

Name: \_\_\_\_\_

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Class: \_\_\_\_\_

## IB ESS

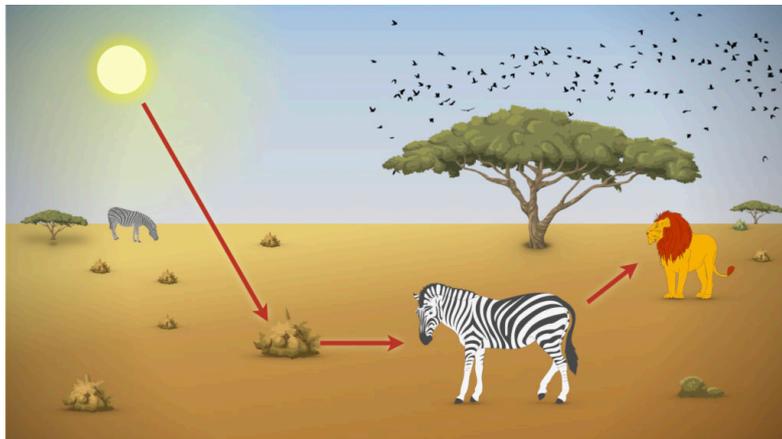
# 2.2 Communities and Ecosystems

### Significant Ideas:

The interactions of species with their environment results in energy and nutrients flow.

Photosynthesis and respiration play a significant role in the flow of energy in communities.

The feeding relationships in a system can be modeled using food chains, food webs and ecological pyramids.



# Photosynthesis and Respiration

1. Define respiration.

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2. Respiration releases energy. State the form of energy that this will eventually become.

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3. State three energy conversions that occur in ecosystems ending in the energy form stated above.

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4. Write the word equation AND chemical equation for respiration.

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5. Define photosynthesis.

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6. Write the word equation AND chemical equation for photosynthesis.

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7. State a type of organism that can occupy the first trophic level of a food chain but not perform photosynthesis.

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## Ecological Pyramids

1. Compare and contrast pyramids of biomass and pyramids of productivity.

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2. State the units used for storages of biomass as represented in pyramids of biomass.

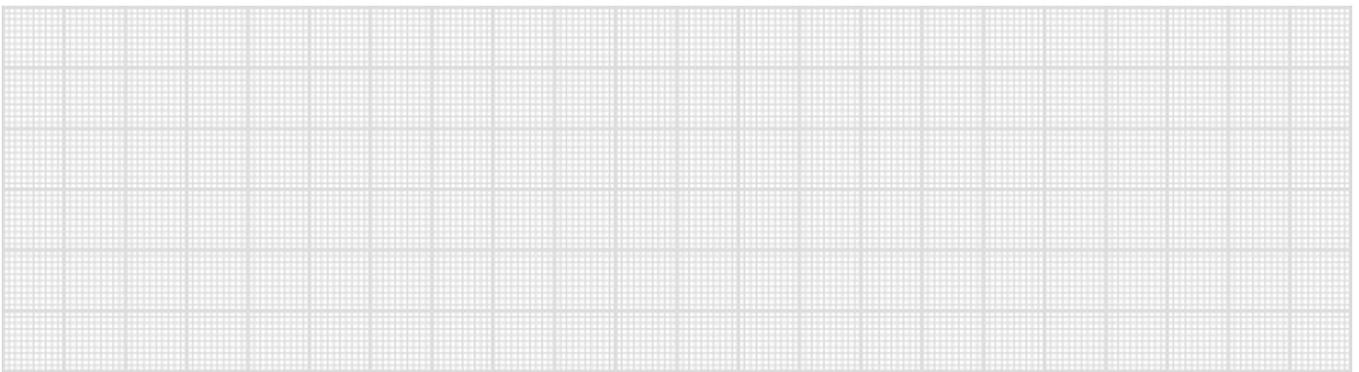
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3. State the units used for energy flow as represented in pyramids of productivity.

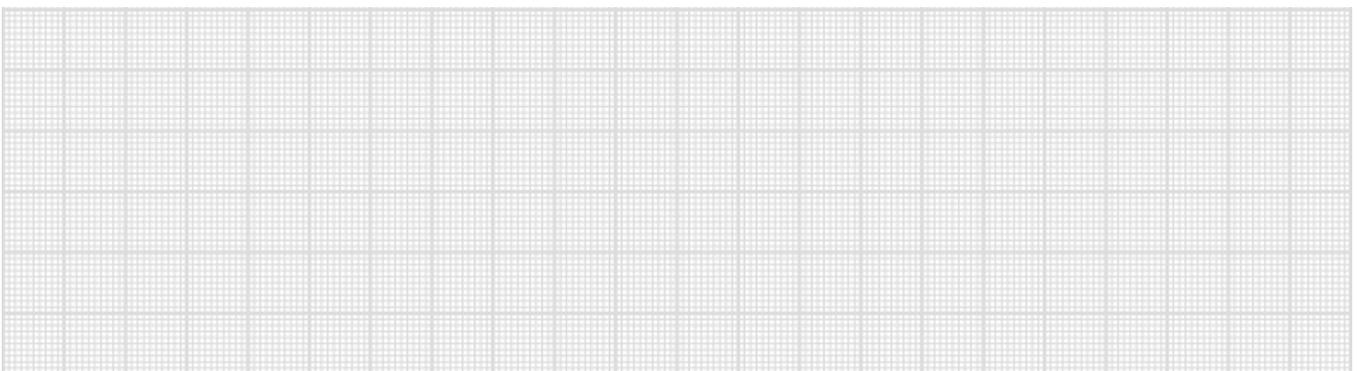
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4. Draw ecological pyramids to represent the following data:

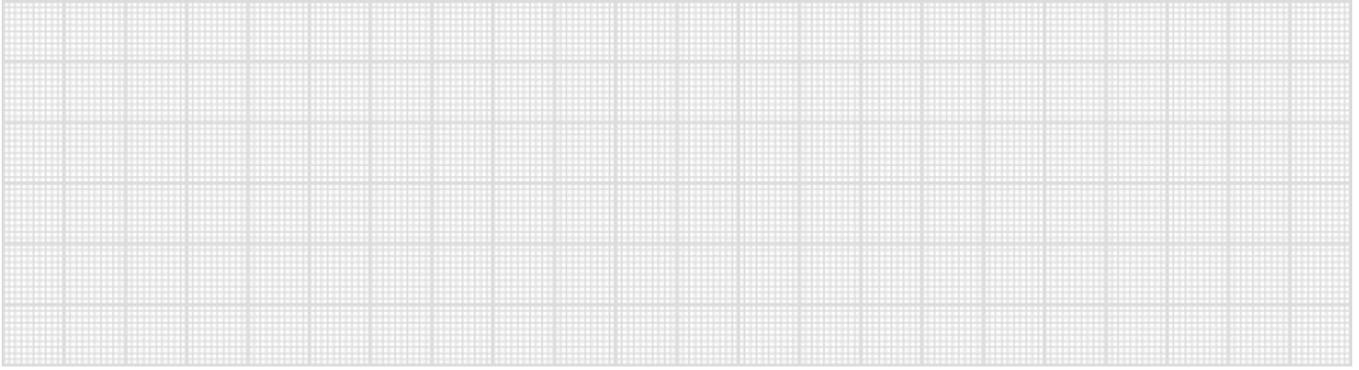
a) A pyramid of **numbers**: one tree is consumed by 100 caterpillars, which are eaten by 20 birds.



b) A pyramid of **biomass** for an ecosystem which contains  $1 \text{ kg m}^{-2}$  of grass. Crickets eat the grass and frogs eat the crickets. 20% of the energy is transferred to the second trophic level, and 10% is transferred to the third level.



c) A pyramid of **productivity** for a food chain involving herbs, insects and voles. Assume an efficiency of transfer of 10% between all trophic levels, and an NPP value of 10,000 KJ m<sup>-2</sup> yr<sup>-1</sup>





5. According to a study in Long Island Estuary, concentrations of less than 0.1 ppm of DDT in plankton led to concentrations of up to 25 ppm in sea birds (Ehrlich *et al.* 1998). Explain why the concentration is notably higher in seabirds.

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6. In sufficient amounts, DDT effects the hardness of bird shells (which often results in the shell breaking and the offspring dying before hatching at an appropriate time). Draw a diagram to show how DDT run-off from farmland can result in egg-thinning in seagulls.

## References

Ehrlich, P. R., Dobkin, D. S. and Wheye, D. (1998) *DDT and Birds* [online] Available:  
[https://web.stanford.edu/group/stanfordbirds/text/essays/DDT\\_and\\_Birds.html](https://web.stanford.edu/group/stanfordbirds/text/essays/DDT_and_Birds.html)

