BIG IDEA BCL

THE CELLULAR BASIS OF LIFE

Organisms are made of one or more cells, which need a supply of energy and molecules to carry out life processes.

7B1: CELLS = 11

- cells, tissues, and organs
- animal cells
- plant cells
- specialised cells
- microscopy
- unicellular organisms
- human skeleton
- role of joints and muscles
- interacting muscles
- problems with the skeletal system

8B2 Respiration and Photosynthesis = 12

- aerobic respiration
- anaerobic respiration
- investigating fermentation
- comparing aerobic and anaerobic respiration
- Photosynthesis
- Leaves
- movement of water and leaves in plants
- importance of minerals to plants
- investigating photosynthesis

BIG IDEA BHL

HEREDITY AND LIFE CYCLES

Genetic information is passed from each generation to the next; this information and the environment affect the features, growth and development of organisms.

7B3: VARIATION and REPRODUCTION = 12

- variation (continuous or discontinuous, to include measurement and graphical representation of variation)
- causes of variation (genetic and environmental)
- exploring variation (link to survival)
- male reproductive system
- female reproductive system
- menstrual cycle and puberty
- foetal development - fertilisation, gestation, and birth
- foetal development - effect of maternal lifestyle on the foetus through the placenta

7B2: ECOSYSTEM PROCESSES=12

- Identifying and classifying organisms
- importance of insects – pollination
- Reproduction in plants, including flower structure, pollination
- Reproduction in plants, fertilisation
- seed and fruit formation and dispersal

8B1: ORGAN SYSTEMS = 12

See big idea health and disease

BIG IDEA BOE

ORGANISMS AND THEIR ENVIRONMENT

All organisms, including humans, depend on, interact with and affect the environments in which they live and other organisms that live there.

- food webs
- toxins in the environment
- ecological balance – predator prey relationships

BIG IDEA BVE

VARIATION, ADAPTATION AND EVOLUTION

Differences between organisms cause species to evolve by natural selection of better adapted individuals. The great diversity of organisms is the result of evolution.

8B3: Evolution AND INHERITENCE = 9

- DNA, chromosomes, and the genome
- Role of chromosomes (fertilised egg contains a full set of chromosomes, half from each parent.)
- Identical twins
- Modelling inheritance, genetic crosses, and predictions
- Variation and survival
- Natural selection
- fossil evidence
- Extinction
- importance of biodiversity

BIG IDEA BHD

HEALTH AND DISEASE

Organisms must stay in good health to survive and thrive; the health of individual results from interactions between its body, behaviour, environment and other organisms.

8B1: ORGAN SYSTEMS = 12

- mechanism of breathing
- Measuring breathing
- gas exchange in humans (incl. diffusion across membranes)
- the effects of disease and lifestyle (exercise, asthma, and smoking)
- healthy diet
- consequences of unbalanced diet including obesity, starvation, and deficiency diseases
- human digestive system
- roles of the digestive organs (incl. enzymes and role of gut bacteria)

9B1: CELL STRUCTURE AND TRANSPORT = 14

- The world of the microscope
- Animal & plant cells
- Eukaryotic and prokaryotic cells
- Specialisation in animal cells
- Specialisation in plant cells
- Diffusion
- Osmosis
- Osmosis in plants
- Active transport
- Exchanging materials

9B4: ORGANISING ANIMALS AND PLANTS = 14

- The blood
- The blood vessels
- The heart
- Helping the heart
- Breathing and gas exchange
- Tissues and organs in plants
- Transport systems in plants
- Evaporation and transpiration

9B3: ORGANISATION AND THE DIGESTIVE SYSTEM = 11

- Tissues and organs
- The human digestive System
- The chemistry of food
- Catalysts and enzymes
- Factors affecting enzyme action
- How the digestive system works
- Making digestion efficient

9B2: CELL DIVISION = 7

Cell division

Growth and differentiation

Stem cells

Stem cell dilemmas

9B4: ORGANISING ANIMALS AND PLANTS = 14

- The blood
- The blood vessels
- The heart
- Helping the heart
- Breathing and gas exchange
- Tissues and organs in plants
- Transport systems in plants
- Evaporation and transpiration

10B8: PHOTOSYNTHESIS = 7

- Photosynthesis
- The rate of photosynthesis
- How plants use glucose
- Making the most of photosynthesis

Link to 9P3

10B9: RESPIRATION = 6

- Aerobic respiration
- The response to exercise
- Anaerobic respiration
- Metabolism and the liver

11B10: THE HUMAN NERVOUS SYSTEM = 5/9

- Principles of homeostasis
- The structure and function of the nervous system
- Reflex actions
- *The brain*
- *The eye*
- *Common problems of the eye*

11B11: HORMONAL COORDINATION = 10/13

- Principles of hormonal control
- The control of blood glucose levels
- Treating diabetes
- The role of negative feedback
- Human reproduction
- Hormones and the menstrual cycle
- The artificial control of fertility
- Infertility treatments
- *Plant hormones and responses*
- *Using plant hormones*

11B12S: HOMEOSTASIS IN ACTION = 7

- *Controlling body temperature*
- *Removing waste products*
- *The human kidney*
- *Dialysis—an artificial kidney*
- *Kidney transplants*

11B12: REPRODUCTION = 9/12

- Types of reproduction
- Cell division and sexual reproduction
- *The best of both worlds*
- DNA and genome
- *DNA structure and protein synthesis*
- *Gene expression and mutation*
- Inheritance in action
- More about genetics
- Inherited disorders
- Screening for genetic

10B15/B16S: ADAPTATIONS, INTERDEPENDENCE, COMPETITION = 11

- The importance of communities
- Organisms in their environment
- Distribution and abundance
- Competition in animals
- Competition in plants
- Adapt and survive
- Adaptation in animals
- Adaptation in plants

10B16/B17S: ORGANISING AN ECOSYSTEM = 5/7

- Feeding relationships
- Materials cycling
- The carbon cycle
- *Rates of decomposition*
- B17 checkpoint

10B17/B18S: BIODIVERSITY AND ECOSYSTEM = 8/14 maybe continued into yr 11

- The human population explosion
- Land and water pollution
- Air pollution
- Deforestation and peat destruction
- Global warming
- *The impact of change*
- Maintaining biodiversity
- *Trophic levels and biomass*
- *Biomass transfers*
- *Factors affecting food security*
- *Making food production efficient*
- *Sustainable food*

11B13/B14S: VARIATION AND EVOLUTION = 6/8

- Variation
- Evolution by natural section
- Selective breeding
- Genetic engineering
- *Cloning*
- *Adult cell cloning*

11B14/B15S: GENETIC AND EVOLUTION =8 / 12

- *The history of genetics*
- *Theories of evolution*
- *Accepting Darwin's ideas*
- *Evolution and speciation*
- Evidence of evolution
- Fossils and extinction
- More about extinction
- Antibiotic resistant bacteria
- Classification
- New systems of classification

10B5: COMMUNICABLE DISEASES 9/14 Can split across yr 9 and 10

- Health and disease
- Pathogens and disease
- *Growing bacteria in the lab*
- *Preventing bacterial growth*
- Preventing infections
- Viral diseases
- Bacterial diseases
- Diseases caused by fungi and protists
- Human defence responses
- *More about plant diseases*
- Plant defence responses

10B6: PREVENTING AND TREATING DISEASE 6/8

- Vaccination
- Antibiotics and painkillers
- Discovering drugs
- Developing drugs
- *Making monoclonal antibodies*
- *Uses of monoclonal antibodies*

10B7: NON-COMMUNICABLE DISEASES 7

- Non-communicable diseases
- Cancer
- Smoking and risk of disease
- Diet, exercise, and disease
- Alcohol and other carcinogens