

# **GEOLOGIC MAPS AND GEOLOGIC STRUCTURES**

## **A TEXAS EXAMPLE**

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**For the maps accompanying this lab exercise, I scanned in black and white the 8 1/2 by 11 color *Geology of Texas* map that students use with this exercise, and modified it in Photoshop, simplifying and highlighting.**

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Name \_\_\_\_\_

## GEOLOGIC MAPS AND GEOLOGIC STRUCTURES A TEXAS EXAMPLE

A geologic map is a map on which is recorded geologic information about the rocks at or near the earth's surface directly beneath the soil cover. (Rocks at the surface without any soil cover are called exposures or outcrops.) Information typically portrayed includes:

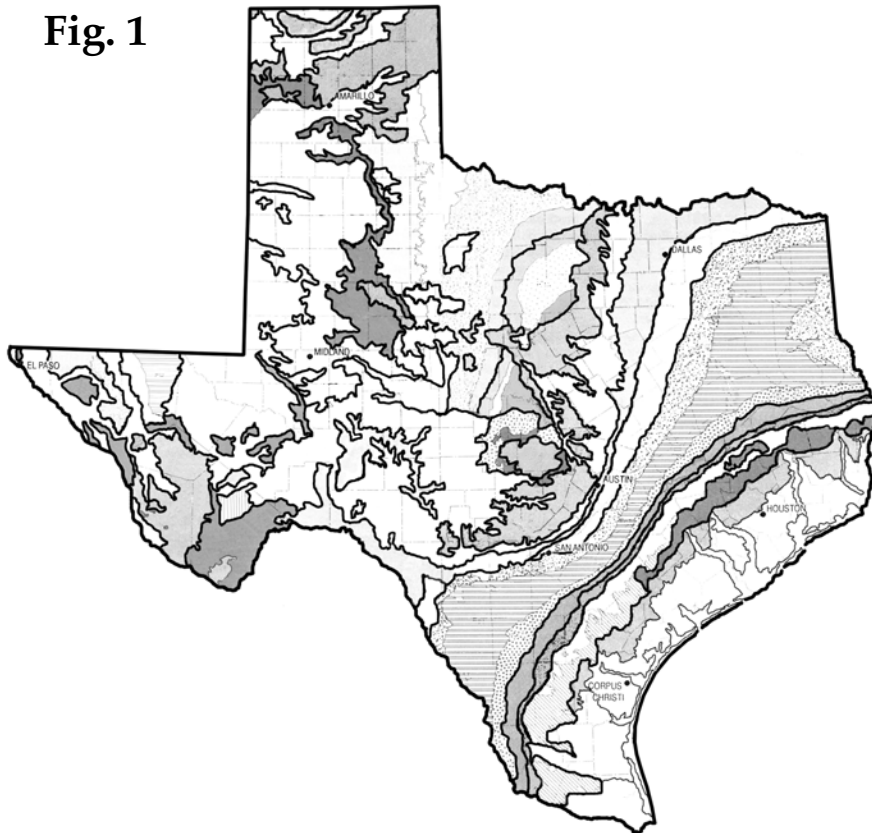
- 1.) Distribution of rocks by age (Periods or Epochs) or distribution of rocks by rock type and other physical features (Formations). Formations and the age of rocks are both generally shown by different colors and symbols on the map.
- 2.) Occurrence of structural features like folds and faults.

A good geologic map (with cross sections) is essential to any additional work, such as petroleum and mineral exploration, groundwater studies, or the interpretation of the geologic history of an area.

Answer the following questions using your lab notes, the 8 1/2 by 11 Geology of Texas map, the cross section (p. 5), the stratigraphic section for South Texas (also p. 5) and the colored pencils provided:

- 1.) What Formation (by name) is found around Corpus Christi, in fact, around most of the Texas coastal zone? \_\_\_\_\_
- 2.) What is its age? (**Give the geologic Epoch.**) \_\_\_\_\_
- 3.) On the Fig. 1 map below, color this Formation yellow:

**Fig. 1**



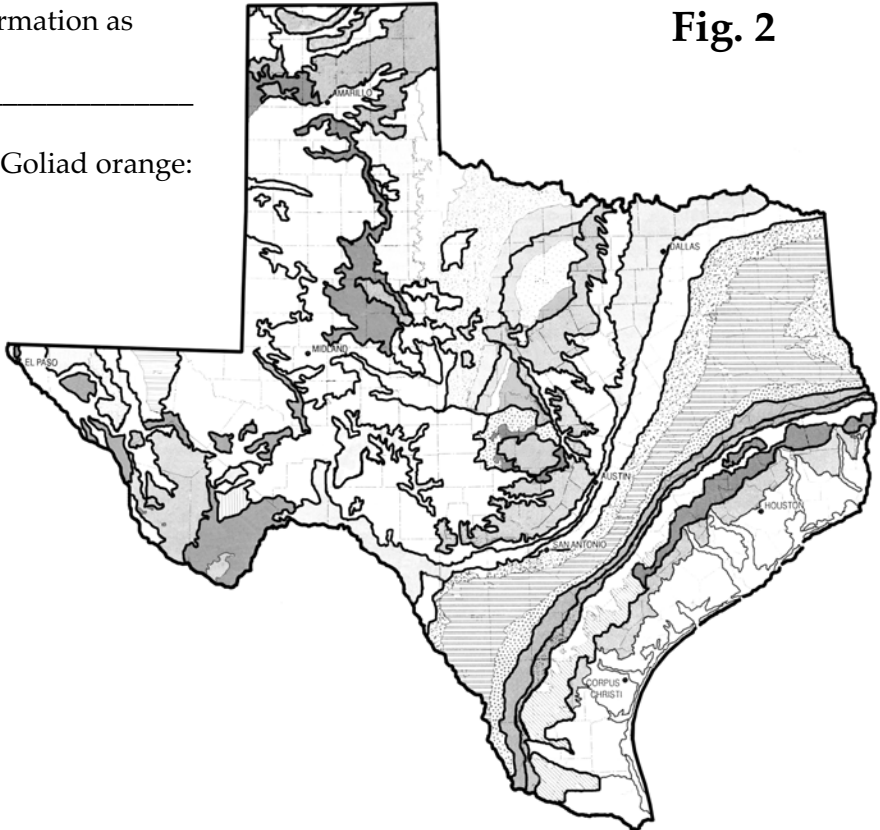
4.) In the Mathis area the flat, clay-rich Pleistocene coastal plain ends, and older, Tertiary-aged Goliad Formation sandstones can be seen forming hills and in sand quarries. The white sand of the Goliad is very distinctive here and contains fossil horse teeth.

What is the age of the Goliad Formation as shown on the geologic map?

(Give the Epoch.) \_\_\_\_\_

5.) On the Fig. 2 map, color the Goliad orange:

Fig. 2



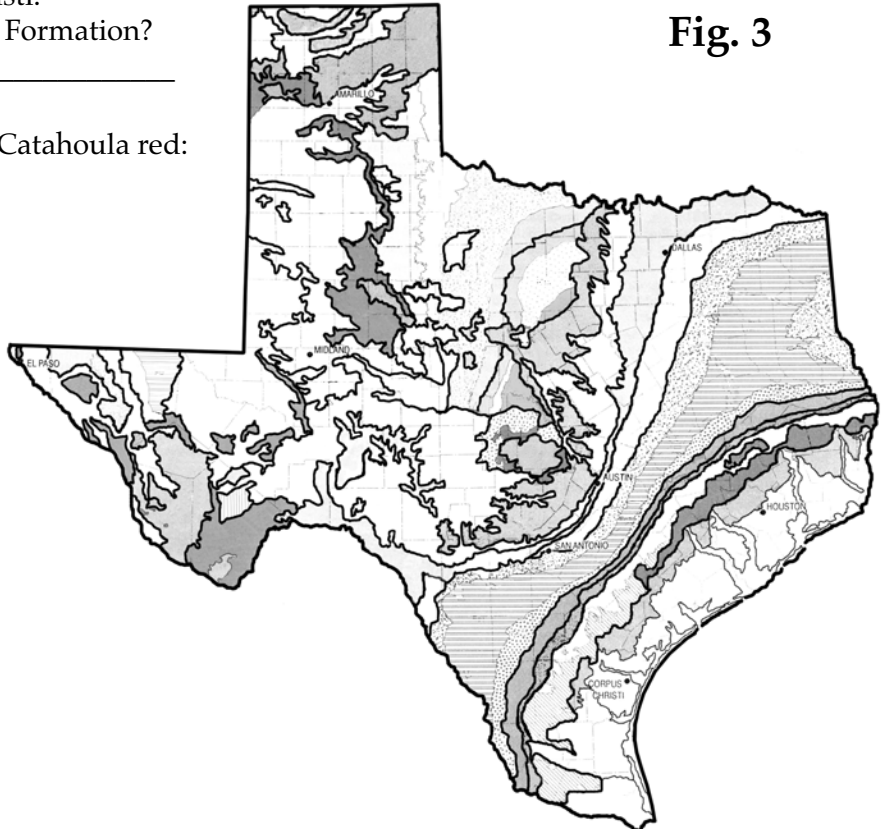
6.) The Catahoula Formation is a tuffaceous sandstone. The abundant tuff fragments were blown in from extensive volcanic eruptions hundreds of miles to the west and northwest, in the Trans-Pecos region. The Catahoula can be seen in outcrops along I-37 (west side of the highway in particular) about 60 miles from Corpus Christi.

What is the age of the Catahoula Formation?

(Give the Epoch.) \_\_\_\_\_

Fig. 3

7.) On the Fig. 3 map, color the Catahoula red:



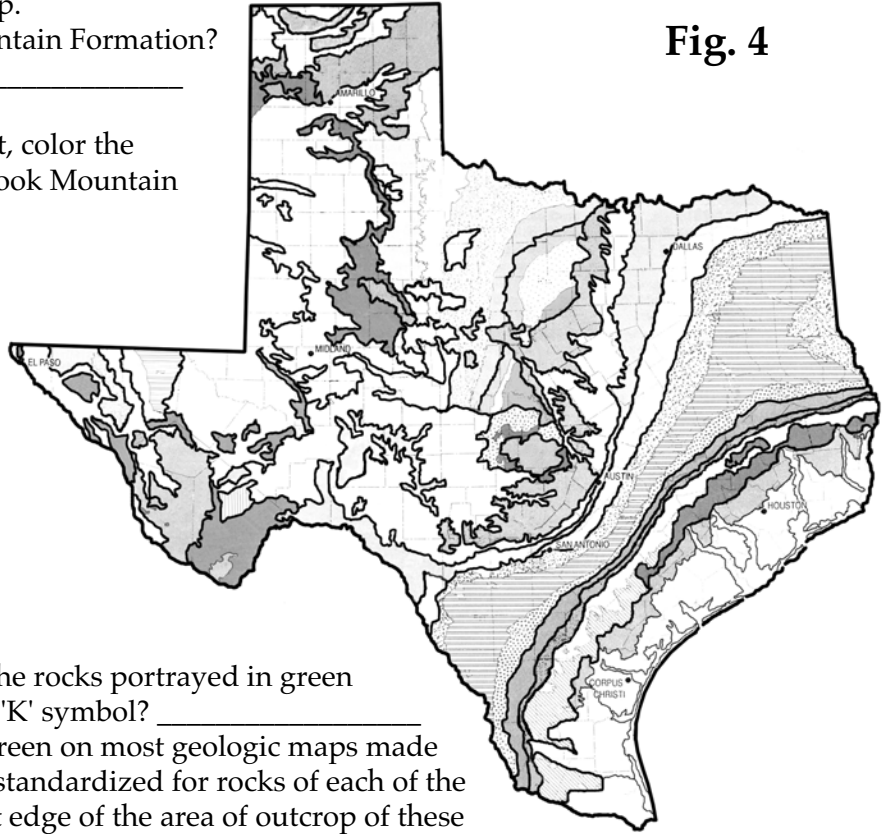
8.) Near Pleasanton, south of San Antonio, snail and clam fossils can be found in the Cook Mountain Formation of the Claiborne Group.

What is the age of the Cook Mountain Formation?

(Give the Epoch.) \_\_\_\_\_

Fig. 4

9.) On the Fig. 4 map to the right, color the Claiborne Group containing the Cook Mountain Formation red orange:



10.) What is the age (**Period**) of the rocks portrayed in green on the geologic map, and with a 'K' symbol? \_\_\_\_\_

(Rocks of this age are shown in green on most geologic maps made in the United States. Colors are standardized for rocks of each of the Geologic Periods.) The southeast edge of the area of outcrop of these rocks passes more or less through San Antonio and Austin and marks the position of both the Late Cretaceous Gulf of Mexico shoreline and the buried, tightly folded Paleozoic rocks of the Ouachita Mountains. The Balcones Fault zone, activated about 10 million years ago, follows this same trend.

11.) Are the Balcones faults (use cross-section) normal or reverse? (*Pick one*) \_\_\_\_\_

12.) If you drilled a well on the border between Guadalupe and Gonzales County, approximately how deep would it have to go to hit rocks of the buried Ouachita Folded Belt?

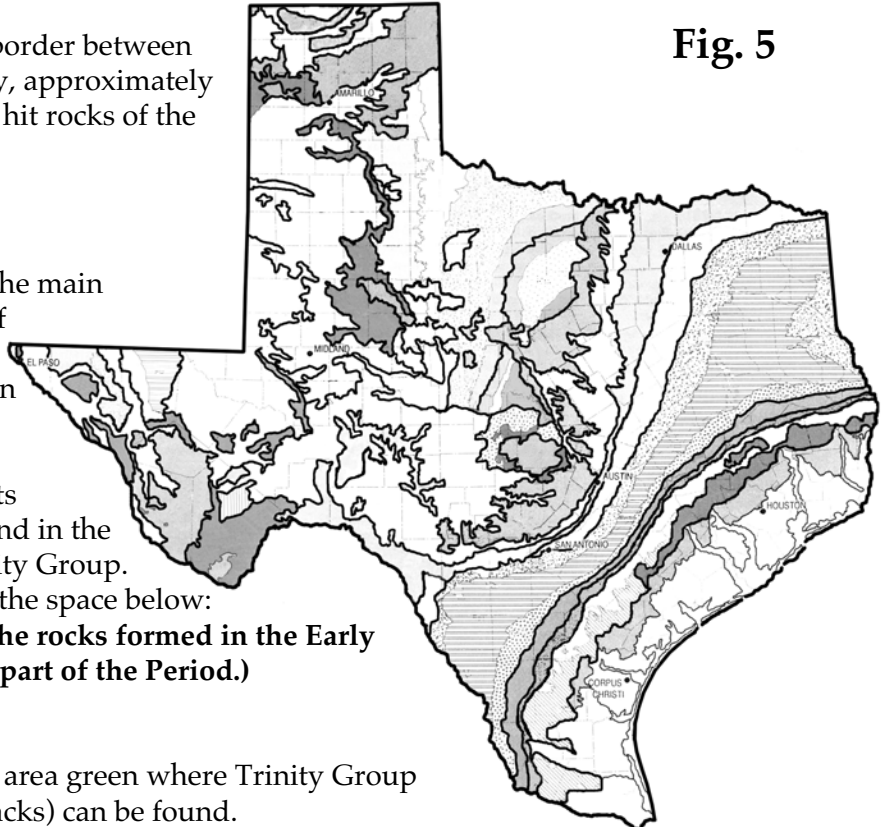
\_\_\_\_\_ Feet

Fig. 5

13.) The Edwards Limestone is the main Hill Country aquifer. It is part of the Fredericksburg Group. Color these rocks yellow green on the Fig. 5 map to the right:

14.) All of the dinosaur footprints preserved in Texas rocks are found in the Glen Rose Formation of the Trinity Group. Give the age of the Glen Rose in the space below:  
(Give the Period, and whether the rocks formed in the Early (first half) or Late (second half) part of the Period.)  
\_\_\_\_\_

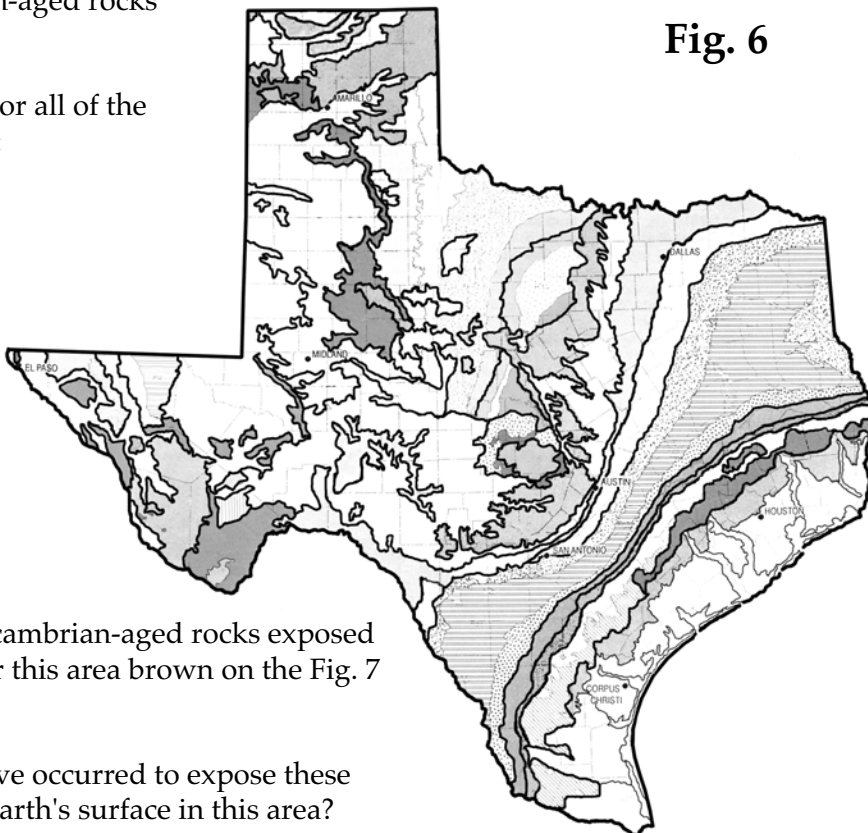
15.) On the Fig. 5 map, color the area green where Trinity Group rocks (and therefore dinosaur tracks) can be found.



16.) The best place in the world to find Early Permian vertebrate fossils is Texas. On the Fig. 6 map, color Permian-aged rocks sky blue:

Fig. 6

17.) On the same Fig. 6 map, color all of the Pennsylvanian--aged rocks blue:



18.) Find the largest area of Precambrian-aged rocks exposed at the surface in Texas, and color this area brown on the Fig. 7 map below:

What two geologic processes have occurred to expose these Precambrian-aged rocks at the Earth's surface in this area?

19.) \_\_\_\_\_

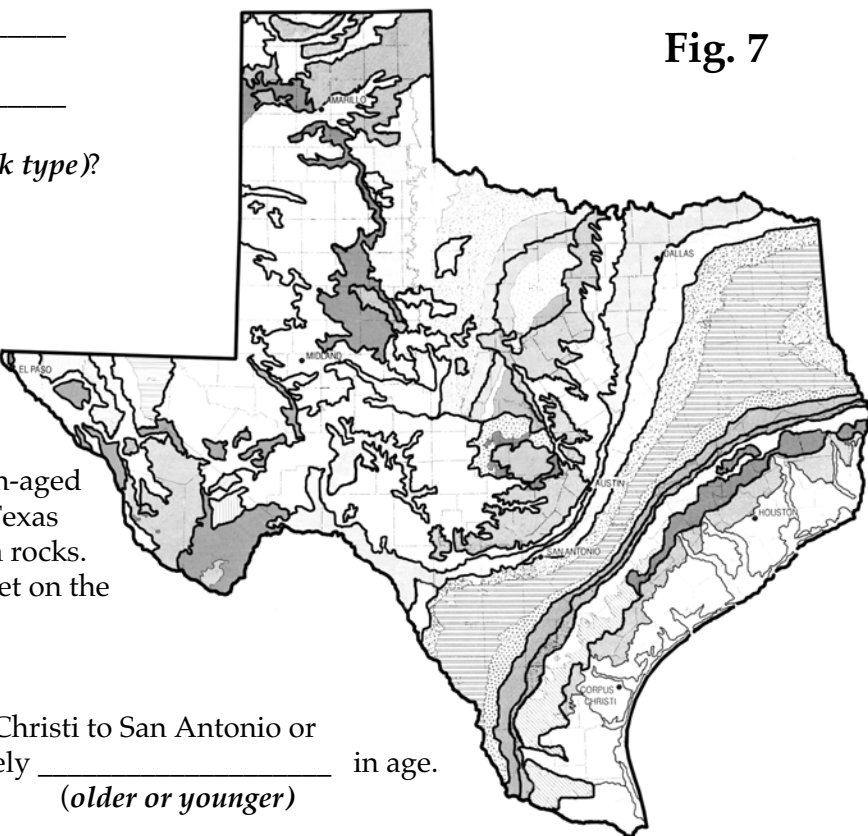
20.) \_\_\_\_\_

What kind of rocks are they (*rock type*)?  
(Look at cross section, p. 5.)

21.) \_\_\_\_\_

22.) \_\_\_\_\_

Fig. 7



23) The largest area of Cambrian-aged rocks exposed at the surface in Texas is found next to the Precambrian rocks. Color these Cambrian rocks violet on the Fig. 7 map:

24.) As you drive from Corpus Christi to San Antonio or Austin, the rocks get progressively \_\_\_\_\_ in age.  
(*older or younger*)

25.) How can you explain this age progression?

## South Texas Stratigraphic Section

System	Series	Group	Formation	Member	Local Name & Pay Zones
QUATERNARY	RECENT		RECENT		
	PLEISTOCENE	HOUSTON	DEAUMONT		
			LISIE		
TERTIARY	PLIOCENE	CITRONELLE	GOLIAD		
	MIocene	FLEMING	LAGARTO		
			OAKVILLE		
		CATAHOULA	ANAHUAC	DISCORBIS HETEROSTEGINA MARGINULINA	GRETA SDS. MARGINULINA SDS.
			FRIO	UPPER FRIO	WEBB PHILLIPS SINTON MELBOURNE PFLUEGER TOM O'CONNOR QUINTANA SDS.
				NODO.BLAN.ZONE AHOM.BILAT.ZONE	
	OLIGOCENE	VICKSBURG	VICKSBURG		STILLWELL SDS.
	EOCENE	JACKSON	WHITSETT		COLE CHERNOSKY
			MC'ELROY		HOCKLEY-SWEDEN GOVERNMENT WELLS LOMO NOVIA
			CADDELL		MIRANDO
		CLAIBORNE	YEGUA (COCKFIELD)		PETTUS O'HEARN YEAGER ROSENBERG COLORADO
			CROCKETT SPARTA		JENNINGS COOK MTN.
			WECHES		
			QUEEN CITY REKLAW		
		WILCOX	CARRIZO (Not used as a sub- surface Unit Below 4000') WILCOX		CARRIZO LULING MASSIVE ROEDER HIRSCH
					SLICK MACKHANK HINNANT BARTOSCH
	PALEOCENE	MIDWAY	MIDWAY		POTH
CRETACEOUS	GULFIAN	NAVARRO	ESCONDIDO OLMOS / NAVARRO		ESCONDIDO OLMOS SDS.
		TAYLOR	MARLBROOK PECAN CAP AHACACHOIL TAYLOR		SAN MIGUEL SDS. ANACACHO SERPENTINE
		AUSTIN	AUSTIN		DALE LS.
		EAGLEFORD	EAGLEFORD		
	COMANCHEAN	WASHITA	BUDA DEL RIO GEORGETOWN		
		FREDRICKSBURG	MC KNIGHT EDWARDS		"A" ZONE "B" ZONE
		TRINITY	GLEN ROSE		
			PEARSALL	BEXAR JAMES PINE ISLAND	
	COAHUILAN	NUEVO LEON	SLIGO LS HOSSTON SS		
JURASSIC	SABINASAN	COTTON VALLEY			
		LOUANN	BUCKNER SMACKOVER	REYNOLDS ODLITE	
			LOUANN SALT		

## Central Texas Geologic Cross Section

