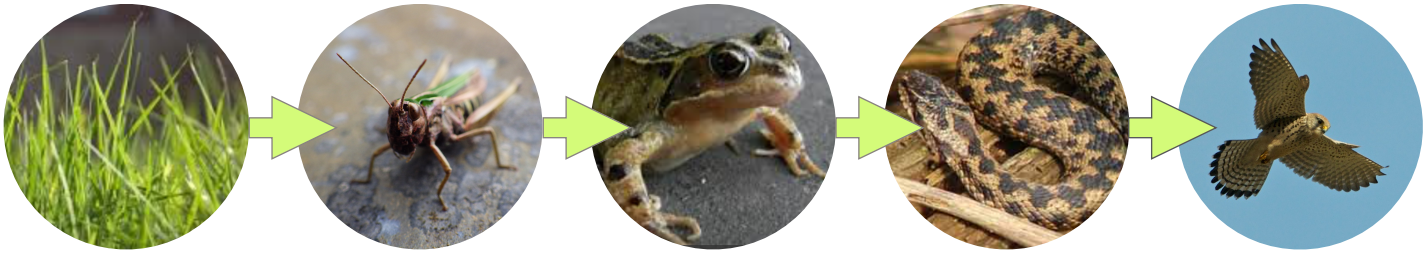
ECO-DIVO THE WORKSHEET

ASSOCIATION FOR THE STUDY OF ANIMAL BEHAVIOUR

Producer	Consumer	Decomposer	Trophic Level
Organisms which need to eat - 'consume' other organisms in order to obtain their energy.	Green plants that synthesize organic matter through the process of photosynthesis. These autotrophic organisms then serve as a source of food for other organisms in a food chain.	The feeding position within a food chain. Eg Producer, primary consumer, secondary consumer etc	Living things that break down dead and decaying organisms into simpler substances, which then become organic nutrients available to the whole ecosystem.

1. Match the definitions above with the correct term.
2. Look at the food chain. The arrows show the direction of the flow of energy from the producers along the food chain. Calculate the percentage efficiency of the transfer of energy between the following trophic levels and fill in the table.



42000 kJ m^{-2} $year^{-1}$	6 300 kJ m^{-2} $year^{-1}$	1250 kJ m^{-2} $year^{-1}$	250 kJ m^{-2} $year^{-1}$	50 kJ m^{-2} $year^{-1}$
Energy available at each trophic level				

Primary consumers and secondary consumers

Energy available after the transfer

(i.e. Available to frogs = 1250 kJ m^{-2} $year^{-1}$

Energy available before the transfer

(i.e. Available to grasshoppers) = 6 300 kJ m^{-2} $year^{-1}$

Percentage = (1250 ÷ 6300) x 100 = 19.84%

Tertiary consumers and quaternary consumers

Energy available after the transfer

(i.e. Available to birds of prey) = 50 kJ m^{-2} $year^{-1}$

Energy available before the transfer

(i.e. Available to snakes) = 250 kJ m^{-2} $year^{-1}$

Percentage = (50 ÷ 250) x 100 = 20%

Producers and quaternary consumers

Energy available after the transfer (i.e. Available to birds of prey) = 50 kJ m^{-2} $year^{-1}$.

Energy available before the transfer (i.e.Available to the grass = 42000 kJ m^{-2} $year^{-1}$

Percentage = (50 ÷ 42000) x 100 = 0.12%

Why is such a small percentage of energy transferred at each trophic level? Where does it go?

Some of the organism is not eaten. Some parts are not digested and so are lost as faeces. Some energy is lost as excretory materials. Some energy is lost as heat, sound and light.