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**IDX G9 GEOGRAPHY H STUDY GUIDE ISSUE 3**

**By Ethan Swee**

—air pressure: weight of the atmosphere. depends on motion, size, number of molecules.

—temperature increases-> spacing between molecules increases -> density decreases -> air pressure decreases

—water vapor content increases-> mass decreases (water vapor is lighter than dry air) -> density decreases –> air pressure decreases

—warm, humid air = low pressure

—cold, dry air = high pressure

—wind: horizontal motion of air across earth’s surface

—anemometer: measures wind speed

—wind vane: measures wind direction

—winds are named for the direction from which they originate

—wind is determined by:

—*gravitational* force: counteracts centrifugal force

—*pressure gradient force*: drives air from areas of higher pressure to lower pressure

—gradient: rate of change in some property over distance

—PGF exists because earth is unevenly heated

—also created by vertical air movement

—isobar: isoline plotted on a map to connect points of equal pressure

—closer isobars -> higher PGF -> faster winds (and vice versa)

—*coriolis force*: deflective force that makes wind traveling in a straight path appear to be deflected in relation to the earth’s surface

—caused by earth’s rotation

—on a nonrotating earth, winds would move in a straight line

—*objects deflected to right in northern hemisphere and to the left in southern hemisphere*

—weakest at equator and strongest at poles

—deflection occurs regardless of the direction in which the object is moving

—deflection increases as the speed of the moving object increases

—does not affect small-scale motions

—winds spiral to the right in the northern hemisphere and to the left in the southern hemisphere

—*friction force*: drags on the wind as it moves across earth’s surface

—decreases with height above surface

—without friction, surface winds would move in paths parallel to isobars at high rates of speed

—geostrophic winds: winds that do not flow directly from high to low, instead flowing around the pressure areas, remaining parallel to the isobars.

—cyclone: low pressure

—counterclockwise in the northern hemisphere and clockwise in the southern hemisphere

—anticyclone: high pressure (cannot be observed)

— clockwise in the northern hemisphere and anticlockwise in the southern hemisphere

—primary circulation: general worldwide circulation

—secondary circulation: migratory high-pressure and low-pressure systems

—tertiary circulation: local winds & temporal weather patterns

—meridional flows: winds that move n/s along meridians of longitude

—zonal flows: winds that move w/e along parallels

—equatorial low: (10° n - 10° s): forms the ITCZ, which is identified by bands of clouds.

—subtropical high (20-35° n/s): caused by dynamic factors instead of thermal factors.

—dynamic factor: caused by the physical displacement of air

—subpolar low (60° n/s): also caused by dynamic factors

—polar high (90° n/s): weaker than subtropical high.

—trade winds: winds converging at the equatorial low

—northeast in northern hemisphere and southeast in southern hemisphere.

—hadley cells: from ITCZ to subtropical high. trade winds are caused by air returning from the subtropical high to the ITCZ.

—doldrums: equatorial calms

—horse latitudes: calms at 25° n/s, caused by sinking cool dry air

—westerlies: surface air diverging within the subtropical high-pressure cells

—stronger in summer, weaker in winter

—less consistent than trade winds

—polar easterlies: cold + dry winds moving away from the polar region in an anticyclonic direction

—weak and variable

—polar front: area between cold air from higher latitudes and warm air from lower latitudes

—antarctic high: stronger than the arctic high because of antarctica’s larger landmass

—rossby waves: occur along the polar front where colder air meets warmer air. cold air moves southwards and warmer air moves northwards

—jet stream: upper-level westerly geostrophic winds

—irregular, concentrated

—weaken in summer and strengthen in winter

—polar jet stream: 30°-70° n

—subtropical jet stream: 20°-50° n

—monsoons: seasonally shifting wind systems

—Asian monsoon: caused by uneven heating of landmass compared to the ocean in the summer, so hot air from the landmasses blow towards the oceans while cool air from the oceans blow to these landmasses.

—land/sea breeze: local winds produced along most coastlines. Caused by the same thing but on a smaller scale.

—mountain/valley breezes: local winds resulting when mountain air cools at night and when valley air gains heat energy during the day.

—ocean currents: driven by frictional drag of winds over water

—caused by differences in temperature, salinity, configuration of the continents and ocean floor, and tides

—western intensification: surface currents approaching the western bits of oceans and piling up on the eastern shores of continents

—upwelling current: where surface water is swept away from a coast either by surface divergence or by offshore winds

—downwelling current: where excess water gravitates downwards

—thermohaline circulation: density differences causing the flow of deep currents

—slower than surface currents but moves larger volumes of water

—ENSO: El Nino Southern Oscillation: system fluctuations that occurs in a multiyear period. Affects temperatures and air pressure patterns, in turn affecting global winds and climates.

—normally the eastern waters of the south pacific are cold and the western bit warm.

—sometimes this changes, and the eastern waters warm up, so a low pressure point develops there.

—trade winds normally moving from east to west weaken and can even be replaced by an eastward flow.

—during El Nino conditions, the thermocline (transition layer between wars/cool waters) lowers in depth, preventing upwelling

—occurs once every 2-12 years, most commonly 3-5 years.

—La Nina: when the neutral condition’s locations of low/high pressure and warm/cool waters are maintained, but at a more extreme level.

—weaker and less consistent that El Nino