

Earth Science Facts to know for the Midterm.

The same substance always has the same density - The density of any given substance will remain the same regardless of the size, shape, or mass of the sample.

Mass: the amount of matter in an object.

Volume: the amount of space an object occupies.

Most substances are densest as a solid. - **Water is most dense at 4°C, when it is a liquid**

Objects denser than water sink, less dense will float. Water expands when it freezes (so ice floats)

Most changes are cyclic (repeating and predictable)

Observation: using the 5 sense to collect data. Ex: The book is yellowish.

Inferences are conclusions or predictions based on your observations. Ex: The rock is old.

Your senses can be extended (made more precise) by using instruments. Ex: The book is 22cm.

Classification is organizing observations in a meaningful way. Ex: The book is science fiction.

Because the Earth bulges slightly at the equator and is slightly flattened at the poles it is called an oblate spheroid

The equatorial diameter is greater than the polar diameter.

A person would weigh slightly more at the poles because he/she is closer to the center of the Earth.

The best model of the Earth's shape is a Perfect sphere (ping-pong ball)

Evidence for a round earth: photos from space (best evidence), ships disappear slowly over the horizon, Earth's shadow on the moon is curved (lunar eclipse), Polaris = latitude, gravity measurements are difference.

The altitude of Polaris (North Star) above the horizon is the same as the observer's **latitude**

Polaris is located above the Earth's **axis of rotation**

You can only see Polaris in the **northern** hemisphere –always have to look **north** to see Polaris.

As a person's latitude increases, the altitude of Polaris **increases**.

If observer at 90°N, then Polaris is **90°** above the horizon (no compass direction). If observer at 0° then Polaris is **0°**.

Latitude Lines run left to right (horizontal) but measures distances **north** and **south** of the equator.

Longitude Lines run up and down (vertically) but measure east and west of the Prime Meridian.

Longitude is based on observations of the sun

Approximate latitude of NY is 41 to 45°N, 72 to **79°W**. NORTH AMERICA WILL ALWAYS HAVE COMPASS DIRECTIONS FOR LATITUDE **NORTH** AND FOR LONGITUDE **WEST**.

Longitude is based on earth's rotation of 15°/hr and the sun's apparent motion.

If you travel west time becomes less, if you travel east, time will increase!

The closer the isolines (contour, isobar, isotherm) the **greater (steeper)** the slope (gradient).

Contour lines always bend at a stream forming a "V" that points in the opposite direction of flow.

Contour Interval – the elevation increase between two contour lines, Ocean/ sea level = 0.

Streams always flow from **high** to **low** elevation.

The earth rotates from west to east - counterclockwise Speed of rotation 360°/24 hours = 15°/hr

Proofs of rotation 1. Foucault's Pendulum 2. Coriolis Effect (right in the Northern Hemisphere and left in the Southern Hemisphere)

Look for words: day, night, hourly Stars at night will move counterclockwise 45° in 3 hours (15° per hour)

The earth revolves counterclockwise - east coasts of continents experience sunrise and sunset first.

Proofs of revolution 1. Different constellations seen different times of year 2. Seasons

Look for words: yearly, monthly, seasonally

Earth's orbit, as are all planets, has a slightly elliptical shape. Travel faster in our orbit when closest to sun (perihelion) because gravitational attraction is greater and slower when farthest (aphelion).

More elliptical means more eccentric

The reason for the seasons is **not due to elliptical orbit**. Reasons: 1. 23.5° tilt of axis 2. earth's revolution 3. during revolution the axis stays parallel to itself (doesn't flip flop)

Know how to calculate the sun's path. Formula: $90^\circ - \text{latitude} = \text{equinox altitude}$. Equinox = sunrise and sunset due east and due west. Then you add or subtract 23.5° to the equinox altitude **not latitude**. Remember, your equinox altitude and altitude of Polaris (latitude) should equal 90°. If it doesn't, you have done something wrong.

Moon phases are caused by moon's revolution.

One side of the moon always faces earth because moon's rotation and revolution speed are equal 27.3 days

Moon phases take 29.5 days, because it takes the moon an extra 2 days to catch up to the earth and align with sun.

Lunar eclipses can occur during a full moon, solar eclipses during a new moon

We don't have eclipses every month because Moon's orbit is tilted 5° from the ecliptic of our orbit.

Spring tides (higher high tides and lower low tides) occur during full and new moon phases (big tidal range)

Neap tides (not very high tides and not very low tides) occur during 1st and 3rd quarter phases (small tidal range)

Electromagnetic Radiation from sun to earth-atmosphere system -- no medium for transfer

Convection - heat energy transferred due to density differences - works best in liquids and gasses

Conduction - heat energy transferred by molecular contact (vibrations) works best in solids

Evaporation absorbs 2,260 j/g and Condensation releases 2,260 j/g

Specific Heat -- High specific heat of water requires more energy to heat up and cool down

Weather takes place in the troposphere. Unequal heating causes pressure differences which cause air movement

As altitude increases, pressure decreases

As pressure increases, density increases

As temperature increases, density decreases

As water vapor increases, density decreases

Winds go out of the high clockwise and into the low counterclockwise. Coriolis effect kicks in. Pressure measured with barometer - isobars are lines of equal pressure - closer together = steeper gradient and greater wind speed. Wind direction measured with a wind vane and wind speed measured with an anemometer. Winds named from the direction they come from.

Chart on Page 14 - planetary wind belt - know land and sea breezes. Remember specific heat of water is high so it takes more energy to heat up and cool down. Sea breeze during the day because land heats up faster than water, LP or land and HP over water. Winds move from HP (over ocean) to LP (over land) hence the name Sea breeze.

Tips

USE YOUR HANDY DANDY REFERENCE TABLES! Ask yourself if ESRT can help you.

DO NOT UNDER ANY CIRCUMSTANCE LEAVE A QUESTION BLANK.

DO NOT SKIP READING THE INTRODUCTORY PARAGRAPHS OR SENTENCES ABOVE THE QUESTIONS.

Study diagrams before looking at questions. Underline key words.

Draw diagrams to help you visualize the questions asked - where possible

Use a straightedge to read graphics, to mark points on a graph and to measure distances.

If you are not sure of an answer, try to eliminate choices that you think are clearly wrong and narrow down your choices.

Then make your most careful guess **AS THE BEST CHOICE**.

Check your test a second time, but only change an answer if you find an obvious mistake. Your first choice is usually correct.

Lookup formulas, even if you think you know them. Substitute information from the question into the formula. Most are on the back page of the reference tables. Use correct units.

Skip over hard questions that are stumping you. Go back to them later. Something else in the test may give you a clue to the harder problems.

Have a healthy meal for dinner the night before. Eat veggies if possible.

A good night sleep is as important as the above