Topic 4.2: Energy Flow Review

**Essential Idea: Ecosystems require a continuous supply of energy to fuel life processes and to replace energy lost as heat.**

**4.2.U1 Most ecosystems rely on a supply of energy from sunlight.**

State how energy in carbon compounds enters most biological communities.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

List three groups of autotrophs.

(List: Give a sequence of brief answers with no explanation.)

**4.2.U2 Light energy is converted to chemical energy in carbon compounds by photosynthesis.**

Outline how light energy is converted to chemical energy.​

(Outline: Give a brief account or summary)

**4.2.U3 Chemical energy in carbon compounds flows through food chains by means of feeding.**

Define food chain and food web.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

State the meaning of the arrow in a food web or chain.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

Draw a food chain, labeling the producer, primary consumer, secondary consumer and tertiary consumer.

(Draw: Represent by means of a labeled, accurate diagram or graph, using a pencil. A ruler (straight edge) should be used for straight lines. Diagrams should be drawn to scale. Graphs should have points correctly plotted(if appropriate) and joined in a smooth curve.)

**4.2.U4 Energy released from carbon compounds by respiration is used in living organisms and converted to heat.**

List three reasons why living organisms need energy for cell activities.

(List: Give a sequence of brief answers with no explanation.)

State the function of ATP.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

Outline how ATP is formed, referencing exothermic and endothermic reactions.

(Outline: Give a brief account or summary)

Outline the reason why respiration releases heat.

(Outline: Give a brief account or summary)

**4.2.U5 Living organisms cannot convert heat to other forms of energy.**

Draw a flow chart to illustrate the energy conversions performed by living organisms.

(Draw: Represent by means of a labeled, accurate diagram or graph, using a pencil. A ruler (straight edge) should be used for straight lines. Diagrams should be drawn to scale. Graphs should have points correctly plotted(if appropriate) and joined in a smooth curve.)

**4.2.U6 Heat is lost from ecosystems.**

State the reason why heat created by living organisms is eventually lost from the ecosystem.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

**4.2.U7 Energy losses between trophic levels restrict the length of food chains and the biomass of higher trophic levels.**

Define biomass.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

Define trophic level.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

State the unit used for communicating the energy in each trophic level of a food chain.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

Outline three reasons why the amount of energy decreases at higher trophic levels.

(Outline: Give a brief account or summary)

State the average amount of energy passed through each trophic level of a food chain.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

**4.2.S1 Quantitative representations of energy flow using pyramids of energy.**

Describe the shape and units of a pyramid of energy.

(Describe: Give a detailed account)

Draw a pyramid of energy given data for an ecosystem.​

(Draw: Represent by means of a labeled, accurate diagram or graph, using a pencil. A ruler (straight edge) should be used for straight lines. Diagrams should be drawn to scale. Graphs should have points correctly plotted(if appropriate) and joined in a smooth curve.)

**4.2.NOS Use theories to explain natural phenomena- the concepts of energy flow explains the limited length of food chains.**

Explain why there is a limited number of organisms in a food chain.​

(Explain: Give a detailed account including reasons or causes)

**Key Terms**

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ecology

ecosystem

community

biotic

food chain

herbivore

heat loss

kJ/m-2/y-1

food web

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pyramid of energy

biomass

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biome

consumer

carnivore

energy conversion

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trophic level

pyramid

energy

nutrient

food web

​

omnivore

energy release

photosynthesis

recycle

​

glucose

​

primary consumer

​

energy flow

sunlight

producer

​

respiration

​

chemical energy

​

secondary consumer

​

nutrient flow

pyramid of biomass

detrivores

saprophites

insolution

second law of thermodynamics