Topic 6 Inheritance, variation and evolution

Reproduction & Inheritance

I can define the following terms….

1. Gamete
2. Clone
3. Fertilisation
4. Cell differentiation
5. Fungal spores
6. Chromosome
7. Gene
8. Genome
9. Mutation
10. Allele (dominant and recessive)
11. Homozygous
12. Heterozygous
13. Genotype
14. Phenotype

I can identify…..

1. The role of meiosis
2. The type of reproduction used by malarial parasites in the human host and in the mosquito.
3. The type of reproduction used by runners such as strawberry plants and bulb division such as daffodils.

I can describe…..

1. The process of sexual reproduction in animals and flowering plants
2. The steps in the process of meiosis
3. The roles of mitosis in multicellular organisms
4. The structure of DNA
5. The role of non-coding parts of DNA
6. How genetic variants may influence phenotype in coding DNA and in noncoding DNA
7. What happens to an amino acid sequence after it is formed on a ribosome
8. The symptoms of Polydactyly
9. The symptoms of Cystic fibrosis

I can explain….

1. How the following cells are adapted for their function: sperm and egg cells in animals and pollen and egg cells in flowering plants
2. Why sexual reproduction leads to variety in the offspring
3. The importance of meiosis for sexual reproduction
4. How DNA controls the order in which amino acids are assembled
5. How a change in DNA structure may result in a change in the protein synthesised by a gene and why this affects its ability to function
6. The importance for medicine in the future of understanding the human genome
7. How Polydactyly is inherited
8. How Cystic fibrosis is inherited

I can compare:

1. The process of meiosis with mitosis
2. The process of sexual reproduction with asexual reproduction (including the advantages of each)

I can….

1. Model insertions and deletions in chromosomes to illustrate mutations
2. Complete a Punnett square diagram and extract and interpret information from genetic crosses and family trees
3. Construct a genetic cross by Punnett square diagram and use it to make predictions using the theory of probability
4. carry out a genetic cross to show sex inheritance
5. Make informed judgements about the economic, social and ethical issues concerning embryo screening, given appropriate information.
6. Appreciate that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise.

Evolution, Genetic engineering, Cloning and Classification

I can define the following terms….

1. The theory of evolution by natural selection
2. Species
3. Inbreeding
4. Vector (in terms of genetic engineering)
5. Plasmid
6. Fossils
7. Extinction
8. Bacterial strain
9. Binomial system of classification

I can identify…..

1. Causes of variation between individuals in a population
2. Reasons why Humans have been using selective breeding for thousands of years
3. Examples of the use of genetic engineering in plant crops (GM crops) and in bacterial cells
4. The main pioneering work done by Alfred Wallace to contribute to the theory of evolution
5. The main contribution that Gregor Mendel had in the mid-19th century to our understanding on genes and inheritance
6. A number of different causes for extinctions
7. An example of an antibiotic resistant strain of bacteria
8. How living organisms were traditionally classified into groups based on a system developed by Carl Linnaeus.
9. The ‘three-domain system’ developed by Carl Woese

I can describe…..

1. The role of geology and fossils in helping Darwin propose the theory of natural selection
2. The steps of natural selection
3. The steps that lead to speciation
4. The steps of selective breeding (artificial selection)
5. The main steps in the process of genetic engineering
6. The steps used in tissue culture in order to grow identical new plants.
7. The main steps in ‘cuttings’ in order to produce many identical new plants from a parent plant
8. The main steps used in embryo transplants
9. The process of adult cell cloning
10. How fossils may be formed
11. The steps that lead to a bacterial strain being antibiotic resistant
12. How evolutionary trees are made for living organisms and for extinct organisms.

I can explain….

1. What problems exist when selective breeding leads to ‘inbreeding’
2. Benefits and risks of selective breeding given appropriate information and consider related ethical issues.
3. Why the theory of evolution by natural selection (as Darwin published in *On the Origin of Species* in 1859) was only gradually accepted
4. The potential benefits and risks of genetic engineering in agriculture and in medicine and that some people have ethical objections
5. The importance of tissue culture
6. The potential benefits and risks of cloning in agriculture and in medicine and that some people have ethical objections.
7. How fossils provide evidence for evolution
8. Methods used by patients or doctors to reduce the rate of development of antibiotic resistant strains

I can compare:

1. Darwin’s theory of variation with that of Jean-Baptiste Lamarck

I can….

1. interpret information about genetic engineering techniques and to make informed judgements about issues concerning cloning and genetic engineering, including GM crops.
2. Interpret information from evolutionary trees