**Energy and Ecosystems Notes Guide 2019**

**Concept: Explain how the activities of autotrophs and heterotrophs enable the flow of energy within an ecosystem.**

Autotrophs

-Autotrophs capture energy from physical or chemical sources in the environment—

-Photosynthetic organisms capture energy present in sunlight.

-Chemosynthetic organisms capture energy from small \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules present in their environment, and this process can occur in the absence of oxygen.

Heterotrophs

-Heterotrophs capture energy present in carbon compounds produced by other organisms.

-Heterotrophs may metabolize carbohydrates, lipids, and proteins as sources of energy by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Essential questions

-What limits the production in ecosystems?

-How do nutrients move in the ecosystem?

-How does energy move through the ecosystem?

Ecosystem

-Includes all the organisms in a community plus abiotic factors

ecosystems are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of energy & processors of matter

-Ecosystems are self-sustaining

-what is needed?

-Ecosystem inputs: capture energy, transfer energy, and cycle nutrients

Food chains

-Trophic levels

-represent feeding relationships

-start with energy from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

-captured by plants which are the 1st level of all food chains

-food chains usually go up only 4 or 5 levels

-demonstrate inefficiency of energy transfer

-all levels connect to decomposers

Inefficiency of energy transfer

-There is a loss of energy between levels of food chain

-To where is the energy lost? The cost of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

Ecological pyramid

-Shows the loss of energy between levels of food chain

-can feed fewer animals in each level

Food webs

-Food chains are linked together into food \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

-Who eats whom?

-a species may weave into web at more than one level

Bears, humans, eating meat? Eating plants?

Energy Consumption and Trophic Cascade:

-A net gain in energy results in energy storage or the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an organism.

-A net loss of energy results in loss of mass and, ultimately, the death of an organism.

-Changes in energy availability can result in disruptions to an ecosystem—

-A change in energy resources such as sunlight can affect the number and size of the trophic levels.

-A change in the producer level can affect the number and size of other trophic levels.

Humans in food chains

-Dynamics of energy through ecosystems have important implications for human populations

-how much energy does it take to feed a human?

-if we are meat eaters?

-if we are vegetarian?

Generalized Nutrient cycling

-Carbon cycle

-Phosphorus cycle

-Nitrogen cycle

-Transpiration