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Earth Science 9 Review

Multiple Choice

1) Which of the following is not an Earth Sphere?	
a) The Hydrosphere	b) The Biosphere
c) The Pyrosphere	d) The Atmosphere

2) A food web differs from a food chain because	
a) Food webs show multiple predator prey relationships	b) Food webs share less information
c) Food webs do not show where the energy goes	d) Food webs only include different species of spiders

3) When large plastics breakdown from UV light, they form toxic	
a) Macroplastics	b) Carbon Dioxide
c) Glucose	d) Microplastics

4) In the biosphere, a rock is considered	
a) Cool	b) Biotic
c) Abiotic	d) Enerbiotic

5) Carbon Dioxide naturally leaves the atmosphere by	
a) Cellular Respiration	b) Photosynthesis
c) Elemental uptake	d) Nitrogen capture

6) The northern and southern hemispheres have opposite seasonal patterns due to	
a) Earth's tilt	b) Nuclear fusion in the sun
c) The moon's gravitational pull	d) The price of oil

7) A species that is moved to a new location with the possibility of outperforming native species is called	
a) Pioneer species	b) Keystone Species
c) Reese's Species	d) Invasive Species

8) Rock formed from magma is called	
a) Sedimentary rock	b) Igneous rock
c) Metamorphic rock	d) Mineral rock

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9) To become clouds, water molecules in the atmosphere undergo	
a) Precipitation	b) Condensation
c) Collection	d) Evaporation

10) The refrigerator compound banned across the world for destroying the ozone layer is called:	
a) ChloroFluoroCarbons	b) ChloroBromoCarbons
c) Carbon Dioxide	d) Dihydrogen Monoxide

11) If a prey species is overhunted:	
a) The prey are guaranteed to go extinct	b) Their predators' population will increase
c) Their predators' population will decrease	d) The top of the food chain will greatly benefit

12) Convection currents do not affect	
a) Air movement in the atmosphere	b) Ocean currents in the hydrosphere
c) Movement of the tectonic plates in Earth's Lithosphere/geosphere	d) The formation of the ozone layer in the stratosphere

13) An example of an environmental policy that incentivizes /rewards people being environmentally friendly is	
a) Taxing people when burning carbon products	b) Paying people for generating energy using solar panels
c) Removing a lane of traffic to reduce the number of cars on the road	d) Limiting the amount of energy supplied to each household

14) A type of pollution that directly affects the mating cries of animals is	
a) Carbon dioxide emissions	b) Deforestation
c) Sewage	d) Sound pollution

15) Deforestation occurs because of	
a) Construction needs	b) Agricultural space
c) Mining and resource extraction	d) All of the above

16) Climate change is	
a) The temporary change to the weather of an area	b) The loss of animals in a region of North America
c) The long-term change to the weather and temperature of a region	d) None of the above

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Matching/vocabulary

Omnivore	An organism that eats both primary producers and animals
Karman line	The point in the atmosphere that marks the beginning of space
Keystone Species	A type of organism that is vital (super important) to the health of their ecosystem.
Bioaccumulation	When toxins or other materials build up inside an organism during its lifetime
Montreal Protocol	The treaty banning the use of CFCs
Bioremediation	An effort to return an environment back to its natural state before pollution
Goldilocks Zone	The area in the solar system that is the optimal distance away from the sun to allow for life and liquid water
Cryosphere	The part of the hydrosphere that exists as a solid.
Biome	An area of earth that receives similar weather and temperature patterns year-round
Biomagnification	When toxins or other particles increase in organisms as you move up the food chain

Bioaccumulation	Convection Current	Omnivore	Bioremediation	The Goldilocks zone
Keystone Species	Biome	Cryosphere	Albedo effect	The Montreal Protocol
Pioneer Species	Karman line	Carnivore	Biomagnification	The Paris Agreement

Diagram

Make a food Chain of the following organisms. Include the names of each level of the food chain. Be sure to show/indicate the direction energy is travelling in the food chain!

Organisms: Alligator, Cricket, Decomposing fungi, grass, frog

Level (energy moving up)	Organism
<i>Tertiary Consumer</i>	<i>Alligator</i>
<i>Secondary Consumer</i>	<i>Frog</i>
<i>Primary Consumer</i>	<i>Cricket</i>
<i>Primary Producer</i>	<i>Grass</i>
<i>Decomposer</i>	<i>Decomposing Fungi</i>

Note: The Decomposing Fungi can also be written on the side, taking energy from all levels and giving energy back to the primary producer through the soil.

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Short Answer

- 1) Why is carbon dioxide so impactful as a green house gas even though something like sulfur hexafluoride is 26 thousand times stronger at being a greenhouse gas?

Humans produce far more Carbon Dioxide than sulfur hexafluoride, and are often polluting the environment in ways that prevent effective carbon dioxide removal, such as deforestation.

- 2) What kinds of technologies have been created or are being researched to help slow down greenhouse gas emissions or pollution? **Describe** 3 different technologies.

Answers will vary. Examples:

Nuclear fusion – A future technology that mimics the reactions in stars where two elements combined and release a lot of energy, reducing the need to burn fossil fuels. No radioactive waste produced.

Nuclear Fission - A current technology that splits a nucleus into two other elements, releasing a lot of energy, reducing the need to burn fossil fuels. Radioactive waste produced, but manageable and somewhat valuable.

Lightbulb advancements – New LED lightbulbs use far less energy than the original tungsten filament bulbs, reducing energy generation requirements.

Oil/plastic eating bacteria – Bacteria that eats plastic or oil for natural and environmentally friendly disposal. The bacteria can be modified to accomplish this in a more effective manner.

- 3) A) What is the most vulnerable part of the food chain? **Explain.**

The top of the food chain – Animals are typically bigger at the top of the food chain, requiring the most energy while also receiving the least amount of energy from their prey. The top of the food chain is affected by any and all changes to levels below it.

B) What is the most important part of the food chain for it to be stable? **Explain.**

Primary Producers – They are the part of the food chain that takes in solar energy to fuel the food chain.

- 4) Animals eat plants, which are directly needed to remove CO₂ from the atmosphere. Would a reduction in wild animals guarantee an increase in the plants needed to control the greenhouse gases?

No it would not guarantee that would happen. Plants need healthy ecosystems to live, as they rely on other things to perform tasks such as pollination, or to eat pests that harm plants.

- 5) How do oil spills effect the environment?

Oil spills cover plants in oil or float on water. In either case, it prevents plants from performing photosynthesis using sunlight. Oil is also toxic to most organisms, leading to organ problems and death. It can also degrade into carbon dioxide, causing more greenhouse gas effects.

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Extending

Hurray! It is the future! A new technology is created that allows humans to teleport anywhere they want around the world. To use the machine, it requires 20 logs of wood, sulfur and fluorine, and some fresh water for every use. The machine generates lots of oil and sulfur hexafluoride in the process. If this technology existed, explain how it would affect the spheres of Earth. Additionally, think about ways the technology can be used, or decide if it is not worth the advantages.

Answers will vary. Some examples of points that could be made:

- **The atmosphere is deeply affected by the sulfur hexafluoride and carbon dioxide, and the loss of trees will decrease photosynthesis, also changing the environment by reducing the amount of CO₂ removed.**
- **Increased greenhouse gases in the atmosphere affect the hydrosphere, including melting ice, precipitation patterns, and collection on Earth (such as rising Ocean levels). It also uses Fresh water supplies, a limited resource that takes time to replenish.**
- **Increased greenhouse gases will lead to habitat loss, forest fires, extreme weather, loss of fresh water, and other effects that damage or destroy food chains/webs/ecosystems.**
- **The Geosphere will also experience some changes due to things like a decline in plant life keeping rocks in place.**
- **The technology would reduce large distance travel, reducing pollution from things like planes. However, it is likely not worth the massive pollution from the technology in most cases, as the massive amount of pollution and resource usage are hard to overcome. Additionally, generation of oil will likely lead to the tempting possibility of burning it for energy.**

Explain what is happening in the Arctic Ocean due to Greenhouse gases. Describe changes to Earth spheres, food chains/webs/ecosystems, and human habits. Detail what should or could be done in the future regarding this issue.

Answers will vary. Some examples of points that could be made:

- **Due to climate change, the Arctic Ocean is losing Arctic Ice at a rate faster than it can be reformed. The Arctic Ocean is therefore losing a lot of ice.**
- **The melted ice will enter the active portion of the hydrosphere, increasing water levels.**
- **The disruption to the water cycle will lead to habitat loss and food web disruption (biosphere), with particular devastation in the tundra ecosystems. There would also likely be a rise in disease from water-breeding mosquitos.**
- **The atmosphere will likely allow more energy to reach Earth due to the Earth's lowered albedo effect, since ice/snow reflects energy.**
- **It is difficult to predict what may happen to the geosphere, but some aspects may be affected (perhaps less freeze/thawing effects due to a warmer world, leading to less sedimentary rock formation).**

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- **The Arctic Ocean would be more open to ships, meaning humans would use more fossil fuel burning vessels to transport goods in the area. It will also more resources revealed that humans will want to extract.**
- **To combat the melting of the Arctic, greenhouse gases need to be reduced by reducing human activities that generate the greenhouse gases, such as fossil fuel vehicles and factories. Efforts to remove the greenhouse gases and/or sustain trees to remove CO₂ overtime should be made through technologies and policies. Manual regeneration of the ice is currently impractical.**