Balancing Acts Revision Sheet (Higher)

- The environment contains many different types of animals and plants. Each type has different needs for food, warmth and shelter. Living things **adapt to survive** in the conditions in which they normally live. *You need to be able to explain adaptations when you are given a type of animal/plant.*
- The species of animals and plants that live in a particular place will depend on the **physical factors** there e.g. temperature, rainfall, soil pH, water pH, light intensity.
- **Green plants** produce food (glucose) by **photosynthesis** using **light** energy from the **Sun**. The amount of chemical **energy stored** (as starch) in a plant (made by photosynthesis) will depend on how much **light**, CO_2 and **warmth** it has had.
- Green plants are called **producers** because they make their own food by converting light energy into chemical energy, which is then used by all the animals in a food chain.
- Animals consume food (so are called **consumers**), either by eating plants or the animals that have eaten the plants.
- Animals that eat other animals are **predators**. The animals eaten are **prey**. *You need to be able to interpret **predator-prey graphs**.*
- A **food chain** shows 'what eats what'. Each stage in the chain is called a **trophic level**.
- A **food web** shows how a number of food chains link together.
- Changes in one part of a food web can affect species in other parts of the web; *you need to be able to work these out.*
- A **pyramid of biomass** (mass of living material) can be drawn to show the mass of plants or animals at each trophic level. *Unlike* a pyramid of numbers it is always pyramid shaped because the biomass gets less at each level going upwards (along a food chain).
- Energy is passed from one organism to the next along a food chain. Much **energy is lost** (about 90%) **from each trophic level** e.g. from respiration; in urine and faeces; in parts that can't be digested; in bits that are not eaten.
- Humans can **manage food production** to improve the efficiency of energy transferred between trophic levels e.g. fish farms; battery hens; providing food that can all be eaten and digested; heating sheds in winter so warm blooded animals don't waste energy from extra respiration keeping warm.
- Food production also involves the **management of ecosystems** e.g. the North Sea where fish stocks are now carefully controlled to make sure there will be some to catch in the future. The creation of **artificial ecosystems** e.g. fish farms to farm salmon.

- **Population size** can be affected by: the **amount of food** or nutrients; **competition for food** or nutrients; **competition for light** (plants); the number of **predators**; **disease**.
- If the numbers of a newly established population are counted over a period of time a **growth curve** can be drawn. It shows **lag**, **exponential**, **stationary** (and possibly **death**) **phases**. *You need to be able to explain each phase*.
- As the human population increases more people need more food and produce more waste e.g. sewage and packaging. They also want more goods from industry so this needs more raw materials; also producing more waste e.g. mine tips. This waste needs to be carefully handled or more pollution will be produced.
- Human activity can change the environment. This affects other living things on Earth. Factories, building, farming, fishing, mining, quarrying, dumping and forestry methods remove habitats (the places where animals and plants live). This can destroy organisms, populations or even whole species so **reducing biodiversity** (the number of different species in an environment).
  These activities need to be limited or controlled if biodiversity is to be sustained.
- The quality of water in lakes and rivers can be monitored by using **biological indicators** i.e. certain species of animals can only live in water where there is the right amount of oxygen for them e.g. sludge worms are only found where there is little or none; mayfly larvae where there is lots. So if they are there or not tells you how much oxygen there is.
- The amount of **oxygen in water** can be **reduced** by industry pumping hot water into a river (the warmer the water the less oxygen in it).
  It is also reduced by **nitrate** and **phosphate fertilizers** being washed off farmland (leaching) into streams and rivers and causing **eutrophication** *(see FT notes).*
- The lack of oxygen caused by warm water or eutrophication causes the suffocation of fish.
- The amounts of dissolved oxygen, nitrate or phosphate are used as **chemical indicators** of water quality.