EARTH SCIENCE REGENTS FACT SHEET—Review Packet #1

THINGS YOU NEED TO KNOW FOR THE REGENTS

**CHAPTERS 1-3 IN WORKBOOK**

An **observation** uses your senses, an instrument extends your senses; an

**inference** (prediction) is a conclusion based on observations.

**Classification** – grouping by observable properties.

Graphing a **direct relationship**, as X-axis (independent variable) increases, Y-axis

(dependent variable) increases.

Graphing an **indirect relationship**,as X-axis increases,

Y-axis decreases.

Graphing a static, no change relationship, as X-axis increases,

Y-axis stays the same.

Most changes in the environment are cyclic (moon phases, tides, etc.).

**Dynamic equilibrium**: a system may have small changes over time that eventually return to balance (like flushing a toilet bowl).

**Percent Error** = (difference: measured-accepted value/accepted value) X 100.The accepted value is the correct answer.

**DENSITY**: The same substance always has the same density when temperature and pressure remain constant, no matter how many pieces you break it in to. Only changes in pressure or temperature can change a substance’s density.

**As pressure increases, density increases.**

**As temperature increases, density decreases**.

Volume of a regular object – **L**ength X **W**idth X **H**eight

Volume of irregular object – Displacement of water.

D M

V

**MAGIC TRIANGLE**: D = M/V; M = D X V; V = M/D.

(density formula on front of ESRT)

**WATER** expands when it freezes, (so ice is less dense than water and it floats).

Other substances contract.

Water is **most dense** **at 4oC**, when it is a liquid. (see cover of ref. tables)

Anything with a density greater than 1 will sink in water; less than 1 will float in water.

An **interface** is a **boundary** across which energy is exchanged

**EARTH’S SHAPE:** Earth’s true or real shape is an oblate spheroid (slightly

flattened at the poles and slightly wider at the equator). We know this because the

gravitational force is slightly stronger at the poles than at the Equator.

The **best model** of the Earth is a billiard ball – a perfectly smooth sphere—because Earth is only very slightly oblate. From space Earth looks perfectly spherical.

**Evidence that the Earth is round**: 1) “sinking ship” observation; 2) photographs from space; 3) Earth’s shadow on the Moon during an eclipse; 4) **the Polaris** **rule** (altitude of Polaris = latitude of the observer) 5) Eratosthenes’s measurements and

6) sunrise and sunset (sun hits tops of mountains first.).

**Latitude lines** (parallels) measure distances North or South of the equator.

(see p.4 of reference tables). **Latitude is expressed as 0- 90North or South**.

**The altitude of Polaris** (the North Star) equals your latitude in the Northern

Hemisphere. Two pointer stars in the Big Dipper (Ursa Major) point to Polaris (the last star in the handle of the Little Dipper (Ursa Minor).) 

**Longitude lines** (meridians) measure distances East or West (see p.4 of reference TABLES). LONGITUDE IS EXPRESSED AS 0- 180**EAST OR WEST OF THE PRIME** **MERIDIAN** (0).

(180= the International Dateline). Longitude is based on observations of the sun

Time zones are based on longitude.

The earth rotates on its axis from west to east (1 full rotation, 360= 24 hours).

**Each 15(of Longitude) = 1 hour**. **As you travel East, time gets later; as you travel West, time is earlier.** (If it’s 12 Noon in New York City, it’s 9 AM in Los Angeles).

**ISOLINES** connect points of equal value in a field. Isolines never cross (two different values cannot be found in the same spot).

The closer the isolines (contour lines, isobars, isotherms) the steeper the slope

or gradient.



**Contour lines form a V shape when they cross a stream. The “V” points upstream and the stream flows in the opposite direction.**

The **maximum elevation of a mountain or hill** is higher than the highest contour line but I unit less than the height of what the next contour line would be. The **minimum elevation** is less than the lowest contour but 1 unit more than the next expected line. (Maximum elevation on diagram is 59’, Lowest is 1’).

**A profile** is the vertical cutaway section or side view of the map (See bottom

of above diagram).

**Gradient = Change in Field Value**

**Distance**

**MINERALS (REVIEW BACK PAGE OF ESRT!)**

--naturally-occurring, inorganic, crystalline, solid substances that make up rocks.

There are thousands of minerals, but 12 are commonly found in rocks.

**Minerals** are identified by streak (powdery residue of a mineral when scratched on a porcelain plate), hardness (Mohs hardness scale from 1-10—one is talc and 10 is diamond), cleavage (the tendency of a mineral to break along flat planes) and color.

**All of these characteristics are based on a mineral’s internal arrangement of atoms**! Color alone cannot identify a mineral because a mineral may have more than one color and different minerals may have the same color.

**Oxygen and silicon** are the most abundant elements found in minerals. (silicon tetrahedron)

**Calcite** is the mineral that bubbles in the presence of acid, so the rocks formed from calcite (limestone, dolostone, marble) also bubble with acid.

**ROCKS** are identified as igneous, sedimentary or metamorphic based upon how they are formed—their origins. They are identified by their **texture.**

**Igneous rocks** form from the **solidification** of lava or magma during volcanic events. The faster the magma/lava cools, the smaller the crystals that form.

**Extrusive** igneous rocks can be **glassy** (no crystals)—cooled very fast; have fine crystals or are **vesicular** (have holes made by escaping gases as the rock cooled).

**Intrusive** igneous rocks cool more slowly inside the volcano, so have larger crystals or grains.

Igneous rocks are also identified by the minerals they contain. They can be **felsic** (light-colored, less dense, rich in aluminum and silicon) or **mafic** (dark-colored, more dense, rich in iron and magnesium. (SEE PAGE 6 ESRT)



**Sedimentary rocks** are formed from sediment or **clasts** of various different sizes (clay, silt, sand, pebbles) that have been **buried, compacted and cemented** together. Sedimentary rocks are **most likely to have fossils**.

Chemically-formed sedimentary rocks form from the evaporation of sea water, which leaves behind rock salt or rock gypsu (SEE PAGE 7 OF ESRT).



**Metamorphic rocks** form from the **recrystallization** of pre-existing rocks that have been subjected to intense heat and pressure during mountain-building or volcanic events. Minerals in these rocks soften, migrate and realign within the rock, showing textures such as foliation, banding, and enlarged crystals.

(SEE PAGE 7 OF ESRT). **Contact Metamorphism** is caused by an igneous intrusion.

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