

Lesson 12 – Let’s Go Caving!

Lesson Overview:

In this lesson students will become familiar with the proper gear/equipment and skills required to participate in the responsible exploration of caves.



Objectives:

Students will be able to:

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.

Standards Addressed:

National Science Education Standards: 5th-8th grade

- Content Standard C: Life Science
- Content Standard F: Science in Personal and Social Perspectives

Duration of Lesson/Time Requirement: 40 minutes; Additional class period required for Activity #3 (optional)

Materials Required:

Pictures of people caving

Props or pictures/illustrations of caving gear/equipment for Activity #1

- Helmet
- Headlamp & additional light sources
- Old rugged clothing
- Hiking boots
- Gloves
- Knee & elbow pads
- Cave pack
- Food & water

Example of a cave map

Materials to create/expand the “Classroom Cave” for Activity #3 (optional)

Light sources for students to use in the “Classroom Cave”

- Students can bring flashlights/headlamps from home

Dry erase board/large piece of paper with the “Rules of 3 for Caving” written on it (optional)

Classroom Technology:

Computer with Microsoft PowerPoint and projection capabilities or SMART Board

National Speleological Society’s Search for a Local Grotto: http://www.nssio.org/Find_Grotto.cfm

Set-Up:

If using a student volunteer for Activity #1 gather the necessary gear/equipment prior to the class period. If using the pictures/illustrations of gear/equipment for Activity #1 print and cut out the template provided.

If completing Activity #3 gather the necessary materials to create/expand the “Classroom Cave”. Set up the “Classroom Cave” prior to the class period designated for the activity.

Procedure:

Introduction

Ask the students how many of them enjoy going to new places and seeing new things. Would they consider themselves explorers? What does it mean to explore or be an explorer?

Exploration =

- To look into closely; scrutinize; examine
- To investigate, study, or analyze
- To travel over (new territory) for adventure or discovery

Explain to the students that the exploration of caves takes people just like themselves into a world much different from that above ground. The world of a cave is one of rock, mud, and darkness where an explorer can encounter exotic formations, streams and waterfalls, tight crawlways, deep canyons and pits, huge rooms, cave crickets and bats.

Cave exploring (also known as caving or spelunking) is the art of safely moving through a natural cave to a destination and returning to the surface without hurting yourself or the cave.

Spelunkers, commonly called cavers, explore caves for many reasons. Caving can be a strenuous sport, a casual hobby, a means to conducting scientific research, or all of these and more. Some cave scientists are interested in the adaptations of cave organisms to their unique conditions. New knowledge of how these creatures survive may provide sources for modern medicines and other technologies. Other cave scientists are interested in how caves are formed. Some cavers explore the cave systems to help landowners and towns learn about their underground resources and how to protect them. Cavers promote an understanding of caves, their contents, and the areas in which they formed.

Activity #1

Note: This activity can be completed using props or pictures of the required caving gear/equipment. If using props select a student volunteer to become a caver and physically “dress up” the student with the props as you explain each piece of gear/equipment. If props are unavailable use the pictures of caving gear/equipment provided to “dress” an outline of a person into a caver. Personalizing the human figure to represent someone the students are familiar with is encouraged.

Tell the students that in order to explore a cave safely cavers need the right gear/equipment and the right skills. Explain that the gear/equipment required will depend on what type of cave is being visited since the amount of water and temperature will vary from cave to cave.

Select a volunteer student to “become a caver” or display the outline of a person. Ask the students what gear/equipment is needed to turn someone into a caver. “Dress the caver” based on what the students recommend. Discuss the necessity and importance of each piece of gear/equipment as it is added to the “caver”.

At a minimum caving requires:

Head Protection: Caves are made out of rock and rock hurts when you smack your head into it (and your other body parts too for that matter). Safety is the #1 concern while caving. Every caver should be wearing a helmet with a chinstrap to provide protection against low ceilings and outcroppings, falls, and falling rocks. Standing up too quickly in a low area or running into a low section of ceiling or projections while concentrating on your footing are all too common while caving, and falling objects are a real hazard when other cavers are climbing above you.

The ideal type of helmet for most caving activities is a climbing style helmet which provides impact protection and shock absorption to protect the head. An essential part of the helmet should be a sturdy, non-elastic chin strap equipped with a quick release and three or four point mounting. The helmet should stay on during a fall but be easily released if it should become wedged. Cavers affectionately refer to their helmets as “brain buckets”.

Lighting: Caves are dark places. In fact, the dark zone of a cave is one of the few places on Earth that people can go to experience something known as “total darkness”. Total darkness means that there is no natural light entering into the cave in that area so the only light cavers have available to them is the light that they bring into the cave with them.

Traveling through most caves requires using your hands for climbing and balance. This can be difficult and unsafe to accomplish while holding a flashlight, so the primary light source for cavers is a hands-free light such as a headlamp. Headlamps come in all shapes and sizes but, in general, they can easily be attached and/or mounted to the caver’s helmet. This leaves the caver’s hands free for safely maneuvering through the cave.

What would happen if a caver only brought one headlamp or one flashlight into a cave and the batteries died or it fell down a pit? This is why cavers bring in at least two additional sources of light besides their primary headlamp. A second headlamp and a good quality small flashlight make great backup sources of light. Additional light sources can be attached to the helmet or worn around the caver’s neck for easy access. It is also a good idea to bring spare batteries and bulbs into the cave as well.

Clothing: You probably do not want to wear your nicest clothes caving since they will get dirty and wet. The type and amount of clothing cavers wear depends on the type of cave they are exploring. The temperature of the cave, how wet it is, and the length and type of the cave trip will affect the type of clothing needed to be comfortable. Old sturdy clothing that helps protect from abrasion and helps retain some body heat is ideal. Taking along some extra clothing or having a dry set of clothes to change into after the caving trip is recommended.

Boots/Footwear: Cavers most likely will encounter rock climbing sections while underground, with the added excitement of darkness and wet, slippery, and possibly muddy rock. Sturdy hiking boots with non-marking soles that provide good ankle protection and good traction are recommended for caving. The fit should be snug and they should keep your feet dry and warm. Keep in mind they will get wet and muddy!

Gloves: Wearing gloves while caving not only helps protect a caver's hands from cuts and abrasions but also helps to protect the cave. Humans (and all mammals) have oils on our skin and when we accidentally touch the rocks and formations within a cave the oils seep into the tiny holes within them. This discolors the formations and can also prevent them from growing any larger. Gloves come in many shapes and types (waterproof, winter, gardening, etc). The type of gloves used by a caver is mainly personal preference. When choosing gloves it is important that they will not impede a caver's grip as they negotiate cracks in the rock but they still provide some protection and warmth.

Knee Pads: When crawling around on rock for long periods of time it is helpful to have a little extra padding for comfort, therefore cavers wear knee pads to help protect their knees and shins.

Elbow Pads: Elbow pads are not essential and are not worn by all cavers but they do help protect your elbows on crawls through long passages.

Cave pack (optional): Most cavers carry a sturdy pack when caving to hold extra supplies such as bulbs, batteries, clothing, food, drinking water, etc. It should be small in size with two shoulder straps and be made of a heavy, durable material and preferably be waterproof. Depending on the length and nature of the caving trip it is not always necessary for each individual caver to carry their own pack.

Food & water (optional): When going on a lengthy caving trip bring some drinking water as well as high energy snacks such as protein bars, granola bars and nuts.

Note: If a student volunteer has been "dressed" as a caver have the class give them a big round of applause at this time. As the student is "undressed" review each piece of gear/equipment with the class and why it is necessary. Thank the student volunteer and have them return to their seat.

Activity #2

Now that we have spent some time learning more about the proper gear/equipment caving requires, what skills does a caver need? Explain to the students that different caves have different technical demands. Most of the skills required to go caving can be developed by actively participating in cave trips with more experienced cavers and by watching how they move through the cave and maneuver various obstacles. Cavers typically learn what not to do by making mistakes and suffering a few bumps and bruises along the way.

For most caving, cavers use a combination of climbing and hiking techniques to move. Cavers spend a lot of time crawling and figuring out how to move their bodies through spaces of varying sizes and shapes.

Skills that cavers should know include:

- Proper stooping techniques
- Basic hands-and-knees crawling
- Belly crawling
- How to move through a squeeze

Other useful skills include:

- Chimneying (climbing up a vertical crack or passage whose walls are close together)
- How to read a cave map
 - Display or pass around several examples of cave maps for the student to view

Note: It is recommended to have the students test some of the caving skills listed above by demonstrating stooping, hands-and-knees crawling, belly crawling, and moving through a squeeze. This can be done by setting up a short obstacle course inside the classroom or having the students carefully maneuver around the classroom furnishings while the educator calls out a skill. A “squeeze” can be created by moving several chairs together or using several cardboard boxes of various sizes that are attached together. Students who are not comfortable displaying these actions should not be forced to participate. If Activity #3 is planned these skills can be incorporated into it.

Activity #3 (optional) – additional class period required

Prior to the start of class expand/create the “Classroom Cave”. Use tables, desks, chairs, cardboard boxes, dark sheets and blankets to create rooms and passageways. Decorate the rooms and passages with materials that the students have developed about caves throughout the previous lessons. Create speleothems and other obstacles. Get creative! Hang up drinking straws to represent soda straws. Scatter popcorn in areas to represent cave popcorn. Use paper/plastic cups and paper tubes to represent other cave formations. Add some plastic or stuffed animals to represent cave critters such as bats, salamanders, and crickets. Include some rock art and artifacts left by previous visitors. It is recommended to make the door to the classroom the “cave entrance”. This can be done by hanging a sheet/curtain in the doorway and having the “cave entrance” be a cardboard box that the students will have to crawl through. Have a separate “cave exit”. This will allow the students to travel in a single file line one-way through the Classroom Cave.

On the day of the activity turn off the lights and make the classroom as dark as possible. Gather the students in an area where they cannot see the “cave” (e.g. in a different classroom). Even though the Classroom Cave is not a “real cave” and the students will be lacking “real” caving gear it is important to treat this activity as if it is a real caving experience.

Greet the students and ask them if they are ready to go caving. Explain that they will be exploring the Classroom Cave and discovering the wonders that it contains inside. Review the

proper gear/equipment required for going on a caving trip. Discuss what skills the students might need to be able to make their way safely and responsibly through the Classroom Cave.

Display the “Rules of 3 for Caving” and explain and discuss them with the class.

Rules of 3 for Caving:

1. Always cave in groups of at least **three** people. Never explore a cave alone. Why? *(If someone gets hurt then 1 person can stay with that individual while the other person can exit the cave to get help)*
2. Always tell **three** people where you are going and when you will be out of the cave. Why? *(If you are not out of the cave when you are expected to be people will know where you are and can come looking for you)*
3. Always have **three** independent sources of light. Why? *(Caves are very dark places. If something happens to your primary source of light then you have 2 backup sources of light to help guide your way safely through the cave)*
4. Use **three** points of contact on climbs. Why? *(If you are climbing up an area in a cave and your foot slips you will have at least 2 other points of contact with the cave to hold you securely in place and prevent you from falling and/or getting injured)*

Tell the students that responsible caving is a team activity and not a competition. Explain that cavers think and act as a unit underground to ensure a safe trip. The actions or attitude of a single member can jeopardize the safety of the whole team, resulting in injury or death. Tell the students that their #1 priority in the Classroom Cave today is safety. As they enter into the Classroom Cave they are to move through in a single file line. The group will move only as fast as the team’s slowest member and they must stay in voice contact with their teammates. After negotiating any obstacles they should assist the person behind them. Remind the students to:

- Stay on established trails to help keep other areas of the cave pristine
- Do not damage formations or other surfaces of the cave
- Avoid disturbing cave organisms or their environment
- Pack out everything they bring into the cave
- Do not disturb artifacts (archeological or paleontological)

Make sure that each student has a light source and allow them to enter into the Classroom Cave.

After all of the students have safely made their way through the Classroom Cave, gather the class together. Have the students discuss their experience.

Wrap-Up/Conclusion

Explain to the students that caving is becoming increasingly popular in all areas of the world. Ask the students what they think will happen as more and more people visit caves. What kinds of impacts could increased visitation to caves have? How can we protect these amazing underground areas?

Tell the students that caves are full of beauty and mystery found nowhere else. They are also fragile. As growing numbers of people seek understanding and adventure underground our mark on caves increases dramatically. Responsible caving helps preserve the cave environment while enjoying it. Cavers are responsible for protecting themselves, other cavers, and the caves they visit.

The Three Basic Rules of Caving are:

1. Take Nothing but Pictures – Leave everything the way you found it so others can appreciate the cave the same way you did.
2. Leave Nothing but Footprints – Minimize your impact to the cave. Do not leave crumbs, trash or human waste in the cave. Do not vandalize the cave by destroying formations or leaving graffiti. Minimize the impacts of your footprints by sticking to established trails and be careful to step where those before you have already stepped.
3. Kill Nothing but Time – You are the visitor to the cave so leave the natural inhabitants alone.

Ask the students if any of them are interested in going caving or becoming a caver. Tell the students that every state has at least one caving club or grotto (which is another word for a cave). Grottos are local chapters of the National Speleological Society (NSS). Grottos are one of the best places to get involved with caving since they provide beginner trips and training opportunities.

Project the website: http://www.nssio.org/Find_Grotto.cfm for the class to view. Select your state to display the grottos located there. Allow students who are interested to record the contact information. Encourage the students to contact members of the local grotto in order to learn more about responsible caving and about the caves where they live.