

Scheme of Learning: Bioenergetics

Topic Sequence:

1	2	3	4	5	6	7	8	9	10
Cell Biology	Particle Model of Matter	Infection & Response	Atomic Structure & the Periodic Table	Atomic Structure (Physics)	Bonding & Structure	Energy	Bioenergetics	Rates of Reaction	Chemistry of the Atmosphere

Topic Overview:

In this section we will explore how plants harness the Sun's energy in photosynthesis in order to make food. This process liberates oxygen which has built up over millions of years in the Earth's atmosphere. Both animals and plants use this oxygen to oxidise food in a process called aerobic respiration which transfers the energy that the organism needs to perform its functions. Conversely, anaerobic respiration does not require oxygen to transfer energy. During vigorous exercise the human body is unable to supply the cells with sufficient oxygen and it switches to anaerobic respiration. This process will supply energy but also causes the build-up of lactic acid in muscles which causes fatigue.

Lesson Sequence:

We begin with a recap of the Cells topic from the start of year 9 and then focus on chloroplasts and the process of photosynthesis. The required practical for this topic investigates how the rate of photosynthesis is affected by the intensity of light. After the practical, we look at other limiting factors (other than light) and how they can be controlled in greenhouses to increase the rate of photosynthesis in plants grown there. We conclude the plants lessons by describing how plants use the glucose they produce during photosynthesis.

The second half of the topic looks at respiration. Beginning with aerobic respiration, we then explain the changes that occur in the body during exercise and compare aerobic to anaerobic respiration. We conclude the topic by learning about metabolism and the role of the liver.

Sequence of Lessons:

1	Photosynthesis
2	The Rate of Photosynthesis – <i>Required Practical</i>
3	Limiting Factors
4	The Uses of Glucose
5	Aerobic Respiration – <i>mid topic assessment</i>
6	The Response to Exercise
7	Anaerobic Respiration
8	Metabolism and the Liver
9	Revision
10	Test

Resources:

1	Exam question in shared folder
2	Pondweed, lamps, metre sticks, glass funnels, large beakers, sodium hydrogen carbonate solution, plasticine.
3	Worksheets in shared area
4	Worksheets in shared area
5	Limewater, straws
6	n/a
7	n/a
8	n/a
9	Resources in shared area
10	Test in shared area

Supportive Reading:

Literacy tasks	Response to exercise lesson has a longer written answer to complete
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Assessment:

Knowledge:	Multiple choice and short answer questions.
Application of Knowledge:	Exam questions based on the skill of 'explain'