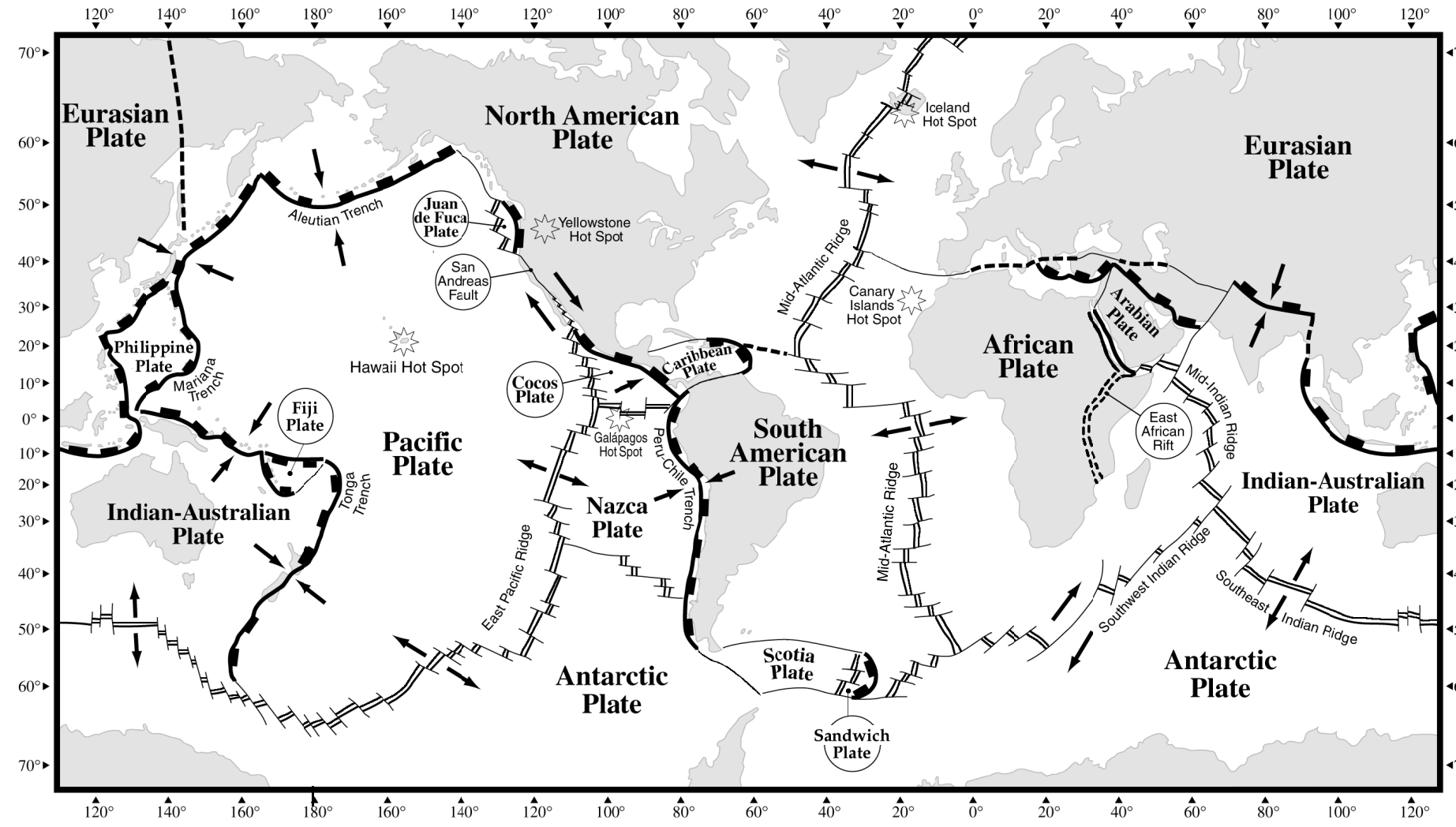
Tectonic Plates



KEY:

Divergent Plate Boundary (usually broken by transform faults along mid-ocean ridges)

Mid-Ocean Ridge

Convergent Plate Boundary (Subduction Zone)

overriding plate

subducting plate

Transform Plate Boundary (Transform Fault)

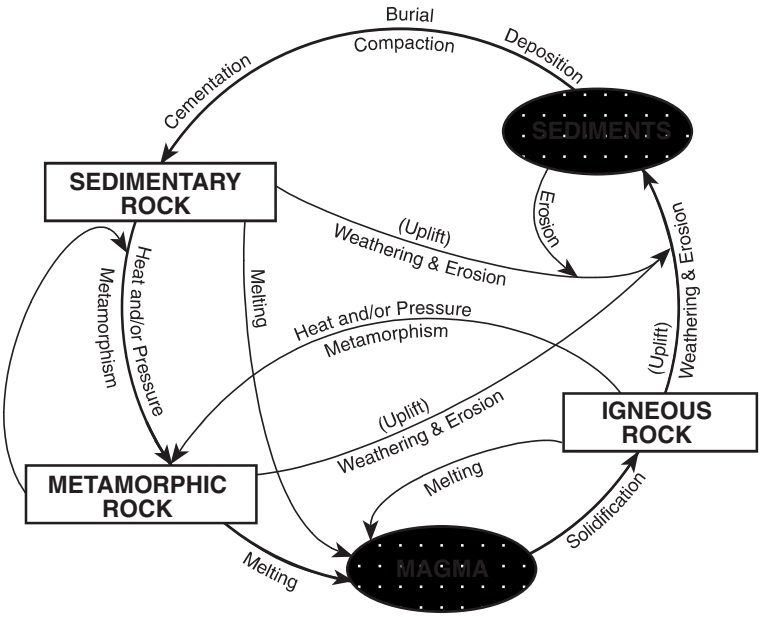
Complex or Uncertain Plate Boundary

Relative Motion at Plate Boundary

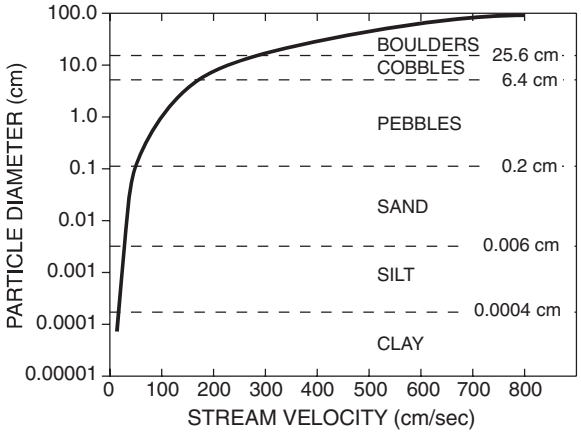
Mantle Hot Spot

NOTE: Not all plates and boundaries are shown.

Rock Cycle in Earth's Crust



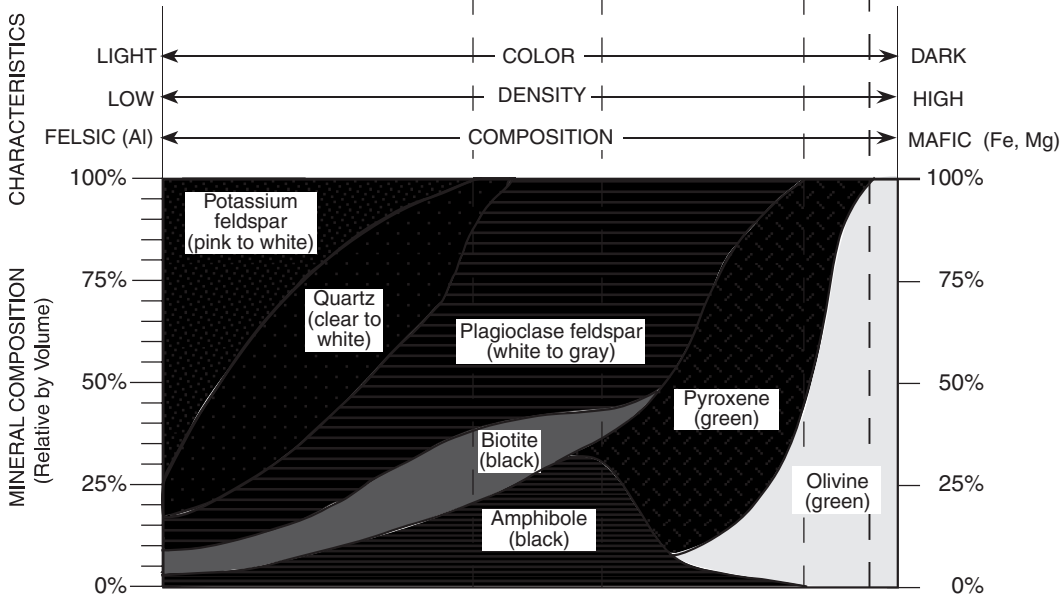
Relationship of Transported Particle Size to Water Velocity



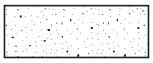
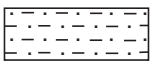
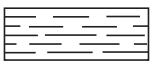
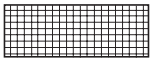
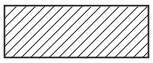
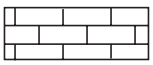
*This generalized graph shows the water velocity needed to maintain, but not start, movement. Variations occur due to differences in particle density and shape.

Scheme for Igneous Rock Identification

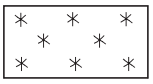
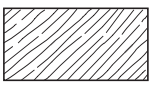
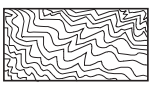
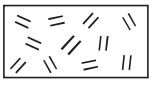
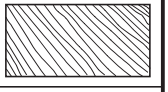
IGNEOUS ROCKS — ENVIRONMENT OF FORMATION						GRAIN SIZE	TEXTURE	
EXTRUSIVE (Volcanic)		Obsidian (usually appears black)		Basaltic Glass		Non-crystalline	Glassy	Non-vesicular
		Pumice		Vesicular Basaltic Glass				Vesicular (gas pockets)
		Vesicular Rhyolite	Vesicular Andesite	Scoria / Vesicular Basalt		less than 1 mm	Fine	
		Rhyolite	Andesite	Basalt				
INTRUSIVE (Plutonic)		Granite	Diorite	Gabbro	Peridotite / Dunite	1 mm to 10 mm	Coarse	Non-vesicular
		Pegmatite				10 mm or larger	Very Coarse	



Scheme for Sedimentary Rock Identification

INORGANIC LAND-DERIVED SEDIMENTARY ROCKS					
TEXTURE	**GRAIN SIZE**	**COMPOSITION**	**COMMENTS**	**ROCK NAME**	**MAP SYMBOL**
Clastic (fragmental)	Pebbles, cobbles, and/or boulders embedded in sand, silt, and/or clay	Mostly quartz, feldspar, and clay minerals; may contain fragments of other rocks and minerals	Rounded fragments	Conglomerate	
			Angular fragments	Breccia	
	Sand (0.2 to 0.006 cm)		Fine to coarse	Sandstone	
	Silt (0.006 to 0.0004 cm)		Very fine grain	Siltstone	
	Clay (less than 0.0004 cm)		Compact; may split easily	Shale	
CHEMICALLY AND/OR ORGANICALLY FORMED SEDIMENTARY ROCKS					
TEXTURE	**GRAIN SIZE**	**COMPOSITION**	**COMMENTS**	**ROCK NAME**	**MAP SYMBOL**
Crystalline	Varied	Halite	Crystals from chemical precipitates and evaporites	Rock Salt	
	Varied	Gypsum		Rock Gypsum	
	Varied	Dolomite		Dolostone	
Bioclastic	Microscopic to coarse	Calcite	Cemented shell fragments or precipitates of biologic origin	Limestone	
	Varied	Carbon	From plant remains	Coal	

Scheme for Metamorphic Rock Identification

TEXTURE		GRAIN SIZE	COMPOSITION	TYPE OF METAMORPHISM	COMMENTS	ROCK NAME	MAP SYMBOL
FOLIATED	MINERAL ALIGNMENT	Fine	MICA, QUARTZ, FELDSPAR, AMPHIBOLE, GARNET, PYROXENE	Regional (Heat and pressure increase with depth)	Low-grade metamorphism of shale	Slate	
		Fine to medium			Foliation surfaces shiny from microscopic mica crystals	Phyllite	
					Platy mica crystals visible from metamorphism of clay or feldspars	Schist	
	BAND-ING	Medium to coarse			High-grade metamorphism; some mica changed to feldspar; segregated by mineral type into bands	Gneiss	
NONFOLIATED		Fine	Variable	Contact (Heat)	Various rocks changed by heat from nearby magma/lava	Hornfels	
		Fine to coarse	Quartz	Regional or Contact	Metamorphism of quartz sandstone	Quartzite	
			Calcite and/or dolomite		Metamorphism of limestone or dolostone	Marble	
		Coarse	Various minerals in particles and matrix		Pebbles may be distorted or stretched	Metaconglomerate