RUBY FALLS

EDUCATIONAL Resource Guide

2026 - 2027

RUBY FALLS®

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Ruby Falls

Educational Resource Guide Overview

Central Focus

During your upcoming school visit, students will engage in an amazing interdisciplinary experience as they explore and study the features of Ruby Falls. In preparation for your visit, the following K-8 Educational Resource Guide will provide teachers with resources and information to build background knowledge to maximize their students' Ruby Falls experience.

Clear Learning Targets (CLTs)

Students will be able to:

1. Explain how caves are formed.
2. Become familiar with select Earth Science vocabulary and application.
3. Describe main features of an underground limestone cave.
4. Retell the history of Ruby Falls.
5. Connect and apply knowledge of Ruby Falls to our environment.

State Academic Standards

During school visits to Ruby Falls, students will learn about a variety of topics aligned with state academic standards across a variety of content areas. Prior to the visit, teachers should reference their respective state standards to identify key concepts that will be taught and/or reviewed through the Ruby Falls experience. As a resource, guidance related to general science concepts and topics and how they align with your Ruby Falls visit are included in the Educational Resource Guide.

Pre-Visit Activities

Before visiting Ruby Falls, teachers may use the information and resources found in the Educational Resource Guide as review or to establish new background knowledge to enhance student engagement during the visit. During pre-visit activities, students will learn how caves are formed, how waterfalls work, and more about different types of rock and the rock cycle.

During-Visit Activities

As the tour takes place, your knowledgeable tour guide will be sharing lots of amazing information about Ruby Falls. Depending on the structure of your group, teachers may also choose to expound on the history and discovery of Ruby Falls, the geology of Ruby Falls, and more by referencing information shared in the Teachable Moments resources. For teachers wanting their students to record information during the tour, an optional Thinksheet! template is also included in the Educational Resource Guide.

Post-Visit Activities

Following your Ruby Falls visit, teachers may choose to coordinate activities that allow students to apply their learning. Such activities may include, but are not limited to, experiments, checks for understanding, a skit, and more. To assist teachers in their planning, several suggestions are included in the Educational Resource Guide.

Ruby Falls

Science Standards Overview

Science Standards Addressed at Ruby Falls

With most schools utilizing state-specific standards, the following general science concepts and topics are provided as teachers align their specific curriculum and learning objectives with their Ruby Falls visit. Here are some potential connections to consider as you reference your state's current science standards and other content area standards:

Earth and Space Science:

- Weathering, erosion, and deposition: Students can investigate the processes of weathering, erosion, and deposition that contribute to the formation of caves and underground features like Ruby Falls.
- Earth's systems: Students can explore the interactions between the geosphere (cave formations), hydrosphere (water flow), and biosphere (organisms living in the cave ecosystem).

Life Science:

- Ecosystems: Students can study the unique cave ecosystem associated with Ruby Falls and examine the interdependence of organisms within that environment.
- Adaptations: Students can explore the specialized adaptations of cave-dwelling organisms and investigate how they are suited to the unique conditions of the cave system.

Physical Science:

- Properties of water: Students can investigate the properties of water and its role in shaping and forming cave features like Ruby Falls.
- Forces and motion: Students can analyze the forces and motion involved in the movement of water within the cave system and the formation of waterfalls.

Scientific Inquiry and Skills:

- Scientific observation: Students can engage in careful observation of the cave environment, documenting the features, patterns, and changes they observe.
- Data collection and analysis: Students can collect data related to the cave system, such as temperature, humidity, or pH levels, and analyze the data to draw conclusions about the cave's characteristics.

Ruby Falls

Academic Vocabulary

1. **Calcite:** A mineral composed of calcium carbonate found in rocks like limestone and marble.
2. **Capillary Tubes:** Tiny, narrow tubes through which water travels in porous rocks or soil due to capillary action.
3. **Cave:** A natural underground chamber or series of chambers formed by erosion, typically in limestone or other soluble rocks.
4. **Column:** A vertical, cylindrical formation in caves created when a stalactite and stalagmite join.
5. **Curtain:** A thin, sheet-like formation of mineral deposits hanging from the ceiling of a cave, often translucent and resembling a curtain.
6. **Erosion:** The process of wearing away and transporting rocks, soil, or sediment by natural forces like water, wind, or ice.
7. **Fault:** A fracture in the Earth's crust where rock on either side has moved due to tectonic forces.
8. **Flowstone:** A deposit of mineral layers formed on the walls or floor of a cave by the dripping or flowing of water.
9. **Formation:** A distinct arrangement or pattern of rocks or minerals created by natural processes.
10. **Helictite:** A speleothem in the form of twisted or curved mineral deposits found in caves, formed by slow crystal growth.
11. **Igneous Rock:** Rock formed from the cooling and solidification of molten magma, such as granite or basalt.
12. **Landform:** A natural feature on the Earth's surface, such as a mountain, valley, or plateau.
13. **Limestone:** A sedimentary rock primarily composed of calcium carbonate, often formed from the accumulation of marine fossils.
14. **Natural Resources:** Materials or substances occurring in nature that can be used by humans, such as minerals, water, and forests.
15. **Magma:** Molten rock beneath the Earth's surface, typically containing dissolved gasses and various minerals.
16. **Speleothems:** General term for various mineral deposits found in caves, including stalactites, stalagmites, and flowstones.
17. **Stalactites:** Cylindrical mineral formations hanging from the ceiling of a cave, formed by the dripping of mineral-rich water.
18. **Stalagmites:** Conical mineral formations rising from the floor of a cave, formed by the deposition of minerals carried by water.

Ruby Falls

Pre-Visit Activity: Caves

Pre-Visit Activity: Caves

Grades K-2

Introduction: In this lesson, we will introduce the concept of caves to our young learners in grades Kindergarten through 2nd grade. We will explore how caves are formed and discuss the famous Ruby Falls as an example. The aim is to provide a basic understanding of caves while keeping the information accessible and engaging for our young students.

I. What is a Cave?

A. Define a cave: A cave is a special place underground where it is dark and cool. It's like a big hole in the ground that you can go inside.

II. How are Caves Formed?

A. Talk about different types of rocks: Rocks are things we find in nature, and there are different kinds of rocks like limestone, dolomite, and gypsum.
B. Explain water and erosion: When it rains, water can make its way into these rocks. The water is like a little helper that can slowly dissolve the rocks and make them go away over a long, long time.
C. Show examples of water erosion: Show pictures or drawings of rivers or streams flowing over rocks and how they can make them smooth and change their shape. Explain that this is similar to how caves are formed, but it takes much longer.

III. Cave Features

A. Discuss stalactites and stalagmites: Inside caves, water drips from the ceiling and the ground. Over time, this water can make special shapes called stalactites (hanging from the ceiling) and stalagmites (growing from the ground).
B. Introduce other features: Explain that caves can also have things like columns (when stalactites and stalagmites meet), and flowstones (smooth and shiny deposits that look like frozen waterfalls).

IV. Ruby Falls and its Formation

A. Introduce Ruby Falls: Tell the students about Ruby Falls, a special cave in Lookout Mountain, Tennessee. It has a big underground waterfall that people can visit.

B. How Ruby Falls was formed: Explain that Ruby Falls was formed a long, long time ago when water dissolved the rocks underground and made big rooms and tunnels. In one of these rooms, there is a beautiful waterfall called Ruby Falls.

V. Fun Facts

A. Mention Ruby Falls' height: Share that Ruby Falls is very tall and only part of the waterfall can be seen from the “waterfall room” in the cave. Though the exact height of the waterfall is unknown, we do know Ruby Falls is the tallest waterfall open to the public in the United States. To get to Ruby Falls, visitors must take an elevator that descends 260 feet into the mountain. That distance is like a tall building with many floors!

B. Highlight the importance of protecting caves: Explain that caves are important, and we need to take care of them so that everyone can enjoy their beauty.

C. Where does the water go? Explain the water in the waterfall eventually makes its way to the Tennessee River by traveling through hidden streams inside the mountain.

Conclusion: Caves are mysterious and fascinating places formed over a long time by water and erosion. Ruby Falls, with its tall underground waterfall, is a special cave that shows us the wonders of nature. By learning about caves, we can appreciate their beauty and understand the need to protect them for future generations to enjoy.

Ruby Falls

Pre-Visit Activity: Caves

Pre-Visit Activity: Caves

Grades 3-5

Introduction: In this lesson, we will delve into the formation of caves and explore how this process is related to the famous Ruby Falls. This lesson is designed for students in grades 3rd through 5th, aiming to provide them with a more detailed understanding of cave formation while maintaining an engaging and age-appropriate approach.

I. What are Caves?

A. Define a cave: A cave is a large hole or tunnel in the ground that is formed naturally. It is usually found in mountains or underground.

II. Formation of Caves

A. Karst Topography:

Explain karst topography: Karst topography is a type of landscape that is formed from soluble rocks like limestone, dolomite, or gypsum.

Discuss soluble rocks: These rocks can be dissolved by water over time, creating caves and underground passages.

B. Water Erosion:

Discuss water erosion: Water plays a vital role in the formation of caves. When it rains, the water absorbs carbon dioxide from the air, creating a weak acid.

Explain carbonic acid: This weak acid can dissolve the soluble rocks, such as limestone, and create openings and passages underground.

Emphasize gradual process: Over thousands and thousands of years, the water slowly erodes the rocks, making the caves bigger and deeper.

C. Cave Features:

Stalactites and stalagmites: When water drips from the cave ceiling, it leaves behind minerals. These minerals build up over time and form pointy formations called stalactites. When the water drips onto the cave floor, it forms cone-shaped formations called stalagmites. When stalactites and stalagmites meet, they form columns.

Flowstones: Sometimes, water flows down the walls or across the cave floor, leaving behind mineral deposits. These deposits form smooth, shiny, and colorful flowstone formations.

III. Ruby Falls and its Formation

A. Introduce Ruby Falls: Ruby Falls is a famous underground waterfall located in Lookout Mountain, Tennessee.

B. Discuss the discovery: Ruby Falls was discovered accidentally in 1928 by Leo Lambert during the construction of an elevator shaft inside Lookout Mountain that would give visitors access to a different cave.

C. Formation of Ruby Falls:

Explain the role of water erosion: Ruby Falls was formed over millions of years by water slowly dissolving and eroding the rocks inside Lookout Mountain.

Emphasize unique features: Ruby Falls stands out because it is home to the tallest and deepest underground waterfall in the United States. Visitors must first descend 260 feet in an elevator and then walk along a cavern trail to view the majestic Falls.

IV. Importance of Preserving Caves

A. Discuss the significance of caves: Caves are unique natural formations that offer habitats for animals, preserve ancient geological records, and provide recreational and educational opportunities for people.

B. Emphasize conservation: It is important to protect and preserve caves like Ruby Falls to maintain their natural beauty and ecological value. Encourage students to learn about caves responsibly and respect their fragile environments.

Conclusion: Caves are fascinating natural formations that take thousands of years to form through the process of water erosion. Ruby Falls, with its underground waterfall and ancient geological formations, exemplifies the beauty and complexity of cave systems. By understanding how caves are formed and appreciating their importance, we can cultivate a sense of stewardship towards these remarkable natural wonders.

Ruby Falls

Pre-Visit Activity: Caves

Pre-Visit Activity: Caves

Grades 6-8

Introduction: In this lesson, we will explore the formation of caves and delve into how this process is related to the creation of Ruby Falls. This lesson is designed for students in grades 6th through 8th, aiming to provide them with a more detailed understanding of cave formation while encouraging critical thinking and scientific inquiry.

I. Formation of Caves

A. Define a cave: Start by defining a cave as a natural underground space or hollow area in the Earth's surface.

B. Karst Topography:

Introduce karst topography: Explain that caves are typically formed in regions with a type of landscape called karst topography.

Discuss karst topography features: Mention that karst topography is characterized by soluble rocks such as limestone, dolomite, or gypsum that can dissolve easily over time.

C. Water Erosion:

Explain water erosion: Discuss how water plays a crucial role in the formation of caves through a process called water erosion.

Carbonic acid formation: Explain that rainwater absorbs carbon dioxide from the atmosphere, forming a weak carbonic acid solution.

Dissolution of soluble rocks: Describe how this mildly acidic water infiltrates the ground, reacting with the soluble rock (e.g., limestone) and causing gradual dissolution.

Formation of passageways: Emphasize that as the water erodes the rock, it creates cracks, fractures, and passages, gradually forming cave systems.

D. Cave Features:

Stalactites and stalagmites: Explain that stalagmites and stalactites are some of the best-known types of ancient cave formations. They are icicle-shaped deposits that form when drops of mineral-rich water leave small amounts of calcium carbonate along cave ceilings or floors that build up over thousands of years. Stalactites form along ceilings and hang downward. When they are actively forming, they drip water onto the ground beneath them. Stalagmites are formations that grow up from the floor from mineral laden drops of water hitting the floor.

Columns: Discuss how stalactites and stalagmites can eventually meet and form columns..

Flowstones: Describe flowstones as smooth sheets of mineral deposits that form when water flows over cave walls leaving mineral deposits. Flowstone hangs downward and may even create curtain-like sheaves along ledges that are known as draperies.

II. Ruby Falls and its Formation

A. Introduce Ruby Falls: Provide an overview of Ruby Falls as an underground waterfall located in Lookout Mountain, Tennessee.

B. Formation of Ruby Falls:

Discuss the geology of Ruby Falls: Explain that Ruby Falls is situated within a cave system formed primarily of limestone, a soluble rock.

Water erosion and dissolution: Emphasize that over millions of years, water seeping through the limestone dissolved and eroded passages that eventually led to the formation of Ruby Falls Cave.

Importance of fractures: Highlight that the presence of fractures and cracks in the limestone rock played a role in guiding the water flow and the formation of the underground waterfall.

C. Unique Characteristics:

Highlight the impressive height: Mention that Ruby Falls is known for its significant height. It is the tallest and deepest underground waterfall accessible to the public in the United States. Visitors must descend 260 feet into Lookout Mountain by elevator to reach the cave and then follow a half-mile trail in the cavern to view the waterfall. The waterfall begins above the ceiling in the “waterfall room,” and its total height is unknown. About 90 feet of the waterfall can be viewed in the falls room section of the cave.

D. Preservation and Conservation:

Discuss the importance of preserving Ruby Falls: Emphasize the significance of protecting natural wonders like Ruby Falls for scientific research, ecological preservation, and future generations' enjoyment.

Encourage responsible cave exploration: Highlight the importance of respecting cave ecosystems and following guidelines to minimize human impact on delicate cave formations.

Conclusion: Understanding how caves are formed provides valuable insights into the dynamic processes that shape our Earth's surface. The formation of Ruby Falls, situated within a limestone cave system, exemplifies the remarkable geological wonders created by water erosion and dissolution. By appreciating the unique features and geological processes behind Ruby Falls, students can develop a sense of awe for the natural world and an understanding of the importance of conservation and preservation.

Ruby Falls

Pre-Visit Activity: Rocks and the Rock Cycle

Pre-Visit Activity: Rocks and the Rock Cycle

Grades K-2

Introduction: In this lesson, we will introduce the concept of rocks and explore the rock cycle. We will also discuss how rocks and the rock cycle are related to the formation of Ruby Falls. This lesson is designed for students in grades Kindergarten through 2nd grade, aiming to provide them with a basic understanding of rocks and their role in the creation of geological wonders like Ruby Falls.

I. Introduction to Rocks

A. Define rocks: Rocks are hard materials that we find in nature. They are made up of different minerals and come in many shapes, sizes, and colors.

B. Discuss rock uses: Explain that rocks are used in many things around us, like buildings, roads, and even toys.

II. Types of Rocks

A. Talk about different rock types:

Igneous rocks: Explain that igneous rocks are formed when hot melted rock called magma cools down and becomes solid. It can happen deep underground or on the Earth's surface.

Sedimentary rocks: Discuss how sedimentary rocks are formed when tiny pieces of rocks, plants, or animals settle and get stuck together over a long, long time.

Metamorphic rocks: Explain that metamorphic rocks are formed when rocks change because of heat and pressure deep inside the Earth. They can change from other types of rocks.

III. The Rock Cycle

A. Introduce the rock cycle: Explain that rocks can change from one type to another over a long, long time. This is called the rock cycle.

B. Discuss the different stages of the rock cycle:

Formation: Explain how rocks are formed in different ways, as we discussed earlier.

Weathering and erosion: Mention that rocks can break down into smaller pieces because of wind, water, or ice. These small pieces are called sediments.

Deposition and compaction: Explain that the sediments can settle in layers and get squished and pressed together over time.

Heat and pressure: Discuss how deep underground, rocks can be heated and squeezed by the Earth's movements. This can change them into metamorphic rocks.
Melting and cooling: Explain that when rocks melt and cool down, they can become igneous rocks again, starting the cycle all over.

IV. The Rock Cycle and Ruby Falls

A. Introduce Ruby Falls: Explain that Ruby Falls is a special cave with an underground waterfall located in Lookout Mountain, Tennessee.

B. Discuss the rocks in Ruby Falls:

Explain that Ruby Falls is made up of limestone rocks.
Mention that limestone is a type of sedimentary rock that is formed from the remains of ancient sea creatures like shells and coral.
Emphasize that limestone can change over time through the rock cycle. It can be heated and pressed to become a different type of rock called metamorphic rock.

V. Appreciating Natural Wonders

A. Discuss the importance of rocks and natural wonders: Explain that rocks are a part of our Earth and they help us understand its history. Natural wonders like Ruby Falls are beautiful and should be appreciated and protected.

B. Encourage exploration and observation: Encourage students to go out and explore rocks and nature. They can observe different types of rocks, colors, and textures around them.

Conclusion: Rocks are fascinating materials that come in many forms and play a significant role in the creation of natural wonders like Ruby Falls. By understanding the different types of rocks and the rock cycle, students can develop a sense of curiosity and appreciation for the world around them. Encourage them to explore rocks, observe their characteristics, and embrace the beauty and uniqueness of our natural environment.

Ruby Falls

Pre-Visit Activity: Rocks and the Rock Cycle

Pre-Visit Activity: Rocks and the Rock Cycle

Grades 3-5

Introduction: In this lesson, we will explore the world of rocks and learn about the rock cycle. We will also discuss how the different types of rocks and the rock cycle are related to the formation of Ruby Falls. This lesson is designed for students in grades 3rd through 5th, aiming to provide them with a deeper understanding of rocks and their role in the creation of geological wonders like Ruby Falls.

I. Introduction to Rocks

A. Define rocks: Rocks are solid materials that make up the Earth's crust.

B. Discuss rock types: Explain that there are three main types of rocks—igneous, sedimentary, and metamorphic—and they can all change from one type to another over long periods of time.

II. The Rock Cycle

A. Explain the rock cycle: The rock cycle is the continuous process of how rocks change and form over time.

B. Discuss the three main rock types and their formation:

Igneous rocks: Explain that igneous rocks are formed when molten rock, called magma, cools and hardens. Magma can cool either underground or on the Earth's surface and form different types of igneous rocks.

Sedimentary rocks: Discuss how sedimentary rocks are formed when layers of sediment, like sand, mud, and pebbles, are compacted and cemented together over time.

Metamorphic rocks: Explain that metamorphic rocks are formed when existing rocks are exposed to high heat and pressure deep underground. This transforms them into new types of rocks.

III. The Rock Cycle and Ruby Falls

A. Discuss the formation of Ruby Falls:

Mention that Ruby Falls is located in Lookout Mountain, Tennessee, and is made up of limestone rocks.

Explain how limestone, a sedimentary rock, is formed from the accumulation of seashells and other oceanic materials over millions of years.

Emphasize that the rock cycle plays a role in the formation of Ruby Falls. Over time, the limestone rocks were exposed to heat and pressure, transforming them into a different type of rock—metamorphic rock.

B. Connect water erosion and the rock cycle:

Discuss how water erosion, as explained in the previous lesson, played a crucial role in the formation of caves like Ruby Falls.

Emphasize that as water flows through the limestone, it slowly dissolves and erodes the rock, creating caves and underground passages.

Explain that the water and the rock cycle work together, as the dissolved minerals in the water can deposit and solidify, forming stalactites, stalagmites, and other cave features.

IV. Importance of Preserving Rocks and Natural Wonders

A. Discuss the significance of rocks: Rocks are essential for building materials, provide clues about Earth's history, and serve as habitats for plants and animals.

B. Emphasize the importance of preserving natural wonders like Ruby Falls: Encourage students to appreciate and protect unique geological formations, as they offer opportunities for learning, exploration, and enjoyment.

Conclusion: Understanding rocks and the rock cycle helps us appreciate the remarkable processes that shape our Earth, including the formation of stunning features like Ruby Falls. By recognizing the different types of rocks and their transformations, we can better understand the intricate connections between geology and the formation of natural wonders. Encourage students to explore and respect these geological marvels while fostering a sense of responsibility towards preserving our natural environment.

Ruby Falls

Pre-Visit Activity: Rocks and the Rock Cycle

Pre-Visit Activity: Rocks and the Rock Cycle

Grades 6-8

Introduction: In this lesson, we will dive deeper into the concept of rocks and explore the rock cycle. We will also discuss how different types of rocks and the rock cycle are related to the formation of Ruby Falls. This lesson is designed for students in grades 6th through 8th, aiming to provide them with a more comprehensive understanding of rocks and their role in the creation of geological wonders like Ruby Falls.

I. Introduction to Rocks

A. Define rocks: Rocks are naturally occurring solid materials that make up the Earth's crust.

B. Discuss rock composition: Explain that rocks are composed of minerals, which are solid substances made of atoms and molecules.

II. Rock Types and Formation

A. Igneous Rocks:

Discuss igneous rocks: Explain that igneous rocks are formed from the cooling and solidification of molten rock called magma.

Talk about intrusive and extrusive igneous rocks: Intrusive rocks form beneath the Earth's surface and cool slowly, allowing large mineral crystals to form. Extrusive rocks cool quickly on or near the Earth's surface, resulting in smaller mineral crystals.

B. Sedimentary Rocks:

Discuss sedimentary rocks: Explain that sedimentary rocks are formed from the accumulation and cementation of sediment particles such as sand, mud, and organic remains.

Discuss the process of lithification: Explain that over time, layers of sediment are compacted by the weight above them, and minerals act as a natural cement to bind the sediment together.

C. Metamorphic Rocks:

Discuss metamorphic rocks: Explain that metamorphic rocks are formed from existing rocks that undergo changes due to high heat, pressure, or chemical reactions.

Talk about foliation and non-foliated rocks: Foliated rocks have visible layers or bands due to the alignment of minerals during metamorphism, while non-foliated rocks lack this layered structure.

III. The Rock Cycle

A. Introduce the rock cycle: Explain that the rock cycle is a continuous process that describes how rocks can change from one type to another over long periods of time.

B. Discuss the different processes involved in the rock cycle:

Melting: Rocks can melt into magma due to high temperatures and pressure.

Cooling and solidification: Magma or lava can cool and solidify to form igneous rocks.

Weathering and erosion: Rocks on the Earth's surface can be broken down by weathering and eroded by natural forces like wind, water, and ice.

Deposition and compaction: Sediments can be transported and deposited in layers. Over time, the weight of overlying sediments compacts them.

Heat and pressure: Buried rocks can experience increased temperature and pressure, causing them to undergo metamorphism and form metamorphic rocks.

Recrystallization and reformation: Rocks can be exposed to different conditions, leading to the recrystallization of minerals and the formation of new rocks.

IV. Ruby Falls and its Geological Significance

A. Discuss Ruby Falls: Explain that Ruby Falls is an underground waterfall located in Lookout Mountain, Tennessee.

B. Geological connection to Ruby Falls:

Emphasize that Ruby Falls is situated within a cave system made primarily of limestone, a sedimentary rock.

Discuss the formation of the limestone: Explain that limestone is formed from the accumulation of shells and other marine organisms over millions of years.

Connect to the rock cycle: Mention that limestone can undergo metamorphism due to heat and pressure, leading to the formation of other types of rocks, such as marble.

V. Appreciating and Protecting Geological Wonders

A. Discuss the importance of rocks and geological wonders: Explain that rocks and geological formations like Ruby Falls provide valuable insights into the Earth's history and natural processes.

B. Encourage preservation and conservation: Emphasize the need to protect and preserve these natural wonders for future generations to appreciate and study.

Conclusion: Understanding rocks and the rock cycle is crucial in comprehending the geological processes that shape our Earth. The formation of Ruby Falls exemplifies the interconnectedness of different rock types and the transformative nature of the rock cycle. By appreciating the geological significance of Ruby Falls and other natural wonders, students can develop a sense of stewardship toward the preservation of our planet's diverse and captivating features.

Ruby Falls

Pre-Visit Activity: Waterfalls

Pre-Visit Activity: Waterfalls

Grades K-2

Introduction:

- Begin by engaging students in a discussion about waterfalls and their characteristics.
- Ask students if they have ever seen a waterfall or heard about one. Encourage them to share their experiences and observations.

Definition of a Waterfall:

- Explain that a waterfall is a place where water flows rapidly over a steep or vertical drop in the land, creating a beautiful cascade of water.

How Waterfalls are Formed:

- Describe the process of waterfall formation using simple language and visuals.
- Explain that waterfalls are formed when a river or stream flows over a hard rock or ledge and erodes the softer rock beneath it.
- Show pictures or diagrams illustrating how the flowing water gradually wears away the rock, creating a vertical drop or "cliff."

Factors Contributing to Waterfall Formation:

- Discuss the factors that contribute to the formation of waterfalls.
- Explain that the hardness of the rock, the slope of the land, and the volume of water flowing are important factors.
- Emphasize that erosion, the wearing away of the rock by water, plays a significant role in the formation and shaping of waterfalls.

Relation to Ruby Falls:

- Introduce Ruby Falls as a special underground waterfall located inside Lookout Mountain, Tennessee.
- Explain that Ruby Falls was formed through a similar process of erosion, but instead of flowing over the surface, it is located inside a cave.
- Share pictures or videos of Ruby Falls to provide a visual representation for the students.

Unique Features of Ruby Falls:

- Highlight the unique characteristics of Ruby Falls that differentiate it from other waterfalls.
- Explain that Ruby Falls is hidden deep within a cave, and the water flows from the cave's ceiling.
- Discuss the formation of stalactites, which are the icicle-shaped rock formations hanging from the cave ceiling, and how they contribute to the beauty of Ruby Falls.

Conclusion:

- Summarize the main points covered, emphasizing how waterfalls are formed through erosion and how Ruby Falls, as an underground waterfall, showcases similar processes.
- Encourage students to appreciate the wonders of nature, including waterfalls like Ruby Falls, and to explore further the importance of water and erosion in shaping our world.

Note: Teachers may choose to use visuals, pictures, and diagrams with students as needed.

Ruby Falls

Pre-Visit Activity: Waterfalls

Pre-Visit Activity: Waterfalls

Grades 3-5

Introduction:

- Begin by asking students if they have ever seen or visited a waterfall and what they know about how waterfalls are formed.
- Activate their prior knowledge and build on it as you introduce the topic of waterfall formation and its relation to Ruby Falls.

Definition of a Waterfall:

- Explain that a waterfall is a natural feature where water flows over a vertical drop or a series of steep rocks, creating a beautiful cascade of water.

How Waterfalls are Formed:

- Discuss the process of waterfall formation using more detailed language and examples.
- Explain that waterfalls are formed when rivers or streams flow over different types of rock, eroding softer rocks faster than harder ones.
- Describe how the erosion of softer rocks creates a drop or cliff, over which the water plunges.

Factors Contributing to Waterfall Formation:

- Discuss the key factors involved in the formation of waterfalls.
- Highlight the role of the type of rock and its resistance to erosion, the slope of the land, and the volume of water flowing.
- Explain that these factors determine the height, shape, and characteristics of a waterfall.

Relation to Ruby Falls:

- Introduce Ruby Falls as a unique example of an underground waterfall located in Lookout Mountain, Tennessee.
- Explain that Ruby Falls was formed through a similar process of erosion, but instead of flowing over the surface, it is located inside a cave.
- Emphasize that Ruby Falls showcases the power of water and erosion in shaping not only surface landscapes but also underground formations.

Unique Features of Ruby Falls:

- Discuss the distinctive features of Ruby Falls that set it apart from other waterfalls.
- Explain that Ruby Falls is hidden deep within a cave, and the water flows from the cave's ceiling.
- Describe how the constant dripping of water over thousands of years has formed beautiful stalactites and other rock formations in the cave.

Human Exploration and Conservation:

- Highlight the importance of caves and waterfalls as natural wonders and the need to conserve and protect them.
- Discuss the role of tourism and responsible visitor behavior in preserving unique sites like Ruby Falls.

Conclusion:

- Summarize the main points covered, emphasizing the role of erosion and water in the formation of waterfalls and the unique characteristics of Ruby Falls as an underground waterfall.
- Encourage students to appreciate the power of nature and to continue exploring and learning about Earth's remarkable geological features.

Note: Teachers may choose to adjust the level of detail and vocabulary to suit the grade level. Teachers may also choose to incorporate visual aids, diagrams, and real-life examples to enhance understanding as needed.

Ruby Falls

Pre-Visit Activity: Waterfalls

Pre-Visit Activity: Waterfalls
Grades 6-8

Introduction:
- Begin by engaging students in a discussion about waterfalls, asking them to share their experiences or knowledge of different waterfalls they may have seen or heard of.
- Build on their prior knowledge to introduce the topic of waterfall formation and its relation to Ruby Falls.

Definition of a Waterfall:
- Define a waterfall as a natural feature where water flows over a steep drop or a series of rocks, resulting in a vertical cascade.

How Waterfalls are Formed:
- Discuss the process of waterfall formation using more advanced concepts and examples.
- Explain that waterfalls are formed when rivers or streams flow over different layers of rock, eroding softer rocks more quickly than harder ones.
- Describe how the erosion of softer rock creates a step or cliff, causing the water to plunge downwards.

Factors Contributing to Waterfall Formation:
- Discuss the various factors that contribute to the formation of waterfalls.
- Explore the role of rock type, the geological structure of the area, the slope of the land, and the volume of water in determining the characteristics of a waterfall.

Relation to Ruby Falls:
- Introduce Ruby Falls as a unique example of an underground waterfall located in Lookout Mountain, Tennessee.
- Explain that Ruby Falls was formed through a similar process of erosion, but instead of flowing over the surface, it is situated inside a cave.
- Discuss how the water at Ruby Falls flows from the cave's ceiling, showcasing the power of water and erosion in shaping both surface and underground landscapes.

Unique Features of Ruby Falls:

- Describe the distinctive features of Ruby Falls that differentiate it from other waterfalls.
- Highlight the fact that Ruby Falls is hidden deep within a cave, creating a sense of awe and mystery.
- Explain how the constant dripping of water over thousands of years has formed beautiful stalactites, stalagmites, and other unique cave formations.

Human Exploration and Conservation:

- Discuss the significance of caves and waterfalls as natural wonders and the importance of conservation efforts.
- Encourage students to understand the impact of human activities on these delicate environments and the need to protect them for future generations.

Conclusion:

- Summarize the main points covered, emphasizing the role of erosion and water in the formation of waterfalls and the unique characteristics of Ruby Falls as an underground waterfall.
- Encourage students to appreciate the power and beauty of natural geological processes and to explore further the wonders of our planet.

Note: Teachers may need to adapt the language and concepts to suit the grade level. Teachers may choose to utilize visuals, diagrams, and real-life examples to enhance understanding.

Ruby Falls

Teachable Moments

The Discovery and History of Ruby Falls

Lookout Mountain Cave and Ruby Falls Cave

- At one time there was a natural entrance to Lookout Mountain Cave on the banks of the Tennessee River, at the base of Lookout Mountain.
- Native people, early settlers, outlaws, Union and Confederate soldiers, ice age and modern animals, and many other visitors have explored Lookout Mountain Cave.
- It was used as a hospital and shelter during the Civil War.
- In 1905, the Southern Railway built a railroad tunnel through the Lookout Mountain, sealing off the cave's natural entrance.

Discovery of the Cave

- The accidental discovery of Ruby Falls is an intriguing tale that involves exploration, determination, and a touch of serendipity. The story begins in the early 20th century with a young man following his heart. Leo Lambert and Ruby Losey were high school sweethearts in Gary, Indiana. After graduation, Leo was working as a chemist when Ruby moved with her family to Chattanooga, Tennessee. Leo decided to follow Ruby and relocated to Chattanooga. Leo enjoyed exploring his new surroundings.
- After Ruby and Leo married in 1916, Leo learned about the rich history and folklore surrounding Lookout Mountain Cave. The cave was well known through centuries of use, first by Native people, followed by more modern visits for hidden meetings and hideouts, and it was used as a hospital during the Civil War. When the railroad built a new tunnel through Lookout Mountain to expand service to Chattanooga, the new tunnel blocked access to Lookout Mountain Cave by intersecting the natural entrance.
- Leo Lambert was determined to re-open Lookout Mountain Cave to the public. After spending After spending a decade researching various methods of accessing the long-sealed cave, the Lamberts had a young family. Leo secured $250,000 from investors in Chattanooga, Indiana, and New York to fund his fledgling Lookout Mountain Cave Company, launching Leo's plan to access the cave by an elevator descending **420 feet** into the solid limestone forming Lookout Mountain.

- Excavators began drilling the elevator shaft in the fall of 1928. Progress was slow but steady as crews drilled around the clock, **removing five feet of limestone every 24 hours.** By late December of 1928, the team was 260 feet into the mountain when they uncovered an opening in the rock and felt a rush of air escape from the void. The 18- inch tall, 5-foot-wide opening in the rock was a passage to the unknown inside the mountain.

- On **December 30, 1928**, Leo led a small group into the darkness through the tight chasm. By the time Leo and the group emerged from the opening 17 hours later, Ruby was certain he and the others had met their death after watching the hours pass. Leo recounted how they crawled on their bellies inside a confining passage for close to seven hours before the tunnel opened to a place where they could stand, and he ate the candy left in his pocket from earlier in the day. They explored sections of the cavern with flowing underground streams and remarkable geological formations. Moving further into the cavern, they heard rushing water. Following the sound, Leo hurried forward, falling when the floor elevation dropped away. A thick layer of mud cushioned his landing from the short fall and the light of his headlamp reflected off a waterfall.

- Days later, Leo returned to the newly discovered cave with Ruby and named the waterfall in her honor, calling it Ruby Falls. While drilling continued to the 420-foot mark where the shaft intersected Lookout Mountain Cave as expected, plans were made to open Ruby Falls Cave for tours in addition to Lookout Mountain Cave. The elevator would provide access to both caves.

- 15,000-pounds of dynamite was used to loosen 5-million pounds of limestone, which was then removed one large bucket load at a time through the shaft. The excavated limestone was used to build Ruby Falls Castle (originally known as Cavern Castle).

Making the Cave Accessible

- On June 6,1930, Ruby Falls opened to the public as a tourist attraction. Visitors from all over flocked to witness the captivating underground waterfall.

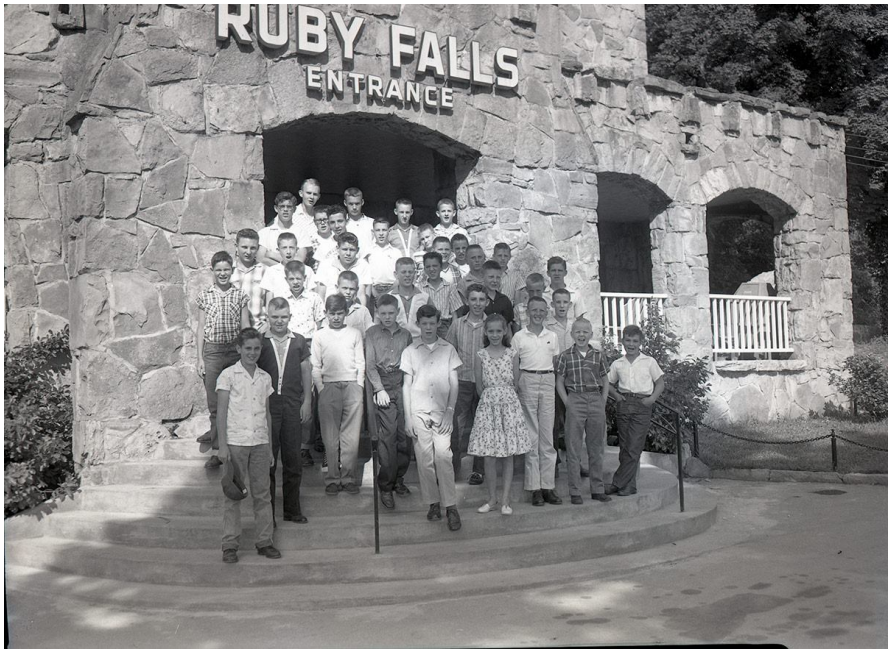
- Today, Ruby Falls remains a beloved destination, offering guided tours that take visitors on a memorable journey deep into the heart of Lookout Mountain to witness the awe-inspiring beauty of the underground waterfall that was discovered by Leo Lambert nearly a century ago.

Celebrating 95 years of wonder at Ruby Falls

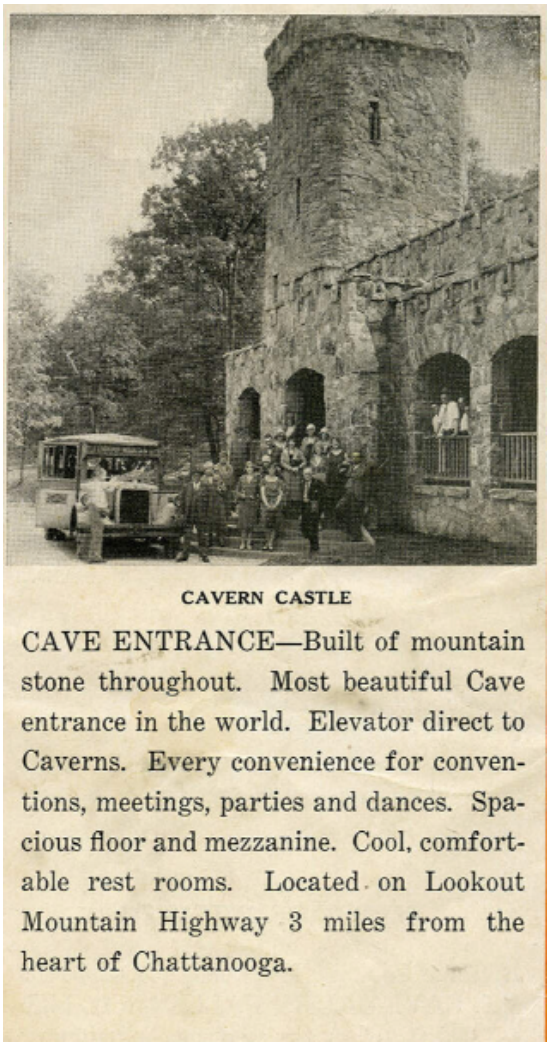
Above: Ruby Falls Castle in 1929 as it neared completion.

Above: Ruby and Leo Lambert as a young married couple.

Above: Science class field trip in the 1930s.



Above: School field trip group, date unknown.



CAVERN CASTLE

CAVE ENTRANCE—Built of mountain stone throughout. Most beautiful Cave entrance in the world. Elevator direct to Caverns. Every convenience for conventions, meetings, parties and dances. Spacious floor and mezzanine. Cool, comfortable rest rooms. Located on Lookout Mountain Highway 3 miles from the heart of Chattanooga.

Above: An excerpt from a 1930 Lookout Mountain Caverns brochure features a group of visitors in front of Ruby Falls Castle.

Left: Photo of a visitor to the park in the 1940s.

95 Years
RUBY FALLS

Ruby Falls

Teachable Moments

Ruby Falls Geology

Geology Timeline

About 300 million years ago on an ancient seabed, skeletons of small creatures accumulated forming layers called strata. Successive layers of shale, and pebbly sand were deposited on top of the limey material and gradually these thick layers hardened to form a sedimentary rock called limestone (for more information on how rocks are formed see the Rocks and The Rock Cycle Pre-Visit Activity). Scientists call this period in geologic time the Carboniferous Period. The Carboniferous Period was at the close of the Paleozoic Era, the oldest era in the geologic timeline (before dinosaurs, mammals or birds had evolved).

It was during this period that the tectonic movements of the Earth's plates caused a series of powerful earthquakes. The plates pushing against each other buckled pushing rock upwards to produce a landform that is called a folded mountain. You know these folded mountains as the Appalachian Mountain chain. As the brittle layers of limestone and sandstone rose from the ocean floor, cracks or crevices opened. Scientists call the cracks or crevices faults or joints. Mountain ranges can form along normal faults. It was along a fault of this type that Ruby Falls was formed. Many of these fault joints can be seen along the ceiling and walls of Lookout Mountain Caverns.

Forming Limestone

Step 1. Carbon dioxide in the air is absorbed by rainwater falling through it. The rainwater also absorbs carbon dioxide that is in the soil after it hits the ground.
Step 2. Water breaks carbon dioxide down into a very weak acid called carbonic acid.
Step 3. The weak acid comes into contact with limestone rock when subterranean streams find their way through the cracks in the limestone rock that have been produced by tectonic forces.
Step 4. The acid solutes (or eats away) the limestone (which is made of calcium carbonate or calcite) causing the cracks to become larger and caves and passages to form this process is called **chemical weathering**.
Step 5. **Physical weathering** by rocks, wind, water, and plants aids the formation of the cave by gradually eroding the limestone.

Speleothems

- Formations of mineral deposits called speleothems form on the walls, floor, and ceiling of some caves.
- Stalactites, stalagmites, columns, cave drapery, cave coral, cave curtains, helictite, flowstones, and cave crystals are types of speleothems.
- Speleothems grow 1 cubic inch every one hundred to one hundred fifty years. This is an extremely slow process! The thickness of speleothems can be used to determine past climate conditions and approximate age.
- Check out the *Leaning Tower* at Ruby Falls. It is estimated to be between three and five million years old. Yes, you read this correctly, 3-5 MILLION YEARS OLD!
- Ruby Falls is relatively dry which slows the formation growth.
- The temperature in the Ruby Falls Cave is about 60 degrees year-round.

Ruby Falls

Teachable Moments

Fun Facts

Did You Know…

- ☐ Ruby Falls Cave is directly above Lookout Mountain Cave with no known naturally intersecting passages.
- ☐ After 17 hours of exploration, Leo was covered in cave mud that was incredibly thick with an overwhelming smell. Leo's wife, Ruby, threw away his clothes. The only items Leo kept were his helmet and boots.
- ☐ During Leo's first exploration, he actually fell into the room with the waterfall from an opening many feet above the natural floor of the cave.
- ☐ Ruby Falls Castle was modeled after a fifteenth century medieval-style castle and was built from stone taken out of the mountain during the construction of the elevator shaft and cavern trails.
- ☐ 5 million pounds of limestone was removed through the elevator shaft – one bucket load at a time using a rope a pulley system.
- ☐ Since 1929, many millions of visitors from around the world have visited the park and enjoyed the beauty of Ruby Falls.
- ☐ Ruby Falls is listed on the National Register of Historic Places for its the significant contribution to the development of tourism in the region.

Ruby Falls

Thinksheet!

Ruby Falls

Thinksheet!

Ruby Falls

Post-Visit Activity: Experiments

Post-Visit Activity: Experiments
Grades K-2

After visiting Ruby Falls, students in grades Kindergarten through 2nd can engage in various experiments and activities related to their experience. Here are a few suggested experiments for these grade levels:

Cave Formation Demonstration: Materials: Sand, a small container, water, a plastic cup or bottle
Procedure:

- Fill the container with sand, creating a small mound.
- Use the plastic cup or bottle to slowly pour water onto the sand mound.
- Observe how the water flows through the sand and creates tunnels and channels, mimicking the erosion process that forms caves like Ruby Falls.

Rock and Mineral Exploration: Materials: Assorted rocks and minerals (if available), magnifying glasses or hand lenses
Procedure:

- Provide students with a selection of rocks and minerals, including samples similar to those found in caves.
- Encourage students to observe the different colors, textures, and patterns of the rocks and minerals using magnifying glasses or hand lenses.
- Guide a discussion on the various characteristics of the samples and discuss how they contribute to the formation and uniqueness of caves like Ruby Falls.

Water Erosion Experiment: Materials: Sand, soil, small rocks or pebbles, containers, water, plastic trays or plates
Procedure:

- Set up several plastic trays or plates, each filled with different materials such as sand, soil, or small rocks.
- Pour water gently onto each tray, simulating rainfall or water flow.
- Observe how the water interacts with the different materials, noting which ones are more prone to erosion and how the flow patterns change over time.
- Discuss the role of water erosion in shaping landscapes, including the formation of caves like Ruby Falls.

Stalactite and Stalagmite Formation: Materials: String, water, Epsom salt or sugar, small cups

Procedure:

- Hang strings vertically from a surface, such as a clothesline or a table edge.
- In separate cups, prepare a solution of warm water mixed with either Epsom salt or sugar (to represent minerals).
- Dip the ends of the hanging strings into the solution and let them hang freely.
- Over time, observe how the solution evaporates and minerals start to accumulate, forming stalactite-like structures hanging from the strings and stalagmite-like structures on the ground.
- Discuss the process of mineral deposition and the formation of stalactites and stalagmites in caves like Ruby Falls.

Note: These experiments should be conducted under adult supervision and adapted to the specific age and ability level of the students. Safety precautions and proper handling of materials should always be followed.

Ruby Falls

Post-Visit Activity: Experiments

Post-Visit Activity: Experiments
Grades 3-5

After visiting Ruby Falls, students in grades 3rd through 5th can engage in various experiments and activities to further explore the concepts related to their experience. Here are a few suggested experiments for these grade levels:

Water Erosion and Landforms: Materials: Sand, soil, rocks, containers, water, plastic trays or plates
Procedure:

- Create a small-scale landscape by arranging sand, soil, and rocks on a plastic tray or plate to represent hills, valleys, and other landforms.
- Pour water gently onto the landscape, simulating rainfall or water flow.
- Observe how the water interacts with the different materials and observe the formation of erosion features, such as gullies, channels, or deltas.
- Discuss the impact of water erosion on the formation of landforms, including the cave system at Ruby Falls.

Modeling Stalactite and Stalagmite Formation: Materials: String, water, Epsom salt or sugar, small cups, clothespin or clip
Procedure:

- Hang a string vertically from a surface using a clothespin or clip.
- Prepare a solution of warm water mixed with either Epsom salt or sugar (to represent minerals) in a small cup.
- Dip the end of the hanging string into the solution and let it hang freely.
- Over time, observe how the solution evaporates and minerals accumulate, forming stalactite-like structures hanging from the string.
- Discuss the process of mineral deposition and the formation of stalactites in caves like Ruby Falls.

Cave Habitat Investigation: Materials: Shoebox or small container, construction paper, craft materials, toy animals or figurines
Procedure:

- Create a model of a cave habitat inside a shoebox or small container using construction paper, craft materials, and any other suitable items.

- Place toy animals or figurines that represent cave-dwelling organisms in the model.
- Research the characteristics and adaptations of animals that inhabit caves.
- Discuss the unique features of cave ecosystems and the challenges faced by organisms living in such environments.

Rock Identification and Classification: Materials: Assorted rocks and minerals (if available), magnifying glasses or hand lenses, identification guides
Procedure:

- Provide students with a selection of rocks and minerals, including samples similar to those found in caves.
- Encourage students to observe the different colors, textures, and patterns of the rocks and minerals using magnifying glasses or hand lenses.
- Use identification guides or online resources to help students classify and identify the samples.
- Discuss the different types of rocks and minerals found in caves and their formation processes.

Note: These experiments should be conducted under adult supervision and adapted to the specific age and ability level of the students. Safety precautions and proper handling of materials should always be followed.

Ruby Falls

Post-Visit Activity: Experiments

Post-Visit Activity: Experiments
Grades 6-8

After visiting Ruby Falls, students in grades 6th through 8th can engage in various experiments and activities to further explore the concepts related to their experience. Here are a few suggested experiments for these grade levels:

Water Flow and Erosion: Materials: Sand, soil, rocks, containers, water, measuring cups, stopwatch
Procedure:

- Create a small-scale landscape using sand, soil, and rocks to represent hills, valleys, and other landforms.
- Set up containers at different locations on the landscape to collect water flow.
- Pour a specific amount of water onto the landscape and measure the time it takes for the water to reach each container.
- Calculate the flow rate for each location and observe how it relates to the features of the landscape.
- Discuss the impact of water flow and erosion on the formation of landforms and cave systems like Ruby Falls.

Modeling Groundwater Flow: Materials: Sand, gravel, plastic container, water, food coloring
Procedure:

- Fill a plastic container with alternating layers of sand and gravel.
- Dig a small well or hole near one end of the container.
- Pour water into the well and add a few drops of food coloring to represent dye tracing.
- Observe how the water travels through the layers of sand and gravel, simulating groundwater flow.
- Discuss how groundwater can contribute to the formation of underground caves and the emergence of springs like those at Ruby Falls.

Mineral Crystal Growth: Materials: Epsom salt or sugar, water, heat-resistant container, string or pipe cleaner
Procedure:

- Dissolve Epsom salt or sugar in warm water in a heat-resistant container until no more can dissolve.
- Suspend a string or pipe cleaner in the solution and let it hang freely.
- Allow the container to sit undisturbed in a warm location for several days, allowing the mineral crystals to grow on the string.
- Observe the formation of crystals and discuss the process of mineral deposition and growth, similar to the formation of stalactites and stalagmites.

Environmental Factors and Cave Life: Materials: Small containers, soil, rocks, plants, water, plastic insects or small figurines
Procedure:

- Set up small containers with different environmental conditions, such as light, temperature, and moisture levels.
- Place soil, rocks, and plants in each container to create miniature cave habitats.
- Add plastic insects or small figurines to represent cave-dwelling organisms.
- Observe and record how the different environmental factors impact the growth and behavior of the simulated cave life.
- Discuss the adaptations of organisms to cave environments and the importance of environmental factors for their survival.

Note: These experiments should be conducted under adult supervision and adapted to the specific age and ability level of the students. Safety precautions and proper handling of materials should always be followed.

Ruby Falls

Post-Visit Activity: Checks for Understanding

Checks for Understanding

Grades K-2

1. **What is Ruby Falls?**
   a) A famous mountain range b) An underground waterfall c) A natural rock formation

2. **Where is Ruby Falls located?**
   a) Lookout Mountain, TN b) Grand Canyon, AZ c) Niagara Falls, NY

3. **How was Ruby Falls Cave formed?**
   a) By volcanic activity b) Through erosion and water flow c) By human construction

4. **What gives the rock formations at Ruby Falls their red color?**
   a) Iron oxide stains b) Copper deposits c) Limestone erosion

5. **What are stalactites?**
   a) Formations on the cave floor b) Formations hanging from the cave ceiling
   c) Underground streams

6. **True or False: Ruby Falls is an above-ground waterfall.**

7. **True or False: The rock formations at Ruby Falls are made of gold.**

8. **How can visitors explore Ruby Falls?**
   a) By taking a guided tour b) By swimming in the waterfall c) By climbing the rocks

9. **What is the importance of preserving Ruby Falls?**
   a) To prevent flooding b) To protect the fragile ecosystem c) To study ancient civilizations

10. **True or False: Ruby Falls is the tallest underground waterfall open to the public in the United States.**

Checks for Understanding: Answers
Grades K-2

1. b) An underground waterfall
2. a) Lookout Mountain, Tennessee
3. b) Through erosion and water flow
4. a) Iron oxide stains
5. b) Formations hanging from the cave ceiling
6. False
7. False
8. a) By taking a guided tour
9. b) To protect the fragile ecosystem
10. True

Ruby Falls

Post-Visit Activity: Checks for Understanding

Checks for Understanding

Grades 3-5

1. **Where is Ruby Falls located?**
   a) Lookout Mountain, Tennessee b) Grand Canyon, Arizona c) Niagara Falls, New York

2. **How was Ruby Falls Cave formed?**
   a) By volcanic activity b) Through erosion and water flow c) By human construction

3. **True or False: Ruby Falls is the tallest underground waterfall open to the public in the USA.**

4. **What gives the rock formations at Ruby Falls their red color?**
   a) Iron oxide stains b) Copper deposits c) Limestone erosion

5. **What are stalactites?**
   a) Formations on the cave floor b) Formations hanging from the cave ceiling
   c) Underground streams

6. **True or False: Ruby Falls is made entirely of rubies.**

7. **Approximately how tall is Ruby Falls?**
   a) 50 feet b) 100 feet c) Unknown

8. **How can visitors explore Ruby Falls?**
   a) By taking a guided tour b) By swimming in the waterfall
   c) By rappelling down the cave walls

9. **What is the importance of preserving Ruby Falls?**
   a) To prevent flooding b) To protect the fragile ecosystem c) To study ancient civilizations

10. **What is one interesting fact about Ruby Falls that you learned during your visit?**

Checks for Understanding: Answers

Grades 3-5

1. a) Lookout Mountain, Tennessee
2. b) Through erosion and water flow
3. True
4. a) Iron oxide stains
5. b) Formations hanging from the cave ceiling
6. False
7. c) Unknown
8. a) By taking a guided tour
9. b) To protect the fragile ecosystem
10. Answers may vary. Encourage students to share one interesting fact they learned during their visit.

Ruby Falls

Post-Visit Activity: Checks for Understanding

Checks for Understanding

Grades 6-8

1. Which geological process contributed to the formation of Ruby Falls Cave?
a) Volcanic activity b) Tectonic plate movement c) Erosion and water flow

2. What type of rock is primarily responsible for the formation of Ruby Falls Cave?
a) Sandstone b) Granite c) Limestone

3. True or False: Ruby Falls is the tallest underground waterfall in the world.

4. What gives the rock formations at Ruby Falls their red color?
a) Iron oxide stains b) Copper deposits c) Calcium carbonate

5. What are stalactites?
a) Formations on the cave floor b) Formations hanging from the cave ceiling c) Underwater rock formations

6. How can visitors explore Ruby Falls?
a) By taking a guided tour b) By swimming in the waterfall c) By rappelling down the cave walls

7. True or False: Ruby Falls is entirely made up of rubies.

8. Approximately how tall is Ruby Falls?
a) 50 feet b) 100 feet c) Unknown

9. What is the importance of preserving Ruby Falls?
a) To prevent flooding b) To protect the fragile ecosystem c) To study ancient civilizations

10. What is one interesting fact about Ruby Falls that you learned during your visit?

Checks for Understanding: Answers
Grades 6-8

1. c) Erosion and water flow

2. c) Limestone

3. False (Ruby Falls is the tallest underground waterfall open to the public in the US.)

4. a) Iron oxide stains

5. b) Formations hanging from the cave ceiling

6. a) By taking a guided tour

7. False

8. c) Unknown

9. b) To protect the fragile ecosystem

10. Answers may vary. Encourage students to share one interesting fact they learned during their visit.

Ruby Falls

Post-Visit Activity: Discussion Questions

Why are there no animals in Ruby Falls?

There are several reasons that animal life is limited in Ruby Falls. There are no large natural entrances to the cave, there are limited food sources, and little light.

What are some adaptations that animals may have as a result of living in a cave?

Many cave animals are blind or do not even have eyes at all, and some are depigmented (colorless) from living in total or near total darkness. Bats are a good example of a cave creature that doesn't have very good sight. They use sonar to navigate in the darkness. Many cave creatures have a greater sense of touch or smell, which helps them live in the dark. Some creatures have longer appendages (arms and legs) for moving around the cave.

Why do you think there are no snakes in the Ruby Falls Cave?

Snakes are reptiles, which are cold blooded. Because the cave is only about sixty degrees, it is not a suitable environment for snakes as they depend on the warmth of the sunlight and surroundings. Also, without the cave having a natural opening, it would be very difficult for a snake to access the cave.

What makes Ruby Falls a natural resource?

A natural resource is anything from nature that humans can use and enjoy. Many people enjoy the tour and the beauty of the cave. Visitors learn about caves, geology and watersheds during their visit.

What do you think is the effect of humans on the caverns?

During the early years when the cave was open to the public, visitors broke and stole some of the formations to keep as a souvenir or to sell. Sometimes people litter or mark on the cave. The basic pH of human skin might counteract the acid ($CaCO_3$) that helps make formations, so if people touch a formation, it may disrupt the formation's growth. The cave environment is fragile and even though it is against the law to damage cave formations, some visitors may do it anyway.

Note: The questions above can be used to facilitate discussions following your visit to Ruby Falls. The answers provided are for guidance only and do not include all possible answers.

Ruby Falls

Post-Visit Activity: Skit

"The Adventure of Ruby Falls"

Characters:

- Leo Lambert
- Ruby (Leo's wife)
- Explorer 1
- Explorer 2
- Narrator

Setting: A beautiful mountain landscape with a hidden cave entrance.

Narrator: Once upon a time, there was a passionate cave explorer named Leo Lambert. He believed that beautiful nature was hidden deep within Lookout Mountain. Let's join Leo on his thrilling adventure!
(Scene: Leo Lambert and his wife Ruby are standing on Lookout Mountain, preparing for the expedition.)
Leo: (Excitedly) Ruby, I have a feeling there might be something amazing hidden inside this mountain. I'm going to find it! I'll be back soon.
Ruby: (Supportive) Good luck, Leo! I can't wait to hear about your discoveries. Be safe!
(Scene: Leo enters the dark cave with a flashlight, while Ruby waits outside.)
Narrator: With his trusty light, Leo bravely ventured into the mysterious opening, ready to explore the unknown with a small group of explorers.
(Scene: Inside the cave, Leo talks to Explorer 1 and Explorer 2.)
Explorer 1: (Nervous and excited) I wonder if we'll find anything interesting. We'll have to look very carefully because it sure is dark in this cave.
Leo: (Eagerly) I believe there's something special hidden deep within this mountain. I won't rest until I find it!

Explorer 2: (Curious) We've been exploring this cave for hours. Maybe we can keep going a little while longer and we'll come to a place where we can stand up instead of crawl.
(Scene: Leo, Explorer 1, and Explorer 2 search deeper into the cave.)
Narrator: Leo, Explorer 1, and Explorer 2 continued their journey deeper into the cave, finally the reach an area in the cave where they can stand. They discover magnificent rock formations and underground wonders.
(Scene: Leo, Explorer 1, and Explorer 2 stop in awe as they reach a stunning underground waterfall.)
Leo: (Amazed) Look! It's a beautiful waterfall, shimmering and cascading from the ceiling. Ruby would be thrilled to see this!
Explorer 1: (In awe) This is amazing, and no one has ever, ever, been inside this cavern.
Explorer 2: (Excitedly) I can't believe we've discovered an unknown cave and waterfall!
(Scene: Leo and the explorers return to the surface, where Ruby is waiting.)
Narrator: Leo and the explorers emerged from the cave, brimming with excitement and a newfound discovery.
Ruby: (Anxiously) Leo, I'm so happy you are okay. You were gone for 17 hours, and I was worried. What did you find? Tell me everything!
Leo: (Smiling) My dear Ruby, we discovered an underground waterfall, underground streams, and beautiful formations. We must share it with the world, but first I want to show you the waterfall.
Narrator: A few days later, Leo and Ruby return to the waterfall together where Leo shares the wonderful news with Ruby that he has named the waterfall in her honor.
(Scene: Leo and Ruby are inside the cave in front of the waterfall.)
Ruby: (Surprised and delighted) Oh, Leo! I'm honored you've named the waterfall after me. Ruby Falls is beautiful. This is truly a remarkable find!
Narrator: From that day forward, Ruby Falls became a renowned wonder, captivating the hearts and imaginations of people from far and wide.
(Scene: Ruby Falls visitors celebrate and marvel at the beauty of the waterfall and cave.)

Note: This simple skit introduces young children to the adventure of Leo Lambert and the discovery of Ruby Falls. It highlights the excitement of exploration and the joy of sharing discoveries with loved ones. The skit can be acted out with simple props and costumes, allowing children to engage in imaginative play and learn about real-life adventures and hidden treasures.