

## Scheme of Work - Progression

### Science

#### Year 9 / Quatrième

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Period 1                         | <p><b>Building Blocks</b></p> <ul style="list-style-type: none"> <li>Scales of objects : from subatomic particles to the whole Earth</li> <li>Manipulation of chemicals and glassware for chemical reactions</li> </ul> <p><b>Atoms are the "building blocks" of all matter in the Universe</b></p> <ul style="list-style-type: none"> <li>History of development of the idea of the atom</li> <li>Chemical reactions</li> <li>Writing and reading basic chemical formulas and equations</li> <li>Periodic table of elements</li> </ul> <p><b>Cells are the "building blocks" of living matter/organisms</b></p> <ul style="list-style-type: none"> <li>Introduction to use of compound light microscope</li> <li>Wet-mount slide preparation</li> <li>Specimen drawing</li> <li>Experiment design, carry-through, data tables, graphing, lab report writing</li> </ul>                                                                                                                                        |
| <b>Autumn – Mid-Term Holiday</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Period 2                         | <p><b>Building Blocks</b></p> <p><b>Cells are the "building blocks" of living matter/organisms</b></p> <ul style="list-style-type: none"> <li>Names and functions of basic organelles</li> <li>Plant vs animal cells</li> <li>Specialized cells</li> <li>Gametes and fertilization</li> <li>Cell multiplication and differentiation during animal development</li> <li>Chromosomes in cells</li> <li>Karyotypes and some chromosomal abnormalities</li> <li>DNA structure and relationship to chromosomes</li> <li>Concepts of DNA replication and mitosis</li> <li>Application and practice of specimen preparation and microscope use</li> <li>Manipulation of substances for DNA extraction</li> </ul>                                                                                                                                                                                                                                                                                                      |
| <b>Winter Holiday</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Period 3                         | <p><b>Individual Response and Group Adaptation</b></p> <p><b>Thermoregulation</b></p> <ul style="list-style-type: none"> <li>Heat conduction</li> <li>Insulation</li> <li>Huddling together</li> </ul> <p><b>Behavioral response</b></p> <ul style="list-style-type: none"> <li>Innate vs learned, stimulus and response, individual vs group</li> <li>Models used in experiments to learn about "real life"</li> <li>Experimental design : collecting data, processing (graphing) and analysing data</li> <li>Thermometers and data loggers</li> <li>Limitations and strengths of experiments of movement</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Winter – Mid-Term Holiday</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Period 4                         | <p><b>Individual Response and Group Adaptation</b></p> <p><b>Biological variation</b></p> <ul style="list-style-type: none"> <li>Group characteristics vs individuals, causes of variation, mutation, sexual reproduction vs asexual reproduction</li> <li>Phenotype vs genotype, inheritance via genes/alleles through sexual reproduction, selective breeding</li> </ul> <p><b>Process of natural selection</b></p> <ul style="list-style-type: none"> <li>Darwin, Impact of environment, Geographical isolation, Misconceptions about "evolution"</li> <li>Group vs individual, antibiotic resistance, genetic modification as a societal issue</li> </ul> <p><b>Human sexual reproduction</b></p> <ul style="list-style-type: none"> <li>Comparative anatomy : male and female</li> <li>Respect and communication, puberty, STDs, intercourse, contraception, pregnancy</li> </ul>                                                                                                                         |
| <b>Spring Holiday</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Period 5                         | <p><b>Earth's crust</b></p> <ul style="list-style-type: none"> <li>Spheres of the Earth : atmo-, litho-, hydro-, bio-</li> <li>Deciduous forest : interactions between the spheres : leaf litter, insects, soil structure, components and production</li> </ul> <p><b>Ecosystem interactions</b></p> <ul style="list-style-type: none"> <li>Food webs, food pyramids, food is energy and matter, energy flows and matter cycles</li> <li>Concepts of photosynthesis and cellular respiration, carbon cycle, speciation</li> <li>Plant structure and interactions with environment : water, light and gas exchanges</li> <li>Fossil fuel formation from organic matter</li> <li>Human impact on ecosystems and climate</li> </ul> <p>If possible :</p> <ul style="list-style-type: none"> <li>Field science : collecting samples, processing and making sense of samples</li> <li>Experimental design and materials manipulation : data collection, presentation, analysis, lab report communication</li> </ul> |