REGENTS PERFORMANCE EXAM

STATION 1

Calculating Epicenters

What will you have to do?

- Find the difference between P & S Waves (LAG TIME)
- Find the distance from Epicenter
  - $1.0 \times 10^3 = 1,000$ km
- Draw a circle using a compass who's radius is equivalent to epicenter distance

Minneapolis, MN
Detroit, MI
Charleston, SC
Approximate
Epicenter

Station 2

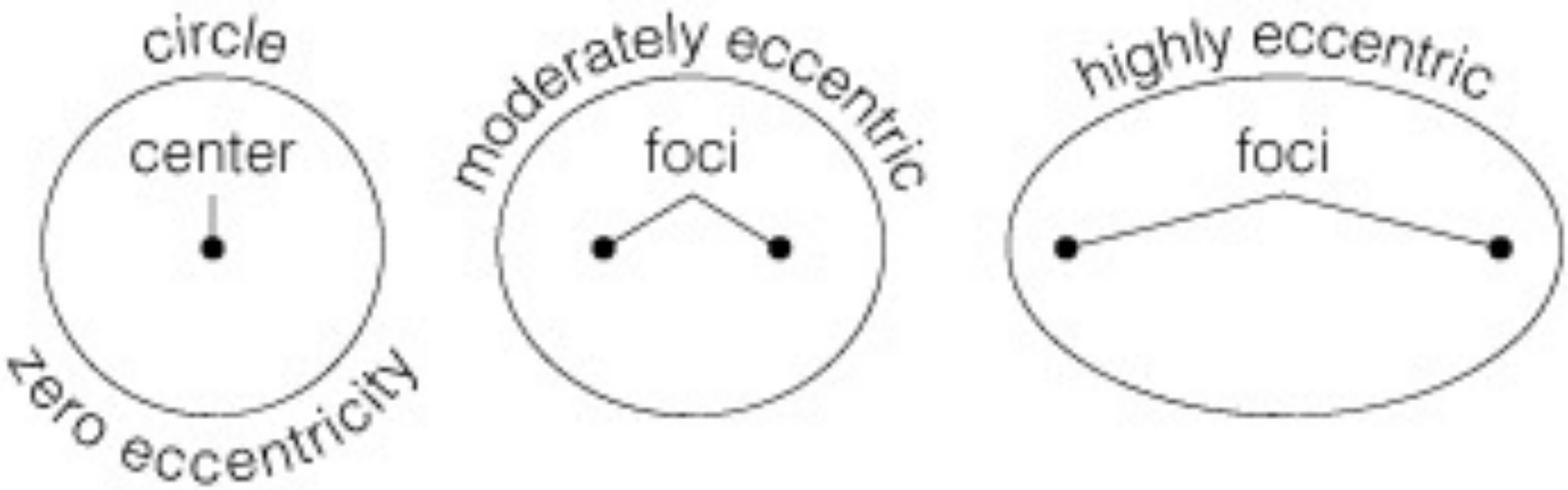
Calculating Eccentricity

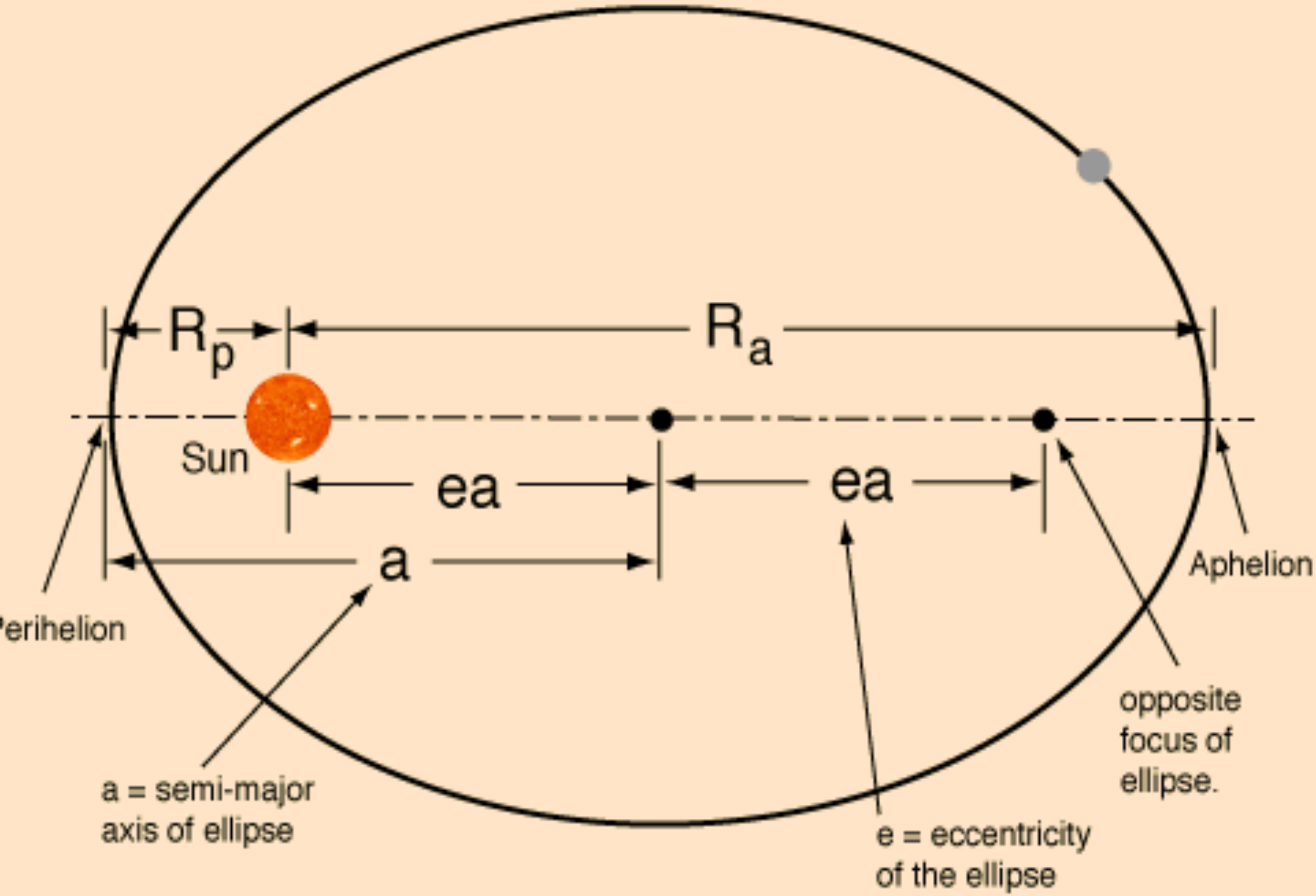
What will you have to do?

- Using thumbtacks, string, and a ruler measure the eccentricity of an orbit.
- You will be told where to place push pins.
- Using string, draw a complete ellipse and then measure its Eccentricity

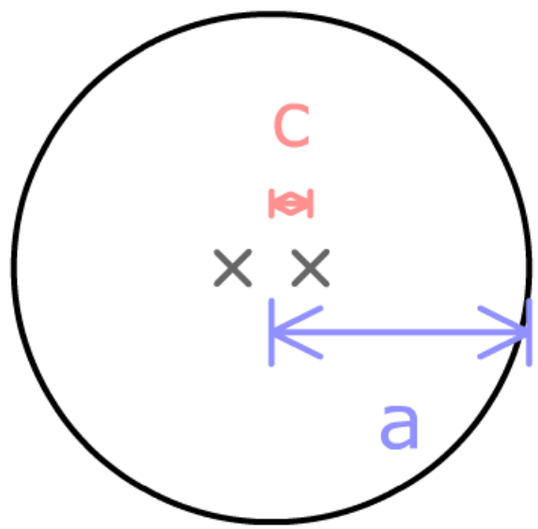
Ellipses and Eccentricity

- An ellipse is an oval-shaped path with two foci
  - **Assume the Sun at one focus of the ellipse.**
- A circle has 1 focus, an ellipse has two foci
- The further FOCI are from each other, the greater the ECCENTRICITY
  - Less Eccentric = Closer to 0.<u>000</u>
  - More Eccentric = Farther from 0.<u>000</u>


circle
center
zero eccentricity
moderately eccentric
foci
highly eccentric
foci


R_p
R_a
Sun
ea
ea
a
Perihelion
Aphelion
opposite focus of ellipse.
a = semi-major axis of ellipse
e = eccentricity of the ellipse

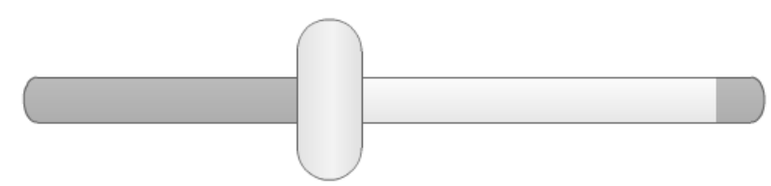
Eccentricity Demonstrator



$$e = \frac{c}{a} = \frac{6}{40} = 0.150$$

c: 6

a: 40



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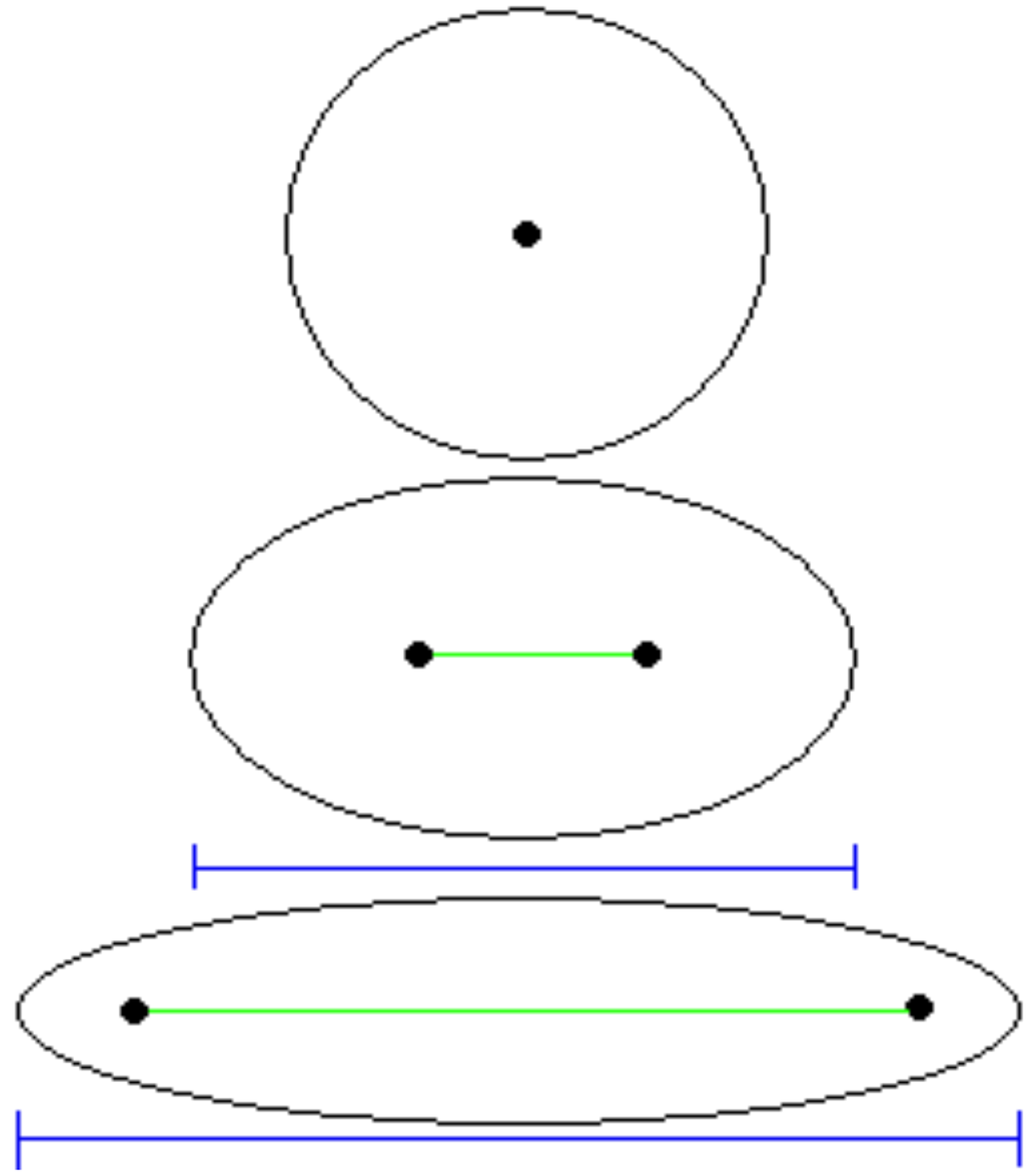
Eccentricity = 0 circle

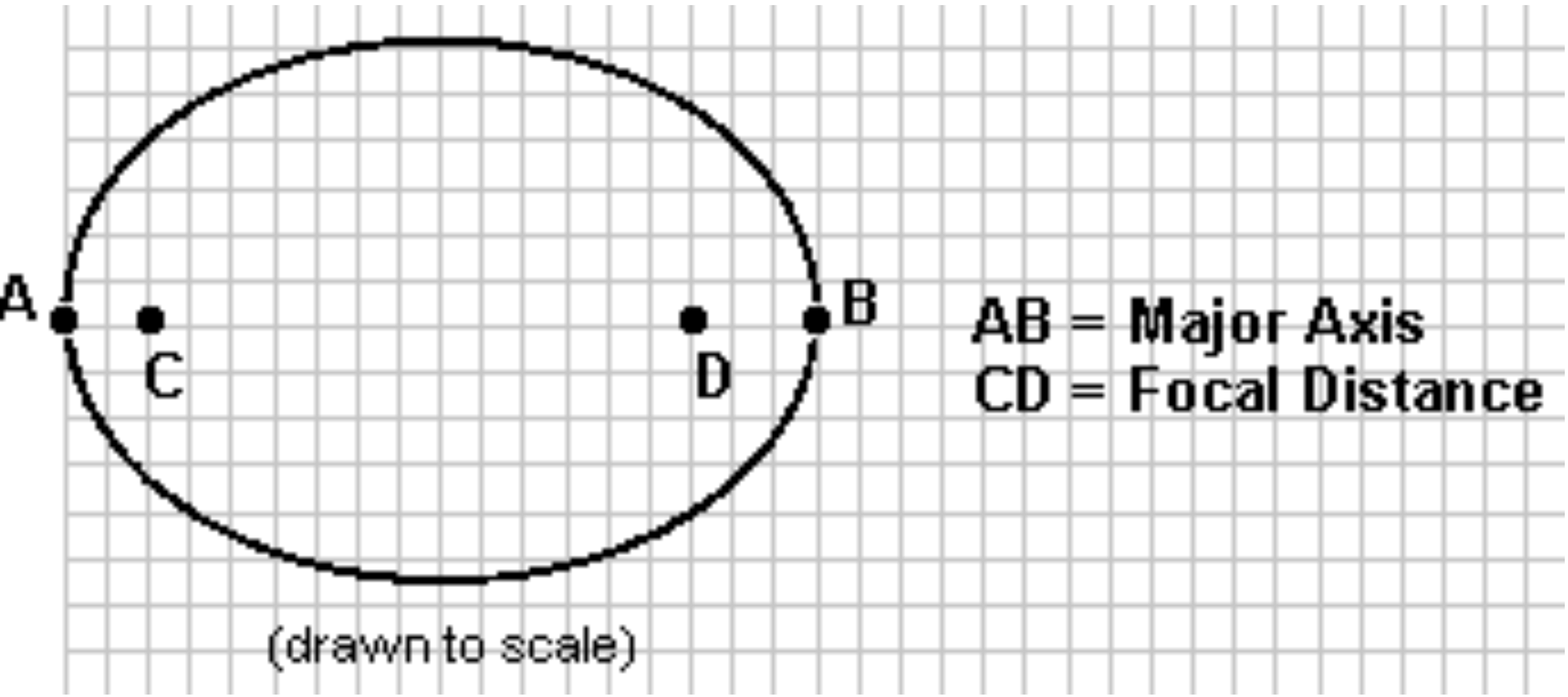
Eccentricity = 0.5

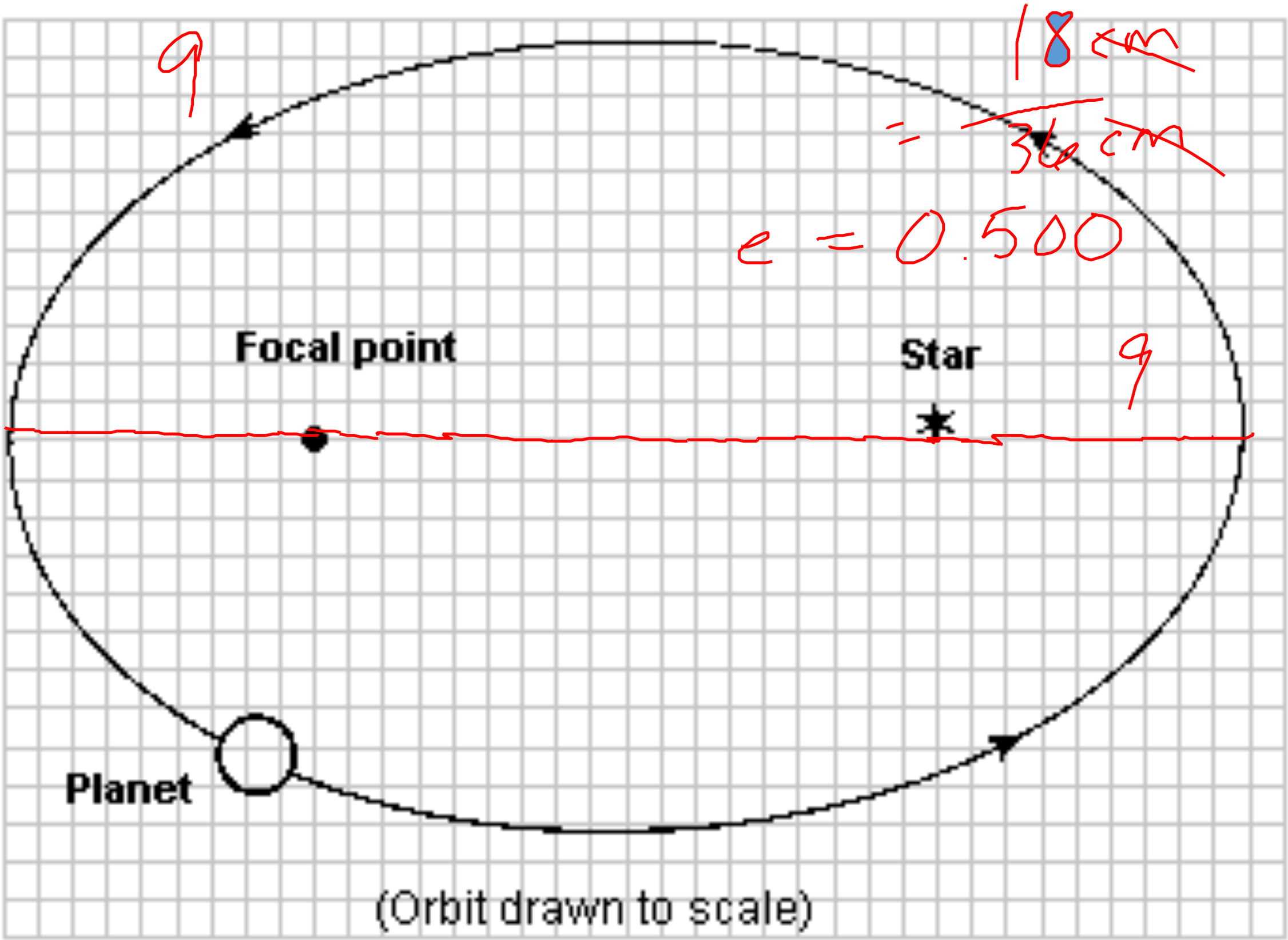
Eccentricity = 1 line



$e = 0.722$

$\frac{13}{18}$ $13 \div 18$




9
18 cm
= 36 cm
e = 0.500
Focal point
Star
9
Planet
(Orbit drawn to scale)

Solar System Data

Celestial Object	Mean Distance from Sun (million km)	Period of Revolution (d=days) (y=years)	Period of Rotation at Equator	Eccentricity of Orbit	Equatorial Diameter (km)	Mass (Earth = 1)	Density (g/cm^3)
SUN	—	—	27 d	—	1,392,000	333,000.00	1.4
MERCURY	57.9	88 d	59 d	0.206	4,879	0.06	5.4
VENUS	108.2	224.7 d	243 d	0.007	12,104	0.82	5.2
EARTH	149.6	365.26 d	23 h 56 min 4 s	0.017	12,756	1.00	5.5
MARS	227.9	687 d	24 h 37 min 23 s	0.093	6,794	0.11	3.9
JUPITER	778.4	11.9 y	9 h 50 min 30 s	0.048	142,984	317.83	1.3
SATURN	1,426.7	29.5 y	10 h 14 min	0.054	120,536	95.16	0.7
URANUS	2,871.0	84.0 y	17 h 14 min	0.047	51,118	14.54	1.3
NEPTUNE	4,498.3	164.8 y	16 h	0.009	49,528	17.15	1.8
EARTH'S MOON	149.6 (0.386 from Earth)	27.3 d	27.3 d	0.055	3,476	0.01	3.3

STATION 3

Identifying Minerals and Rocks

What will you have to do?

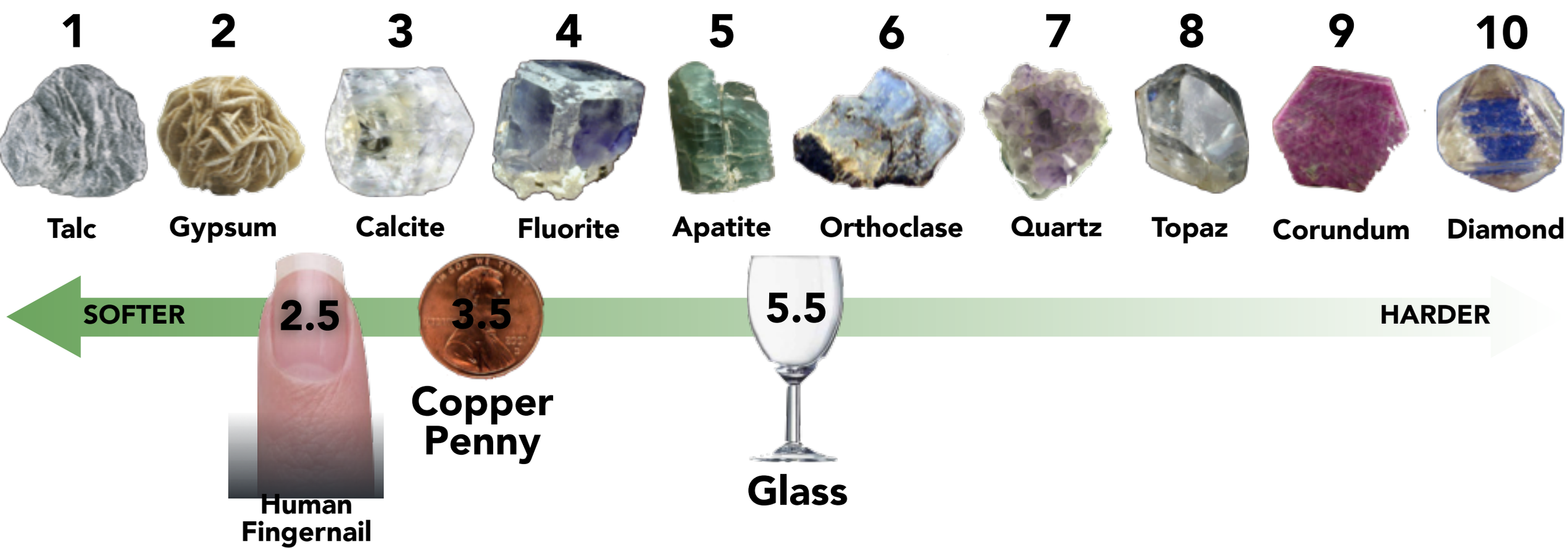
- Minerals
  - All minerals can be identified by physical and chemical properties
  - Properties are determined by atomic arrangement
- Minerals are identified using Tests
  - Color, Streak, Hardness, Luster, Breakage

COLOR

- The color that the solid mineral appears under normal conditions on Earth.
- First and the WORST

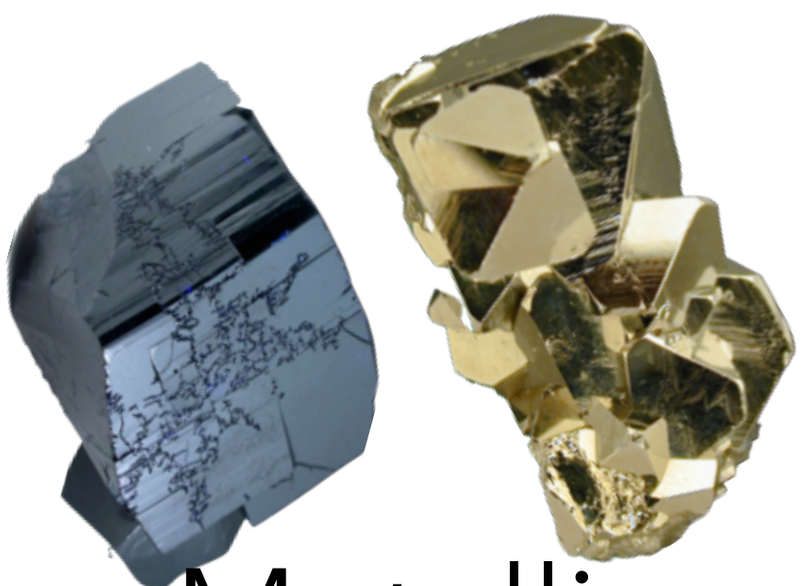
HARDNESS

- A mineral's resistance to being scratched. Hardness is measured using the Moh's Hardness Scale.
- If the mineral scratches glass → HARDER than Glass
- If the mineral does not scratch glass → SOFTER than Glass



LUSTER

- The way light reflects of the surface of a mineral. Luster can either be metallic or nonmetallic.



Metallic Luster

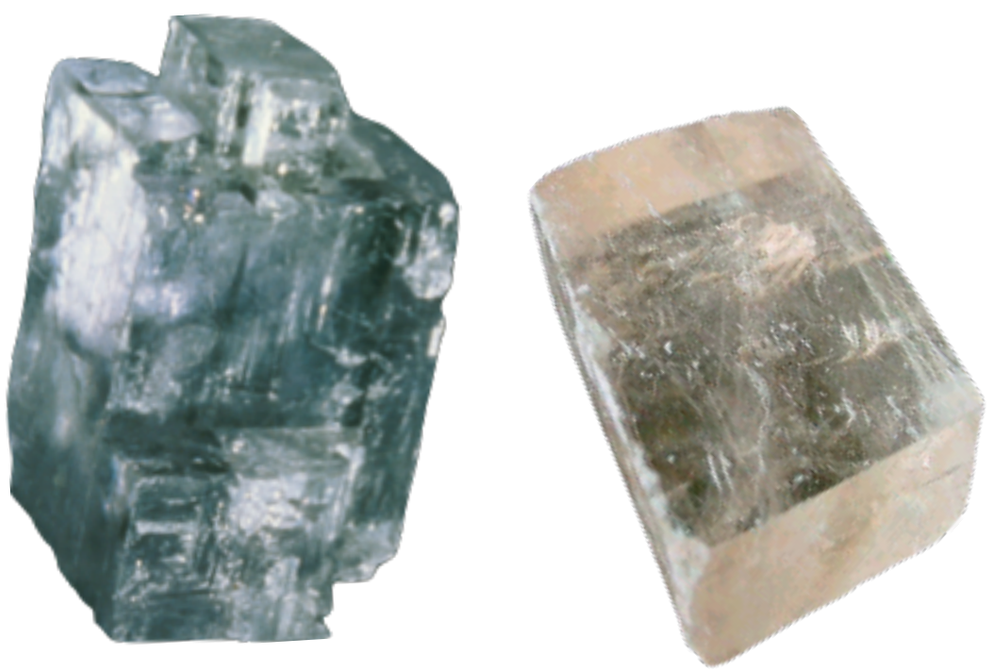
Nonmetallic Luster

STREAK

- The color of a mineral in its powdered form.

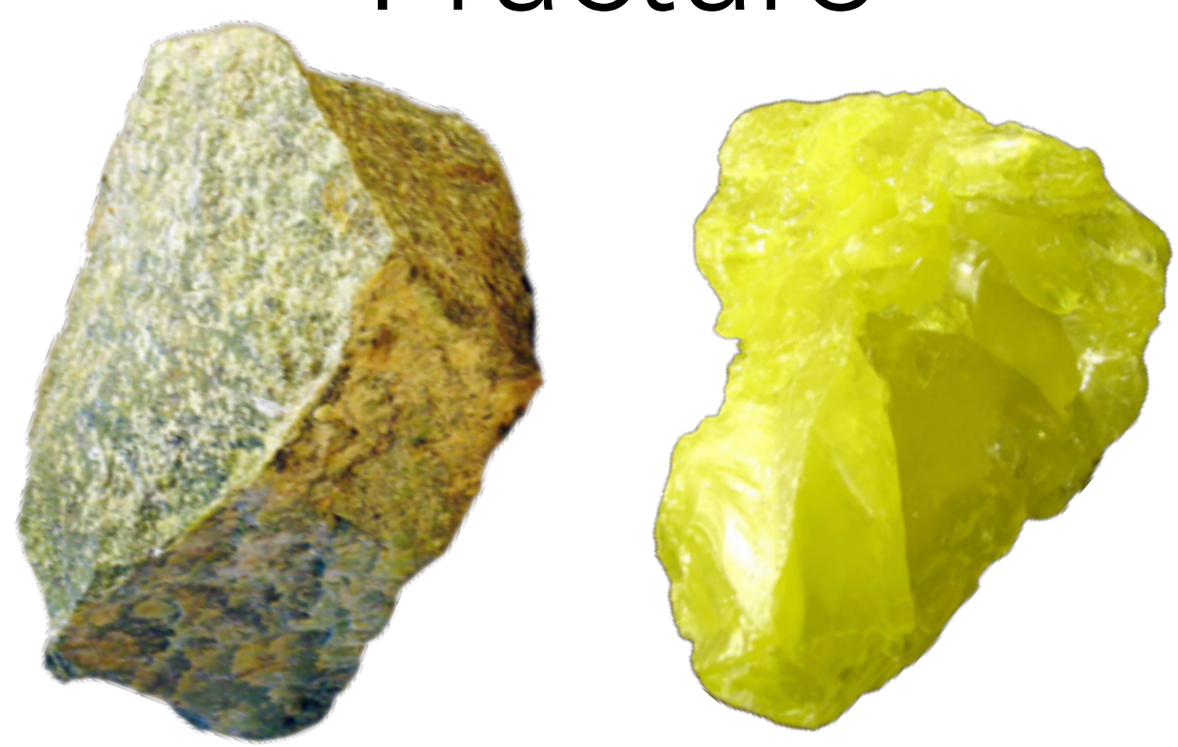
BREAKAGE

- The way in which a mineral breaks apart.



Cleavage

Fracture



What will you have to do?

- Rocks – Identify Type of Rock (Igneous, Sedimentary, Metamorphic)

IGNEOUS - CRYSTALS

INTERGROWN OR
INTERLOCKING CRYSTALS

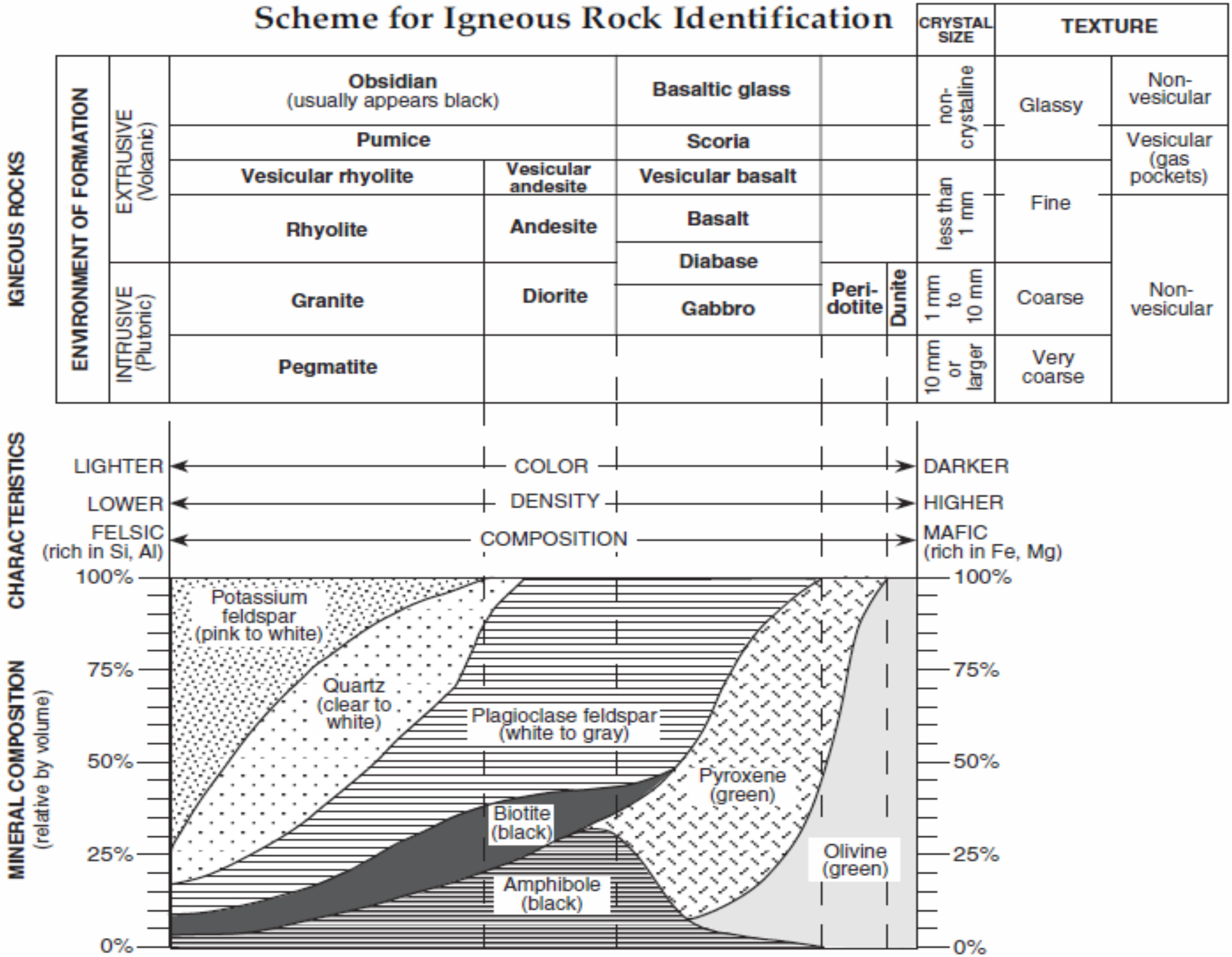
IGNEOUS - VESICULAR

GAS POCKETS OR HOLES

IGNEOUS – GLASSY TEXTURE

SMOOTH SURFACE; FINE/NO CRYSTALS

Scheme for Igneous Rock Identification



SEDIMENTARY

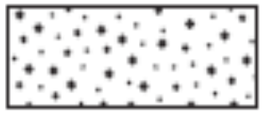
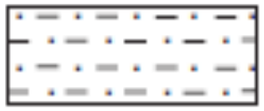
VISIBLE SEDIMENTS

SEDIMENTARY

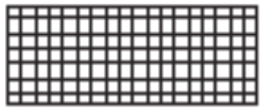
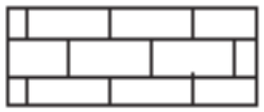
FOSSILS

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 (0.006 to 0.2 cm)		Fine to coarse	**Sandstone**	
	Silt (0.0004 to 0.006 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	Fine to coarse crystals	Halite	Crystals from chemical precipitates and evaporites	**Rock salt**	
		Gypsum		**Rock gypsum**	
		Dolomite		**Dolostone**	
Crystalline or bioclastic	Microscopic to very coarse	Calcite	Precipitates of biologic origin or cemented shell fragments	**Limestone**	
Bioclastic		Carbon	Compacted plant remains	**Bituminous coal**	

METAMORPHIC

FOLIATED

METAMORPHIC

BANDING

Scheme for Metamorphic Rock Identification

TEXTURE		GRAIN SIZE	COMPOSITION	TYPE OF METAMORPHISM	COMMENTS	ROCK NAME	MAP SYMBOL
FOLIATED	MINERAL ALIGNMENT	Fine	MICA	Regional (Heat and pressure increases)	Low-grade metamorphism of shale	**Slate**	
		Fine to medium	MICA, QUARTZ, FELDSPAR, AMPHIBOLE, GARNET		Foliation surfaces shiny from microscopic mica crystals	**Phyllite**	
					Platy mica crystals visible from metamorphism of clay or feldspars	**Schist**	
	BAND-ING	Medium to coarse	MICA, QUARTZ, FELDSPAR, AMPHIBOLE, GARNET, PYROXENE		High-grade metamorphism; mineral types segregated into bands	**Gneiss**	
NONFOLIATED		Fine	Carbon	Regional	Metamorphism of bituminous coal	**Anthracite coal**	
		Fine	Various minerals	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		Pebbles may be distorted or stretched	**Metaconglomerate**	