

Amazing Caves! – Detailed Lesson Information

Lesson #	Name of Lesson	Lesson Overview	Objectives	Standards Addressed	Duration of Lesson/Time Requirement
1	Caves: Earth's Underground Treasures	This lesson introduces students to caves.	Students will be able to: <ol style="list-style-type: none"> 1. Define the terms "cave" and "speleology". 2. List at least 2 different types of caves. 	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard D: Earth and Space Science ISTE Standards for Students: <ul style="list-style-type: none"> • Creativity and Innovation • Technology Operations and Concepts 	40 minutes; Additional class time may be required for creation of student "wordles"
2	Caves of the United States	Students will become familiar with some of the longest caves in the United States.	Students will be able to: <ol style="list-style-type: none"> 1. Identify at least one of the longest caves in the United States. 2. Create a map of where some of the longest caves in the United States are located. 3. Explain the difference between a "show cave" and a "wild cave". 	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard D: Earth and Space Science ISTE Standards for Students: <ul style="list-style-type: none"> • Creativity and Innovation • Communication and Collaboration • Research and Information Fluency • Technology Operations and Concepts 	40 minutes
3	Geo Detectives	Students will use geologic maps to determine what rock type caves are located in.	Students will be able to: <ol style="list-style-type: none"> 1. Define the term "geology". 2. Analyze a geologic map. 3. Identify that caves are located in areas of sedimentary rock. 	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard D: Earth and Space Science ISTE Standards for Students: <ul style="list-style-type: none"> • Creativity and Innovation • Communication and Collaboration 	40 minutes

				<ul style="list-style-type: none"> • Research and Information Fluency • Critical thinking, Problem Solving, and Decision Making • Technology Operations and Concepts 	
4	Rocks Rock!	Students will become familiar with rocks, minerals, and be introduced to the rock cycle.	Students will be able to: <ol style="list-style-type: none"> 1. Explain the difference between rocks and minerals. 2. Compare and contrast igneous, metamorphic, and sedimentary rocks. 3. Demonstrate the rock cycle. 	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard D: Earth and Space Science ISTE Standards for Students: <ul style="list-style-type: none"> • Creativity and Innovation • Research and Information Fluency 	40 minutes
5	Disappearing Rocks	Students will examine limestone rock and perform a "Bubble Test".	Students will be able to: <ol style="list-style-type: none"> 1. Describe the characteristics of limestone rock. 2. Explain how limestone rock forms. 3. Model the effects of acids on a carbonate rock such as limestone. 	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard A: Science as Inquiry • Content Standard B: Physical Science • Content Standard D: Earth and Space Science 	40 minutes
6	Making Carbonic Acid	Students will become familiar with the concepts of acidity, alkalinity, and pH. They will demonstrate how carbonic acid is formed and describe	Students will be able to: <ol style="list-style-type: none"> 1. Explain the concepts of acidity, alkalinity, and pH. 2. Explain that carbon dioxide reacts chemically with 	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard A: Science as Inquiry • Content Standard B: Physical Science • Content Standard D: Earth 	40 minutes

		how it can dissolve limestone and create caves.	<p>water to form carbonic acid.</p> <ol style="list-style-type: none"> 3. Demonstrate how carbonic acid is formed by using the color change of universal indicator to monitor the changing pH of a solution during a chemical reaction. 4. Describe how carbonic acid can dissolve limestone and create caves. 	and Space Science	
7	Create a Cave	In this lesson students will create a model to demonstrate how caves form.	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Create a cave model. 2. Demonstrate the process of cave formation through dissolution of limestone. 	<p>National Science Education Standards: 5th-8th grade</p> <ul style="list-style-type: none"> • Content Standard A: Science as Inquiry • Content Standard D: Earth and Space Science <p>ISTE Standards for Students:</p> <ul style="list-style-type: none"> • Research and Information Fluency 	40 minutes
8	Dripping Crystals	This lesson will introduce students to cave formations, also known as speleothems, and the basic process in which they form.	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Define speleothem. 2. Describe how stalactites and stalagmites form. 3. Model stalactite and stalagmite formation. 	<p>National Science Education Standards: 5th-8th grade</p> <ul style="list-style-type: none"> • Content Standard A: Science as Inquiry • Content Standard B: Physical Science • Content Standard D: Earth and Space Science 	40 minutes for the introduction and to set up the initial experiment. Allow the students a few minutes during class

					over the next couple of days to record observations about their experiment. Dedicate at least 10 minutes during a future class period to wrap-up and discuss the results of the experiment.
9	Speleothem Sleuths	There are many types of speleothems found in caves besides stalactites and stalagmites. In this lesson students will individually research a specific type of speleothem and then creatively share their knowledge with their classmates.	Students will be able to: <ol style="list-style-type: none"> 1. Independently research a type of speleothem using the Internet. 2. Construct a visual aid/poster to communicate information about a type of speleothem. 3. Orally present information about a type of speleothem to their classmates. 	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard D: Earth and Space Science ISTE Standards for Students: <ul style="list-style-type: none"> • Creativity and Innovation • Research and Information Fluency • Technology Operations and Concepts 	40 minutes; Additional class time required for student presentations and creation of the "Classroom Cave"
10	Cave Critters	Students will learn that caves provide suitable habitat for wildlife species and that the	Students will be able to: <ol style="list-style-type: none"> 1. Define "habitat", "adaptation" and "biospeleology" 	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard C: Life Science 	40 minutes; additional class time required for

		animals found within caves have a variety of adaptations that allow them to survive in such a unique environment.	<ol style="list-style-type: none"> 2. Explain the difference between “trogloxene”, “troglophile”, and “troglobite” and give at least one example of each. 3. Identify and describe adaptive advantages of animals found in and around caves. 		presentation of student created cave critters
11	People & Caves	This lesson summarizes the many ways that humans have used caves historically as well as their current uses. Students are able to create their own cave art as an optional activity.	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. List at least 2 ways people use caves. 	<p>National Science Education Standards: 5th-8th grade</p> <ul style="list-style-type: none"> • Content Standard C: Life Science • Content Standard F: Science in Personal and Social Perspectives <p>ISTE Standards for Students</p> <ul style="list-style-type: none"> • Research and Information Fluency 	40 minutes
12	Let’s Go Caving!	In this lesson students will become familiar with the proper gear/equipment and skills required to participate in the responsible exploration of caves.	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Describe at least 2 items of gear/equipment cavers use and the purpose of each. 2. Demonstrate at least 2 skills required for responsible caving. 	<p>National Science Education Standards: 5th-8th grade</p> <ul style="list-style-type: none"> • Content Standard C: Life Science • Content Standard F: Science in Personal and Social Perspectives 	40 minutes; Additional class period required for Activity #3 (optional)
13	Are There Caves Near You?	Students will investigate whether or not there are caves located near where	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Explain why caves are or are not located where they 	<p>National Science Education Standards: 5th-8th grade</p> <ul style="list-style-type: none"> • Content Standard D: Earth and Space Science 	40 minutes; Additional time required for optional

		they live/go to school.	live/go to school.	ISTE Standards for Students: <ul style="list-style-type: none"> • Creativity and Innovation • Communication and Collaboration • Research and Information Fluency • Critical thinking, Problem Solving, and Decision Making • Technology Operations and Concepts 	activities
14	Take a Trip to a Cave!	Students will participate in either a physical field trip or a virtual field trip to a cave.	Variable	National Science Education Standards: 5 th -8 th grade <ul style="list-style-type: none"> • Content Standard D: Earth and Space Science ISTE Standards for Students: <ul style="list-style-type: none"> • Creativity and Innovation • Communication and Collaboration • Research and Information Fluency • Technology Operations and Concepts 	Variable