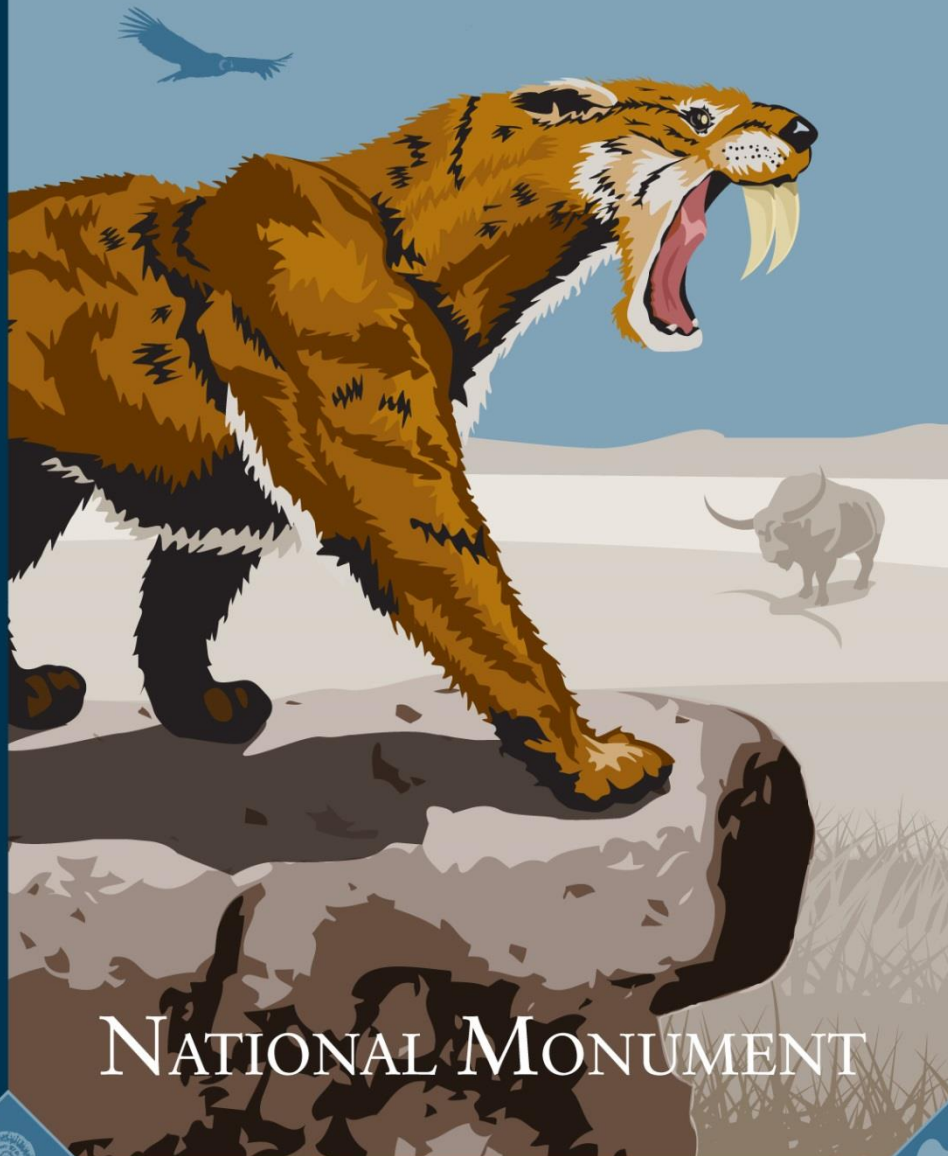




# Teacher Resources

## TULE SPRINGS FOSSIL BEDS



NATIONAL MONUMENT

6th – 8th Grade

# Tule Springs Fossil Beds National Monument Teacher Resources

## Grades 6-8

Tule Springs Fossil Beds is one of our newest National Park Service units, located in the Las Vegas Valley. We are providing these educational resources for K-12 educators together with our partners: the Protectors of Tule Springs. Over the last ~570,000 years, water has transformed the Upper Las Vegas Valley. Tule Springs Fossil Beds National Monument is an urban park that preserves the unique story of this ever-changing ecosystem

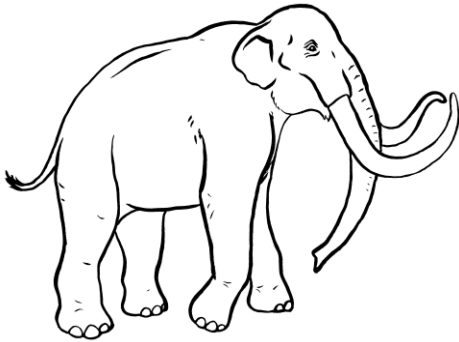
Tule Springs Fossil Beds National Monument preserves thousands of Pleistocene (Ice Age) fossils that help tell the story of a dynamic environment. These fossils were preserved within expanding and contracting wetlands between 100,000-12,500 years ago. Many of the Pleistocene animals of Tule Springs are still alive today, including the coyote (*Canis latrans*), jackrabbit (*Lepus* sp.), and aquatic snails. Some animals went extinct, disappearing from North America entirely.

The Monument also protects Mojave Desert habitat from urban development. This wildlife and plant corridor is home to a diverse group of native plants and animals. Flash floods are also common seasonally in the upper Las Vegas Wash. Important cultural resources, such as historic objects, cultural sites, and artifacts are also protected within the Monument.

Tule Springs Fossil Beds National Monument is in the early phases of park planning, so we do not have facilities on site. Further information can be found at [NPS.gov/TUSK](https://www.nps.gov/TUSK)



Name: \_\_\_\_\_ Date: \_\_\_\_\_



# Meals for Mammoths

Columbian mammoths were some of the largest mammals that ever existed, and like many large animals, they were herbivores. Mammoths lived almost entirely on grass!

Scientists estimate the average Columbian mammoth ate 300 pounds of grass per day. At 245 calories per pound, this means one of these giants consumed 73,500 calories every day.

$$\frac{300 \text{ lb grass}}{1 \text{ lb grass}} \times \frac{245 \text{ calories}}{1 \text{ lb grass}} = 73,500 \text{ calories}$$

What if mammoths had chosen other foods? How much would they need to eat then? We can use factor-label equations, like the example above, to find out.



Alfalfa

970 calories per pound

$$\frac{73500 \text{ calories}}{970 \text{ calories}} \times \frac{1 \text{ lb alfalfa}}{1 \text{ lb alfalfa}} = \underline{\hspace{2cm}} \text{ lb of alfalfa}$$



Corn

1536 calories per pound

$$\frac{73500 \text{ calories}}{\underline{\hspace{1cm}} \text{ calories}} \times \frac{1 \text{ lb corn}}{\underline{\hspace{1cm}} \text{ calories}} = \underline{\hspace{2cm}} \text{ lb of corn}$$



Oats

1765 calories per pound

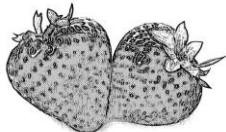
$$\frac{\underline{\hspace{1cm}} \text{ calories}}{\underline{\hspace{1cm}} \text{ calories}} \times \frac{1 \text{ lb oats}}{\underline{\hspace{1cm}} \text{ calories}} = \underline{\hspace{2cm}} \text{ lb of oats}$$



Pumpkin

118 calories per pound

$$\frac{\underline{\hspace{1cm}} \text{ calories}}{\underline{\hspace{1cm}} \text{ calories}} \times \frac{1 \text{ lb pumpkin}}{\underline{\hspace{1cm}} \text{ calories}} = \underline{\hspace{2cm}} \text{ lb of pumpkin}$$



Strawberry

145 calories per pound

$$\frac{\underline{\hspace{1cm}}}{\underline{\hspace{1cm}}} \times \frac{\underline{\hspace{1cm}}}{1 \text{ lb grass}} = \underline{\hspace{2cm}}$$

# Climate Change at Tule Springs

**Author:** Damon Wahl

**Time:** 3 Hours

## **General Objective:**

The students will develop an understanding of climate change based on the fossil and soil records found at the Tule Springs Fossil Beds National Monument.

## **Learning Outcomes:**

The students will better understand how climate change affected the environment in the past based on data found at the Tule Spring site. This will help the student better understand climate change in the future.

## **Rationale for Lesson:**

This activity will help the students to develop their understanding of Tule Springs Fossil Beds and what types of information can be found at the site. Through this information they will better understand Las Vegas' past.

## **Instructional Procedures:**

### **Focusing Event**

- 1: Get the students into small groups of 4 or more and have them discuss what they know about global climate change.
- 2: Have the students then share their results with the whole class.

### **Assessing student knowledge**

- 1: Based on discussion results the teacher can assess the previous knowledge of the students.

### **Teaching methods**

The teacher will explain that the Earth has experienced natural climate changes for millions of years, and human-caused climate changes much more recently.

The students should also watch "Worth Protecting: Desert Springs Monitoring in Joshua Tree" made by the NPS. This video goes over how groundwater springs are critical to desert ecosystems and how scientists study these special places.

### **Student activities**

#### **Step 1:**

The students will split up evenly into groups of 2 or more to read and discuss the article "The Geology and Paleontology of Tule Springs Fossil Beds National Monument, Nevada", as well as the downloadable "Rock Record & Climate" supplemental materials.

# Climate Change at Tule Springs

1: Distribute materials to students. Have them read the materials and discuss with their group.

2: Prompt the students to:

Analyze how desert springs change over time.

Analyze how sediment layers at Tule Springs Fossil Beds show climate change over time.

3: Have each group share their results with the class.

## **Step 2:**

The students will split up evenly into new groups of 2 or more to read and discuss the “Tule Springs Local Fauna” supplemental materials.

1: Distribute materials to students. Have them read the materials and discuss with their group.

2: Ask the students if they can explain where the animals in the Tule Springs Fossil record are now. Discuss within their groups and write down the possible answers.

3: Have each group share their results with the class.

## **Step 3:**

The students will split up evenly into new groups of 2 or more to discuss the fossil record at Tule Springs and what it might mean for the future.

1: Have students watch the “Species' Range Shifts at Sequoia-Kings Canyon NP” video.

2: Have the students predict what may happen to the ecosystem in Tule Springs due to climate change based on the information they have. They should discuss this with their group and write down the ideas predicted.

## **Formative checks**

Have the students write down and turn in their notes from the discussion.

## **Evaluation Procedures:**

The teacher will assess the students by their written record of the discussion. The teacher will also evaluate the students through verbal interaction and class participation.