

Hall of Earth Sciences – First floor, through the lobby at the end of the hallway into the Geology hall.

Find the nice ammonoid near the entrance to the upcoming Hall of Earth Sciences.

- 1) What group do they belong to? What other critters are related?
- 2) When did the first ammonoids appear on the planet?
- 3) When did they go extinct?
- 4) Trilobites display. (Glass case to the right of the Large Ammonoid). Where were these Trilobites discovered? Hint (Rock Formation). How old are these fossils and what period did they exist?
- 5) Big Fish Display. Which time period was the “Age of the fish”?
 - a) Name five fish from the Devonian Period.
 - b) What period is the Pharyngolepis from?
 - c) This fish was an active predator with sharp jaws. (Paleozoic) What is his name?

More Fossils...

- 1) Name 3 fossils hanging on the wall.
- 2) Where did the Dimetrodon reside? What period?
- 3) When did the Paleozoic period end?
- 4) What percentage of Marine and land based organisms vanished at the end of the Paleozoic Extinction?

Dinosaur Fossil and Meteorite Exhibit

- 1) The KT Extinction also known as the Cretaceous-Tertiary Extinction or (K-Pg) wiped out most life on the Earth. According to this display what percentage of life was wiped out at the end of the Mesozoic Era? What do scientist believe to have caused this extinction 66 million years ago?
2. There are two dinosaurs on display here, what are their names?
3. At this display you will find a large meteorite that was found in California, who discovered the it? How much did it weigh originally? What year was it discovered?
4. Find the Huge Chasmosaurus head (Ceretopsid). How much would this DINO have weighed?

Ever Wonder How To Find Fossils?

Find this display and summarize the eight proper ways to find and extract fossils.

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)

Evolving Science Area and Plate Tectonics Exhibit (also located in the same hall as the fossils)

- 1) Look for the Geologic Mysteries Placard on the wall. What year did the theory of plate tectonics arise?
- 2) “Earth Shaking Theories” Look at the map of world plates. Which plate is that big yellow one in the center of the map?
- 3) List the 4 steps of the scientific method. Hint (Evolution of Science)
- 4) Find the huge Globe in the center of the plate tectonics exhibit. How long is the Mid Atlantic Ridge?
- 5) What is the largest tectonic plate on Earth?
- 6) Hawaii was formed from this kind of event?

FIND THE “*Lines of evidence Makes Plate Tectonics A Reality*” PLACARD.

- 7) Who’s the German Scientist that first hypothesized about Continental Drift?
- 8) What is Pangea and when did it exist?
- 9) What layer of earth’s interior lies between the Earth’s crust and the outer core?
- 10) How thick is the Earth’s rigid, rocky crust?

SEA FLOOR SPREADING

- 1) What happens to old ocean floor crust when sea floor spreading occurs?
- 2) List (3) phenomena's that are a result from Convection and Sea Floor Spreading?
- 3) List (3) types of Plate Boundaries along with (1) characteristic for each?
- 4) What type of Plate Boundary do we live on in Southern California?
- 5) What fault line do we live on?
- 6) "Slipping and Sliding". Name the 2 Plates that separate the San Andreas Fault Line.
- 7) What mountain belt was formed when the Indian and the Eurasian Plates collide?
- 8) list 2 examples of volcanic island chains that formed from ocean to ocean plate convergence?

More Geology!!.....

Look for the big granite rock formation just left of the plate tectonic exhibit. Read the "Back Yard Granite" placard on the granite rock formation.

- 1) Which river cuts through San Bernardino County?
- 2) Read the inland southern California placard, during the Pleistocene and name 4 Fauna and 4 flora fossils that can be found in or near this river bed. How are these fossils preserved?
- 3) (Look Up ^) What type of rock coalesced to form the Southern California Batholith?
- 4) Now, look at the fossils behind you. "The usual suspects". Where did these fossils get unearthed?

More Geology, continued

- 5) “Geologist Read the Rocks”. What are (2) types of dating techniques used to piece together the history of Earth?
- 6) Explain what the concept of relative dating is?
- 7) What method of dating determines the absolute date?
- 8) Look into the porthole displays on the sedimentary rock layers. List (5) ways to determine the age of sedimentary layers.

Upstairs, Even More Geology ...

Plate Tectonics, The Engine That Moves Continents.

- 1) Which fault connects the Pacific plate and North American plate? Approximately how long is it? Which other fault is mentioned here? How many miles does it span? Is this other fault a young, or old fault line? At approximately 2 million years old. San Jacinto.

Even More Geology Continued...

- 2) The San Andreas Fault runs through the nearby San Bernardino Mountains, and is the main reason for the uplift that created the mountains here which started 2-3 million years ago. Each Earthquake causing more and more uplift, while erosion contributes to wear the mountain down and give it its shape. What type of zone contributes to the stress here, and the name of the “kink” mentioned to run through this zone? How many miles does this kink span? What other mountains besides the San Bernardino Mountains are affected by this plate collision that shaped these transverse ranges?

- 3) What tool do we use to measure earthquakes, in terms of energy released?

Upstairs, continued...

4) Approximately how many earthquakes do we have each year? And out of how many of those earthquakes are considered notable?

5) Which country had the largest earthquake? What was the magnitude of their quake?

6) Name nine the cities, states or countries mentioned as having notable earthquakes above a 6.0 Magnitude quake.

7) Fossils can be transported and found in areas thousands of miles away from where they inhabited, which animal mentioned here suggest this to be true? Where is this animal said to have inhabited, compared to where it's fossils were found?

8) As you continue down this walkway there are several rocks displayed on the wall. What 3 types of rocks are on display here, what types of texture do they have, and which minerals can be found in each?

Ice Age Precipitation – *Glaciers Rivers and Lakes*

Display Board Area

1) What evidence in the San Bernardino Mountains can be found that confirms glaciers were once present in this area?

2) When and where minerals deposited during the deglaciation period?

3) What are some of the animals which can be found on this display? Name 4 of them and how long ago each one you list became extinct.

Other side of Display and Continue Down Bridge Way, Geologic Timescale and Division of Rock Time...

- 1) What can fossils tell us about our past?

- 2) What type of organism did every single creature on Earth evolve from? How long ago did these organisms exist?

- 3) What are the names of the four different time eras? Which time period did each one span?

- 4) What the heck is a Geologic Formation? Which seven formations are listed here, and how long ago did each one form?

- 5) Behind you is a giant fossil display, what was this giant animal? Name three facts about it that you found to be interesting, next draw a quick sketch of this creature's fossils.

"Limestone Caves and Karst Topography" Interactive Cave Display

Over time rainwater flowing over thick limestone beds will start to dissolve this rock. In The Mojave Desert caves are etched into the limestone during this process making limestone caves.

- 1) Briefly explain this process, and name what chemical compound the rainwater and carbon dioxide form when absorbed by the rainwater. Lastly to complete this process, would the water table need to be high or low?

Limestone and Karst, continued

2) When water penetrates and drips slowly down the limestone in these limestone caves it carves out and forms specific shapes such as Stalactites, which grow in a downward position, hanging from the ceiling. What other fantastic formations can be made from the rainwater? There are five others mentioned here.

3) What type of animal once roamed these caves and why is their dung considered to be from waste to treasure? What have we learned from it? Hint, it's the large fossil display before you entered this cave!

4) Bonus Question, Not Found at This Display. What other State in The United States (besides California) has a high amount of Limestone, underground Caves, and a lot of Karst Topography going on?

Crossing The Bridge of Geological History, Over The Woolly Mammoth and Wolves.

"Following Fossils Table"

San Bernardino County spans approximately 20,105 square miles, it is the largest County in size in The United States. The entire County includes 24 cities, and borders L.A, Kern, Riverside, Orange, and Inyo County. To explore the entire County would take a considerable amount of time. Look at the table with all the counties listed above and read the information provided. What type of fossils can be found in these counties? And what type of fault lines dominate these counties, or are there multiple types of fault lines found here?

Hall of Biodiversity

John C. Belcher North American Mammal Collection and Random Bug Questions. All located in the Hall of Biodiversity across from The Bird Display.

- 1) Name three mammals found in The Punchbowl Formation.
- 2) Name three mammals found in The Barstow Formation.
- 3) Who is bigger the Alaskan Brown bear or the Polar Bear?
- 4) Who is hanging out with the Bear in this exhibit?
- 5) There are no Grizzly bears in Southern California. Where and when was the last one killed?
- 6) Which mammal here ran the risk of extinction in the 1800s? What almost led to its extinction?
- 7) How big can Mountain Lions get?
- 8) Look at that Big Bison. How big do they get? Is this one close to the largest one found?
- 9) Compare the Desert Bighorn with the Rocky Mountain Big Horn. Who is bigger?
- 10) What year was the Grey Wolf added to the Endangered Species list? What state were they killed off from?
- 11) What is the only native Marsupial to the US?
- 12) Who is Tayassu Tajaco? What is it also known as?
- 13) What do Ravens have to do with The Desert Tortoise?
- 14) Just how big do Moose get?

Hall of Biodiversity-continued

15) Name five of the reptiles that can be found on display in this area. My favorite one is the Desert Horned Lizard, or *Phrynosoma Platyrhinos*. Which one is your favorite, and why?

16) Approximately how many Reptiles and Amphibians are on the endangered species list in California?

Insects and Plants, small display near The Brown Bear and Grey Wolf Display.

1) Here you will find the arthropod and plant section name two plants and two insects that are displayed here. Look at them under the microscopes that are set up in this section. Name a noticeable characteristic, use the microscope to see the delicate details of each.

Random Bird Questions and The California Condor

1) Name the largest bird in Northern America. What is it's wing span? Is this bird extinct, or only endangered?

2) What is Oology?

3) Find the exhibit of the Birds of The High Desert. Name six birdies found there.

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4) Find the exhibit of the Birds of The Cliffs and Rocky area. Name six birdies found there.

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5) Find the exhibit of The Birds Of The Coastal Sage and The Chaparral. Name six birdies found there.

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