Topic 3.3: How does energy transformation affect global systems?

- Earth is a _____ in which energy is transformed.
- Earth's atmosphere is heated by the _____ and transfer of _____ energy and _____ energy.
- Energy transfer and energy transformation _____ Earth's temperature.
- Energy transformation and transfer can _____ aquatic and terrestrial ecosystems.

Concept 1: Earth is a _____ in which energy is transformed.

- _____ , and mountain formation on Earth are all due to energy transformations.
- _____energy, _____ energy, and _____ energy all play important roles in Earth's system.
- _____ energy has the greatest impact on Earth.
- Its transformations drive water movement through the _____ and the _____.
- _____ energy is transformed into _____ energy inside Earth's crust.
- This thermal energy drives _____ to move and is the source of volcanic activities.
- _____ energy is used to produce electricity.
- The Moon's _____ energy is the reason why _____ exist on Earth.

1. What types of energy contribute to the Earth system?
2. Which type of energy transformation has the greatest impact on Earth?

Concept 2: Earth's atmosphere is heated by the _____ and transfer of _____ energy and _____ energy.

- The Sun gives off _____ energy.
- This _____ energy is transformed into _____ energy.
- The Sun's _____ energy consists of _____ light, _____, and _____ radiation.
- When _____ light is absorbed by Earth's surface, it is converted into _____ energy.
- The atmosphere _____ infrared radiation and traps it as _____ energy.
- _____ radiation plays the largest role in regulating Earth's temperature.
- The rest of the solar energy is_____, _____ , and scattered by clouds and the atmosphere.
- _____ gases warm Earth's atmosphere and contribute to the _____ *effect.*
- _____ gases include_____, water vapour, _____, and_____.
- **Conduction:** the transfer of _____ energy between two substances that are _____
- _____ of molecules in the water and land transfer _____ energy to molecules in the air through _____
- **Convection:** the transfer of _____ energy by the _____ of heated fluids from one place to another
- Convection occurs in the _____ and distributes _____ energy.

1. Describe the roles played by the following in warming Earth's atmosphere.

a) radiation
b) conduction
c) greenhouse gases
d) convection

Concept 3: Energy transfer and energy transformation _____ Earth's temperature.

- Water moves among the hydrosphere, geosphere, and atmosphere through:

1) _____

2) _____

3) _____

4) _____

- _____ releases _____ energy into the atmosphere.
- Water returns to the surface through _____ as rain and snow.
- When water absorbs thermal energy, it _____ from Earth's surface.
- Plants take up water from the _____ and release it into the _____ as water vapour. This is the process of _____.

Water Moderates Earth's Temperature

- Water absorbs a lot of energy through _____.
- _____ plays a role in cooling Earth.
- _____ **capacity:** the amount of energy required to change the temperature of ___ g of a substance by ____ degree Celsius
- _____ has a high specific heat capacity.
- Therefore, ocean temperatures stay _____.

1. Describe the role energy transformation plays in the water cycle.
2. What is specific heat capacity?
3. Why are coastal temperatures more moderate than inland ones?

Concept 4: Energy _____ and _____ can harm aquatic and terrestrial ecosystems.

- Greenhouse gases are causing Earth's atmosphere to become _____.
    - This is leading to the _____ in ocean temperature as well.
    - As a result, aquatic ecosystems are being _____ and aquatic animals are dying.

- Terrestrial ecosystems are _____ impacted by the _____ in radiation exposure.
    - _____ materials and wastes that accumulate in the _____ are contaminating terrestrial ecosystems.
    - Harmful effects are seen as a result of _____.

1. Explain how climate change is affecting at least one aquatic organism.
2. Why are radioactive materials so harmful to terrestrial ecosystems?

Topic 3.3 Summary: How does energy _____ affect global systems?

- Earth is a system in which energy is _____.
- Earth's atmosphere is _____by the transformation and transfer of

  _____ energy and _____ energy.
- Energy _____ and energy _____ moderate Earth's temperature.
- Energy transformation and transfer can _____ aquatic and terrestrial ecosystems.