This Caving Activity Patch is dedicated to John Goeringer, a man who loved the Lord and earnestly sought to share the gospel with everyone he met. John served as a lieutenant in Battalion 3124 at Big Valley Grace Community Church in Modesto, CA from 2005 to 2006. He went home to be with the Lord after a tragic work place accident on November 28, 2006.

Caving

Theme Verse
2 Timothy 3:16 All Scripture is God breathed and is useful for teaching, rebuking, correcting and training in righteousness, so that the man of God may be thoroughly equipped for every good work.

Character Trait
Risk taker

Leadership Skill
Getting and giving information

Unit Objectives
To teach the importance of exploring God's word, the bible. To learn how to be risk takers for God's Kingdom and for the betterment of society. To discover how to get and give information that will be useful and will make a positive difference in others lives.

Leaders Resources

cave-exploring.com
exploringcaves.com
cavinginto.net

Small Group: Meeting 1

Materials needed:
Bibles
Paper and pen/pencil

Devotions
Read 2 Timothy 3:16, then read Acts 8:26-39.
Discuss the following questions:

What do the two different passages have to do with each other?
Who told Philip to go up to the chariot?
Why was Philip sent to go up to the chariot?
What risks did Philip take when he approached the chariot and spoke to the Ethiopian?
If Philip did not know the truth and meaning of scripture would he have been of any use in this situation?
What could Philip expect would be gained by his sharing the truth and meaning of the scripture with the Ethiopian?
Do you think the Ethiopian shared his faith with anyone when he returned home?
Have you ever felt the Spirit lead you to the share the gospel with someone?
What risks are you taking when you share your faith with someone new?
Are the risks worth the gain?

Prayer
Take prayer requests
Pray for the requests and for God to give you the discipline to explore the bible regularly and be a risk taker for the Lord and to be able to boldly articulate your faith to others when the opportunity arises.

Business
Take attendance.

Action
Make a list of items needed to safely explore a cave.

Council Ring: Meeting 1

Risk Takers

Whenever we try something new, we are taking a risk. That is part of growing though, and it is imperative. Most people are risk averse. Not the leader! They calculate the risk and what is to be gained from taking the risk. Then they communicate that to the followers and away they go to a better tomorrow!. Are you known as a person who is willing to take risks? If so, you will become an extraordinary leader!

Ask the group to name some risk takers in history. What did they risk and what was to be gained?
A few examples:
Astronauts Christopher Columbus The Pilgrims Lewis & Clark

Now ask the group about risk takers in the bible. What did they risk and what was to be gained?
A few examples:
Noah Moses Abraham Joshua and Caleb David Jesus The Apostles

Ask the group "What can you do to be a risk taker for Christ?"
"How can you best get and give information contained in God's word?"

Share the following scriptures; Have the group read the passages.

Joshua 1:8 Do not let this book of the law depart from your mouth. Meditate on it day and night so that you may be careful to do everything written in it. Then you will be prosperous and successful.

Acts 4:31 After they prayed, the place where they were meeting was shaken. And they were all filled with the Holy Spirit and spoke the word of God boldly.

1 Peter 3:15 But in your hearts set apart Christ as Lord. Always be prepared to give an answer to everyone who asks you to give the reason for the hope that you have. But do this with gentleness and respect.

2 Timothy 15 Do your best to present yourself to God as one approved, a workman who does not need to be ashamed and who correctly handles the word of truth.

We need to explore the bible so we can become risk takers for God.

Game Suggestion: Meeting 1
Blind as a Bat American Eagle
Resources needed: blindfolds for all participants
Same rules as American Eagle except no running
Blindfold all participants
Decrease the size of the play area
Have leaders stand at the sidelines to keep the participants in the play area
Have leaders at the finish lines to let the participants know they have crossed the line
Have leaders turn participants around so they are heading the right direction
Player who starts in the middle calls out "American"
All other players call out "Eagle"
(Similar to the game "Marco/Polo")
Whenever some one is captured they start calling out "American" and assist in other captures

Action: Meeting 1

What is Cave Exploring?
Cave exploring or "Caving" is the act of moving through a cave and returning to the surface without hurting yourself or the cave. One who goes caving is known as a caver.

The scientific study of caves and the cave environments is known as speleology.

Cave exploration has also been referred to as spelunking. In the 1960's the term spelunking and spelunker began to be viewed by experienced caving enthusiasts as a term for inexperienced cavers using inadequate light sources and gear. Nowadays the term spelunker is generally used to denote someone untrained and unknowledgeable in current exploration techniques. Some t-shirts and bumper stickers proclaim "Cavers rescue spelunkers".

For the purposes of this Activity Patch we will only be covering safely moving through horizontal caves. Specialized skills and equipment are needed when moving through vertical caves, wet caves, ice caves, and underwater caves.

Test your knowledge about caves
Use a true or false questionare
Make your own questions or use one found online at American Cave Conservation Association (Sample attached)

Share the cavers credo: Take only pictures, leave only footprints, kill only time.

Basic Safety Rules of Caving

1. Never explore alone. A team of 3 or 4 should be the minimum. At least one in the group should be an experienced caver.
2. Always let someone on the surface know where you are going and when you expect to return. Make sure they have directions to the cave.
3. Always check your gear before entering the cave.
4. Never go caving under the influence of drugs or alcohol or anything that may impair your judgment
5. Always carry at least 3 sources of light and extra batteries.
6. Stay out of a cave that is prone to flooding if there is rain in the forecast. Caves can flood quickly.
7. Don't run jump, show off, or fool around. Proceed cautiously and watch where you're stepping.
8. Avoid piles of rubble or anything that looks unstable. Falling is the #1 cause of caving accidents.
9. Never leave an inexperienced caver alone. All members of the group should remain in earshot of each other.
10. Leave the keys to you vehicle hidden in a safe place outside the cave or just inside the cave entrance. Make sure everyone in your group knows where to find them.

Techniques for Moving Through a Cave

For most caving you will be using a combination of climbing and hiking techniques to move. You will also have to crawl and figure out how to move your body through spaces of varying shapes and sizes. Skills you will need to learn are:
Proper stoopway techniques (crouching, duckwalking)
Basic hands and knees crawl
Belly crawling
How to move through a squeeze (tight space)
Chimneying (climbing up or down a vertical crack or passage whose walls are close together
How to read a cave map

Hazards

Trips, slips, and Falls
Trips, slips, and falls are the most common type of accident in caving. You are most likely to stumble towards the end of a caving trip when you are tired and not picking your feet up as well as you were at the beginning of the adventure. Wet. damp, moist rocks and dirt can cause you to slip. Be certain of your footing when walking on wet surfaces.
Pace yourself
Keep up your energy level by eating and drinking water regularly
Do not travel with a dim light as this can make it difficult to see floor irregularities and other obstacles
Always be on the lookout for potential hazards around the edges of pits and climbs
Do not depend solely on your past knowledge of the cave, be aware conditions may have changed.

Rockfall

Rockfall is the second most common cause of caving injuries. The entrance areas of caves are exposed to large swings in temperature, erosion, and other factors which make them especially prone to loose rocks. Many large cave rooms are littered with large, loose boulders called "breakdown". These rocks can shift unexpectedly when you are climbing on them. Pits with rocks at the top can be extremely hazardous because the high velocity of a falling rock can cause major injuries or death.

Always be aware of people below you

Stay out of the rockfall zone

Don't count on your helmet or quick reflexes to save you from injury

If there is loose rock around you, you are probably in the rockfall zone

Yell "ROCK!" if you dislodge a rock, debris or drop a piece of caving gear

Do not look straight up if someone yells "ROCK!"

Be careful of shifting rocks if the passage you are going through is between or under "breakdown"

In a breakdown passage. avoid pushing or kicking the rocks

Getting Lost

It is not uncommon to get disoriented in a cave. Cave systems can be complex and navigating them difficult. Take the following precautions:

Take note when you enter the cave whether the wind is in your face or at your back. Use this knowledge to help navigate your way out.

Make sure to turn around frequently and look back towards the way out especially at key junctions. The way out will look quite different than the way in.

Pick out landmarks at key junctions

Look at the structure of the cave to see if there are any regular patterns or trends to the cave that you can use to find your way back

Keep an eye on the person in front of and behind you to help keep the group together

Don't place your faith in arrows that others have painted or scratched on the walls or floor. (This is vandalism.)

You may feel the need to mark your path with reflective tape or markers. Make sure to secure them without damaging the cave. Make sure to retrieve all markers on your way out. If you do decide to use arrows to mark your way out always make sure the arrows are pointing towards the way out.

There may be some caves where it is acceptable to stack cairns along the way to mark your path.

Be sure to check with the land owner or government agency before deciding o mark your path as restrictions may apply.

What to do if you do get lost:

Stay put! Don't keep wandering around aimlessly

Put on your extra clothing to keep warm

Eat a snack and drink a little water

If you are comfortable in the dark turn your flashlight off to conserve battery life

Pound rocks together to make noise or blow a whistle to signal your group members or rescuers. The sound of the rocks or whistle will travel much further than your voice.

Don't lie down on the ground or a rock as this will only accelerate body heat loss.

Be patient and don't panic

Hypothermia (decrease in core body temperature)
It is better to prevent hypothermia than to treat it.
Wear the right type of clothing for the cave environment you will be in
Stay dry as much as possible
Pack the right kinds of clothes, a space blanket, and a candle and matches for emergencies
If someone in the group needs to wear their spare clothing to stay warm, it is time to exit the cave
Even slow movement will help keep a person warm. Use a steady but measured pace to exit

Dehydration
Caving can be very strenuous. As in any strenuous activity it is important to drink water regularly. Dehydration can be a problem in hot, dry caves and cold, wet caves. In warm caves, you will sweat more, but the humidity does not allow your body to cool effectively. In cool, wet caves, you do not notice your thirst as much as you would in a dry cave, but you are still losing water.

Equipment Needed
Gather items needed for safe cave exploration and then share the items with the group and discuss each item's importance. Ask questions and take questions while sharing the items.

Before you get started sharing the items ask for a show of hands whether a compass works in a cave (yes). Also whether a cell phone works in a cave (No).

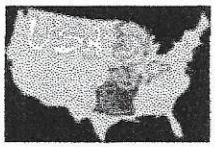
Items needed:
1. Head mounted light
2. Back-up flashlight
3. Extra batteries for all lights
4. Extra bulbs for all lights
5. Hardhat / helmet with a chin strap
6. Boots
7. Appropriate clothing to keep you warm (Clothing may get permanently stained or torn, so don't wear your Sunday best clothes!)
8. Water bottle
9. High energy snacks
10. Duct tape to tape extra flashlight on your helmet
11. Space blanket or 2 large plastic bags
12. Small backpack
13. Gloves
14. Wool or thermal socks
15. Longjohns or thermal underwear in colder caves
16. A third small back-up flashlight
17. Knee and elbow pads
18. Small first aid kit
19. Candles
20. Lighter and water proof matches

21. Whistle
22. Pad of paper and pen and pencil
23. Compass
24. Extra boot laces
25. Small length of twine for attaching your backpack to your feet to drag behind you in tight spaces
26. Camera
27. Change of clothes and shoes. Leave these in the car for the trip home.
28. Map of the cave if available
29. Urine bottle and wag bag (for feces)
30. Large plastic bag to put your dirty clothes and shoes into when you finish.

- About ACCA
- Membership
- Kid's Cave
- Education
- Volunteer
- Professional Services
- News & Events
- Cave Facts
- ACCA Calendar
- ACCA Forums
- Links
- Contact Us
- Home
- Cavern.org

True or False

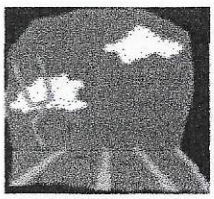
Number a sheet of paper from 1-15 and test your knowledge of caves and cave-related topics by answering either True (T) or False (F) to the following questions.



1) True or False:
There are more than 17,000 caves in the United States.

2) True or False:
Louisiana and Rhode Island are the only states that do not have caves.

3) True or False:
The longest cave in the world is located in Kentucky.



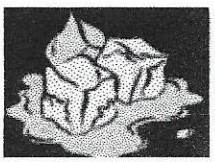
4) True or False:
The largest room inside a U.S. cave is big enough to hold 14 football fields

5) True or False:
The deepest room inside a U.S. cave is 1,550 feet below the entrance.

6) True or False:
There are only 55 species of bats in the world.

7) True or False:
Cavers are classified as troglobites.

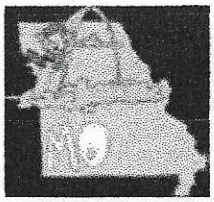
8) True or False:
Blind cave fish could see if they wore glasses.



9) True or False:
Caves can be made by wind, waves, and melting ice.

10) True or False:
Stalagmites grow from the ceiling and stalactites grow from the ground.

11) True or False:
The study of caves is called geology.



12) True or False:
Missouri is often called "the cave state".

13) True or False:
Only 2% of the water we use everyday is groundwater.

14) True or False:
Fossils are not found in limestone.

15) True or False:
Bats are blind.

Click here
to discover the answers!

About ACCA
Membership
Kid's Cave
Education
Volunteer
Professional Services
News & Events
Cave Facts
ACCA Calendar
ACCA Forums
Links
Contact Us
Home
Cavern.org

Answer Page

True or False | Word Hunt

True or False

- True. There are over 3,750 reported wild caves in the state of Kentucky alone.
- True. Caves have been discovered in 48 of the 50 states within the U.S. To find a cave near you, click here.
- True. With over 350 miles of mapped cave passage, Mammoth Cave, the longest cave in the world, is located in Park City, Kentucky.
- True. The Big Room, located in Carlsbad Caverns, New Mexico, is 1800 feet long, 1100 feet wide and 225 feet high.
- True. The deepest room within a U.S. cave is Columbine Crawl Cave in Wyoming. It reaches a depth of 1550 feet below the entrance.
- False. There are about 1000 species of bats. Here, in the U.S., there are 39 species. To learn more about bats, click here.
- False. Troglobites are animals that complete their entire lifecycle inside a cave. People are classified as trogloxenes; animals that visit caves and show no special adaptations for the cave environment. To discover other cave animals and their classifications, click here.
- False. Blind Cave fish have no eyes. Instead, they have nerves on their body that they use to sense objects. click here to learn more about cave wildlife.
- True. Caves can be formed by many natural processes. To read about the different types of caves, click here.
- False. Stalactites hang tight to the ceiling. Stalagmites grow from the ground. To learn about other cave formations, click here.
- False. The study of caves is called speleology. Geology is the study of the earth. click here, to learn more about speleology.
- True. Missouri is home to ten show caves and countless wild caves.

- False. 98% of the water we use everyday is groundwater. To learn more about groundwater, click here.

- False. Fossils, such as brachiopods, crinoids and ammonites, are commonly found in limestone. click here, to learn more about fossils.

- False. Contrary to legend, there are no blind bats. Many bats actually do have good vision, but most do not depend on their eyesight to guide them. To learn more about bats, click here

Word Hunt

cavern: a, ace, ave, can, cane, car, cave, ear, earn, near, race, ran, rave, van, vane.

limestone: i, in, isle, its, lime, me, meet, met, mile, mist, most, nile, noel, not, on, one, stem, stone, ten, tim, to, ton, tone.

Caving Patch
Session 2. Cave Geology

Theme Verse for Session 2
Psalm 119:11
I have hidden your word in my heart that I might not sin against you.

Session Outline
Lesson on Cave Geology
Individual Action
Squad Discussion
Council Ring

Caving Patch Session 2 Resources
Lesson materials
Individual Action Handouts
Squad Discussion Handout
Council Ring notes

Additional Resources
Websites
USGS National Park Service: Geology of Caves
http://www.nature.nps.gov/geology/usgsnps/cave/cave.html
Geologic Glossary (USGS):
http://www.nature.nps.gov/geology/usgsnps/misc/glossaryAtoC.html#carbonate
National Cave and Karst Research Institute
http://www.nckri.org/
National Caves Association:
http://cavern.com/

Lesson on Cave Geology

- Talk about the types of caves and how they are formed:
    - In rock through water dissolving the rock in weak spots.
    - In lava flows by the outer part of the lava flow cooling and become a crust. The inside part of the lava continues to flow, leaving a lava tube behind.
    - In ice by melt water flowing and melting more ice
    - In cliffs by the sea, by the action of waves battering weak areas to make holes.
    - Through earthquake activity separating layers of rock to make caves.
    - By wind blown sand battering weak areas in cliffs to make holes.

- Talk about the formations found in caves and how they are formed:
  - Stalagmites: dripping water from above forms mounds on the floor.
  - Stalactites: water dripping from the roof leaves deposits behind that form an "icicle" hanging from the roof.
  - Column: a stalagmite and stalactite grow together to form one column.
  - Soda straw: formed by drops that stick to the roof long enough for calcite to crystallize, forming a ring. The rings continue to grow until a straw is formed.
  - Flowstone: water flows down a sloped wall and forms wide deposits.
  - Drapery or bacon strip: water flows down a vertical wall and deposits calcite in a line. As the line is built up, it forms a drapery or strip that looks like bacon.
  - Rimstone dam: water collects in a depression and the calcite deposits along the edge of the depression. Over time this builds up into a wall, or dam, around the depression.
  - Cave pearls (oolites): calcite coats a pebble that is in the standing water in a pool. Over time the calcite builds up around the pebble to form a cave pearl.

- Have the boys complete the matching exercise on the last page of the lesson handout.

Action

Boys are each given a sheet with 6 statements that have missing information. They have to seek this information from leaders. They also have to discover the Bible verse for the session.
Six men are given cards. Each card contains the missing information for one statement. The card also has one part of the reference for the Bible verse for that session. Once a boy has written down the missing information on their sheet, the leader will give the boy the part of the reference for the Bible verse.
Boys have to find all six leaders and fill in the missing information on their sheet. Then they have to look up the verse for the session and write that on their sheet.

Action Sheet for Session 2 of the Caving Patch (answer sheet)

Fill in Bible verse
reference below:

Psalm 1. There are 4 types of caves: _solution_ , _lava_ , sea and glacier.

_1_ 2. The features in a cave are made by _dripping water_. They are called speleothems.

_1_ 3. Stalactites are cave features that _hang down_.

Stalagmites are cave features that ____grow____ ____up____.

__9____ 4. The deepest cave in the USA is ____Neff____ ____Canyon____ in
Utah. It is ___1,189____ feet deep.

__1____ 5. The biggest cave in the USA is the __Big____ ___Room____ at
___Carlsbad____ ___Caverns___ in New Mexico. It is
1,180 feet long, 1,100 feet wide and _____250_____ feet high.

__1____ 6. Caves have been used as places to live, for storing food, as tunnels, for ___fertilizer___, and for nitrates for ____gunpowder___.

Write out the Bible verse you have discovered on the back of this paper.

Action Sheet for Session 2 of the Caving Patch (handout for boys)

Fill in Bible verse reference below:

Fill in blanks below to complete each sentence:

_____ 1. There are 4 types of caves: _____ , _____ ,
sea and glacier.

_____ 2. The features in a cave are made by _____ _____.
They are called speleothems.

_____ 3. Stalactites are cave features that _____ _____.
Stalagmites are cave features that _____ _____.

_____ 4. The deepest cave in the USA is _____ _____ in
Utah. It is _____ feet deep.

_____ 5. The biggest cave in the USA is the _____ _____ at
_____ _____ in New Mexico. It is
1,180 feet long, 1,100 feet wide and _____ feet high.

_____ 6. Caves have been used as places to live, for storing food, as tunnels, for _____, and for nitrates for _____.

Write out the Bible verse you have discovered on the back of this paper.

Action Cards for Session 2 of the Caving Patch (handouts for leaders)
(Cut out each card and give to individual leaders. Have boys find the leaders to get the information they need to complete their action sheet.)

Card 1
Make sure the boy writes the missing information on his sheet before you give him the Bible verse reference information.

- There are 4 types of caves: solution, lava, sea and glacier.

Part 1 of reference for Bible verse: Psalm

Card 2
Make sure the boy writes the missing information on his sheet before you give him the Bible verse reference information.

- The features in a cave are made by dripping water. They are called speleothems.

Part 2 of reference for Bible verse: 1

Card 3
Make sure the boy writes the missing information on his sheet before you give him the Bible verse reference information.

- Stalactities are cave features that hang down. Stalagmites are cave features that grow up.

Part 3 of reference for Bible verse: 1

Card 4
Make sure the boy writes the missing information on his sheet before you give him the Bible verse reference information.

- The deepest cave in the USA is Neff Canyon in Utah. It is 1,189 feet deep.

Part 4 of reference for Bible verse: 9

Card 5
Make sure the boy writes the missing information on his sheet before you give him the Bible verse reference information.

- The biggest cave in the USA is the Big Room at Carlsbad Caverns in New Mexico. It is 1,800 feet long, 1,100 feet wide, and 250 feet high.

Part 5 of reference for Bible verse: 1

Card 6
Make sure the boy writes the missing information on his sheet before you give him the Bible verse reference information.

- Caves have been used as places to live, for storing food, as tunnels, for fertilizer, and for nitrates for gunpowder.

Part 6 of reference for Bible verse: 1

Squad Discussion
Handout for each squad

- Instructions for Squad Leader
  - Ensure each boy has completed the Individual Action handout, to include writing the theme verse on the back of their handout sheet.
  - Ask the boys what the theme verse means and why it is important.
  - Have the boys read out loud this Bible passage: 1 Samuel 24: 1-13
  - Ask the boys how the theme verse applies to this Bible passage.

Council Ring
Bible passage: 1 Samuel 24: 1-13

Read the Bible passage out loud (or have some boys do it).

- Talk about the background of how David and his men came to be in the cave.

They were hiding from King Saul and his army, as Saul was trying to find David so he could kill him. Because Saul had not been obedient to God, God had chosen David to replace Saul as king, and Saul did not want this to happen.

- Talk about how David had an opportunity to kill Saul.

Saul came into the cave alone; David and his men were hiding at the back of that cave. David had an opportunity to kill or capture Saul, and to put an end to living in fear for his life. Killing Saul would also make it possible for David to become king right away, instead of waiting for Saul to die. It must have been very tempting for David to kill Saul.

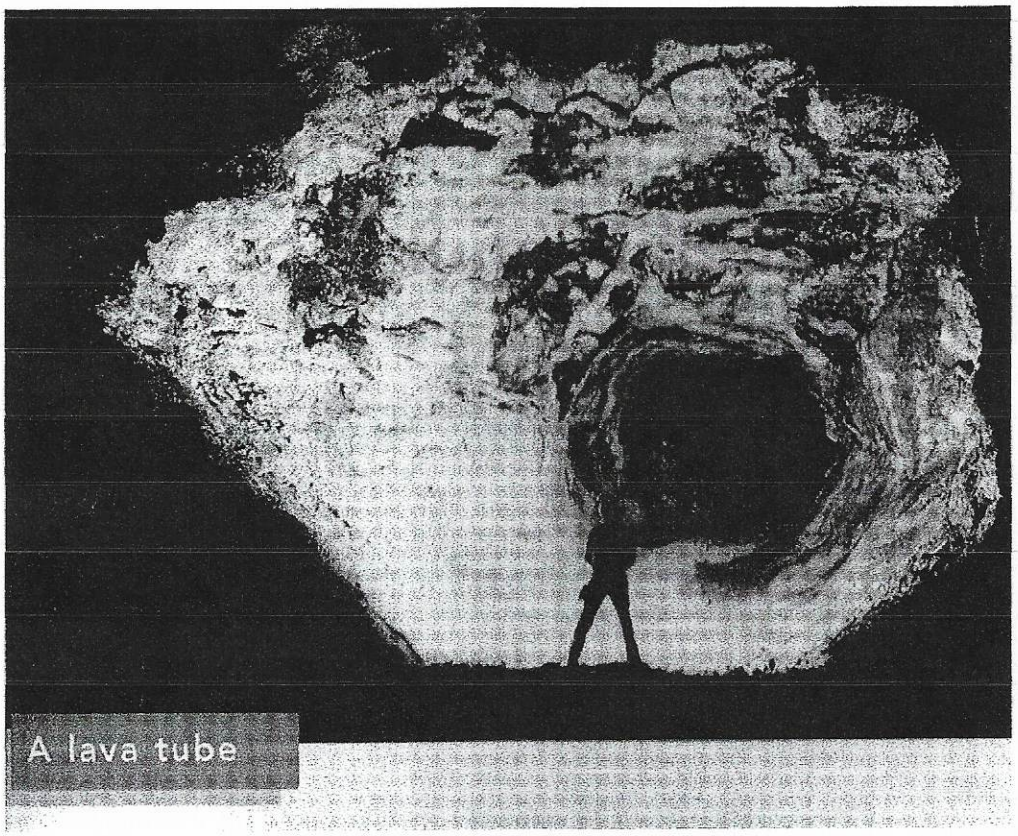
- Talk about what David did.

David did not kill or capture Saul and he did not let his men do so either. David did cut a piece off of Saul's cloak. When Saul left the cave David called after him and showed him the piece of his cloak. This let Saul know that David could have killed him or captured him, but had chosen to let him go. Saul realized that David was more righteous than Saul was.

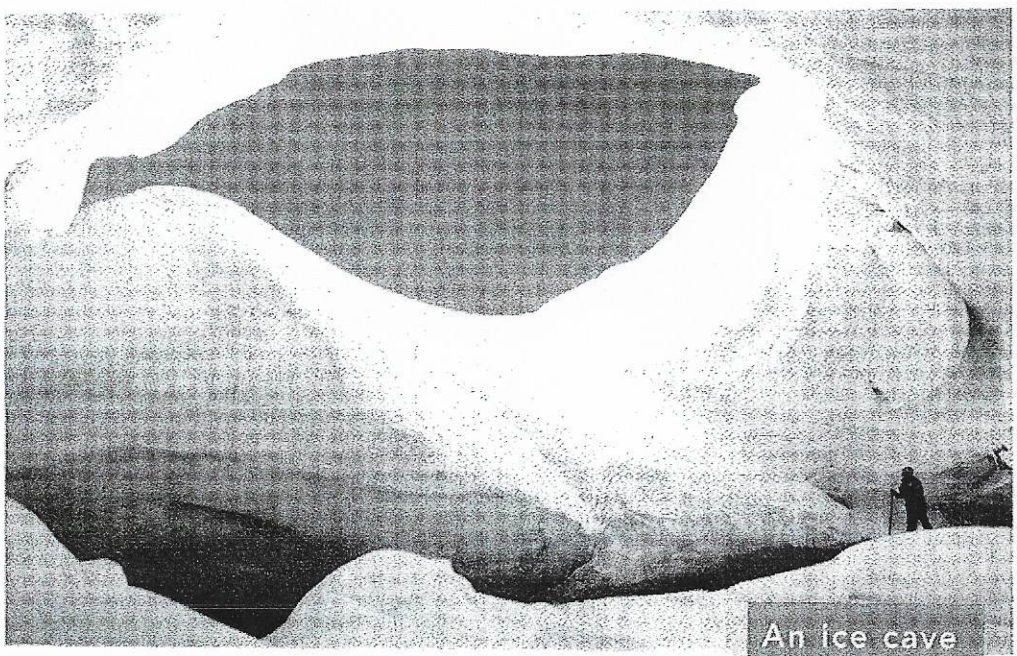
- Talk about why David did what he did.

David knew that God would not approve of him harming Saul, who was still the king that God had chosen. David also knew that it was wrong to commit murder. How did David know these things? He had learned God's word from the Scriptures that he had. David had hid God's word in his heart, and so he knew what was the right thing to do

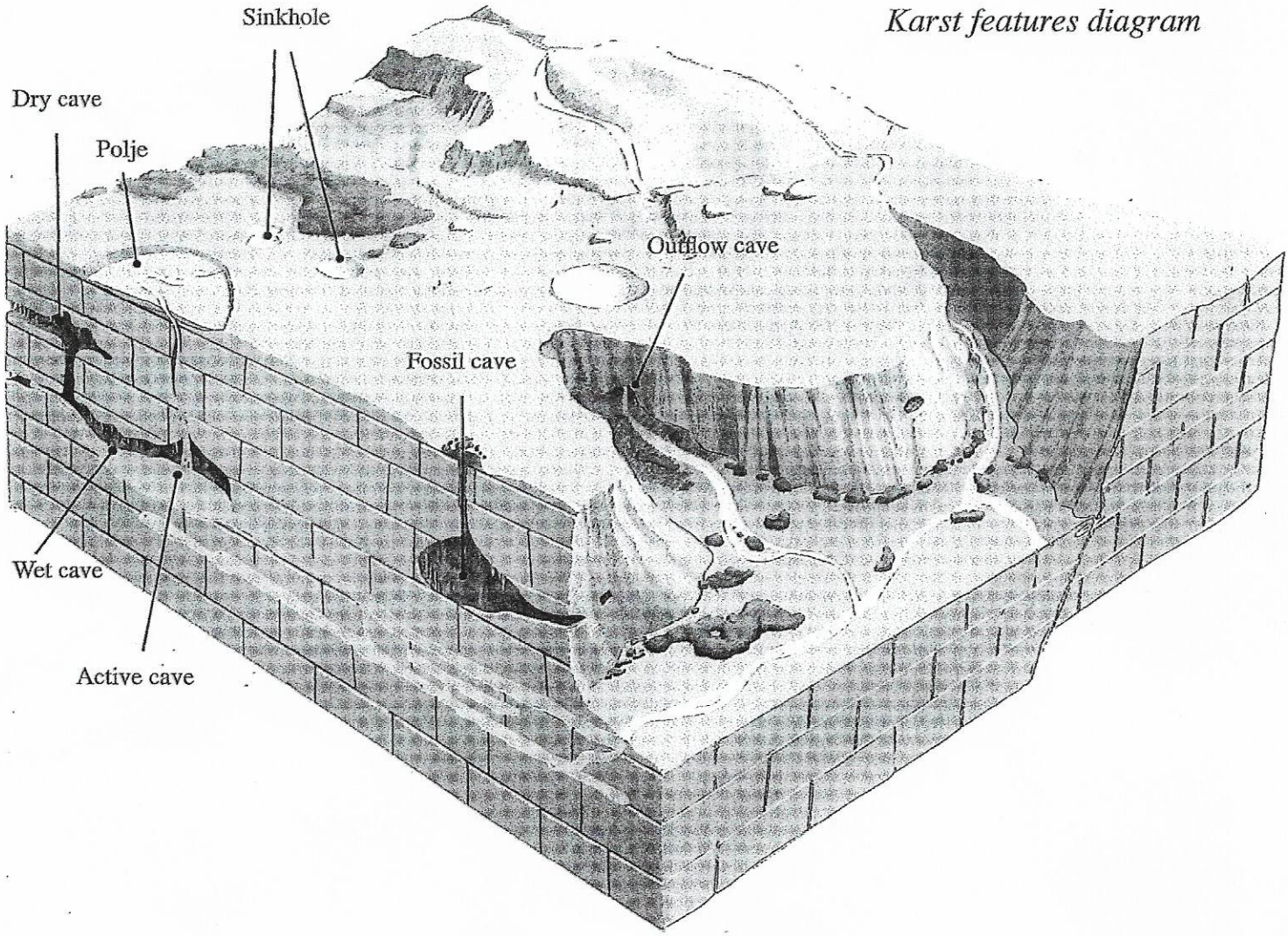
Types Of Caves



A lava tube



An ice cave



Karst features diagram

TECTONIC CAVES

A massive movement of bedrock separates rocks along joints or fractures. The cave created in this fashion is usually a small, high, narrow fissure consisting of a single passage. The ceiling is often a flat section of rock that did not move, or moved in a different direction. Massive, brittle rocks such as sandstone and granite are the best rocks for tectonic caves; however, they can also occur in basalt and limestone.

SOLUTION CAVES

This is the category of caves that is classified as caverns. They are formed by the dissolution of soluble rocks such as limestone (calcium carbonate), dolomite (calcium magnesium carbonate), gypsum (calcium sulfate dihydrate) and salt (halite). When researching caves, the dissolution of limestone is usually the example given. For the purpose of this lesson we will also use limestone as our host rock. However, the conditions are basically the same for other soluble rocks.

CORAL CAVES

When colonies of coral in shallow water expand and unite, they form lacy or bulbous walls around an open area. When the shoreline is pushed up or the sea level falls, the cave is exposed. Waves and wind erode the coral, enlarging the cave, sometimes even destroying it.

EOLIAN CAVES

Also known as wind caves. Wind erodes away the weak areas in sandstone cliffs.

GLACIER CAVES

Long tunnels form near the snouts of glaciers between glacial ice and the underlying bedrock. Water from the surface drains down through crevasses in the glacier. It enlarges the crevasses and melts away the ice at the base of the glacier.

ICE CAVES

There are two types of ice caves:

- The first is carved out of glaciers or snowfields by water and/or wind.
- The second is a rock cavity containing ice formations. As moisture in a cave is frozen it clings to the walls and continues to build up. When slight melting occurs or water enters the cave, it runs along the walls creating formations similar to calcite speleothems.

VOLCANIC CAVES

There are various forms of volcanic caves. They are all created from flowing lava and the effects of volcanic gases. Categories of volcanic caves include lava tubes, pressure-ridge caves, spatter cone chambers and blister caves.

SEA CAVES

Waves eroding away weak areas along sea cliffs create these caves which can be any size from crevices to large chambers.

TALUS CAVES

Boulders pile up leaving passages underneath and between them.

TUFA CAVES

As a stream of water saturated with calcium carbonate goes over a precipice it becomes aerated. The carbon dioxide is released, causing the calcium carbonate to leave the water as well and deposit on the edge of the cliff. Eventually the deposits form an umbrella-shaped canopy. In some instances they can completely bridge a river, forming a natural tunnel.

Background Information

Continuing with the limestone cavern example, the terminology used in this lesson will reflect this cavern type. However, the names of speleothems are defined by their shape regardless of the material they are created from.

As mentioned in Lesson 2, formations begin when calcium bicarbonate enters the cavern and the chemical balance of the solution alters, forcing the calcium carbonate to deposit on the surface of the cavern ceiling or wall it entered through. The path of the watery solution from there is what determines the shape of the eventual speleothem as it deposits calcite along the way.

Listed below are some of the most common forms of speleothems and a brief description of how each is created. There are several other speleothem formations found in caverns around the world. Some are very rare, found only in unusual conditions.

Soda Straw - Formed when the solution first enters the cave from the ceiling and the calcite crystallizes around the drop forming a ring before the drop falls. As drop after drop continues to enter the cave at the same point, the water will then travel through the rings deposited before them, building ring upon ring at the end of the last one. Over time, the result is a thin, hollow tube that resembles a straw.

Stalactite - When a soda straw is forming, the solution will also deposit calcite along the inside of the tube as it travels through it. Eventually, the straw will become solid. At that point, as the solution continues to want to enter the cave at the same point, it is forced to the side of the tube, then runs down the outside. Over time, the result looks like an icicle.

Stalagmite - As the watery solution falls from the ceiling, it lands on the floor or a ledge where it splashes or runs over an area, leaving the remaining calcite in its wake.

The continued deposits build into a mound.

Note: while a stalactite and a stalagmite are formed from the same drops of water, the nature of their growth means that a stalactite may possibly grow in length faster than a stalagmite will grow in height. However, the stalagmite will most likely be wider than the stalactite. There are two easy ways to help your students remember the difference between a stalactite and stalagmite:

1. Stalactite is spelled with a C for ceiling
   Stalagmite is spelled with a G for ground
2. A stalactite holds "tite" to the ceiling
   A stalagmite "mite" reach the ceiling someday

Column - Usually a stalagmite is directly below a stalactite. Over much time they may finally meet. As calcite continues to run down the length of the stalactite, it now continues to run down the connected stalagmite smoothing the connection point. Some columns have been together for so long it is hard to tell where the two formations first joined.

Flowstone - Similar to the formation of a stalagmite. However, the area receiving the deposit has a slope to it, so the water runs down the slope in a wide spread. A flowstone can cover a large area.

Drapery/ bacon strip - When a water drop emerges on a vertical wall, gravity drags it down the side of the wall depositing calcite in a line. Each additional deposit builds up this fine line until it looks like hanging material. Draperies with red hues, caused by iron and other minerals in the calcite solution, look like bacon strips.

Rimstone Dam - (also known as **Gours** in Europe) Depressions in the cave floor may collect saturated water. The calcium in the solution will deposit around the edge of the pool. Eventually the deposits build up so high that more and more water can be held. The calcite deposits act as a dam.

Cave Pearl - (also known as **Oolites**) If a pebble is in a rimstone pool, the saturated water will coat it. As water drops continue to fall in the pool, they cause ripples which gently roll the pebble, giving it a smooth coating.

Cavern Geology

Speleothem Match

Draw a line from the name of the formation to the picture.

Stalactite

Stalagmite

Column

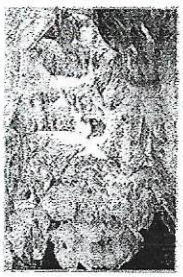
Soda Straws

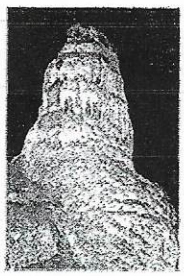
Drapery

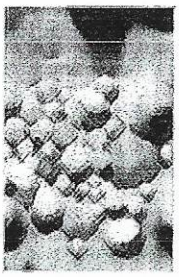
Flowstone

Rimstone Dam

Cave Pearls







Sierra Nevada Recreation Corporation

P.O. Box 78, Vallecito, CA 95251 • 209-736-2708 • caverns@caverntours.com • www.caverntours.com

Small Group: Meeting 3

Materials needed:
Bibles
Paper and pen/pencil

Devotions
Read the following passages:
1 Kings 17:1-6 Elijah fed by ravens.

Matthew 4:4 Jesus answered, "It is written: Man does not live on bread alone, but on every word that comes from the mouth of God."

Matthew 6:25 "Therefore I tell you, do not worry about your life, what you will eat or drink; or about your body, what you will wear. Is not life more important than food, and the body more important than clothes?"

Discuss the following questions:
What were the risks Elijah was taking?

How does the story about Elijah relate to that live in caves?

What is life?

What is our source of life? Physical? Spiritual?

What are we dependent on? (air, water, food , shelter, etc.)

What are some ways to feed your soul?

Prayer
Take prayer requests
Pray for the requests.

Business
Take attendance.

Action
Make a list of food sources in caves.
How do animals survive in caves?
What is the largest cave dweller?
Name as many cave dwellers as you can.

Game Suggestion: Meeting 3

Bat Relay Race.
Bring several baseball bats to the meeting.
Divide the young men into equal teams.
Place one bat in front of each team.
Place a second bat a distance away in front of each team.
At "go" have one member of each team hold the bat upright with the hitting end on the ground and place their head on the other end.
Players will spin around the bat while holding it in place.
Have the players spin around 5 times (or whatever amount will make them a little dizzy)
Then players release the bat and run (or stagger) to the next bat where they will repeat the process and return to their team.
The next players in line repeat the process until all players have completed the game.

Action: Meeting 3 CAVE LIFE

Resources needed:
Imagination
Ladders
Chairs
tables
desks
blankets, tarps, sleeping bags, etc.
large safety pins
2 inch clear tape
plastic cave animals, insects, etc.
3 or 4 helmets
3 or 4 flashlights
small pad of paper
pen or pencil
copies of the lesson
copies of the Missing Words activity sheet
copies of the Matching Game activity sheet about zonation

Arrive at the meeting a few hours early to set up a classroom cave.
Drape the blankets, tarps, etc. over the ladders, chairs, tables etc. to form a cave. Be creative and make a few different branches off the cave. Make sure the young men will be able to crawl through the cave. Place the plastic cave critters in various locations within the cave.

Lesson: Cave Life

Animal and plant species must adapt to live in different conditions. Some animals and plant life are unable to adapt to certain conditions and are, therefore, unable to sustain life in environments with those conditions. For instance, deserts with their harsh heat and dry conditions are not hospitable to penguins, yet the ice cold, humid conditions of the Polar Regions are ideal for penguins.

There are many ecosystems above ground. A cave system has its own ecosystem that is different from any above ground environment. Because it is sheltered, outside conditions have very little effect on a cave's environment. While above ground ecosystems are affected throughout the year by the seasons, most of the time a cave is not. Therefore, caves have a unique, constant environment.

In addition to the lack of environmental changes, there are other aspects that affect the living conditions in a cave system. Because caves are between the surface and the water table, they are in the direct path of water that filters from the surface down to the water table. Since the water cannot evaporate out of the cave, it tends to stay humid.

Probably the most prominent feature of a cave is the darkness. This plays a very important role in the way animals live in caves and how they adapt to the environment. A cave system, if large enough, with have three "zones" based on the level of light it receives. The first is called the "Entrance Zone." This is the area at the immediate cave opening. Next is the "Twilight Zone," the area that starts at the end of the entrance zone and goes until all traces of light are gone. The last zone is the "Dark Zone." This is the rest of the cave beyond the twilight zone, where no amount of light ever penetrates. Each cave will have a different distance for each zone, depending on how large the entrance is and the contours of the cavern. Some caves may not be big enough to have a dark zone.

Different animals live in different areas of the cave depending on how well they have adapted to the living conditions. Because the entrance zone is so close to the surface, it is affected by the outside elements. Since it gets direct sunlight and rain, both plants and animals can easily live here. This area of the cave is used mostly for shelter. The twilight zone, which may not get direct sunlight, is less hospitable. It is close enough to the surface that it is still affected by the outside elements, but provides more shelter and a cooler environment than the entrance zone. Some plant life may still grow here. The animals that live in this zone prefer the cooler, moister conditions. Animals that are found in these two zones are not necessarily cave inhabitants. They are more like visitors who can also live outside the cavern. However, some may choose to live their whole life in a cave.

The dark zone is the area of the cave that requires the greatest degree of special adaptation in order to live there. It gets absolutely no light, is not affected by outside elements and has a constant temperature and fairly constant humidity. The animals that live in this area of the cave have adapted in order to survive. Due to the lack of

sunlight, many of these animals have little or no pigment. Many of them also have no eyes or are blind. To make up for the lack of sight, cave animals have developed other ways to find there way around and to find food. Some have extra long antennae to feel with; others have acute senses of smell and/or hearing.

All cave animals and organisms fit into one of three categories of cave life. Placement in these categories depends on how much time the organism actually spends in the cave.

We call the first type trogloxenes. You can look at the word origin to figure out what kind of creatures fall into this category. Troglos is the Greek word for cave, and xenos is the Greek word for guest. So, you can think of trogloxenes as cave visitors. They come and go at will, but use the cave for specific parts of their life cycles - hibernation, nesting or giving birth. A trogloxene will never spend a complete life cycle in a cave. The most familiar trogloxenes are bats, bears, skunks and raccoons. Even moths are trgloxenes. Trogloxenes have no special adaptations to the cave environment.

Next, we have troglophiles. From the Greek - troglos for cave, and phileo for love. Love? Well, troglophiles are animals that can survive outside the cave, but may prefer to live inside it. They leave the cave only in search of food. Some examples of troglophiles include beetles, worms, frogs, salamanders, crickets and even some crustaceans like crayfish. A troglophile can live its entire life either inside or outside of the cave.

The creepiest - and most fascinating - types of cave life are troglobites. Again - troglos for cave and this time bios for life. Troglobites spend their entire life cycle within a cave. They're found only in caves and wouldn't be able to survive outside a cave. The troglobites are the animals that have adapted to cave life. They have poorly developed or absent eyes, little pigmentation and metabolisms that allow them to go a long time without food. They also have longer legs and antennae, allowing them to move and locate food more efficiently in the dark. Troglobites include cave fish, cave crayfish and shrimp, millipedes, as well as some salamanders and insects.

Due to the isolated nature of a cave system, food sources are limited. Animals who live in the entrance zone are not permanent inhabitants and leave the cavern to acquire food. Those living in the twilight zone may leave the cave as well, or they may rely on food sources within the cave. The animals living in the dark zone must rely completely on food sources already in the cave, or on those brought in.

Due to lack of light in the dark zone, no plant life can grow. However, bacteria, mold and fungus may grow from organic material. The web begins with small organic materials that may be washed in through underground streams, come from the surface through sinkholes, travel by air currents, or fall off troglophiles. Another source of organic material is from animal droppings and dead animals. Bat guano is an important contributing food source.

It is important to understand that even though light does not reach the dark zone, life would not be able to exist there without food sources that began with light. The organic material that makes its way into the dark zone originated on the surface where there is light. Without light plant life cannot grow. Plants break down to organic material that is brought into the cavern. Animal droppings are also produced from organic material, so again, without light there would be no animal droppings. Without any of these food sources that originate on the surface with light, life in the dark zone (or anywhere else on Earth) would not be possible.

In the dark zone, small insects and protozoa feed off the bacteria and fungi that grow from the organic material. Small, water-dwelling animals may eat organic material floating on the water surface. Larger animals then eat the smaller animals. Their droppings provide the nutrients for more bacteria & fungi to grow and the web is then complete.

Since the food supply is limited and does not have much variety, the animals that can sustain life in a cavern are also limited. The balance of nature in the cavern food chain is very fragile, as are the animals that live there. If one element in the web is affected, it causes a chain reaction that eventually affects every living thing in the cavern.

After the lesson take the following actions:

Send the young men through the classroom cave in small groups of 3 or 4. Give them flash lights, helmets, a pen and pad of paper. Have them locate and record as many cave critters as they can. Make sure you give them a set time to spend in the cave.

While one group is going through the cave, have another group complete the missing words activity sheet.

Have a third group complete the matching game about zonation.

Rotate the groups through all three exercises.

Council Ring: Meeting 3

"Let Your Light Shine"

Review the Small group meeting verses and questions.

Nothing grows or lives without light. People who don't know Christ are hidden from His light. They are in a dark cave of deception, ignorance, and rebellion.

The light from Jesus is like food for the soul. Different people need different food sources depending where they are in the cave. Some are deeper in sin so it is harder for the light to penetrate.

As followers of Christ we must be risk takers and figure out how to feed the lost. who are in the cave. We need to get the right information from the bible to share with them depending on where in the cave they live. We need to figure out what is the best approach to feed their souls and let our light shine.

Cavern Life

Missing Words

The _____ zone is at the beginning of the cavern.

The _____ zone receives partial light.

The _____ zone is the part of the cavern that never receives any light.

The dark zone is unaffected by the outside environment because it has a constant _____ .

Since the water in a cave is unable to evaporate out, the cavern environment stays _____ .

Due to the lack of light, animals that live in the dark zone tend not to have _____ or _____ .

The animals that live in caves prefer the _____ and _____ living conditions.

The animals that normally live outside but use a cave for shelter are called _____ .

The animals that prefer the cool, moist conditions of the twilight zone and can comfortably live in a similar environment outside are _____ .

Animals that live exclusively in a cave are known as _____ .

Cave animals can be classified by which zone they live in as wells as the three surface areas of the cavern. These areas are: _____ , _____ , _____ .

A blind cave fish would be found in the _____ zone and on the _____ .

Because of the lack of _____ in the dark zone, plants are not able to grow.

Organic material that makes its way into the cavern provides a source for _____ and _____ to grow from.

WORD LIST (some words may be used more than once)

entrace	eyes	trogloxenes	ceiling	fungus	twilight
cool	troglophiles	dark	pigment	temperature	floor
troglobites	walls	light	humid	moist	bacteria

Sierra Nevada Recreation Corporation

P.O. Box 78, Vallecito, CA 95251 • 209-736-2708 • caverns@caverntours.com • www.caverntours.com

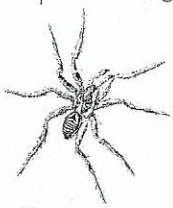
Cavern Life

Inhabitants

Match the animal to the number representing the area of the cave in which it lives

salamander _____

millipede _____



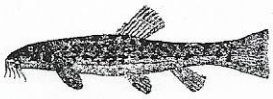
spider _____

snail _____

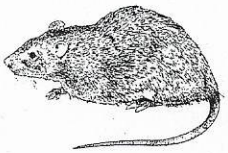
moth _____

bat _____

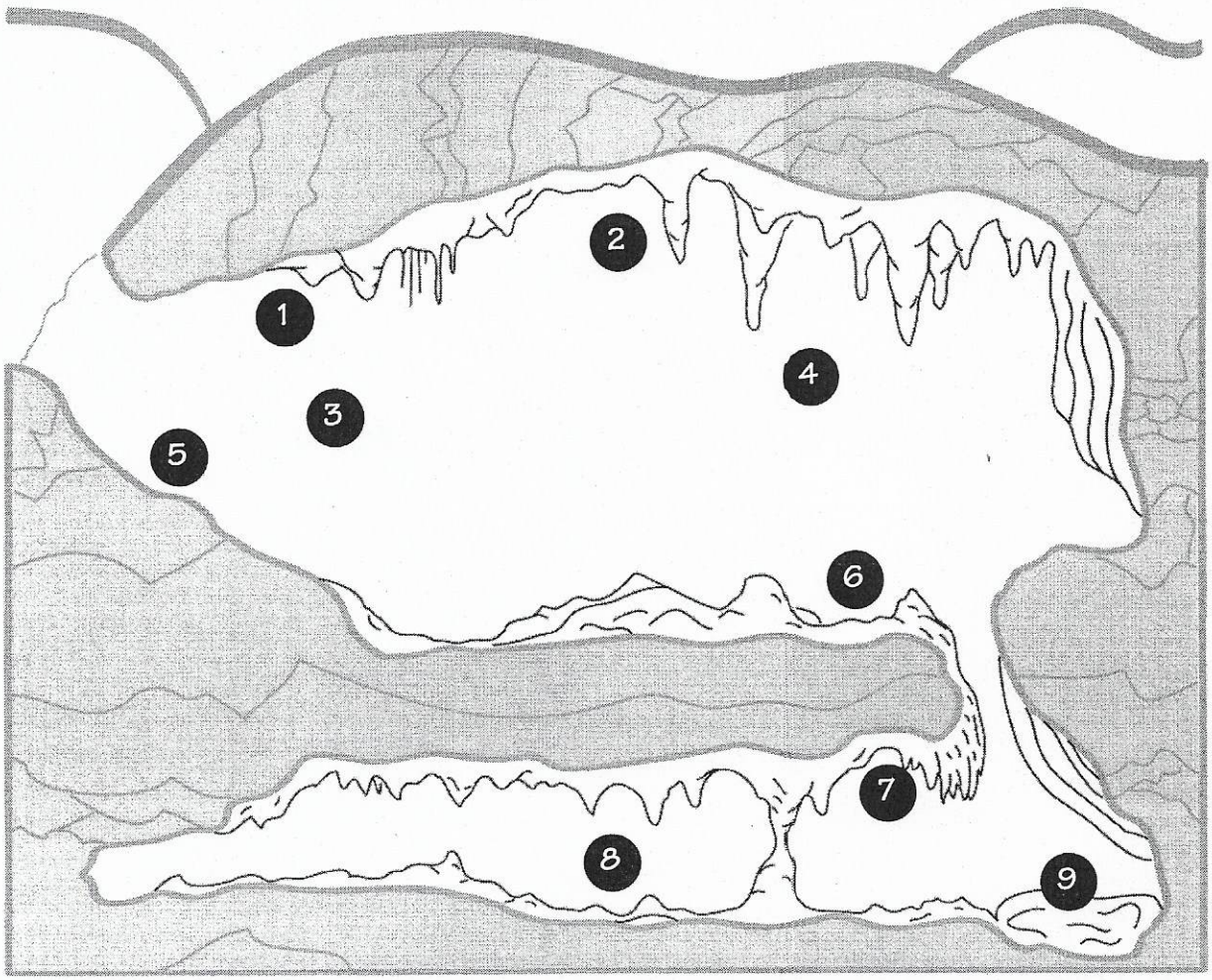
bird _____



cave fish _____



rat _____



Sierra Nevada Recreation Corporation

P.O. Box 78, Vallecito, CA 95251 • 209-736-2708 • caverns@caverntours.com • www.caverntours.com

Small Group: Meeting 4

Materials needed:
Bibles
Paper and pen/pencil

Devotions
Read: Genesis 1:27-28

What does 'subdue' in verse 28 mean in this context?
What does 'rule' in verse 28 mean in this context?

Do any animals make trash? No - only humans do. It is our duty as good stewards of the earth to keep our trash to a minimum and to properly dispose of any trash we create.
In order to keep our planet as pristine as possible we need to conserve our natural resources and use them wisely. We need to be certain our actions now do not adversely affect the future of our planet.

For the spiritual aspect of this lesson, think of your mind as a cave. Once an improper image, etc. enters your mind it will permanently remain there and damage it.. You want to keep your thoughts pure and your mind clean. Your body is the temple of God - keep this in mind always and don't let it get polluted.

1 Corinthians 10:13 No temptation has seized you except what is common to man. And God is faithful, He will not let you be tempted beyond what you can bear. But when you are tempted He will also provide a way out so that you can stand up under it.

Prayer
Take prayer requests
Pray for our planet to remain as pristine as possible. Pray that our minds will remain pristine and pure for the Lord.

Business
Take attendance.

Action
Name several types of trash, pollution, or other ways we have negatively impacted our planet and its lesser inhabitants.

Now discuss some possible solutions to the pollution problems on planet earth.

Action: Meeting 4 CAVE CONSERVATION

Resources needed:
Imagination
chairs
tables
desks
large cardboard boxes
different size empty plastic bottles
plastic drinking straws (preferably the type that can bend)
2 inch clear tape
1 helmet
small bag of rocks
some trash (flattened aluminum can, old glove, bottle cap, wadded up paper, etc.)
copies of the lesson

Arrive at the meeting a few hours early to set up a cave obstacle course.
Use the chairs, tables, boxes etc. to form a cave obstacle course. Make sure the young men will be able to crawl and walk through the cave. Place the plastic bottles and straws in various locations within the cave. Tape some of the smaller bottles to the underside of the tables to represent stalactites. Place other bottles on the floor along the course to represent stalagmites. Tape two bottles together at the bottle tops to represent columns. Make slits in the tops of the boxes and place the soda straws through the slits, bend the straws to stay in place. Scatter some small rocks in the areas where the young men will be able to stand up and walk through the course to add more authenticity. Place a few items of trash along the course too.

Lesson: Cave Conservation

A cave is a fragile environment. That doesn't mean that it could easily collapse, it means that due to its essentially unchanging environment, any artificial changes may be quite devastating.

The beauty and mystery of caves should be available for the enjoyment of everyone. However, carelessness and deliberate vandalism can ruin these precious natural environments for all of us.

Some of the ways people have knowingly damaged caves include:
DAMMING - Many cave entrances are on the side of a valley with a river which eroded away the side of the cave to create the entrance. When a dam is built and the water rises, it goes into the opening and floods the cave. All cave life is killed and formations are no longer able to grow.
VANDALISM - Selfish people thinking only of their own entertainment paint graffiti or carve on the cave walls and break formations to take away as souvenirs.

MINING - Some mining techniques such as quarrying break into caves and destroy them. Sometimes caves are specifically chosen to be mined for their beautiful formations that are broken out and sold.

There are many ways to damage a cave without even realizing it:
-Lint from your clothing can fall off. While this in itself is not devastating, show caves with thousands of visitors each year can leave behind quite a collection of difficult-to-clean lint.
-The beautiful formations in caves are a draw to people. They want to reach out and touch them, and unfortunately, many people do. People have natural body oils and contaminants on their skin. Every time we touch something we leave a light coating of oil and contaminants. Speleothems grow by continual deposits of calcite. However, when the calcium solution encounters an oily spot, it slides off (just like when you wash your car and water beads up and slides off.) Your oil has created a barrier that the calcite cannot cling to. In a sense, that area of the formation is now dead; it can no longer grow and the other contaminants will discolor the formation.
-Garbage is a more obvious contaminant, however, many people thoughtlessly drop their litter not realizing how it can negatively affect the cave's ecosystem and formation growth.
-Without paying attention to their surrounding, people in caves can make a careless movement that can destroy a formation in a split second which took tens of thousands of years to grow. One wave of the arm, standing up too soon in a low passage, or stepping on fragile formations without looking first - that's all it takes.
-Water pollution - You don't even have to be in a cave to affect it with water pollution. When people dump garbage and chemicals in places other than approved dump sites, they may be doing so near a cave without realizing it. Rainwater carries the contaminants and chemicals into the cave where they can seriously harm or kill the cave life. The polluted water then continues down to the water table and contaminates our drinking water.
-Improperly developed and maintained sewage systems can also drain into caves, contaminating them and the water supply.

People who love caves use the expression to "cave softly." This refers to being extra careful in and around caves in order to not damage them or their inhabitants in any way. There are some basic rules that you can follow to be a safe and considerate cave visitor:
-Do not touch any speleothem or formation with your bare hand.
-Move carefully. When exploring a wild cave choose a path through the least sensitive area. Don't go where damage will be likely to occur. Remember, you do not have to explore everywhere in the cave.
-Do not take any souvenirs - even already broken formations or artifacts. Leave the cave as you found it, for others to enjoy.
-Bring out everything you took in and any other litter you find.
-Be aware of cave life - before exploring a cave try to find out what types of animals live there. Your presence can have a devastating effect. Hibernating bats will use energy they need to survive until spring if they are disturbed, and may die.

-When you need to mark your trail use removable trail markers. Do not make any marks in the cave.

Cavers care about the preservation of these beautiful subterranean environments and embrace the motto:

"Take only picture, leave only footprints, kill nothing but time."

Many cavers are revising this saying to be even more cavern friendly:

"Take nothing but pictures, kill nothing but time, and leave nothing - not even footprints."

While this is hard to achieve, cavers have found ways to leave no trace of their visit, honoring and preserving the pristine beauty of these protected natural environments. At Sierra Nevada Recreation Corporation, we are very committed to our conservation efforts.
-When developing the caves for access to visitors, great care is taken in avoiding delicate formations when installing walkways, stairs and lighting.
-Visitors are not allowed to eat, drink, chew gum or tobacco, or smoke while inside the caves. The organic garbage they may leave behind can be very harmful to the cave's ecosystem.
-Even with these precautions, some litter still finds its way into a show cave. Our cave naturalists are trained to remove anything that does not belong in the cave, except artifacts.
-Since a cave is a dark place, the lighting installed to illuminate the beautiful cave formations changes the natural cave environment. With light, plant life such as algae is able to grow. Since this is not normal for the cave, regular maintenance includes the removal of any plant growth. In addition, lighting is held to a minimum and all of the lights are turned off whenever there is no one in the cave.

After the lesson take the following actions:

Tell the group that you have created a cave obstacle course and that they will each have an opportunity to go through the course. Using the conservation lessons that they just learned, they will be graded on their performance going through the cave obstacle course.

Send the young men one at a time through the cave obstacle course. Give them a helmet. Tell them it's OK to walk standing upright wherever possible. Have them try not to touch, step on, or bump into any of the stalactites, stalagmites, or soda straw formations in the cave. Explain to them that the plastic soda cans and straws are not trash in this cave as they are representing cave formations for this exercise.

Have them begin the course. They should pick up any trash in the cave, however don't remind them about picking up the trash as they should already know this if they were listening to the lesson. Count how many times they touch, step on, or bump into any of the formations. Deduct points for any trash they pick up. Lowest score is the winner.

While one young man is going through the cave obstacle course, have the rest of the group play a game in another location. Do not let the other participants watch, as they will gain an advantage on how best to navigate through the course and where the trash is located, etc,

Caving Patch

Session 4

1. Council Ring

Genesis 1: 27-28

So God created man in his own image, in the image of God he created him; male and female he created them. God blessed them and said to them, "Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish of the sea and the birds of the air, and over every living creature that moves on the ground."

Genesis 3: 17-18, 23

To Adam he said, "Because you listened to your wife and ate from the tree about which I commanded you, 'You must not eat of it,' "Cursed is the ground because of you; through painful toil you will eat of it all the days of your life. It will produce thorns and thistles for you, and you will eat the plants of the field."

Revelation 22: 1-3

Then the angel showed me the river of the water of life, as clear as crystal, flowing from the throne of God and of the Lamb down the middle of the great street of the city. On each side of the river stood the tree of life, bearing twelve crops of fruit, yielding its fruit every month. And the leaves of the tree are for the healing of the nations. No longer will there be any curse.

Isaiah 35: 3-10 (see also Isaiah 11: 6-9 and 65: 17-25)

During this session we talked about how we are to care for God's creation, and how we are to be careful about what we do when we are inside a cave. God wants us to care about His creation enough that we will want to take care of it.

God created Adam and Eve in the beginning, and put them in the garden of Eden to take care of it. And he told Adam and Eve to rule over the earth. Adam and Eve were perfect, and God's creation was perfect, and life was very good. Taking care of the garden was not hard work; it was probably something that Adam and Eve enjoyed doing very much.

But Adam and Eve sinned by doing something that God had told them not to do. Because of their sin God cursed the ground and also cursed man. And God drove Adam and Eve out of the Garden of Eden so that they would not be able to eat from the tree of life. Creation is no longer perfect, and we, as people, are no longer perfect. We have to work hard to survive. And many people don't take care of the God's creation as he told us to do.

But the Bible tells us that a day is coming when Jesus will be king over all the earth, and when God will remove the curse from the ground and from man. The trees of life will grow and people will be able to eat from these trees. We will still take care of the earth, but it will not be the hard work that it is today. What a day to look forward to! What a wonderful hope we have, those of us who belong to Jesus. And while we are waiting for that day to arrive, let us practice doing what God wants us to do, let us learn to obey Him in all things, including taking care of His creation.

Small Group: Meeting 5

Materials needed:
Bibles
Paper and pen/pencil

Devotions
Read Mtthew 27:57-60 and Matthew 19:23-26
The tomb described in these passages is basically a manmade cave that was carved out of solid rock.
Humans have used natural caves or manmade caves for many purposes. Our lesson today will discuss many of them.
Discuss the following:
Does God use rich people for his glory?
Would Pilate have released Jesus' body to a poor man?
Is it sinful to be rich?
Where should you store up your treasures?

Prayer
Take prayer requests
Pray for the requests

Business
Take attendance.

Action

List as many caves as you can think of. They can be real or fictional caves. Think of any caves mentioned in books, any on TV or at the movies, or any that you may have visited.

List as many different uses of caves as you can think of.

Action: Meeting 5 Humans and Caves

Resources needed:
pie tins
different rock samples in numbered containers
muriatic acid
heavy rubber gloves
gogles
pencils
Dissolution experiment / rock identification worksheet
rock identification chart

Lesson: Humans and Caves

Throughout history mankind has utilized caverns for numerous purposes. The dark, hidden, even-temperatured spaces have had their practical uses. In addition, the mysterious subterranean chambers have inspired numerous myths and legends. Walking slowly into the unknown and inhospitable, haunted by eerily echoing dripping water, visitors have always had strong emotional reactions to caverns. It is not hard to understand why primitive people believed caverns to be places where evil creatures lurked, or magical events transpired.

Listed below are ways that people have used caverns:

PRACTICAL & EVERYDAY USES

-Primitive people used caverns for shelter, refrigeration of their food, and as cemeteries.
-In the past, caverns with their forbidding, dark interiors and complicated, hard-to-navigate passageways were sometimes used as jail cells.
-Bat populated caverns have been mined for bat guano, which makes an excellent fertilizer.
-Geologists have learned much about the history of the earth by studying the exposed geological layers in caverns.
-During the Revolutionary War, caverns were mined for saltpeter, and ingredient in gunpowder.
-Mushrooms, which require darkness and humidity, have been grown commercially in caverns.

COVERT USES

-Caverns have made great hiding places for fugitives from the law, notorious among them, Black Bart who hid out at California Cavern, and Jesse James who made Meramec Caverns in Missouri his hiding place.
-With often concealed entrances and dark, enclosed interiors, caverns have made

excellent venues for secret meetings. At California Cavern, the "Know Nothing" political party held its clandestine meetings there in 1855.

CEREMONIAL USES

-Primitive people used caverns as places for sacrificial ceremonies, and to record their histories with colorful pictographs.
-Young people from ancient times to the present day have used the mystery of caverns to create tests of bravery and coming-of-age tests.
-Caverns have been used as beautiful and unusual venues for acoustically rich church services, marriage ceremonies and community dances.

PROTECTIVE USES

-During the Civil War, slaves escaping the southern states utilized what was called the "Underground Railroad" - the excellent protection afforded by hidden caverns.
-During the two World Wars, emergency plans for the protection of the population included using caverns as bomb shelters.

ENTERTAINMENT/ADVENTURE USES

-Spelunking trips are physically and emotionally demanding, making caverns a great destination for adventurous people.
-Families enjoy walking tours along trails in caverns, viewing the beautiful crystalline formations and learning about their geological formation.
-People who have a passion for caverns have purchased karst land and developed trails in caverns to make it possible for the general public to visit and enjoy them.

After the lesson have the squads identify the rock samples and do the dissolution experiment.

Squad # _____

Dissolution Experiment

Place the rock samples in the shallow pan. Using the drip bottle, place a few drops of muriatic acid on each rock sample.

This is known as the "bubble test." The limestone piece will bubble as the acid dissolves it.

Which rock sample is the limestone?

_____ Limestone

Rock Identification Worksheet

Use the Rock Identification Chart to help you identify the following 7 types of rock. Place the number of each rock next to it's name.

_____ Apatite

_____ Granite

_____ Limestone

_____ Quartz

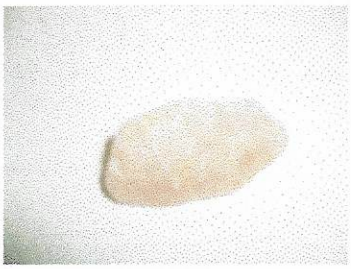
_____ Schist

_____ Serpentine

_____ Slate

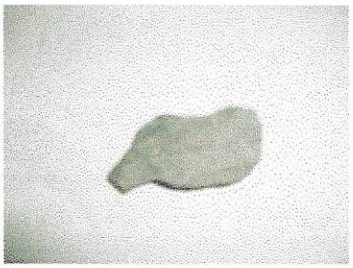
Rock Identification Chart

Apatite



Quartz

Serpentine



Slate

Granite

Limestone

Schist

Caving Patch

Session 5

1. Council Ring

Psalm 32:7

You are my hiding place, you will protect me from trouble and surround me with songs of deliverance.

Revelation 6: 15-17

Then the kings of the earth, the princes, the generals, the rich, the mighty, and every slave and every free man hid in the caves and among the rocks of the mountains. They called to the mountains and the rocks, "Fall on us and hide us from the face of him who sits on the throne and from the wrath of the Lamb! For the great day of their wrath has come, and who can stand?"

You may remember that in Session 2 we talked about David and we read about how he and his men were hiding in a cave because King Saul was trying to find David and kill him. David had hid God's word in his heart and so he knew what was right and what was wrong. David chose to follow God's word and to do what was right, and God protected David because of this.

When we choose to follow God and to do what He tells us in His word, the Bible tells us that God will also protect us. In the verse we read from Psalm 32 we are told that God is our hiding place and that He will protect us. This is true in our everyday lives, and is also true when really bad things happen.

In Revelation we read about the day when Christ will return to the earth. That will be a terrible day for those who are not following Christ and who are not doing God's will. These people will try to hide away in caves because they are so afraid. Notice how all people who do not belong to God, from the kings all the way down to the slaves, are trying to hide.

But those who belong to God will not need to hide or be afraid. Jesus told us, and we can read it in Matthew 24 verses 30 and 31, how he will send his angels to gather his elect, his followers, from all over the earth. In the day when all those who are not followers of Christ will be trying to hide in caves, we who are followers of Christ will be carried by his angels to meet Him in the air. You can bet that we will be singing songs of deliverance on that day!

If you are already a follower of Christ you can be glad that God is your hiding place and that He will always protect you. You should be watching and praying, as Jesus told us to do. If you are not a follower of Christ and would like to be, please talk with one of the men tonight. We would love to show you how you can follow Christ.

Let's pray.