOLOGIC TIMELINE *Science Reading*



## Topics Included

**Fossils and Rock Layers**

**Faults and Intrusions**

**Geologic Timeline**

# Each topic *includes*

- ✓ **One page science reading passage to teach the topic.**
- ✓ **Notes with questions to guide their reading**
- ✓ **Comprehension worksheets to review the information using multiple levels of questioning**
- ✓ **Task cards to extend their learning and for extra review**
- ✓ **Answer keys to easily check the student knowledge**
- ✓ **Digital version for more flexibility on how to use the lesson**
- ✓ **Lesson Design to help you differentiate the lesson in your classroom**

**Geologic Time Scale**

**Define / Describe:**

- How old is Earth?
- What are the three main Eras?
- When was the Precambrian time?

**Identify:**

- label the four main time periods on the geologic time scale and the time periods between the three main eras.

| ERA         | PERIOD        | LIFE FORMS                |
|-------------|---------------|---------------------------|
| Cenozoic    | Quaternary    | Humans, Elephants, Horses |
|             | Neogene       | Monkeys, Bears, Deer      |
|             | Paleogene     | Early Mammals, Birds      |
|             | Cretaceous    | Dinosaurs, Pterosaurs     |
| Mesozoic    | Jurassic      | Dinosaurs                 |
|             | Triassic      | Early Dinosaurs, Reptiles |
| Paleozoic   | Permian       | Reptiles, Amphibians      |
|             | Carboniferous | Trilobites, Fish          |
| Precambrian | Proterozoic   | Simple Life               |
|             | Eozoic        | Earliest Life             |

Earth is about 4.6 billion years old, and it has undergone many big changes over that time. To help make sense of this long history, scientists use a tool called the geologic time scale. This time scale divides Earth's history into smaller parts based on major events, such as the appearance of new life forms or mass extinctions. The earliest part of Earth's history is called Precambrian time. After that, Earth's history is divided into three main eras: the Paleozoic, Mesozoic, and Cenozoic (Diagram 1).

**Diagram 1:** The Precambrian time makes up about 88% of Earth's geological history, with simple life beginning toward the end of that time. Afterward, during the Paleozoic Era, life evolved and diversified rapidly—geologically speaking.

**Text Excerpts:**

**Precambrian time** lasted from about 4.6 billion to 541 million years ago, making up most of Earth's history. During this time, Earth formed, and the first oceans appeared. Simple life like bacteria and algae developed, and later, soft-bodied organisms such as jellyfish began to live in the oceans. Because many of these early life forms didn't have hard parts, they didn't leave many fossils behind, which makes this time harder for scientists to study.

The **Paleozoic Era** lasted from about 541 to 252 million years ago. This era saw a great explosion of life, especially in the oceans. Many new animals appeared, including trilobites, brachiopods, and the first vertebrates like jawless fish. Later in the Paleozoic, life began to move onto land. Ferns, mosses, and giant swamp forests grew, and animals such as insects, amphibians, and early reptiles evolved. The Paleozoic ended with the largest mass extinction in Earth's history, which wiped out most marine species.

The **Mesozoic Era** lasted from about 252 to 66 million years ago and is often called the "Age of Reptiles." This is the time when dinosaurs ruled the land. Other important life forms, including the first birds, small mammals, and flowering plants, appeared. Large marine reptiles like ichthyosaurs and plesiosaurs swam in the oceans while flying reptiles like pterosaurs soared through the skies. This era ended with a mass extinction, likely caused by a giant asteroid impact, that led to the extinction of the dinosaurs.

The **Cenozoic Era** began about 66 million years ago and continues today. It is known as the "Age of Mammals" because mammals became the dominant land animals after the extinction of the dinosaurs. Over time, many modern animals evolved, such as elephants, whales, horses, and eventually humans. Birds also became more widespread, and flowering plants covered much of the land. The Cenozoic has also included major climate changes, such as the Ice Ages, which shaped much of the land we see today.

The geologic time scale helps scientists organize Earth's long and complex history. Each era tells a different part of Earth's story, from the first simple life in the ocean to the rise of dinosaurs and eventually to the mammals and humans of today. Scientists can piece together how life and the planet have changed over billions of years by studying rock layers and fossils.

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**Worksheet Questions:**

Class: \_\_\_\_\_ Date: \_\_\_\_\_

Notes

**Digital Presentation:**

geologic time scale, fossils, and rock dating digital

File Edit View Insert Format Slide Arrange Tools Extensions Help

Background Layout Theme Transition

1 2 3 4 5 6 7 8 9

**Define / Describe:**

- How old is Earth? Add text
- What are the three main Eras? Add text
- When was the Precambrian time? Add text

**Identify:**

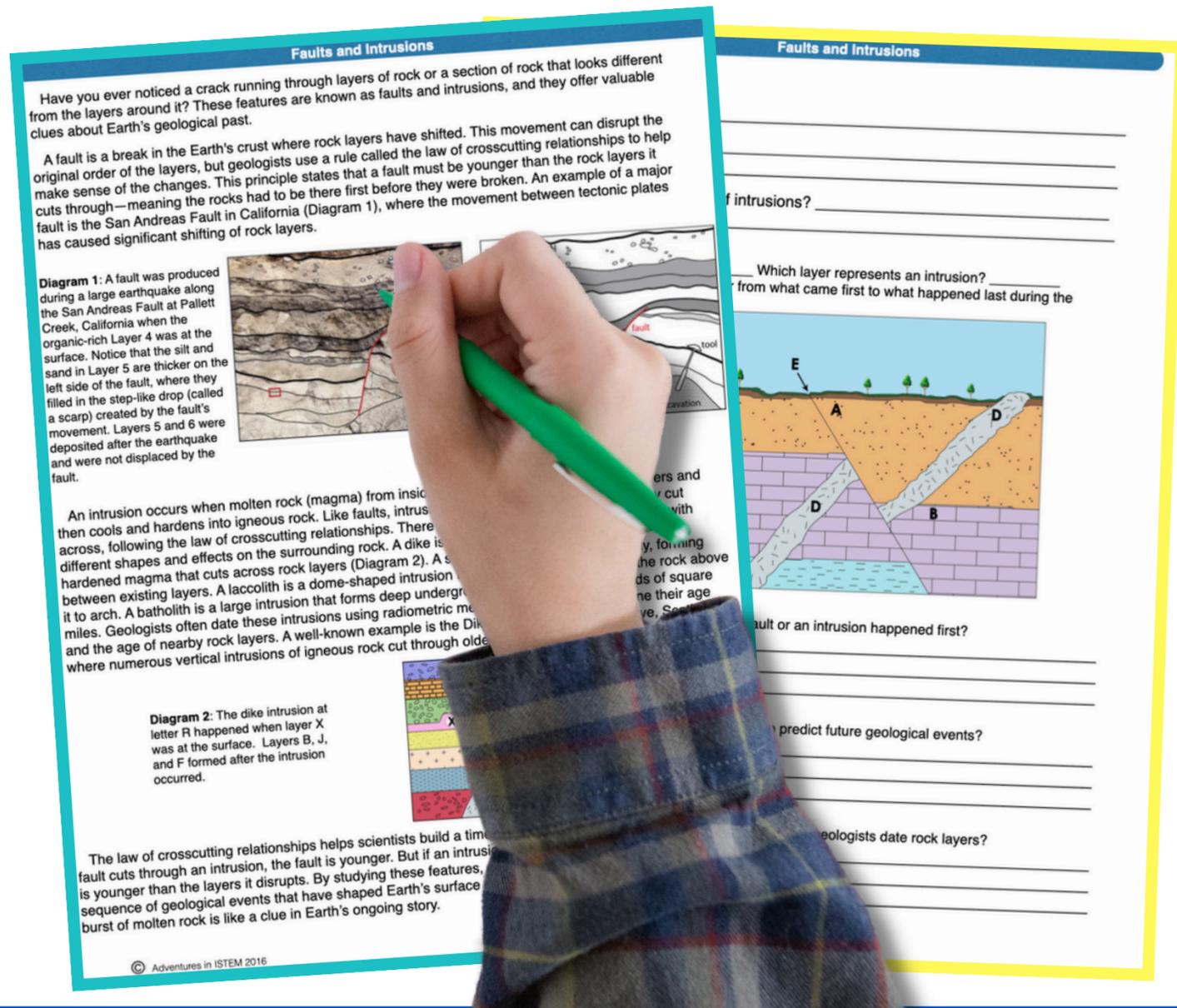
- label the four main time periods on the geologic time scale and the time periods between the three main eras. Add text

**Elaborate / Extend:**

- Why is the Precambrian time harder to study than other time periods? Add text
- How might studying rock layers on Mars help scientists understand that planet's history? Add text

# FOSSILS, ROCK LAYERS, AND GEOLOGIC TIMELINE

## Science Reading



# What Are *students* Doing?

- ✓ **Marking the text**
- ✓ **Filling in the guided note-taking template**
- ✓ **Reviewing and applying their knowledge**
- ✓ **Reinforcing their understanding**

# FOSSILS, ROCK LAYERS, AND GEOLOGIC TIMELINE

## Science Reading

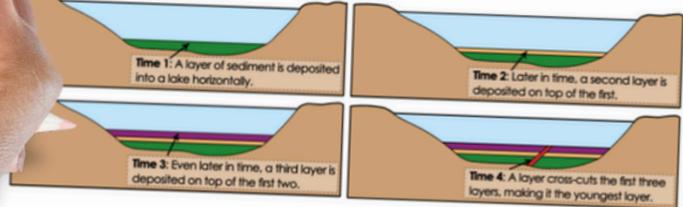
**Fossils and Rock Layers**

**Define / Describe:**

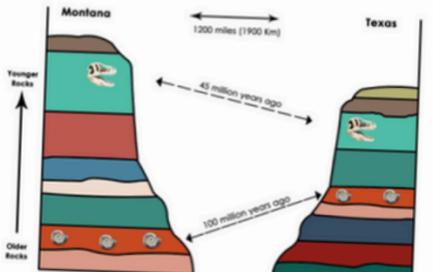
1. What is the law of superposition?
2. What can fossils tell us about Earth's past?
3. If a fault cuts through rock layers, is it older or younger than the layers it cuts through?

**Identify:**

4. Put the layers of rock in order from youngest to oldest.



5. Put the fossils in order from youngest to oldest.



**Elaborate / Extend:**

6. How do scientists know that the Earth is billions of years old?
7. How might studying rock layers help us understand Earth's history?

Have you ever wondered how scientists know what Earth was like millions of years ago? Fossils and rock layers give us important clues. Fossils are the remains or traces of ancient organisms, while rock layers, known as strata, help scientists understand the order of events in Earth's history.

Rock layers form slowly over time as sediments—such as sand, mud, and tiny pieces of plants and animals—settle in the water and pile up. Over time, the weight of the layers above presses down on the lower layers, turning them into solid rock. According to the law of superposition, the oldest layers are at the bottom, and the youngest are at the top (Diagram 1), similar to stacking books: the first book placed down ends up on the bottom, and the last one is on top. Natural events like earthquakes can sometimes shift these layers and create cracks called faults. When a fault cuts through a rock layer, it must be younger than the layer it breaks through.

Scientists use rock strata to determine the relative age of fossils. If a fossil is found in a lower rock layer than one in an upper layer. This helps scientists create a timeline of Earth's past. Fossils called index fossils are used to date rock layers. Index fossils are from species that lived for a short time but were widespread. If the same index fossil is found in different places, scientists know those rock layers are from the same time period (Diagram 2).

**Diagram 2:** Fossils, known as index fossils, found in different locations can be used to date rock layers and create a timeline for that location.

Fossils form when sediments quickly bury plants or animals. Over time, the remains are preserved in rock. These fossils help scientists determine what kinds of life existed when the rock layer was formed. For example, if scientists find a fossil of a sea creature in a rock layer, they know that area was once underwater. Fossils can take different forms. Body fossils are actual remains of organisms, such as bones, teeth, or shells. Trace fossils provide evidence of ancient life, such as footprints, burrows, or leaf imprints. Minerals replace the original material in petrified fossils, turning it into stone. Some small organisms are preserved in tree resin, which hardens into amber fossils over time.

Scientists can create a timeline of Earth's history by studying fossils and rock layers. Each layer of rock and the fossils within it provide valuable clues about what life was like millions of years ago. Remember, the next time you see a rock, it might hold a story from the distant past!

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## Different ways to use the *science readings*

- Substitute plan on days you will be out
- Introduction of the material at the beginning of the unit
- During the explain phase of the 5E model
- As part of a science station
- For reteach to reinforcing their understanding
- During the review at the end of the unit

# Why? SCIENCE READING PASSAGES?

- ✓ Increase science literacy in the classroom
- ✓ Simple passages to help students comprehend the information
- ✓ Note-taking template to help students interact with the reading
- ✓ Worksheets to review and apply their knowledge
- ✓ Reinforcement task cards to continue their understanding



“My students and I absolutely loved this resource!!! The way this was planned out with the reading, diagrams, and questions was perfect. I mainly used this with my students but they used it one day with a substitute and they wrote to tell me how great it was! (I think they thought I created it so I have to tell them otherwise!)” -

Nicole

# FOSSILS, ROCK LAYERS, AND GEOLOGIC TIMELINE

## Science Reading

**Geologic Time Scale**

**Define / Describe:**

1. How old is Earth? \_\_\_\_\_
2. What are the three main Eras? \_\_\_\_\_
3. When was the Precambrian time? \_\_\_\_\_

**Geologic Time Scale**

Earth is about 4.6 billion years old, and it has undergone many big changes over that time. To help make sense of this long history, scientists use a tool called the geologic time scale. This time scale divides Earth's history into smaller parts based on major events, such as the appearance of new life forms or mass extinctions. The earliest part of Earth's history is called Precambrian time. After that, Earth's history is divided into three main eras: the Paleozoic, Mesozoic, and Cenozoic (Diagram 1).

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| ERA                     | PERIOD        | LIFE FORMS                          |
|-------------------------|---------------|-------------------------------------|
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|                         | Neogene       | Monkeys, apes, early humans         |
|                         | Paleogene     | Early mammals, birds                |
| Mesozoic                | Cretaceous    | Dinosaurs, pterosaurs, early birds  |
|                         | Jurassic      | Dinosaurs, pterosaurs               |
|                         | Triassic      | Early dinosaurs, pterosaurs         |
| Paleozoic               | Permian       | Reptiles, amphibians, early mammals |
|                         | Carboniferous | Reptiles, amphibians, early mammals |
|                         | Devonian      | Reptiles, amphibians, early mammals |
| Precambrian time period | Proterozoic   | Simple life forms                   |
|                         | Eozoic        | Simple life forms                   |
|                         | Archaean      | Simple life forms                   |

A hand is shown writing on a piece of paper in the foreground, partially overlapping the diagram.

Check out what teachers just like you have said about the science reading products:



“I love using reading passages in my science classes because I am able to reinforce all the learning strategies they have learned in the past and give the students more understanding of the information provided.” – Suzzane



“I was really glad to find a bundle that included so many of our objectives since we do not have a curriculum” – Amanda



“This article kept my 8th graders engaged while reviewing this topic” Brower Power Science

# HOW TO USE THE RESOURCE IN

# 3 simple steps

1

Print the PDF version, make copies, and hand out to students

2

Use the digital version by clicking the titles in the RED BOX to make your own copy (found at the end of the PDF)

3

Share the resource with your students using your favorite LMS (Google Classroom, Powerschool (schoolology), Canva...)

**Interactive Digital Flip Book**

## Teachers Guide

What You Will Need To Get Started:

1. Download link for the Google Resource by clicking on the titles in the red box  
**Cell Energy Digital Flip Book Student**  
**Cell Energy Digital Flip Book Teacher**
2. Access to the Internet and a Google Account (Free)
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**Define / Describe:**

1. What is the law of superposition?  
Add text

2. What can fossils tell us about Earth's past?  
Add text

3. If a fault cuts through rock layers, is it older or younger than the layers?  
Add text

**Identify:**

4. Put the layers of rock in order from youngest to oldest. (1-youngest, 5-oldest)

5. Put the fossils in order from youngest to oldest. (1-youngest, 4-oldest)

**Elaborate / Extend:**

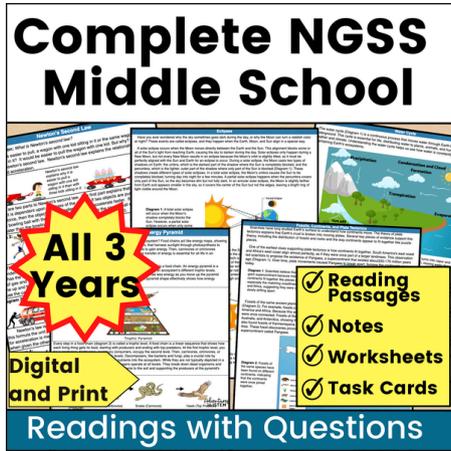
6. How do scientists know that the Earth has changed over time?  
Add text

6. What could happen in the future to mark the end of the Cenozoic Era?

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## Complete NGSS Middle School



**All 3 Years**

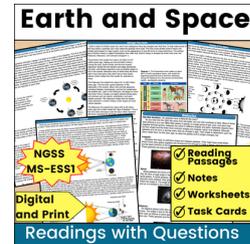
- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Digital and Print

Readings with Questions

## Earth Science Standards

### Earth and Space



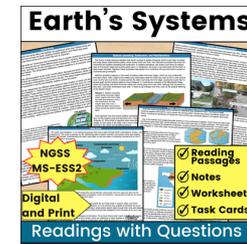
NGSS MS-ESS1

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Digital and Print

Readings with Questions

### Earth's Systems



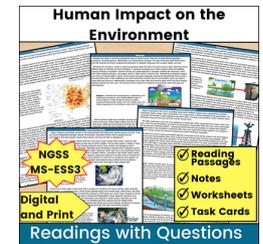
NGSS MS-ESS2

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

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Readings with Questions

### Human Impact on the Environment



NGSS MS-ESS3

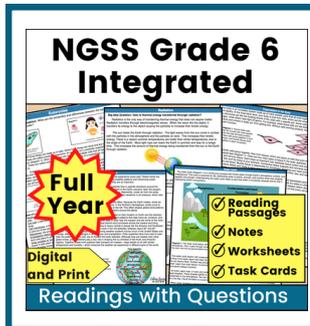
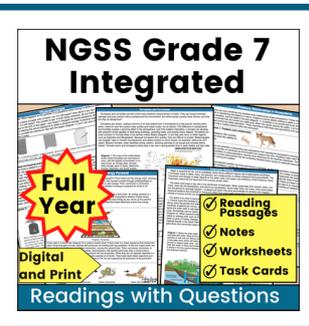
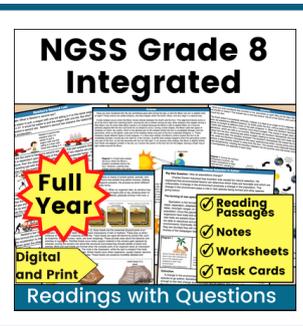
- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Digital and Print

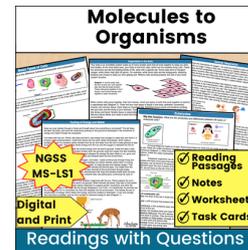
Readings with Questions

## Life Science Standards

## Integrated Model by Grade Level

|   |  |  |
|---|--|--|
| <h3>NGSS Grade 6 Integrated</h3>  <p><b>Full Year</b></p> <ul style="list-style-type: none"><li>✓ Reading Passages</li><li>✓ Notes</li><li>✓ Worksheets</li><li>✓ Task Cards</li></ul> <p>Digital and Print</p> <p>Readings with Questions</p> | <h3>NGSS Grade 7 Integrated</h3>  <p><b>Full Year</b></p> <ul style="list-style-type: none"><li>✓ Reading Passages</li><li>✓ Notes</li><li>✓ Worksheets</li><li>✓ Task Cards</li></ul> <p>Digital and Print</p> <p>Readings with Questions</p> | <h3>NGSS Grade 8 Integrated</h3>  <p><b>Full Year</b></p> <ul style="list-style-type: none"><li>✓ Reading Passages</li><li>✓ Notes</li><li>✓ Worksheets</li><li>✓ Task Cards</li></ul> <p>Digital and Print</p> <p>Readings with Questions</p> |
|---|--|--|

### Molecules to Organisms



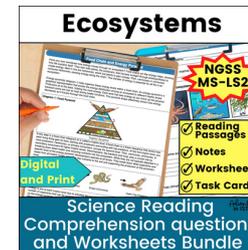
NGSS MS-LS1

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Digital and Print

Readings with Questions

### Ecosystems



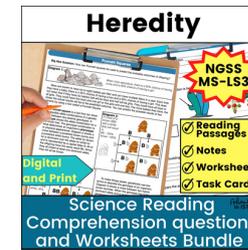
NGSS MS-LS2

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

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### Heredity



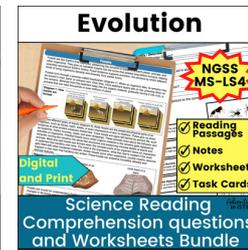
NGSS MS-LS3

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

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### Evolution



NGSS MS-LS4

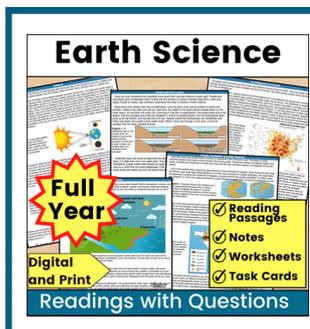
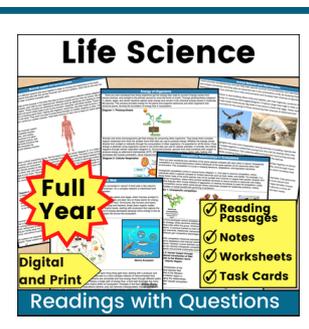
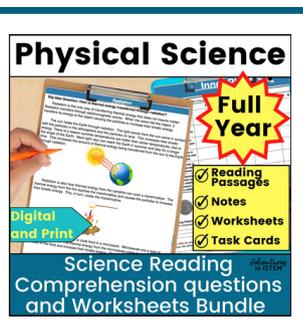
- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Digital and Print

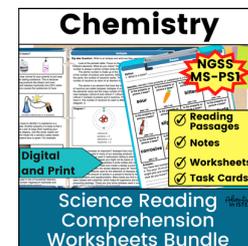
Science Reading Comprehension questions and Worksheets Bundle

## Physical Science Standards

## Alternative Model by Topic

|  |  |  |
|--|--|--|
| <h3>Earth Science</h3>  <p><b>Full Year</b></p> <ul style="list-style-type: none"><li>✓ Reading Passages</li><li>✓ Notes</li><li>✓ Worksheets</li><li>✓ Task Cards</li></ul> <p>Digital and Print</p> <p>Readings with Questions</p> | <h3>Life Science</h3>  <p><b>Full Year</b></p> <ul style="list-style-type: none"><li>✓ Reading Passages</li><li>✓ Notes</li><li>✓ Worksheets</li><li>✓ Task Cards</li></ul> <p>Digital and Print</p> <p>Readings with Questions</p> | <h3>Physical Science</h3>  <p><b>Full Year</b></p> <ul style="list-style-type: none"><li>✓ Reading Passages</li><li>✓ Notes</li><li>✓ Worksheets</li><li>✓ Task Cards</li></ul> <p>Digital and Print</p> <p>Science Reading Comprehension questions and Worksheets Bundle</p> |
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### Chemistry



NGSS MS-PS1

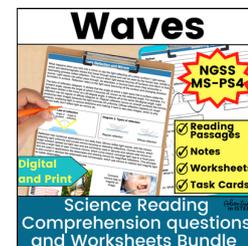
- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Digital and Print

Science Reading Comprehension Worksheets Bundle

**Chemistry also includes thermal energy**

### Waves



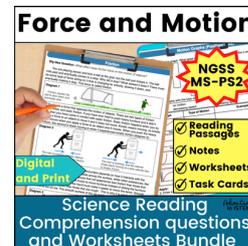
NGSS MS-PS4

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

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Science Reading Comprehension questions and Worksheets Bundle

### Force and Motion



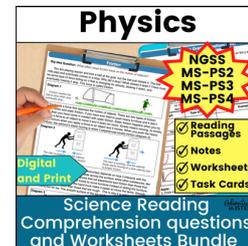
NGSS MS-PS2

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Digital and Print

Science Reading Comprehension questions and Worksheets Bundle

### Physics



NGSS MS-PS2, MS-PS3, MS-PS4

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Digital and Print

Science Reading Comprehension questions and Worksheets Bundle

**Physics includes mechanical energy**



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