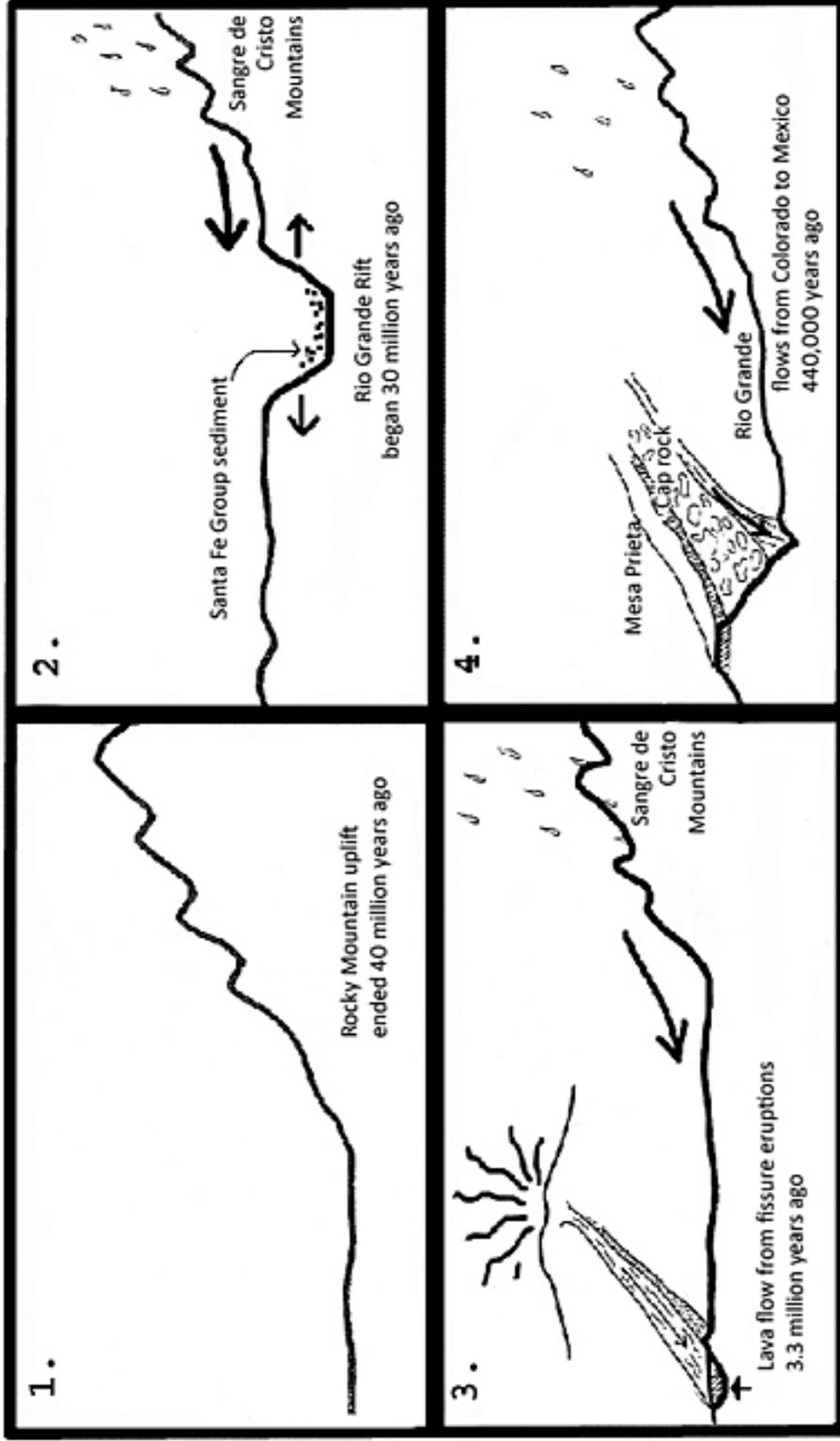


Name \_\_\_\_\_

Date \_\_\_\_\_

### Unit 2. Geology of Tsikw'aye (Mesa Prieta)

#### FORMATION OF MESA PRIETA Student Activity Sheet- Activity 1



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

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



## Unit 2. Geology of Tsikw'aye (Mesa Prieta)

### GEOLOGIC HISTORY OF MESA PRIETA

#### Student Information Sheet- Activity 2

Looking at Mesa Prieta today, with its tumbled dark **basalt** boulders, prickly pear **cacti** and an occasional juniper bush, it is hard to imagine its fiery beginning.

#### *Part 1*

The story of Mesa Prieta actually began long before the volcanoes, between 75-40 million years ago. There was great pressure inside the Earth that caused our present day Sangre de Cristo Mountains to rise. By 30 million years ago, the great pressure was over, and New Mexico began to split apart, forming the Rio Grande Rift. The Española valley began to drop down as the rift developed. As the valley dropped, much of the sediment from the Sangre de Cristo mountains was deposited into the Española valley,



forming layers of sedimentary rock that are part of the Santa Fe Group.

#### *Part 2*



Between 5 and 3 million years ago, west and northwest of the present town of Taos, **shield volcanoes**, **fissure eruptions** and **lava domes** from numerous eruptions occurred. Most of these eruptions **spewed** out runny lava similar to the Hawaiian volcanoes. Multiple lava flows over time filled in much of the Taos valley, forming the Taos Plateau. One eruption, approximately 3.6 million years ago, was erupted from a fissure west of Pilar and flowed south for 20 miles, finally coming to a stop at the present day town of Chamita. As the lava cooled and hardened it formed **basalt** rock in a layer called a **cap rock**.

You can see many of the extinct shield volcanoes and lava domes if you drive north to Questa. They look like round hills and are

called **cerros**. The largest cerro is named San Antonio Mountain and is a lava dome.

If people had lived 3.3 million years ago when the lava flowed down from the Taos Plateau, they would have been standing on the land that was as high as Mesa Prieta is today.

In the past 3.3 million years, rain and rushing streams have eroded the soft sedimentary rock on all sides of the basalt **cap rock**. The sediment under the cap rock was protected from erosion.



*Cap rock above the Rio Grande*

About 440 thousand years ago the Rio Grande became a river that flowed from Colorado to the Gulf of Mexico. The river speeded up the erosion process. On the Mesa you will find many **river cobbles** that the Rio Grande carried down from the north. As the land around the cap rock was worn away, the Mesa was left to stand on its own, high and rocky against the blue New Mexico sky.



### *Part 3*

During the ice age, 2.5 million years ago, the northern parts of the earth were covered by huge ice fields. Geologists call this time the Pleistocene Epoch.

These continental **glaciers** did not reach New Mexico, but smaller mountain glaciers created the jagged shape of the Truchas Peaks.



*Truchas Peaks, viewed from Mesa Prieta*

During the **glacial cycles** the climate was cool and moist and supported lush grasslands and mountain forests. When glaciers retreated during **interglacial cycles** the climate

became warm and dry. The dinosaurs had died out 65 million years ago and the age of mammals followed. Scientists call the large ice age mammals “**mega fauna**”. Saber tooth cats and **dire wolves** hunted woolly mammoths, giant **bison**, ground sloth and giant elk. Many other mammals, including horses and camels also lived here.



*Ice Age horses, Equus scotti*

Fossils of some of these mammals have been found in the Española and Pojoaque valleys. Even older fossils of mammals that lived before the ice age have been found in the Santa Fe Group sediments under Mesa Prieta near Chamita. They included ground sloths, horses, camels, dogs, and beaver.

Scientists believe that the earliest people who lived in New Mexico came here about 12,000 – 13,000 years ago. We call these people Paleo-Indians. They lived on plants they gathered and animals they hunted. The first spear point to be found together with giant bison skeletons was excavated at Folsom, NM. Pronghorn antelope, horses and

jackrabbits were probably hunted as well. **Folsom spear points** have been found on Mesa Prieta.



Folsom Point

About 10,000 years ago the most recent ice age ended, glaciers melted and the climate became warmer and drier. Most of the large mammals became **extinct** and some scientists think that the hunting of these animals by the early people may have helped cause their extinction.

After their extinction, horses did not live in North America again until the Spanish brought them from Spain about 500 years ago.



*Europeans brought the first modern horses to North America*

Some large mammals like the bison, wolf, bear and elk were able to **adapt** to the changing climate by becoming smaller over thousands of years.



*Giant Ice Age bison*

Many of the smaller mammals that live today, such as mice and squirrels, were also able to adapt to these climate changes.