

Ch. 11.1

1. Why would snowfall decrease the percentage of solar radiation absorbed by the Earth's surface?

275 white snow reflects radiation (high albedo)

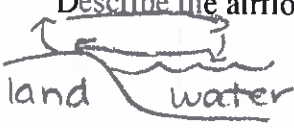
2. Why are cloudy days generally cooler than clear days?

clouds reflect incoming radiation

3. Why does the conduction of heat in the atmosphere only occur close to the earth's surface?

276 conduction → mols collide & transfer E (direct contact of part. - Air mol are in contact w/Earth's surface)

4. Describe the airflow when the sun warms the land next to cooler lake or ocean surface.

276  warm air over land rises & is replaced w/cool air from above the lake/ocean

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5. Describe heat flow and relate this to the atmosphere.

278 Heat is the transfer of E that fuels atm processes ( $\uparrow T \rightarrow \downarrow T$ )

6. Describe the relationships between temperature, density, and air pressure in the atmosphere.

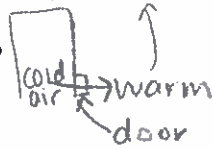
$\uparrow T = \uparrow P$  Directly prop.  $T \uparrow = \downarrow D$  inversely

7. How does the atmosphere work much like an air-conditioned building? What causes wind?

282 Air moves in response to density imbalances created by unequal heating of Earth's surface (cold, dense air rushes out the door to replace the warm air that rose)

8. What happens to the area illuminated by sunlight as the rays strike the ground at a lower angle?

301  area illuminated at low  $\angle = \uparrow S.A.$



9. What happens to the relative intensity of the sunlight as it strikes at a lower angle?

301  $\sin \angle = \uparrow S.A. = \downarrow Intensity$

10. Give the type of air mass (Continental tropical, maritime tropical, continental polar, maritime polar, arctic) associated with each set of conditions.

Warm and dry CT

Cold and humid mP

Very cold and dry Arctic

Warm and humid mT

Cold and dry cP

11. What type of air mass brings very cold winter air to Nebraska?

303 cP

1. What type of air mass brings warm humid air from the Gulf of Mexico in the summer?

303 mT

13. Thunderstorms occur when a warm humid air mass is forced over a cold dry air mass. Where would each type of air mass probably come from in the Midwest US?

303 cp - Canada mT - Gulf of Mexico  
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14. What is the Coriolis effect? Would the wind's path be curved or a straight line if we could observe it from space? Coriolis effect deflects moving part. like air & water  $\curvearrowright$  in

305 N. Hemi. &  $\curvearrowleft$  in S. Hemi - caused by Earth's rotation. It combine w/ heat imbalance to create trade winds, polar easterlies, &

15. Describe Hadley cells.

305-b  $\curvearrowright$   $\curvearrowleft$  Warm air at equator rises, cools, condenses, westerlies and sinks.  $0^{\circ}$ - $30^{\circ}$  N & S - related to trade winds

16. What is the intertropical convergence zone? (ITCZ)

306 It follows the Sun's most direct rays around equator. Air is heat & converges, forced upward & creates  $\curvearrowright$  at eq  $\curvearrowright$   $\curvearrowleft$

17. Describe the four fronts from the text and the weather associated with each.

308-09 cold - clouds, showers, some storms (abrupt)  $\rightarrow$   $\curvearrowright$   $\curvearrowleft$

Ch. 15.2 warm - extensive cloudiness & precip (gradual)  $\rightarrow$   $\curvearrowright$   $\curvearrowleft$   
stationary - Sim. to warm (T & P gradient is small)  $\rightarrow$   $\curvearrowright$   $\curvearrowleft$   
occluded - precip on both sides of front  $\rightarrow$   $\curvearrowright$   $\curvearrowleft$

18. Explain how water temperature and amount of dissolved salt affects water density.

393  $\downarrow T = \uparrow D$   $\uparrow \text{Salt} = \uparrow D$   $\uparrow \text{Sal} - \text{Add salt / Remove Fresh water}$   
Ch. 15.3 cold, salty water = most dense  $\downarrow \text{Sal} - \text{Remove Salt / Add Fresh}$

19. Discuss the horizontal movement of energy within the oceans. (gyres, surface currents, density currents)

397-04 Gyre - closed, circular current system - water at poles freezes leaving cold, salty dense water... it SINKS & travels along ocean floor toward equator (density current) warm, eq water displaced toward poles via surface currents

20. Discuss the vertical movement of energy within the oceans. (upwelling, water masses) Surface currents

397-B upwelling - surface water near coast is displaced, nutrient-rich, cold water comes up  
water masses  $\rightarrow$  see #19 with sinking & rising

21. One of the predicted effects of global warming is a smaller temperature and salt content difference between the southern and northern ends of the Gulf Stream that runs from the Gulf of Mexico to Northern Canada. So that the warm, saline surface waters of the Gulf Stream can continue to push northwards, there must be a comparable, deep return current of cold, dense water from the Nordic seas.

a. What happens to the rate of circulation of the current as the density difference becomes smaller?

rate of circulation decreases as density diff decreases (gradient isn't as steep) - must have diff heating!

b. What happens to the average temperature of northern Europe if the Gulf Stream current slows down?

Avg temp of Europe decreases