5th Annual
“Flora, Fauna and Fossils in Southern Nevada” Art Contest
References and Resources

For more information on the contest, please visit:
https://ccsd.net/departments/community-government-relations/2019-fossil-day-art-contest

Southern Nevada Climate and Other Facts

Present Day
- Nevada is the driest state in the United States with mostly arid and semi-arid climate regions
  - Most parts of Nevada receive scarce precipitation during the year
  - Southern Nevada averages only about 4.5” of rainfall a year
- Winter in southern Nevada tends to be of short duration and mild while the summers are HOT
- Average temperatures in Las Vegas
  - July is on average the hottest month with an average high of 104°F and a low of 81°F
  - December is on average the coldest month with an average high of 57°F and a low of 39°F
- Nevada’s highest recorded temperature was 125°F in Laughlin on June 29, 1994
- Nevada has more hot springs than any other state in the country, with more than 300 occurring naturally
- Nevada has more mountain ranges than any other state in the United States (more than 300 ranges)
- Out of all the states, Nevada has the largest percentage of its land owned by the federal government (more than 80 percent)

Last Ice Age
- The area featured abundant wild grasses and desert spring waters which sustained the varied animal and plant life (and eventually westward travelers which led to the naming of the area, Las Vegas, Spanish for “the meadows”)
- Wetter and cooler than today; as much as an average of 5-10 °F cooler year round
- Mix of desert scrub shrub, pinyon-juniper woodland, and wetland environments
The Precambrian Supereon (4.54 billion years ago to 541 million years ago): Exposures of Pre Cambrian rocks are scarce in the state of Nevada with the majority located in southern Nevada. The Late Pre Cambrian rocks represent a time when shallow seas covered parts of Nevada and contain the oldest fossils in the state. Colonies of cyanobacteria, some of the first photosynthesizing organisms, formed layered columns of sediment (like stacks of thin pancakes) called stromatolites. Recently fossils of tiny tube-shaped multicellular organisms have also been discovered.
The Paleozoic Era (541 million years ago to 252 million years ago): Remnants of shallow seas and ocean basins were left behind by the Paleozoic era. Life exploded at the beginning of this eon, fossils of reef building animals like corals and sponges, along with other marine animals like trilobites, crinoids, fish, and a variety of mollusks represent most of the life during this time. By the end of the Paleozoic most of Earth’s landmasses had drifted together forming the supercontinent Pangea, Nevada was on one of the coasts, and parts of the state started to dry up as the supercontinent evolved. The global tectonic activity involved in creating a supercontinent started a chain of events that led to the largest mass extinction Earth has ever endured, approximately 95% of life in the oceans and 70% of life on land was wiped out.
Geologic and Paleontological History of Nevada

The Mesozoic Era (252 million years ago to 66 million years ago): The Mesozoic Era is also known as the time of the dinosaurs. This new era, following the largest mass extinction on Earth, allowed for all sorts of animals to flourish, dinosaurs are always thought of first when animals from this time are discussed but one group of animals was growing in number and diversity and would eventually outlive the dinosaurs, they are the mammals. Nevada during the Mesozoic changed drastically several times and the supercontinent Pangea also had begun to break apart. In the Triassic period oceans receded leaving larger areas of Nevada dry only to be followed by the oceans advancing inland again over parts of the state leaving behind fossils of different land and marine animals including large amphibians in southern Nevada, marine reptiles called Ichthyosaurs (Nevada’s state fossil) in west central Nevada and even the remains of large trees found as petrified wood. During the Jurassic oceans persisted in western sections of the state as a massive dune field expanded in size covering most of what is now Utah and parts of Nevada, Arizona, Colorado, Wyoming, New Mexico and Idaho. In Nevada this is called the Aztec sandstone and it is known to have tracks of dinosaurs, insects, and small mammals in places like Red Rock Canyon National Conservation Area, Valley of Fire State Park, and Gold Butte National Monument. During the Cretaceous oceans again receded as a mountain arc to the west was being built creating the Sierra Nevada range. Layers of ash have been found in rocks of this age along with fossils of turtles, fish, crocodiles, flowering plants, ferns, cattails, and dinosaurs.

Triassic Nevada: Shonisaurus popularis (left) a species of Ichthyosaur from Nevada and is also the state fossil; giant amphibians called Metoposaurs (vertebra lower left and image from Las Vegas Natural History Museum display bottom center); a large chunk of petrified wood found in Southern Nevada.
Geologic and Paleontological History of Nevada

The Mesozoic Era (252 million years ago to 66 million years ago)

By Emily Willoughby, https://commons.wikimedia.org/w/index.php?curid=34538149

Jurassic and Cretaceous Nevada:
(clockwise from top left) Fossils from Dromaeosaurs like Deinonychus antirrhopus, Hadrosaurs and Iguanadons like Eolambia, leaf imprints, small Tyrannosaurs like Stokesosaurus clevelandi, giant Sauropods like Brachiosaurus, and track ways like this small mammal print called Brasilichnium are all found in Nevada.

(Palmer & Ambrose, 2009)

https://www.deviantart.com/pedrosalas/art/Stokesosaurus-clevelandi-607524354

https://www.nhm.ac.uk/discover/dino-directory/eolambia.html
Geologic and Paleontological History of Nevada

The Cenozoic Era (66 million years ago to present): Mammals ruled during the Cenozoic with the ancestors of modern animals taking on strange and unique forms and sizes as they evolved into the animals we recognize today. Tectonic and volcanic activity had begun to increase in the region as it went through periods of compression and extension of the Earth’s crust which led to the creation numerous mountain ranges that run North-South and the basins between them now called the Basin and Range Province. During the Early Cenozoic (Tertiary) strange looking ancient ancestors of rhinos, elephants, horses, and other hooved animals made up much of the large mammal population and was up against some of the largest carnivores of the time like the giant bear dog. These animals evolved or went extinct and at the beginning of the Late Cenozoic (Quaternary) the Pleistocene epoch had begun (2.6 million years ago to about 11,000 years ago). The Pleistocene is also known as the Ice Age and in Nevada this meant a cooler and wetter climate although it wasn’t cold enough to have been covered in snow and glaciers. The large mammals at this time were herbivores like the Columbian mammoth, western camel, bison, horses, and giant ground sloths and the carnivores that preyed on them were the iconic saber-toothed cat, dire wolf, and the American lion. These are the same animals that have been found all over Tule Springs in the north end of the Las Vegas Valley.

Tertiary Nevada: (Clockwise from top left) Teloceras an ancestor of the rhino, Hemiauchenia a llama like camelid, Calichootheres like Moropus, the unique looking Brachycrus, Arctodus a short-faced bear, Gomphotherium which is related to other elephants, and a cat like predator Pseudaelurus all have fossils that can be found in Nevada.

https://upload.wikimedia.org/wikipedia/commons/6/68/Teleoceras_Horsfall.jpg
https://dinopedia.fandom.com/wiki/Hemiauchenia
https://commons.wikimedia.org/wiki/File:Moropus_elatus_life_restoration.jpg
https://en.wikipedia.org/wiki/Pseudaelurus
https://howlingpixel.com/index-en/Gomphotherium
https://alchetron.com/Pseudaelurus
https://commons.wikimedia.org/wiki/File:Moropus_elatus_life_restoration.jpg
https://en.wikipedia.org/wiki/Pseudaelurus
Geologic and Paleontological History of Nevada

The Cenozoic Era (66 million years ago to present): Quaternary Nevada

Pleistocene (2.6 million years ago to 11,700 years ago): Megafauna of the Ice Age ruled. Giants like the Columbian mammoth (left), and Camelops (left center) along with several types of horse, bison (lower left) and ground sloth (right) roamed Las Vegas. The saber-toothed cat (upper right), dire wolf (bottom center), and American lion (center) were among the predators here.

Holocene (11,700 years ago to Present): Tule Springs provides important habitat for burrowing owls (below), kit foxes (right), the threatened desert tortoise (bottom right) and several other wildlife species that are recognized for protection under the Clark County Multiple Species Habitat Conservation Plan.
Plant Life

Present Day
- Nevada state flower is the sagebrush
- Nevada state grass is Indian ricegrass – a popular food among bison, jackrabbits, and people on gluten-free diets (known as Montina flour)
- Mostly pinyon pine and juniper with some sagebrush
- Joshua tree present in some areas
- Variety of cacti
- Creosote bush
- Protected plants found in Tule Springs Fossil Beds National Monument
  - Las Vegas bearpoppy
  - Merriam’s bearpoppy
  - Las Vegas buckwheat
  - Halfring milkvetch

Past
- All the plants present in Tule Springs during the Ice Age are still alive today. Most of these plants are no longer found in Tule Springs, but if you want to see them you must visit cooler places at higher elevations or areas with more abundant water.

Did you know?! The Tule Springs Fossil Beds were designated as a National Monument in December 2014. The area contains the single largest assemblage of ice age fossils in the Southwest, spanning geologic history from 7,000-200,000 years before present; a continuous record found nowhere else.
ADDITIONAL RESOURCES

National Fossil Day
https://www.nps.gov/subjects/fossilday/index.htm

Protectors of Tule Springs
https://protectorsoftulesprings.org/

Tule Springs Fossil Beds National Monument
http://www.nps.gov/tusk/index.htm

Ice Age Fossils State Park
http://parks.nv.gov/parks/ice-age-fossils

UNLV Research on Ice Age Wolves
https://www.unlv.edu/news/release/unlv-researchers-find-first-evidence-ice-age-wolves-nevada

Las Vegas Sun Article Giants in Our Backyard

USA Today Article on Dinosaur Museums in Nevada
https://traveltips.usatoday.com/dinosaur-museums-nevada-4886.html

The Dinosaurs and Prehistoric Animals of Nevada

Past Climate and Vegetation Changes in the Southwestern United States
https://geochange.er.usgs.gov/sw/impacts/biology/pastclim/

Tule Springs Fossils Return to Nevada

Books for aspiring paleontologists: