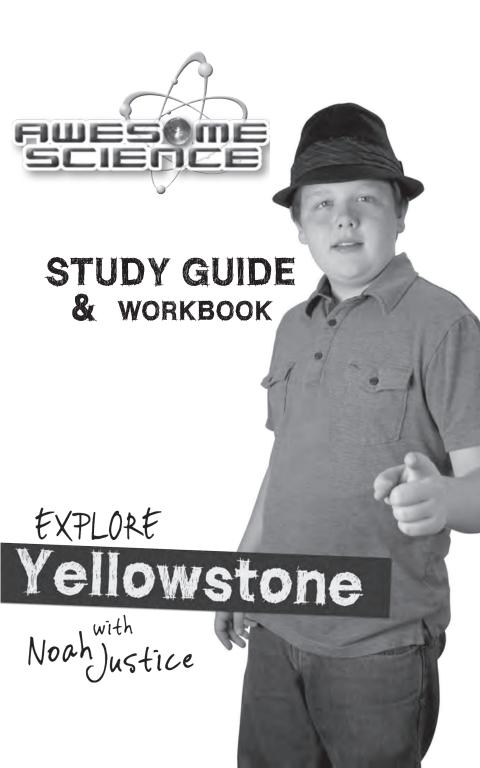


Study Guide



Creation Conversations.com
(if your parents are awesome, they are invited too)





March 2012

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Contents

Introduction	6
About Yellowstone National Park	8
Geologic Column	10
The Geysers	15
Yellow River and Hayden Valley	17
Yellowstone Falls	19
Mud Volcano	21
Yellowstone Lake	22
Old Faithful	24
The Mammoth Hot Springs	25
Petrified Forest	27
Awesome Facts about the Petrified Forest	29
Yellowstone: Conclusion	34

Introduction

One of the most remarkable places on earth is Yellowstone National Park. With beautiful mineral pools and hot geysers, this place is full of mystery. Early trappers thought that this was the entrance to hell itself, and came back with unbelievable stories of this amazing landscape. As more explorers came, a movement began to save this national treasure for the people, and in 1872 it became America's first national park.

Most of the signs in the park approach its history from an evolutionary perspective, meaning millions of years for its formation, and based on the religion of secular humanism. But a closer look at the evidence reveals consistencies with much shorter ages and large catastrophes. The biblical record best explains what we see at Yellowstone!

This study guide is divided by different concept areas related to the park and is designed to help enhance the learning experience after you have watched the DVD. Fill-in-the-blank questions help the learner become familiar with important words and concepts, true and false questions help in comprehension, and the discussion questions and bonus activities help extend the learning experience.

All this and more, from the Awesome Science DVD series!

Bonus Activity:

Research and read more about the discovery and early explorations of Yellowstone. See if you can discover which president was in office when Yellowstone was made a national park.

Complete Word List

acidic
ash
basalt
basement
buoyancy
caldera
canyon

cataclysmic
catastrophic
Cenozoic
cycle
earthquakes
elements
erosion
eruption

fossils fumarole geologic column

Flood

geologic ages

hardwood

geysers

hydrogen sulfide ice dam

layers log mats

lava

magma mammals

mega-volcanism

Mesozoic microbes

micro-organisms

mineral mud pots

Paleozoic petrified

plates

pools

Precambrian

reptiles magma mammals

mega-volcanism

Mesozoic microbes

mineral

micro-organisms

mud pots Paleozoic petrified plates pools

Precambrian reptiles

Key Concepts

glaciation evolutionary fossilization worldview deposition

petrification

humanism

sin-cursed

About Yellowstone National Park

Fill in the blanks with words from the following list:

geysers	super volcano	sedimentary
eruptions	caldera	geologic
mud pots	plates	sin-cursed
basement	Flood	lava chamber
tuff	volcanic rhyolite	
	0	onal Park, most people
	nber the a	
	ch more to see. It cover	
acres and thre	ee states cross its bound	daries.
was hundreds	_	gigantic
Flood the four the Flood and tremendous _	s us that at the beginning of the great deed in the great deed in the great deed in the earth was a changes, be great the state of the great deed in the gre	p burst forth. During
	re still active, shaping th We can see other su ey can be seen on almo	uper volcanoes around

Be	sides the	and
roc		wo other types of rocks in the park:
		, which is hardened lava, and
	, wł	ich is cemented volcanic ash.
Μι	uch of the rin	of the volcano's in
Yel	llowstone has	been breached, or covered with volcanic
pro	oducts.	
Re		is an active volcano, with a
		just several miles beneath
		s a reminder of the volcanic activity that
		the past and activity that we expect in the
tut	ure.	
Be		Creator's design, even in a world the forest is coming back
qui	ickly.	world the forest is coming back
Di	scussion Q	uestions:
1.	What is volca	unic tuff?
2.	What effect of plant life?	loes fire have on Yellowstone in terms of
3.	Were larger a return to the	nimals able to escape from the fire and park later?
Bo	nus Activi	ty:
	n a map, locat canoes.	e five other locations that have super

Geologic Column

Fill in the blanks with words from the following list; one word is used twice in this section:

layer	Flood	fossils	log mats
sedimentary	Cenozoic	catastrophic	creation
week		Paleozoic	fossilization
sediments	vegetation	Precambrian	microbes
erosion	biblical worlds	view	
In order for us	to better unde	erstand the geol	ogy of Yel-
lowstone, we n	eed to take a lo	ook at the Geol	ogic Column.
geologic colum years, starting	nn represents lowith the being laid	ecular scientists ong ages of time and down slowly as	e, billions of ending in the
without a glob	al catastrophe.		
Using the Bible	e as our history	guide book, th	e earth is only
about 6,000 ye	ears in age acco	ording to the ge	nealogies.
Since many of	the layers are		, the
Flood was the		historical o	event that was
the mechanism	n for quickly la	ying down each	layer.
The		each f the Flood.	were
Many week of creation. There were like	on, mostly on c	•	

^{10 •} Explore Yellowstone STUDY GUIDE

with the raising and lowering of the
mountains and valleys to cause some changes, but largely
they were the rocks made during the
Because of the years before the Flood, we do see some evidence of the process of and some sediment layers, but there are very few fossils because the Flood, the prime mechanism for, had not yet come.
Secular scientists say that these early layers do not have fossils because life was too "simple" at the beginning, and only had evolved.
Thelayers start with fossils of sea floor creatures, which would have been buried first with the onset of the Flood. In layers above are fish fossils because they were the next to die. How does this make sense when you read the time-line of events regarding the Great Flood?
Above the fish and sea creature fossils are found land plant fossils and coal. When the Flood moved inland, it wiped out most of the As trees were uprooted, they surely formed into some of the large floating, similar to what we have seen at Mount St. Helen's Spirit Lake after the eruption.
Large reptiles could no longer survive. Their bodies may have floated on top of the water for a while, but eventually their weight and mass carried them to the ocean floor, where they were quickly buried by other. The natural sorting power of

flowing water may have also contributed to distributing plants and animals in sedimentary layers through and other factors.
Most layers have a better explanation when viewed in light of a
Since there is not a full sequence of the column in any one location, this is consistent with the Flood account because water and currents will carry sand, silt, and mud to different places around the earth.
It's Flood action, not billions of years of activity.
Use the numbers between 1 and 7 to order the events into the sequence that created coal:
the tree bark came off causing large deposits of peat which eventually turned into coal the bark sank to the bottom of the sea floor loosened logs rubbed together floating on the Flood waters when buried by other sediments.
Discussion questions:
1. Read Psalm 104:8–9 and Genesis 2:10. How does thi

- 1. Read Psalm 104:8–9 and Genesis 2:10. How does this help our understanding of Yellowstone in terms of geology and geologic processes?
- 2. Why do secular scientists have to combine locations to get their full view of the geologic column?

- 3. How many years passed between the creation week and the Flood of Noah?
- 4. How does the Bible's account of creation and the great Flood explain the historical evidence of dinosaurs and their fossils?
- 5. How could the ability of land animals to move to higher ground during the first stages of the Flood impact their placement in the fossil record?
- 6. From which time period on the geologic column are the rock layers containing more coal and reptiles?
- 7. Fossilization of plants and animals happens quickly. It does not take long periods of time. What are some scenarios that could explain the lack of numerous mammal fossils and support the idea of them surviving longer during the initial stages of the Flood?
- 8. Why is the biblical explanation so much stronger for several reasons than secular explanations regarding the geologic record? (Clues: Where do "simple" life forms and fossilization relate to this?)
- 9. What are several reasons why we don't see fossils being formed today?
- 10. Which layer on the geologic column contains the last layers of fossils and represents the end stages of the Flood?

Bonus Activity:

Read Genesis 1:1–11; compare a secular geologic column to the creation week timeline.

The Geysers

On the northwest side of the southern loop is a prize collection of geysers. It's a great place to get out and tour the hot springs.

Please note if the following statements are true

` '
Yellowstone hosts one-thirds of all the known geysers in the world
The close proximity of these geysers is because of the large magma chamber a few miles below the surface.
The highest geyser in the world resides here; Steamboat Geyser. It can erupt up to 300 feet high, and eruptions are rarely unpredictable
A geyser's source is melted snow and rain which eventually moves through the porous sedimentary rock.
The water mixes with saline brine and heat from the shallow magma
The water rises well above the boiling point, but remains in a liquid state due to the pressure and weight of overlying water and rocks
The water can exceed 900 degrees

plumbing system develops. When the pressure is sufficient it forces the water up to the surface and a geyser results.
There are a variety of minerals and species of algae in the hot pools. Microbes grow at different acidities. A pool's color cannot be used to determine its acidity. Orange is more acidic and green is more alkaline
The organisms and enzymes can survive sulfur emissions similar to microbes living near thermal vents on the bottom of the ocean
Secular scientists suggest that if you look into the pools you imagine as it began billions of years ago
In reality, these heat-loving microbes are not simple or primitive, but extremely complex in their structure and biochemistry
Microbes, like all of creation, require an intelligent designer, the creator God of the universe. Evolved over billions of years? Not a chance!

Yellow River and Hayden Valley

Fill in the blanks with words from the following list; one word is used twice in this section:

Yellowstone Lake	glacial	Hayden Valley	
buffalo	shoreline	fumaroles	
Ice Age			
O			
Some of the hottest g stone are		atures here in Yellow-	-
The Yellowstone Rive	er runs throu	gh the park, with its	
source being		·	
TD1 '11		.1 .	
There were once mill			
roamed the plains and			
They were killed off r	nostly by hu	nting, but now a stron	ıg
herd exists in Yellows	tone year-rou	ınd.	
by 200 feet of water v	vhen Yellows	tone Lake extended	
through this valley aft	er the retrea	t of the glaciers at the	
end of the	.		
Very little grows here	because it w	as a lake bed where	
clay line	s the valley fl	oor. Trees across the	
river mark the former	·	of the lake.	

<u>Discussion Questions:</u>

- 1. In which part of Yellowstone Park are bison normally found?
- 2. What effect has Yellowstone River had on rhyolite and soft tuff?
- 3. What causes the stained pastel color by the hot springs and fumaroles?

Yellowstone Falls

Fill in the blanks with words from the following list:

ice dam	Missoula flood
tens of thousar	nds of years
Grand Canyon	of Yellowstone
	a in the park called the
	It was cut by the
	ver through basalt and ash and is one of the
most well-reco	gnized geologic features of the park.
	sts thought that the carving of this canyon, but evidence is
	merge that an upstream
may have failed	d, carving out this canyon in a very short
period of time,	maybe in even as little as a day.
	e canyon is soft, so it would have been quite st-moving water.
There is similar	r evidence like this in eastern Washington
with the	, at Mount St. Helens, as
	nd Canyon in Arizona.

Discussion Questions:

- 1. How does the steepness of the canyon walls help us realize there has been a recent cutting of the canyon?
- 2. How can we tell that Yellowstone was not formed by glaciation?
- 3. Explain the processes that form a U-shaped canyon.
- 4. Understanding that this canyon has not been affected by glaciation helps us conclude that it was formed quite recently, after the Ice Age, only a few thousand years ago.

Bonus Activity:

What geologic features do Yellowstone, the Grand Canyon, and Mount St. Helens all have in common?

Mud Volcano

Please note if the following statements are true (T) or false (F).

Throughout the park there are some really cool mud pots, and they are some of the least acidic features in the park.

In 1870, Mud Volcano was a miniature volcano. It spewed mud up to 450 feet in the air. Early explorers were awed by it.

Hydrogen sulfide gas from deep in the earth is used by some micro-organisms as an energy source.

They help convert the gas into hydrochloric acid, which breaks down rock into wet clay and mud.

Escaping gases can't explode through the mud.

Yellowstone Lake

At over 7,000 feet, Yellowstone Lake is the biggest and highest lake in North America. Some people are concerned because a bulge has been seen growing on the bottom of the lake. Some say it's going to erupt soon.

It's true that scientists have been closely monitoring Yellowstone Lake for volcanic activity and a growing bulge on the bottom of the lake. In studies of past eruptions around the world, a bulge in a volcano can be bad news. Look up recent volcanic eruptions from around the world; you may be surprised at how many of them occur!

Fill in the blanks below with words from the following list:

catastrophe	magma	dormant
mega-volcanism	Mount St. Helens	equalize
water	valley	
entire north side of then the entire no	eof the mountain grevorth side of the mountain grevorth side of the mountain and a nine hour en	v out in a large bulge, ntain slid into the
	ellowstone Caldera is s active, but very plac	
		big way, based on what

devastating to the entire
This type is a remnant of the
recorded in Genesis chapters 6-8, where the fountains of
the great deep opened up, which included and
We don't see it like that today because the earth
after the Flood began to and the large-
scale volcanic activity slowed down. But during that time, it
was catastrophic.
Could the Yellowstone super volcano erupt again? Let's read

Could the Yellowstone super volcano erupt again? Let's read 2 Peter 3:10 (NKJV) to find out: "But the day of the Lord will come as a thief in the night, in which the heavens will pass away with a great noise, and the elements will melt with fervent heat; both the earth and the works that are in it will be burned up." What do you think?

Old Faithful

- 1. What was the average time between the eruptions of the famous geyser known as Old Faithful?
- 2. What are the two years in which earthquakes occurred that altered how regular Old Faithful has become?

The Mammoth Hot Springs

On the northern loop in the northwestern corner, there is an amazing site where hundreds of feet of white terraces have been built up. During the time of the global Flood, about 4,350 years ago, large deposits of lime mud accumulated and were deposited in this area as limestone layers.

How do they continue to form?

Use the numbers between 1 and 9 to arrange in order the events of this terrace-building sequence:

 Water flows across the surface
 Elements are left to form terraces
Winter snows and summer rains bring a lot of water to the area
The water and lime seeps out of the ground through fractures in the calcium carbonate beds
 Water is heated
The water dissolves
 Water evaporates
 Water moves through the ground
Lime is picked up by the water

These terraces are always in a transitional state. Old ones stop forming while new ones begin. This is because the chemicals in the water frequently plug up the outgoing water, forcing it in a different direction where there is less resistance.

Some signs in the park suggest that Mammoth Hot Springs took 65,000 years to form, but at the current rate of deposition, averaging about eight inches a year, only a few thousand years would be required to make the terraces we see today. Now that is awesome!

Petrified Forest

One of the most fascinating parts about Yellowstone is the Petrified Forest, as much of it is in the Specimen Ridge area. There we find hundreds of upright petrified logs in 27 to 50 "layers of forests."

Please note if the following statements are true (T) or false (F).

Secular scientists say that there were many forests here, one laid on top of the other, which took around 30,000 years in an ongoing cycle to create, but when you look at the evidence, it doesn't really make sense
A forest would continue growing when it would be covered by volcanic ash
Minerals would soak into the tree, and petrify it
The ash weathered into rocks and compost, then a new forest grew, was destroyed by the ash, and the process continued
Eventually the layers were exposed by glaciation, revealing what we see today
Yet even by the end of the Flood, some of the trees were still floating on the top of the Flood waters, even as the waters retreated from the new emerging land masses

As the logs became water logged, the heavy end, the root ball, sank in the water to the submerged land surface below.

With the water currents still carrying the logs, they were completely lost
There was also a lot of continuing volcanic activity beneath the waters and on the emerging land surface, creating large explosions of ash that was added to the accumulating silt.
Because the logs were not sinking at the same time, they would come to rest on different layers of silt and ash.
Eventually, the upright logs would be fully buried and the chemicals in the water and ash would petrify the trees over a period of a very long time
When the Flood waters fully receded, up to 50 levels of logs were deposited
If the logs were trees that grew at these locations, one would expect to find a well-developed root system under the logs, but they are non-existent in all of the mature trees at all 50 levels

Bonus Activities:

Using the Bible as our history guidebook, with an earth age of only 6,000 years, the Petrified Forest of Yellowstone does not match up with the secular science of 30,000 years, but there is a different explanation. What is this biblical view? Find and note verses that support this explanation.

Awesome Facts about the Petrified Forest

Be sure to discuss these facts when you see the bolded questions at the end of some of the following bullet points.

Awesome Fact #1: No Root Systems

- Also, none of the logs have branches or bark, indicating a cataclysmic event. Is the lack of branches or bark really proof of a cataclysmic event and, if so, why?
- In addition, the root balls at the bottoms of the logs are small and broken off, evidence of the trees being forcefully pulled out of the ground from a different location, transported, and deposited in this area at Yellowstone. What event could have been taking place that explains this finding?
- When studying the rings of the logs near the top of the ridge and at the bottom, there is a lot of similarity in the ring sizes, indicating they all grew at the same time.
 If the trees grew in different forests at different time periods, would the rings appear similar?

Awesome Fact #2: Tree Ring Continuity

• If each forest was killed by a different eruption, then the trace element profiles in the ash the logs are buried in should also be different, even if from the same volcano.

Awesome Fact #3: Very Few Trace Element Profiles

- There are only four different trace element profiles, which help us realize that the trees were buried in less than a year. **Why is this fact so important?**
- The fossil pollen, leaves, and needles in the ground do not match with the species of fossil stumps. **Does this evidence support the idea that these trees actually grew in this area?**

Awesome Fact #4: Non-Matching Forest Floor Flora

- In a typical forest the decomposing material on the forest floor, such as pine needles and dead trees should match the trees around it. But at Specimen Ridge in Yellowstone, the petrified flora doesn't match the petrified trees, which makes for a very petrifying situation. It indicates they didn't grow there.
- In a typical forest you would expect to find evidence of animal life, such as burrows and nests, but this isn't what is found at Specimen Ridge.

Awesome Fact #5: No Large Animal Activity

- There is no evidence of animal tracks in this area, except the remains of termites and their holes in some of the logs.
- Some might say that the animals fled during the eruptions. This happens with large animals, but is not true of worms and insects. And bones, teeth, and droppings could not escape burial either. From this information, does the idea of successive forests growing and being destroyed during different

eruptions make sense?

• If the secular story is used to explain the formation of these petrified forests, then there should be successive layers of clay and organic debris. There is no clay found in these volcanic layers and the organic materials are only about an inch thick in places — does that help support this conclusion?

Awesome Fact #6: No Successive Layers

• In addition, sediments in these layers appear to have been graded and laminated, the result of water and fluid action. If these layers were only produced by volcanic activity, would such features be evident?

Awesome Fact #7: Graded and Laminate Layers

- This was the result of the receding Flood waters, not just volcanic action.
- In 1980, during the eruption of Mount St. Helens the entire north side of the mountain slid down into the valley. Part of the landslide went into Spirit Lake, causing a massive water wave 800 feet high. The water wave and steam blast reached the opposite hillside where a large mature forest stood. In a very short time, all of the trees were uprooted and pulled down into the lake. Thirty years later, some of the logs still float on top of the lake. How can this event help explain the Petrified Forest?
- Several months after the eruption, some of the logs began to float upright, then slowly sank to the bottom of the lake in an upright position. The ones with less

resin sank first. How could the presence of resin keep an object from sinking?

- Using sonar equipment, SCUBA gear, and general observation, it was estimated that around 20,000 logs were upright on the bottom of the lake at different levels in the sediments.
- If another eruption happens at Mount St. Helens and a large mud flow empties into the lake, then more logs will be buried at a more rapid rate.
- If the lake was drained at any point in the future and the layers exposed, the buried logs would probably look much like Specimen Ridge in Yellowstone. **Do you agree with this conclusion?**
- Mount St. Helens has also explained petrified forests around other parts of the world, such as in Argentina where Darwin proposed long geologic ages. This evidence shows how short catastrophic events could explain the same geologic features from a biblical perspective.

What is Petrification?

Please note if the following statements are true (T) or false (F).

Petrification is actual	ly a pretty	complex	process.	lt d	loesn't
take that much time.					

Secular scientists used to say it took many years to petrify wood, but we can do it quickly in labs today
What you need to petrify is the presence of water saturated with elements such as lime or silica
We know from the caves around Yellowstone that these minerals are in abundance
When a log is buried and saturated with water containing these minerals, there is a chemical exchange that takes place.
Researchers a few years ago did their own experiment by putting a piece of wood into a silica-rich hot spring at Yellowstone. One year later the wood contained substantial petrification
Even if we give an extended range, it could take as much as five hundred years to fully petrify a log. That's still in the biblical time scale
In fact, commercial hardwood is now being produced for flooring, which is man-made petrified wood
Many of the processes in nature which secular science thought took ages we can now do very quickly. Coal and oil have been produced in less than a year.
The global Flood would provide the right conditions to quickly bury and exchange the chemicals and heat necessary to produce petrified wood on such a grand scale as in Yellowstone

Yellowstone: Conclusion

Yellowstone National Park, where many natural wonders are remarkably preserved, also preserves a testament to the catastrophic Genesis Flood and its after-effects. Secular and biblical geologists both agree on the evidence found in Yellowstone, but disagree on how to interpret that evidence.

One observer rejects God and the Bible and hence, a global Flood, and accepts millions of years from the religion of humanism.

The other observer views God as the authority in all areas, and hence recognizes the effects of the Flood as a result of God's judgment on sin.

We are all given the opportunity to turn to our Creator, repent of our sins, and make Him our Lord. We invite you to begin this journey today.

If you have enjoyed this great DVD and study guide, please look for others in the series:



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Yellowstone

Noah Justice

Designed to make science fun, the *Awesome Science Series* is an educational and entertaining opportunity for everyone.

Use this study guide for *Episode 2: Explore Yellowstone* to display the knowledge the student has obtained by watching Noah explore America's first national park in Wyoming, Yellowstone. He has paid special attention to the petrified forests, showing evidence of how many of the park's features were created by catastrophe and not long ages.



