



Bureau of Land Management

# Junior Explorer



# Big Cedar Ridge



Copyright Smithsonian Institution  
Photographed by A.C. Morey

**Activity Book**

## Public Lands Belong To You!

The Bureau of Land Management (BLM) is a federal government agency that takes care of more than 245 million acres of land. Most of these lands are in the western part of the United States. These are America's public lands, and they belong to all Americans. These public lands are almost equal in area to the states of Texas and California put together.

The BLM manages public lands for many uses. The lands supply natural resources, such as coal, oil, natural gas, and other minerals. They provide habitats for plants and animals. People enjoy the big open spaces on the lands. Public lands also contain evidence of our country's past, ranging from fossils to Indian artifacts to ghost towns.



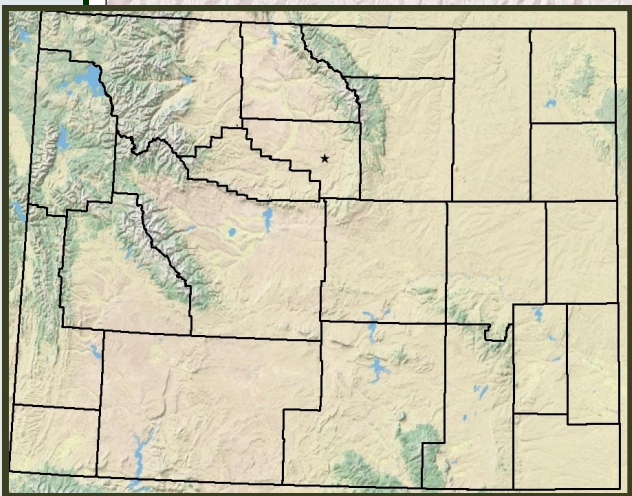
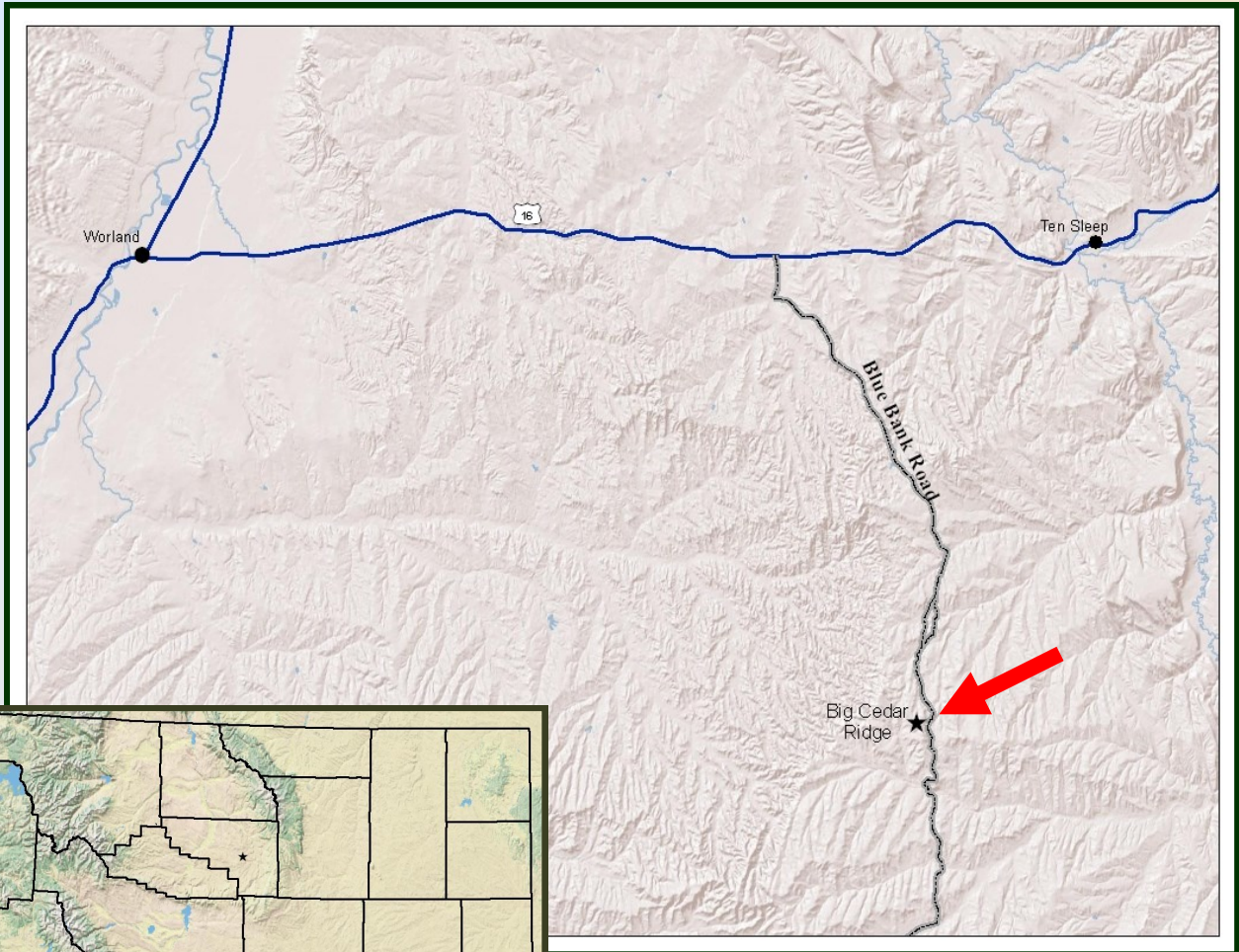
## Junior Explorers

BLM's Junior Explorer program helps introduce young explorers like you to the lands and resources that the BLM manages. This "Big Cedar Ridge Activity Book" focuses on a paleontology locality near Worland, Wyoming. You will learn about this fossil plant site during your visit.

You can work through the activities on your own or invite a sibling, parent or an adult you know to join you. When you complete the activities, check them against the Answer Key in the back of the booklet. Then say the Junior Explorer pledge on page 16, sign the certificate, and you're on your way to exploring and protecting America's public lands. Have fun!

# Where is Big Cedar Ridge?

Big Cedar Ridge is located in Washakie County in northwest Wyoming. To drive there, travel east out of Worland on US Highway 16 for 17.5 miles then turn south onto BLM Road 1411 (Blue Bank Road). Follow Blue Bank Road for 14.5 miles.



Ask at the BLM Worland Field Office in Worland for more information:

101 S. 23rd Street

Worland, WY 82401

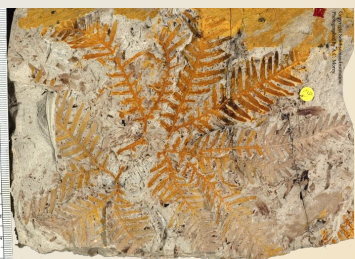
(307)347-5100

# Introduction to Site



Seventy million years ago, a mudflow of volcanic ash suddenly entombed the entire landscape around Big Cedar Ridge in central Wyoming. The plants were fossilized where they were growing. With excavation, scientists can find the buried plants and learn what Big Cedar Ridge looked like when dinosaurs walked here.

Today the fossils are preserved in the blue-gray layer.



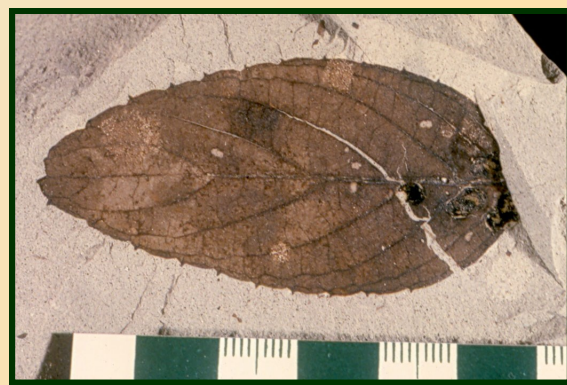
A glossary of terms used throughout this activity book can be found on page 14.



Artist's rendition of Big Cedar Ridge 70 million years ago. By Mary Parish, Smithsonian

In 1990, paleobotanist Dr. Scott Wing of the Smithsonian Institution was driving past Big Cedar Ridge. On that particular day the ridge and the 5 meter thick layer of volcanic ash turned to clay caught his eye. As he dug into the base of the blue-gray colored layer he started to expose the fossil plants.

Since that day scientists have identified over 100 new plant species and have been able to distinguish at least five different types of insects that fed on the plants at Big Cedar Ridge.



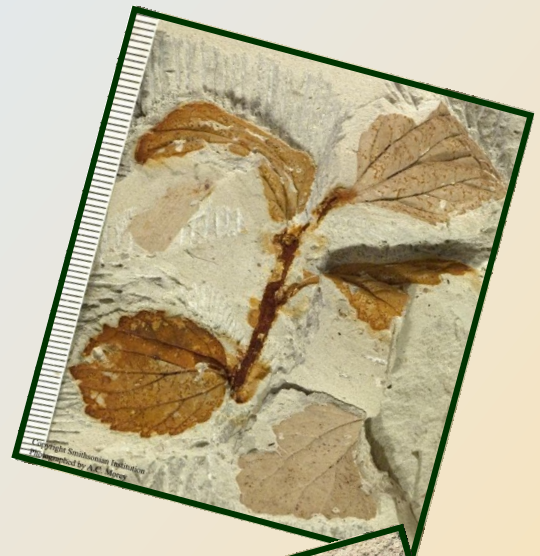
# What is a fossil?

**Fossils** are the preserved remains of plants or animals. Any plant or animal (vertebrates or invertebrates) can become fossils under the right conditions.

**Invertebrates** are animals without a backbone. This includes clams, ammonites, and corals.

**Vertebrates** are animals with a backbone. This includes dinosaurs, fish, turtles, and humans.

**Plant fossils** can take the form of leaves, cones, and seeds. The most common plant fossils at Big Cedar Ridge are leaves.



# Find your own fossil.

On BLM land reasonable amounts of common plant fossils and invertebrate fossils can be collected for personal use. Vertebrate fossils and archeological artifacts cannot be collected without permission from the local BLM office.

Look at the pictures below and circle the objects that can be collected during your visit to Big Cedar Ridge. Cross out the ones you will leave on the ground.



For more information on laws and policy about paleontological resources on BLM land, including the Paleontological Resources Preservation Act (PRPA) visit

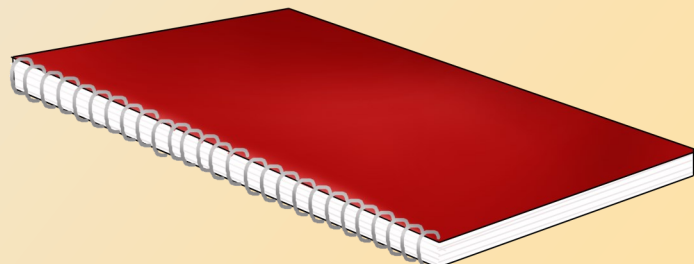
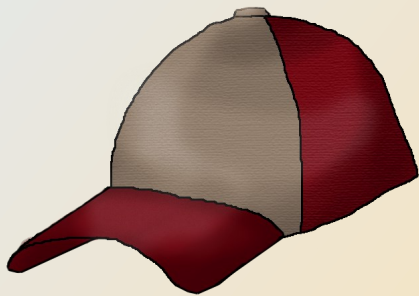
[www.blm.gov/wo/st/en/prog/more/CRM/paleontology/paleontological\\_regulations.html](http://www.blm.gov/wo/st/en/prog/more/CRM/paleontology/paleontological_regulations.html)

# What you will need

Look at the pictures below and unscramble the words to discover items you should bring for a day of exploration at Big Cedar Ridge.



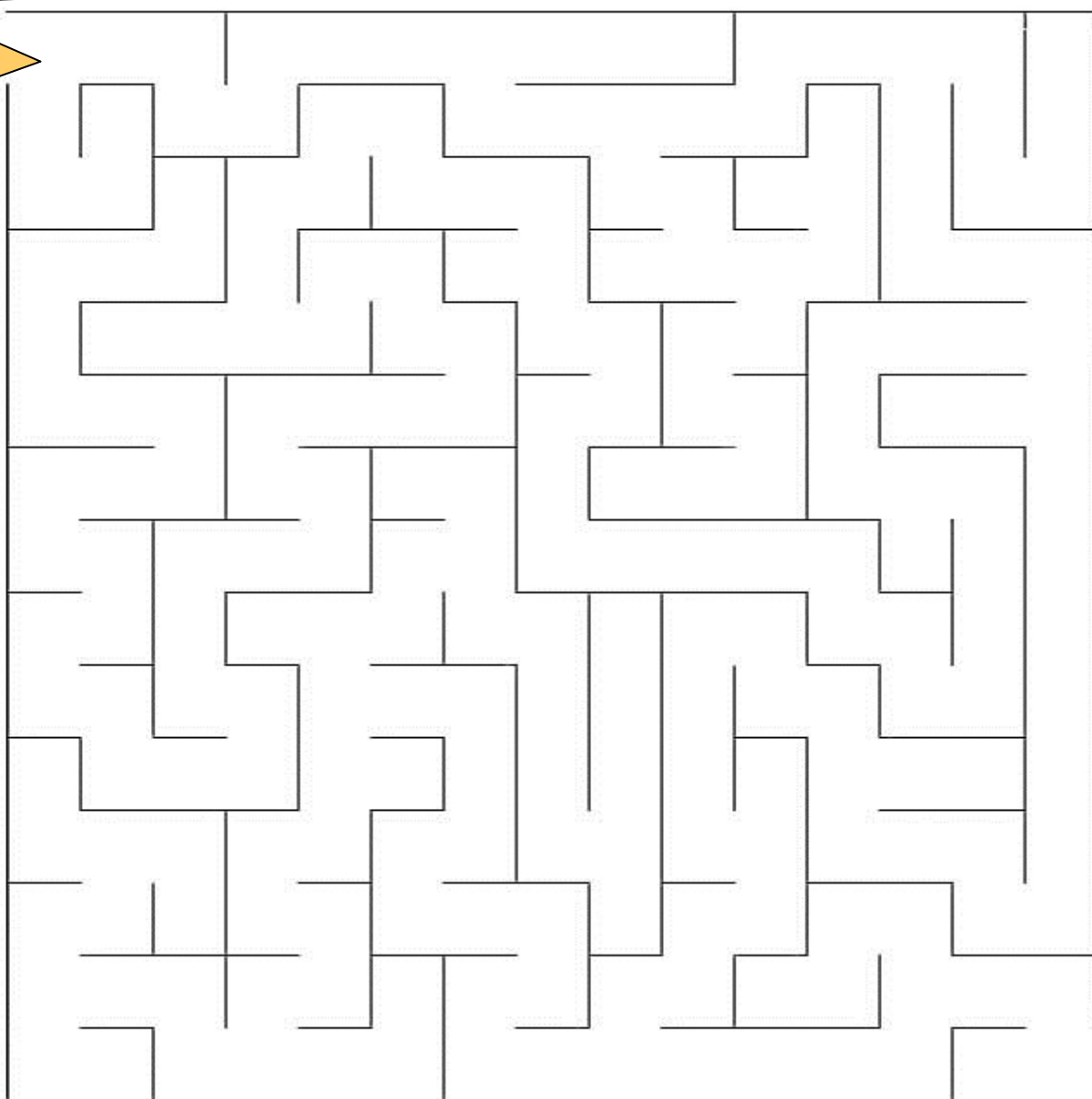
1. aht \_\_\_\_\_
2. hvelos \_\_\_\_\_
3. crko mhrema \_\_\_\_\_
4. tltieo eppra \_\_\_\_\_
5. waret \_\_\_\_\_
6. ignmksa pate \_\_\_\_\_
7. senernucs \_\_\_\_\_
8. slvgeo \_\_\_\_\_
9. nsu lesgssa \_\_\_\_\_
10. ooetnkob \_\_\_\_\_







Finding fossils is hard work!



# “HOW TO” PAGE

The plant fossils at Big Cedar Ridge are not laying on the surface. It takes hard work and patience to find a fossil and not everyone who visits BCR will find one.

## **Step 1:** Find a fossil area.

The fossils are located in the blue-gray ribbon of tuff running across the middle of the ridge.



## **Step 2:** Look for the fossils.

Open a small trench with your shovel and remove the over-burden (dirt covering the zone containing fossils). There may be 3 to 4 feet of over-burden in some areas.

## **Step 3:** Collect the fossils.

Cut horizontally and lift out blocks of the fossil-rich rock. Split the rock with your rock hammer along the line on its side. The rocks tend to split where there is a fossil.



## **Step 4:** Preserve the fossil.

Wrap the fossils you would like to keep in several layers of toilet paper. The toilet paper will keep the rock from breaking and allow it to dry slowly. After drying for two weeks the fossil is stable and you can display it on your bookshelf!

# What is it?

**Step 5:** Identify your fossil. Collecting and preserving your fossils is not the last step. The final step is identifying what you found. Though extinct, many of the fossil plants found at BCR are related to modern, living plants. Below are some of the common fossils from BCR. Can you match them to their modern relative?

A. Fern



B. Conifer



C. Palm



D. Flowering plant



# Environmental Reconstruction

From the fossil plants found by paleontologists, scientists have been able to reconstruct what Big Cedar Ridge may have looked like 70 million years ago. Three main types of vegetation communities have been described; Fern Wetland, Palmetto Thicket, and Streamside Thicket. These plants and plant communities tell us 70 mya Big Cedar Ridge was a mild, humid climate with an average temperature of 75° F. There was a mixture of flowering plants, ferns, palms, and coniferous.

Use your imagination to color this page!



# You can be a paleontologist too!

Finding fossils is fun, but the knowledge that can be gained from fossil discoveries can be even more thrilling. New species of plants and animals, and new information on known species continue to be discovered each year. These discoveries expand our knowledge on the fascinating past of the Earth on which we live, giving us glimpses of a world very unlike the planet today. To become a paleontologist, stay especially focused in your math and science classes. Remember to stay curious!

Test your skills by locating the terms in the word search below.

Q	C	O	R	A	L	H	C	X	I	K	U	U	X	Z
Y	H	A	N	Q	E	B	I	L	A	G	C	E	E	I
X	G	V	T	H	F	E	R	N	U	M	V	F	F	N
P	A	L	E	O	N	T	O	L	O	G	Y	U	H	V
N	F	B	F	D	Q	K	E	L	D	A	N	N	U	E
P	A	L	E	O	B	O	T	A	N	I	S	T	F	R
K	E	Z	A	S	I	N	S	E	C	T	S	E	T	
P	U	L	E	A	V	E	S	J	B	H	E	F	S	E
G	L	W	R	O	C	K	S	O	I	M	I	Y	N	B
N	F	O	S	S	I	L	P	P	L	N	L	L	B	R
X	Q	Y	Z	Y	M	U	S	L	O	O	F	H	P	A
R	G	X	Y	Y	C	E	R	C	A	D	U	E	A	T
V	O	L	C	A	N	O	S	C	K	N	G	O	L	E
Z	A	R	T	I	F	A	C	T	R	S	T	T	M	G
X	G	S	H	O	V	E	L	Y	W	G	U	S	J	P

FOSSIL
FERN
PALEOBOTANIST
CORAL
CONIFER
PLANTS
PALM
LEAVES
INVERTEBRATE
ARTIFACT
PALEONTOLOGY
VOLCANO
INSECTS
SHOVEL
ROCKS



# Glossary

**Archaeologist:** a social scientist who studies human cultures of the past, primarily through analysis of items left behind

**Artifact:** an object created by a human being

**Conifer:** a tree or bush that produces cones and usually has leaves that are green all year

**Coral:** deposits of the skeletons of small creatures that form a hard, marine material

**Fern:** a plant with large, delicate leaves and no flowers

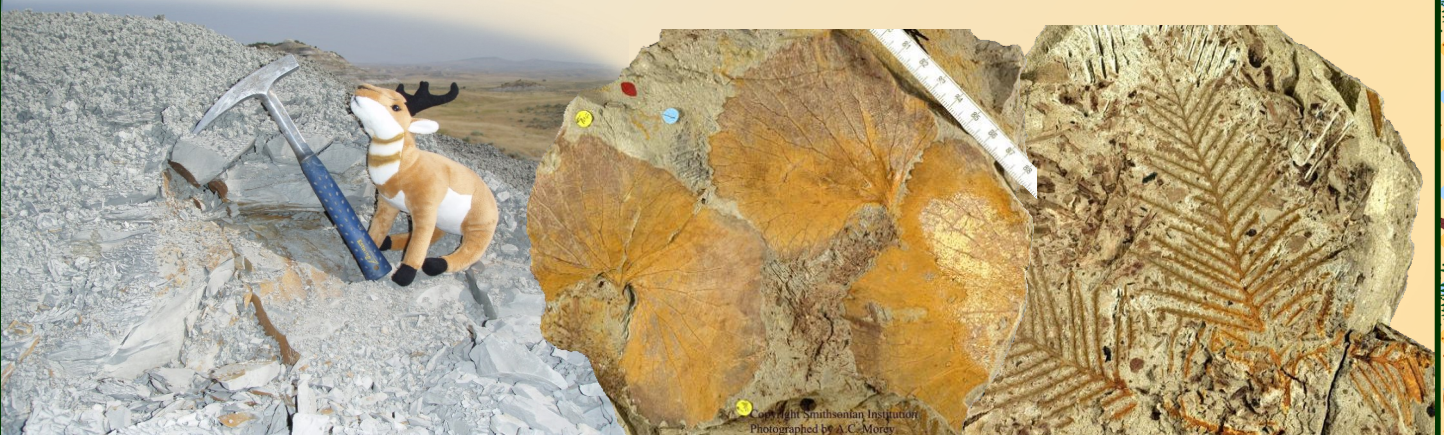
**Fossil:** a remnant, impression, or trace of an organism that lived in the past

**Invertebrate:** an organism lacking a spinal column

**Paleobotanist:** a botanist that specializes in fossil plants

**Paleontologist:** a scientist that studies life in the geologic past, partly through plant and animal fossils

**Vertebrate:** an organism with a spinal column





Cut out and save certificate



# Bureau of Land Management Junior Explorer



As a Bureau of Land Management Junior Explorer, I promise to:

- *do all I can to help preserve and protect the natural and cultural resources on our public lands,*
- *be aware of how my actions can affect other living things and the evidence of our past,*
- *keep learning about the importance of nature and our heritage, and*
- *share what I have learned with others!*

---

Date

---

Explorer Signature





# Answer Key

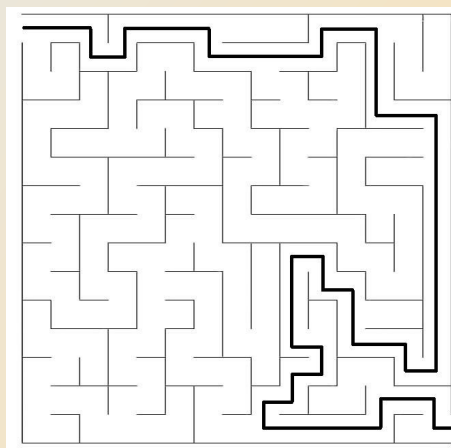
Page 7.







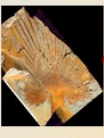



Page 8.

1. hat;
2. shovel;
3. rock hammer;
4. toilet paper;
5. water;
6. masking tape;
7. sunscreen;
8. gloves;
9. sun glasses;
10. notebook

Page 9.

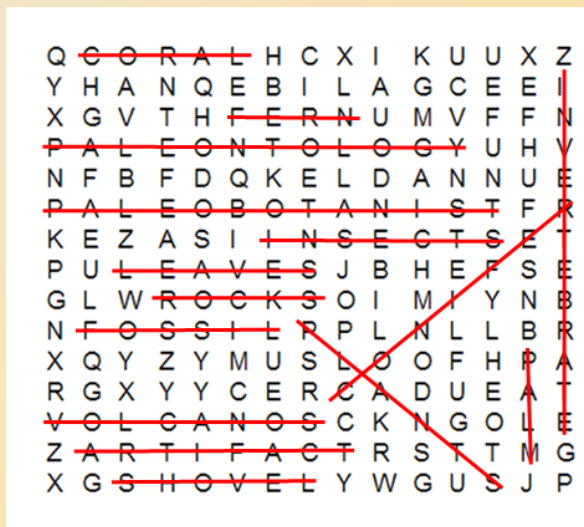


Page 11.

A. Fern		
B. Conifer		
C. Palm		
D. Flowering plant		

Red lines connect the fossil images to their corresponding living counterparts: A to C, B to D, C to B, and D to A.

Page 13.





For more information, please visit [www.blm.gov/ywld](http://www.blm.gov/ywld)

Join us again soon at **Big Cedar Ridge!**

