10.1 – ECOLOGICAL NICHES

B4.2.1	Ecological niche as the role of a species in an ecosystem
B4.2.2	Differences between obligate anaerobes, facultative anaerobes and obligate aerobes
B4.2.3	Photosynthesis as the mode of nutrition in plants, algae and several groups of photosynthetic prokaryotes
B4.2.4	Holozoic nutrition in animals
B4.2.5	Mixotrophic nutrition in some protists
B4.2.6	Saprotrophic nutrition in some fungi and bacteria
B4.2.7	Diversity of nutrition in archaea
B4.2.8	Relationship between dentition and the diet of omnivorous and herbivorous representative members of the family Hominidae
B4.2.9	Adaptations of herbivores for feeding on plants and of plants for resisting herbivory
B4.2.10	Adaptations of predators for finding and killing prey and of prey animals for resisting predation
B4.2.11	Adaptations of plant form for harvesting light
B4.2.12	Fundamental and realised niches
B4.2.13	Competitive exclusion and the uniqueness of ecological niches

NICHES

Define niche

_____

_____

Differentiate between fundamental niche and realised niche

Fundamental Niche	
Realised Niche	

Describe the consequences of two species occupying the exact same niche

_____

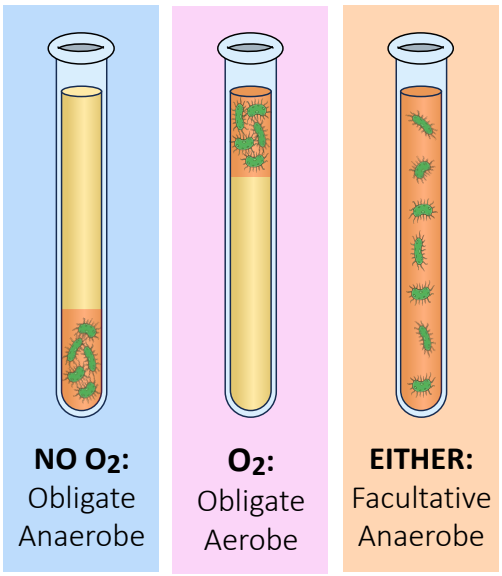
_____

_____

_____

MODES OF RESPIRATION

Outline the different modes of respiration (with examples)



MODES OF NUTRITION

Define the two main types of nutrition and identify the particular strategies associated with each type

Define Autotrophic Nutrition:

Define Heterotrophic Nutrition:

Describe mixotrophic nutrition (with a specific example)

Differentiate between types of heterotrophic nutrition

Holozoic Nutrition:

Saprotrophic Nutrition:

ARCHAEAN NUTRITION

Identify the three sources of energy archaean species can use for ATP production

1. _____

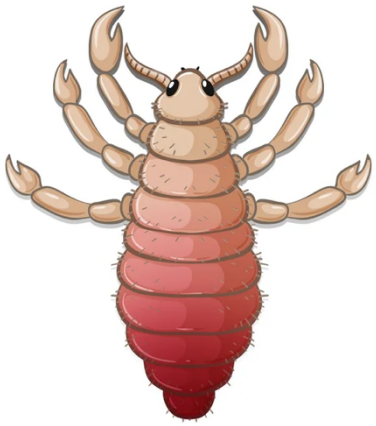
2. _____

3. _____

ADAPTATIONS

List the adaptations possessed by plants for the harvesting of light

- L _____
- O _____
- U _____
- S _____
- E _____



Identify adaptations of herbivores (versus plant defences) and predators (versus prey defences)

Herbivore Adaptations	Plant Defences

Predator Adaptations	Prey Defences

Describe the relationship between dentition and diet members of the family Hominidae

_____

_____

_____

10.2 – ENERGY TRANSFER

C4.2.1	Ecosystems as open systems in which both energy and matter can enter and exit
C4.2.2	Sunlight as the principal source of energy that sustains most ecosystems
C4.2.3	Flow of chemical energy through food chains
C4.2.4	Construction of food chains and food webs to represent feeding relationships in a community
C4.2.5	Energy supply to decomposers as carbon compounds in organic matter from dead organisms
C4.2.6	Autotrophs as organisms that use external energy sources to synthesise carbon compounds from simple inorganic substances
C4.2.7	Use of light as the external energy source in photoautotrophs and oxidation reactions as the energy source in chemoautotrophs
C4.2.8	Heterotrophs as organisms that use carbon compounds obtained from other organisms to synthesise the carbon compounds they require
C4.2.9	Release of energy in both autotrophs and heterotrophs by oxidation of carbon compounds
C4.2.10	Classification of organisms into trophic levels
C4.2.11	Construction of energy pyramids
C4.2.12	Reductions in energy availability at each successive stage in food chains due to large energy losses between trophic levels
C4.2.13	Heat loss to the environment in both autotrophs and heterotrophs due to the conversion of chemical energy to heat in cell respiration
C4.2.14	Restrictions on the number of trophic levels in ecosystems due to energy losses

ENERGY SYSTEM

Differentiate between a 'closed' and an 'open' energy system

Closed: _____

Open: _____

ENERGY SOURCES

Compare a photoautotroph and a chemoautotroph

Similarities: _____

Differences:

	PHOTOAUTOTROPH	CHEMOAUTOTROPH
Energy Source		
Chemical Process		

ENERGY TRANSFERS

Outline how energy stored in organic compounds can be released via cell respiration

_____

_____

_____

GLUCOSE + OXYGEN ⟹ CARBON DIOXIDE + WATER + ATP

Compare the different feeding processes by which consumers and decomposers access organic material

_____

_____

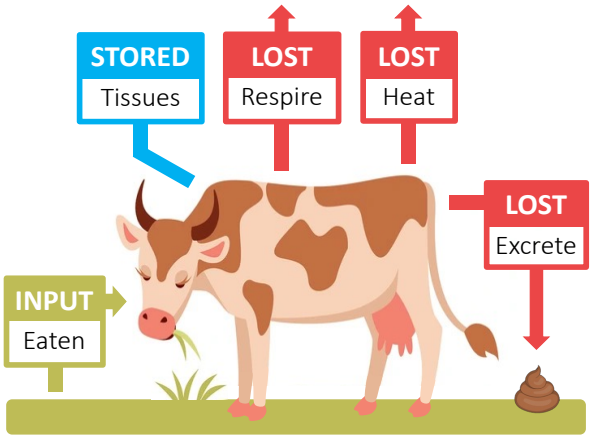
ENERGY LOSS

Outline how energy is lost in feeding pathways

1. _____
2. _____
3. _____

State the general efficiency of energy transformations

_____



FEEDING PATHWAYS

Define trophic level

_____

_____

_____

_____

Label the different trophic levels

Level 1	
Level 2	
Level 3	
Level 4	

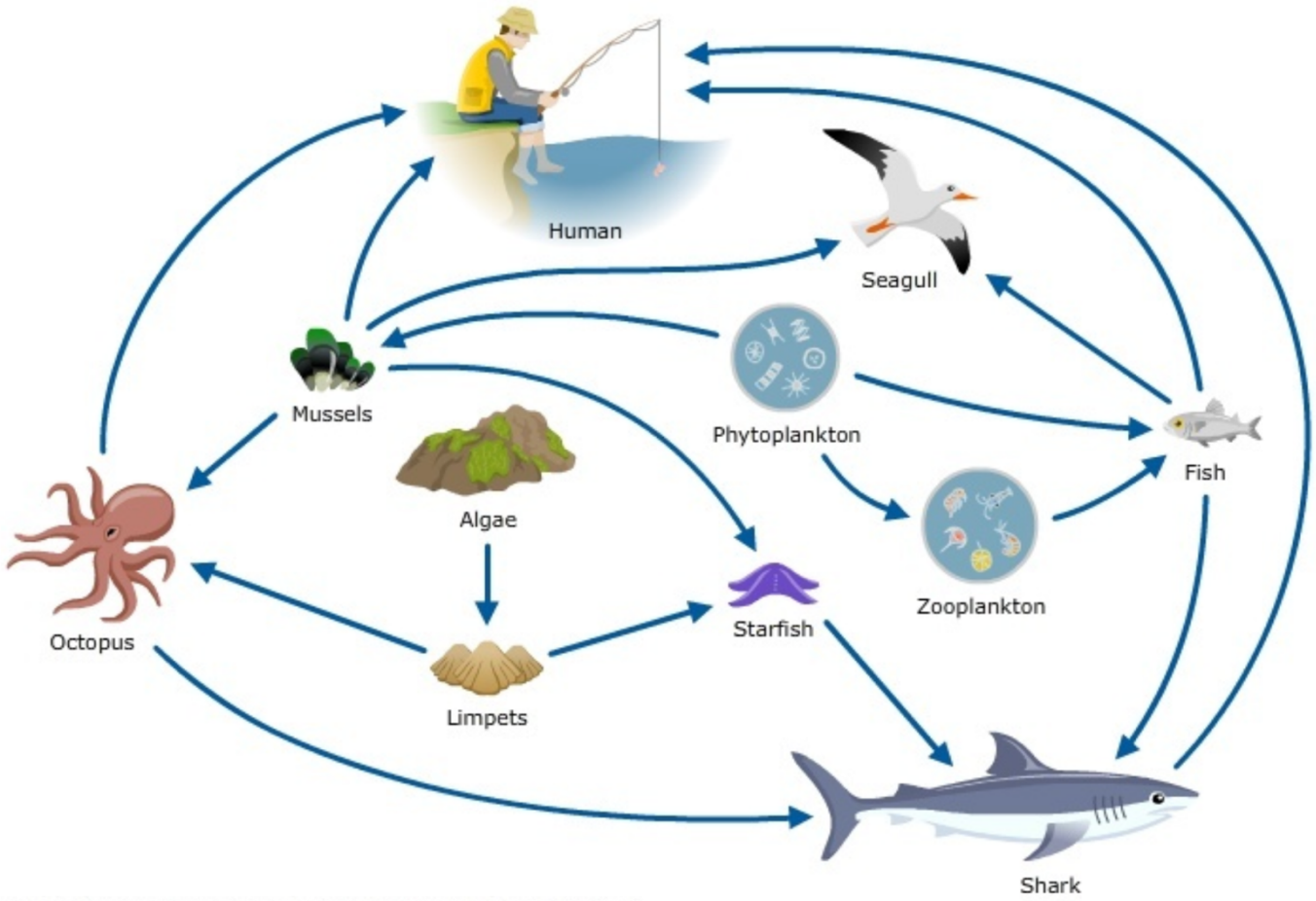
Distinguish between a food chain and a food web as a means of representing feeding relationships

_____

_____

FOOD WEB

Deduce feeding relationships from the information included in the food web below



Producers: _____

Secondary Consumers: _____

Shark Trophic Levels: _____

PYRAMIDS OF ENERGY

Explain how energy losses restrict the number of possible trophic levels within an ecosystem

_____

_____

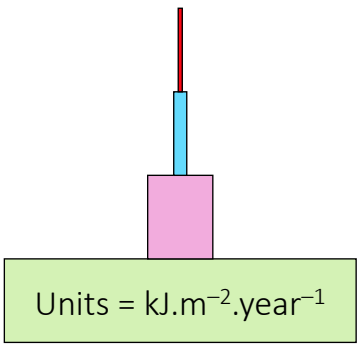
Describe the shape and the general construction of a pyramid of energy

_____

_____

_____

_____



10.3 – NUTRIENT CYCLES

C4.2.15	Primary production as accumulation of carbon compounds in biomass by autotrophs
C4.2.16	Secondary production as accumulation of carbon compounds in biomass by heterotrophs
C4.2.17	Constructing carbon cycle diagrams
C4.2.18	Ecosystems as carbon sinks and carbon sources
C4.2.19	Release of carbon dioxide into the atmosphere during combustion of biomass, peat, coal, oil and natural gas
C4.2.20	Analysis of the Keeling Curve in terms of photosynthesis, respiration and combustion
C4.2.21	Dependence of aerobic respiration on atmospheric oxygen produced by photosynthesis, and of photosynthesis on atmospheric carbon dioxide produced by respiration
C4.2.22	Recycling of all chemical elements required by living organisms in ecosystems

BIOMASS

Define biomass

_____

_____

Distinguish between primary productivity and secondary productivity

_____

_____

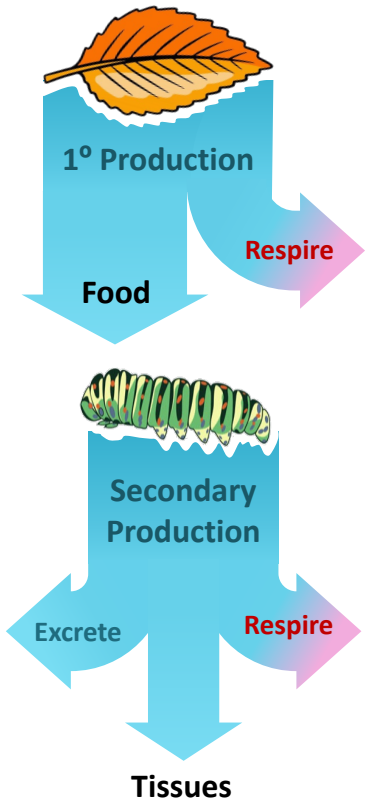
_____

Explain why secondary production is less than primary production

_____

_____

Give one example of a biome that will accumulate biomass at a fast rate



_____

_____

Explain why higher trophic levels have less biomass (the energy content per unit mass is not reduced)

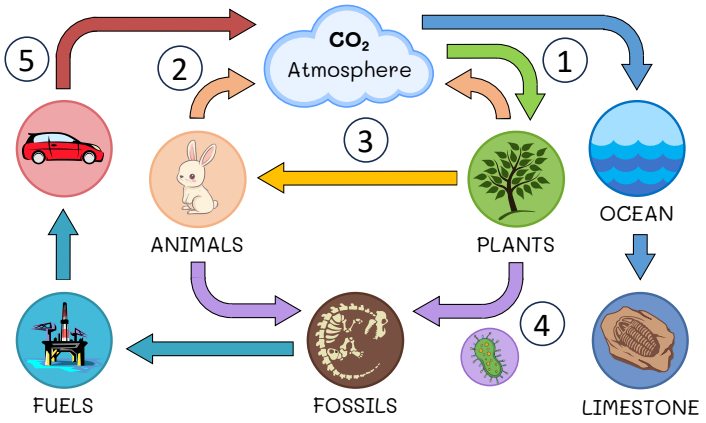
_____

_____

_____

CARBON CYCLE

Identify the different processes occurring within the carbon cycle



1. _____
2. _____
3. _____
4. _____
5. _____

State the conditions required for the formation of fossil fuels (peat, oil, coal and natural gas)

_____

_____

_____

_____

Differentiate between a carbon sink, a carbon source and a carbon flux

_____

_____

_____

_____

KEELING CURVE

Explain the Keeling Curve in terms of photosynthesis, cell respiration and combustion

_____

_____

_____

_____

_____

_____