THE FINAL PROJECT: **UNIT IDENTIFICATION AND DESCRIPTION**

To complete your Stratigraphic Report, you must first thoroughly identify and describe all units. To do this, you should follow the guidelines from the igneous, metamorphic, and sedimentary activities. These are summarized below. You can work with a partner for this part of the exercise, but you may not discuss cross-cutting relationships and chronology of events associated with the Final Project.

IGNEOUS ROCKS: **Identification and Description**

- Texture: Use the following terms: aphanitic, phaneritic, porphyritic-aphanitic, porphyritic-phaneritic, glassy, vesicular
- Observed minerals: Identify the minerals in each rock, referring back to the minerals bin and your mineral ID chart.
  - For *aphanitic* rocks: You cannot identify minerals that occur as crystals that are too small to see with the naked eye, so in these cases, describe the aphanitic rock's color.
  - For *porphyritic-aphanitic* rocks, you will identify the minerals comprising the phenocrysts, what percentage of the entire rock each phenocryst mineral makes up, and describe the color of the aphanitic groundmass.
  - For *phaneritic* rocks, you will identify the minerals and estimate the percentage of each mineral in the rock. ***For phaneritic rocks, the percentage must add up to 100%!!!***
- Overall rock composition: Use **one** of the following terms: felsic, intermediate, mafic
- Rock name: Use the appropriate name from the classification scheme provided on the back of this page (you may also find Figures 4.7 and 4.8 on pages 117 and 120 of your textbook useful).

CLASSIFICATION OF IGNEOUS ROCKS

		Mafic	Intermediate	Felsic
Rock Composition		Increasing Silicon, Sodium, Potassium →		
		Decreasing Calcium, Iron, Magnesium →		
Rock or Groundmass Color		Dark ←		→ Light
		Black, dark to medium grey	Medium/light grey, brown, purplish	Tan, pink, white
Texture	HIGHLY VESICULAR (no crystals)	SCORIA (often a rust-red color)		PUMICE (often contains glassy strands)
	GLASSY (no crystals)			OBSIDIAN
	APHANITIC or PORPHYRITIC APHANITIC	* BASALT	* ANDESITE	* RHYOLITE
	PHANERITIC	GABBRO	DIORITE	GRANITE
Mineral Content		Olivine/Pyroxene Ferromagnesian Minerals; Calcic	Pyroxene/Amphibole; Plagioclase	Amphibole/Biotite; Sodic; K-spar; Quartz

* For porphyritic-aphanitic rocks, add the modifier "PORPHYRITIC" to the rock name (e.g., Porphyritic basalt)

SEDIMENTARY ROCKS: **Identification and Description**

For each ***detrital*** sample, fill in the table by documenting the:

a. Dominant clast size: use ONE of the following terms: gravel, sand, mud
b. Clast composition: indicate which of the following clast types are present (there may be more than one): rock fragments, quartz, feldspar, mica, clay
    i. NOTE: Although you might be able to determine the composition of the cement in the rock, please focus on determining the clast composition.
c. Rounding and sorting: if discrete clasts are observable, you can indicate the degree of rounding and sorting of these clasts by using the terms given on the comparison chart provided.
    i. NOTE: If the sample is composed of clays, you cannot determine the sorting and rounding because the grains are too small to see.
d. Rock name: use the classification provided.

For each ***non-detrital*** sample, fill in the table by documenting:

a. The mineral composition of the rock
b. Any other characteristics that might help identify the rock
c. The rock name – use the classification provided.

DETRITAL SEDIMENTARY ROCKS

CLAST SIZE	CHARACTERISTICS	ROCK NAME
Gravel > 2 mm	Angular rock or mineral fragments	**Breccia**
	Rounded rock or mineral fragments	**Conglomerate**
Sand 1/16- 2 mm (visible clasts)	Predominantly quartz clasts; clasts are typically rounded and well sorted.	**Quartz sandstone**
	Abundant feldspar clasts, rock fragments, and some quartz; clasts are typically angular and poorly sorted.	**Arkose**
	Very few quartz clasts; lots of feldspar, clay, and rock fragments; clasts are typically angular and poorly sorted.	**Graywacke**
Mud (Clay) < 1/16 mm (clasts generally not visible)	Fissile, splits into thin layers	**Shale**
	Massive, breaks in clumps	**Mudstone**

NON-DETRITAL SEDIMENTARY ROCKS

COMPOSITION	CHARACTERISTICS	ROCK NAME
Calcite	Wide variety of textures; light to dark grey color *(crystalline, clastic, very fine-grained)*	**Limestone**
	Varieties:	
	Composed of loosely cemented fossil fragments	***Coquina***
	Soft, powdery, composed of microscopic skeletal material	***Chalk***
Microcrystalline Quartz	Very hard, smooth, conchoidal fracture	**Chert**

METAMORPHIC ROCKS: **Identification and Description**

- **Texture**: Note whether it is foliated or nonfoliated. If the rock is foliated, document the specific texture (i.e., slaty, schistose, etc.)

- **Composition**: List the major minerals that you observe in the rock (or infer to be present, e.g., clay for slate, which is too fine-grained to see the individual mineral grains).

- **Rock Name:** Use the appropriate rock modifiers.

METAMORPHIC ROCK CLASSIFICATION

TEXTURE			Common Minerals	*"Root" ROCK NAME	Examples:
FOLIATED	SLATY	Can't see individual grains; exhibits *slaty cleavage*, or the tendency to break along parallel planes	**[Clay, micas (chlorite, biotite), quartz, feldspar]	**SLATE**	Green slate
	SCHISTOSE	Can see individual grains	Biotite, muscovite, quartz; garnet, amphibole	**SCHIST**	Garnet-mica schist
	GNEISSIC	Can see individual grains; foliation is expressed as clearly distinguishable light and dark bands	Light colored bands = quartz and/or feldspar Dark colored bands = biotite, amphibole (pyroxene, garnet)	**GNEISS**	Biotite-quartz gneiss
NONFOLIATED		Crystalline texture; effervesces with HCl; will not scratch glass; can occur in a variety of colors	Calcite	**MARBLE**	Grey calcite marble
		Crystalline texture; scratches glass; can occur in a variety of colors	Quartz	**QUARTZITE**	Pink quartzite

***Rock name modifiers:**
Schists and Gneisses: Use major minerals in order of increasing abundance (with least abundant first, most abundant last).
Slates, Quartzites, Marbles: Use overall rock color.

** Although too fine to see with the naked eye, thin section studies have shown that most slates contain clays, and some mica, quartz and feldspar.