Name _____ Date _____

STUDY GUIDE – CHAPTERS&7

THE EARTH AND SPACE

1. ENVIRONMENTAL IMPACTS OF MINING AND THE TRANSFORMATION OF MINERALS

- ***animal habitat is ruined;***
- ***trees and vegetation are removed and therefore can no longer remove CO_2 from the environment***
- ***trees and vegetation are removed and therefore can no longer introduce O_2 into the environment***
- ***food chains are disturbed as animals' food is taken away***
- ***trucks and machinery used in mining add CO_2 to the environment by burning fossil fuels***
- ***the rock and soil is dumped back as a series of spoil banks and can contaminate the water***

2. PERMAFROST

1) layer of ground whose temperature has been 0^0 or less for at least 2 years

SAMPLE PROBLEMS

1) In the Canadian Arctic, houses are sinking into the ground, and runways are cracking. Explain why.

2) Is there any vegetation in the Far North of Québec? Explain your answer.

3. CONSEQUENCES OF A RISE IN TEMPERATURE IN THE PERMAFROST

2) landslides can occur;
3) trees can fall;
4) building constructed on permafrost can collapse;
5) carbon dioxide and methane gas trapped in the permafrost can be released and contribute to global warming

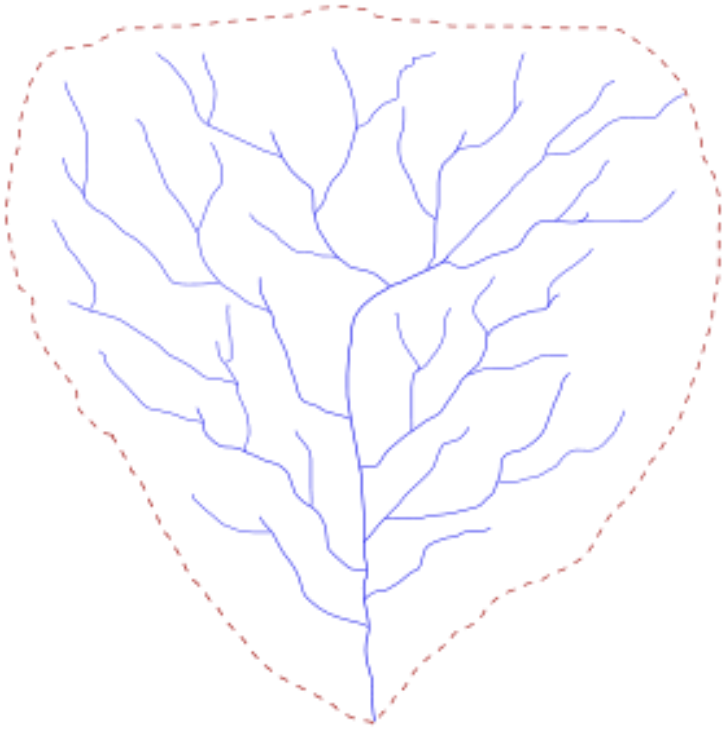
4. CHEMICAL AND BIOLOGICAL REACTIVITY OF A SOIL

Conditions for a soil to be fertile:

1) a sufficient amount of minerals
2) adequate moisture
3) an appropriate soil pH(7)

5. CATCHMENT AREA

- ***Territory surrounding a waterway***



- ***A watershed is an extent or an area of land where surface water from rain and melting snow or ice converges to a single point, usually the exit of the basin, where the waters join another water body, such as a river, lake, reservoir, estuary, wetland, sea, or ocean.***

- ***The watershed includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into those channels, and is separated from adjacent basins by a drainage divide.***

- ***The watershed acts as a funnel by collecting all the water within the area covered by the basin and channeling it to a single point. Each watershed is separated topographically from adjacent basins by a geographical barrier such as a ridge, hill or mountain.***

6. IMPACTS OF HUMAN ACTIVITY ON THE WATERWAYS IN A CATCHMENT AREA

- ***Watersheds are important elements to consider also in ecology. As water flows over the ground and along rivers it can pick up nutrients, sediment, and pollutants. Like the water, they get transported towards the outlet of the basin, and can affect the ecological processes along the way as well as in the receiving water source.***

- ***Modern usage of artificial fertilizers, containing nitrogen, phosphorus, and potassium, has affected the mouths of watersheds. The minerals will be carried by the watershed to the mouth and accumulate there, disturbing the natural mineral balance. This can cause eutrophication where plant growth is accelerated by the additional material.***

SAMPLE PROBLEMS

1) Environmental experts divide inland waters among watersheds. How do they define the boundaries of watersheds?

2) Name four factors that affect the flow of water within a watershed.

7. SALINITY

- ***measure of the quantity of salt in a solution***

SAMPLE PROBLEMS

1) Where does salt in seas and oceans comes from?

2) Which water is denser?

   a) water with three-percent salinity or water with four-percent salinity?

   b) water at 12°C or water at 18°C?

8. INFLUENCE OF SALINITY ON THE DENSITY OF A SOLUTION

- ***Water with higher salinity has a higher density and sinks deeper into the seas and oceans.***
- ***Water salinity is responsible for the formation of subsurface currents in seas and oceans.***
- ***Colder water has a higher density***
- ***Movement of water of different salinity produces ocean currents***

SAMPLE PROBLEMS

1) Explain why sea water is less salty near the poles.

2) Does sea water sinks deeper into the ocean that fresh water?

3) The differences in seasonal temperatures are not as great in the ocean as on land.

a) Explain why.

b) Name three factors that affect the temperature of ocean waters.

4) Is seawater more saline at the poles or in the tropics? Explain your answer.

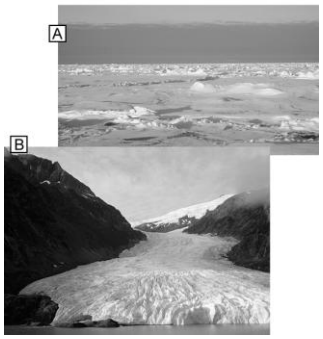
9. GLACIERS AND ICE FLOES

A) Glaciers- mass of ice on land, formed by compressed snow

B) Ice pack – composed of ice floating on the oceans near the North and South Poles.

10. IMPACTS OF THE MELTING OF GLACIERS AND ICE FLOES

A) increase in sea level
B) disturbance of thermohaline circulation
C) disturbance of certain marine ecosystems that depend on salt water like coral reefs
D) melting pack ice threatens the survival of species that depend on the ice, such as polar bears or ringed seals.



SAMPLE PROBLEMS

1) The two photos opposite were taken during a trip to the Arctic.

a) Which photo features pack ice?

b) What distinguishes the glacier from the pack ice?

11. FACTORS THAT AFFECT THE CIRCULATION OF **SURFACE** CURRENTS

a) WINDS
b) ROTATION OF THE EARTH

12. FACTORS THAT AFFECT THE CIRCULATION OF DEEP CURRENTS

A) TEMPERATURE
B) SALINITY
C) DENSITY

SAMPLE PROBLEMS

1) What am I?

a) I am a wind-driven ocean current

b) I am an ocean current caused by differences in water density.

c) I form a huge "conveyor belt" that transports ocean waters around the world.

13. THERMOHALINE CIRCULATION

- ***Ocean current- movement of seawater in a certain direction***
- ***Ocean circulation the combined effect of all the currents that move across the ocean***
- ***Termohaline circulation***

- huge conveyor belt formed by surface and subsurface currents that move water all around the world

- moves warm water from the equator towards the North and South poles

- moves cold water from the North and South poles towards equator

- transfers heat around the world; regulates the climate on the planet giving warmer temperatures at the poles and colder temperature at the equator

SAMPLE PROBLEMS

1) Study this map of the world carefully.

a) ***Using arrows draw the termohaline circulation.*** Indicate the warm currents in red and the cold currents in blue

b) Which current is closer to the floor: the red or the blue?

2) Surface ocean currents sink 3 km when they reach the Greenland coast. Why?

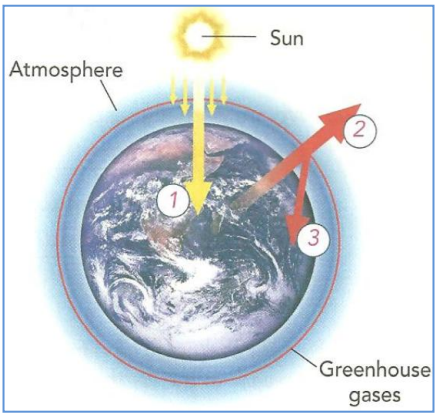
3) The Gulf Stream is an ocean that crosses Atlantic ocean. This current carries warm waters from the Florida coast northward to Newfoundland, then branches off eastward to Northern Europe. What effect does the Gulf Stream have on the climate in northwestern Europe?

14. TECHNOLOGIES USED TO PRODUCE ELECTRICITY USING THE ENERGY RESOURCES IN THE LITHOSPHERE AND HYDROSPHERE

SPHERE	FORM OF ENERGY	ADVANTAGE	DISADVANTAGE
LITHOSPHERE			
HYDROSPHERE			

ATMOSPHERE			

15) DESCRIBE THE GREENHOUSE EFFECT



- Greenhouse gases have always been present in the atmosphere. The main greenhouse gases are water vapour (H_2O), carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). They help the Earth retain part of the heat it receives from the Sun. Without these gases, the mean temperature on Earth would be –18°C

  In the greenhouse effect, the sun's rays are absorbed by the ground.(1)
- Once heated, the ground emits infrared rays, some of which pass through the atmosphere and are lost in space.(2)
- Greenhouse gases trap some of the infrared rays and send them to Earth, which makes the temperature rise on the Earth's surface. (3)

16) DESCRIBE THE CONSEQUENCES OF A HIGHER CONCENTRATION OF GREENHOUSE GASES

GLOBAL WARMING: Scientists believe that an overall temperature increase of 2^0C is a critical point beyond which there will be serious climate disruptions: droughts, melting of glaciers and a rise in sea level, heat waves, floods, disturbances in ecosystems.

SAMPLE PROBLEMS

1) True or false? Explain your answers.

a) The greenhouse effect is a recent phenomenon, caused by human activity on Earth.

b) By accumulating in the atmosphere, greenhouse gases trap increasing amounts of ultraviolet radiation.

c) Clearing land intensifies the greenhouse effect because carbon dioxide is released as felled trees decompose.

d) Photosynthesis in plants plays a major role in stabilizing temperatures on Earth.

2) For each of the following greenhouse gases, name a human-caused source of emissions.

a) carbon dioxide (CO_2)

b) methane (CH_4)

3) Decomposing waste in landfills produces methane (CH_4). In some sites, this gas is collected and burned to transform it into carbon dioxide (CO_2). Does this practice have a positive or negative impact on the environment? Explain your answer.

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1) <u>DESCRIBE TECHNOLOGIES USED TO PRODUCE ELECTRICITY USING THE ENERGY RESOURCES IN THE ATMOSPHERE</u>

- ***Wind energy can be drawn from the wind and converted into electricity.***
- ***It is a renewable resource that produces no greenhouse gas.***
- ***Wind turbines work in a relatively simple way. The wind spins the blades, which activate an electric generator inside the nacelle.***
- ***Wind energy is then transformed into electrical energy, which is distributed to consumers.***

EXTRA PRACTICE

1) ***Which of the following can contaminate water in a water body?***

A) Topography
B) Agriculture
C) Geology
D) Climate

2) ***Which of the following is not an environmental impact of mining?***

A) Disturbance in food chains
B) Less oxygen added by plants oxygen into the environment
C) Occurrence of landslides
D) Ruining of animal habitats

3) ***Which of the following statements is false about salinity of water in oceans:***

A) Salt in seas and oceans come from the artificial fertilizers containing nitrogen, phosphorus and potassium.
B) Water with 4% salinity at 12 degrees Celsius is denser than water with 3%. salinity at 18 degrees Celsius.
C) Sea water is more salty away from the poles.
D) Warm water is less dense.

4) Oceanic circulation involves two types of ocean currents; surface currents and deep currents. The following table lists 4 factors that influence oceanic circulation.

FACTORS AFFECTING OCEANIC CIRCULATION

1. Rotation of the Earth
2. Differences in the water temperature
3. Differences in the water salinity
4. Prevailing winds

Which of the two factors in particular influence SURFACE CURRENTS?

A) 1 and 2
B) 1 and 4
C) 2 and 3
D) 3 and 4

5) Which of the following reactions does not produce carbon dioxide:

A) Respiration
B) Decomposition of organic matter
C) Any combustion reaction
D) Forest fires

6) Many scientists agree that the current climate change we are experiencing is due to an increase of the greenhouse gases caused by human activity. W***hich of the following gases DOES NOT contribute to climate change:***

A) Carbon dioxide
B) Methane
C) NO_x
D) Ozone

7) Which of the following options contains only factors that affect THE TEMPERATURE of ocean waters?

A) Seasons, topography, depth
B) Latitude, depth, salinity
C) Season, depth, vegetation
D) Latitude, season, depth

8) Which of the processes is a result of melting glaciers and ice floes?
a) Decrease in sea level.
b) Eutrophication.
c) Disturbance of thermohaline circulation.
d) Increase in salt content of seawater.

9) Which of the following situations represent factors linked to the CURRENT climate change due to greenhouse effect?

a. cellular respiration in plants and animals
b. photosynthesis
c. combustion of fossil fuels
d. forest fires
e. increase in red meat consumption
f. industrial processes
g. volcanic eruptions
h. increased farming

10. Which of the following is caused by differences in salinity of water?

A) Surface currents
B) Subsurface currents
C) Global warming
D) Waves

11. Which of the following energy resources IS NOT found in the lithosphere?

A) Fossil fuels
B) Uranium
C) Geothermal energy
D) Electric dams

12. Which of the following is a set of greenhouse gases?

A) Carbon dioxide, methane, water
B) Carbon dioxide, methane, NO_x
C) Water, oxygen, methane
D) Water, carbon dioxide, methane

10) Which of the following forms of energy is non renewable and contributes to the greenhouse effect as well?

A) Geothermic energy
B) Aeolian energy
C) Fossil fuels
D) Wind energy

11) ***Which of the following is NOT TRUE about hydroelectric dams?***

A) Can flood large areas of land.
B) Is a non renewable form of energy.
C) Can contaminate water.
D) Obtained from hydrosphere.

12) Which of the following statement is true about the greenhouse effect?

A) New phenomenon produced by the carbon dioxide released during the combustion of fossil fuels.
B) Natural phenomenon through which the earth retains some of the energy it receives from the sun.
C) The greenhouse effect makes the earth absorb too much heat from the sun.
D) The greenhouse effect is happening because the layer of ozone around the earth is too thick.

EXTENDED ANSWERS

1) Name the following:

A)It is a process that takes place in plants and helps stabilizing the temperatures on earth. _____

B)It is a renewable form of energy obtained from the atmosphere. _____

C)Oceanic circulation caused by differences in water density. _____

D)It helps in transporting ocean water around the world. _____

2) Name any two conditions required to make the soil fertile.

_____

_____

3) People living in the Canadian Arctic face a lot of problems recently. A few of them are are listed below. ***Explain the possible causes:***

A) After a warm summer, many houses begin sinking into the ground and runways were cracking. ***Explain why.***

_____

_____

B) Groceries are relatively expensive as no vegetation can be done in the region. ***Explain why.***

_____

_____

C)Scientists agree that the type of soil existing in the Canadian Arctic is currently contributing to global warming. ***Explain how.***

_____

_____

D)A lot of lanslides happen in the Canadian Arctic. ***Explain what measures could be put in place in order to prevent landsliding in this area.***

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4. Describe a catchment area

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5. ***Name two factors affecting:***

Flow of water within a watershed:

_____, _____

Circulation of deep currents:

_____, _____