

CURRICULUM CONCEPTS SCIENCE LEVEL 8	LEARNING OUTCOMES AS 90731 Describe geological processes affecting NZ (2 credits)	LEARNING ACTIVITIES AS 90731
EARTH SYSTEMS AND INTERACTING SYSTEMS Develop an in-depth understanding of the inter-relationship between human activities and the hydrosphere, geosphere, atmosphere and biosphere over time	Explain the theory of plate tectonics in general terms, and in relation to the NZ continental area in particular Describe the features of various plate contact zones, including collision/subduction zones, sea floor spreading zones and transform/shearing zones Investigate how seismic activity is detected and measured in NZ and how earthquake epicentres are calculated Relate/discuss how the methods used in earthquake detection are also used to understand the internal structure of the earth Describe both the Richter scale and the Mercalli scale Describe the active and dormant volcanoes in NZ Explain how different types of volcano are linked to different magma sources	Review knowledge and understanding of plate tectonics theory Interpretation of geological maps of the NZ region and global regions Build 3-D model of fault line areas in NZ Review understanding of seismic activity Use Edgecumbe and Napier earthquakes as models - research Build a simple seismometer, relate this to both Richter and Mercalli scales Review understanding of volcanic activity Use Ruapehu as a model - research Link ideas to US 6365
UNDERSTANDING ABOUT SCIENCE Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate	Link data gathering to warning systems	Link information gathered by the Institute of Geological and Nuclear Sciences (IGNS) to the warning system for earthquakes, tsunamis for NZ
INVESTIGATING IN SCIENCE Develop and carry out investigations that extend their scientific knowledge, including developing their understanding of the relationship investigations and scientific theories and models.	Review & research of data gathering techniques and model building	Review & research of the impact of events such as the Edgecumbe earthquake and the Mt Ruapehu eruptions of the 1990s and the Canterbury Earthquakes of 2010 & 2011
COMMUNICATING IN SCIENCE Use accepted science knowledge, vocabulary, symbols and conventions when evaluating accounts of the natural world, and consider the wider implications of the methods of communication and/or representation employed.		This skill will be facilitated by the work done throughout this topic, along with the Participating and Contributing , and Understanding about Science skills.

CURRICULUM CONCEPTS SCIENCE LEVEL 8	LEARNING OUTCOMES US 6365 Demonstrate knowledge of geological hazards	LEARNING ACTIVITIES US 6365
EARTH SYSTEMS AND INTERACTING SYSTEMS Develop an in-depth understanding of the inter-relationship between human activities and the hydrosphere, geosphere, atmosphere and biosphere over time	<u>element 1</u> Describe three geological hazards from provided information for a given area or areas. <u>performance criteria</u> 1.1 The description identifies types of hazard consistent with the provided information for a given area or areas. 1.2 The description outlines the potential impacts to the area or areas from the identified hazards for a given area or areas	Research assignment Five periods of class time allocated Research of material provided on earthquakes, volcanic activity and tsunamis Focus on local area – Taupo, Rotorua, Whakatane, White Island
UNDERSTANDING ABOUT SCIENCE Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge, and to present their findings for peer review and debate.	<u>element 2</u> Describe methods of monitoring a selected geological hazard. <u>performance criteria</u> 2.1 The description identifies monitoring techniques appropriate to the hazard. 2.2 The description outlines how the monitoring techniques function.	As above Prepare a written descriptions of monitoring methods, and of warning systems, as part of the presentation of this research assignment
INVESTIGATING IN SCIENCE Develop and carry out investigations that extend their scientific knowledge, including developing their understanding of the relationship investigations and scientific theories and models.	<u>element 3</u> Discuss risk assessment related to a selected geological hazard. <u>performance criteria</u> 3.1 The discussion outlines how data are gathered and interpreted to assess risk. 3.2 The discussion outlines the difficulties of determining the frequency or likely frequency of the hazard. 3.3 The discussion outlines the difficulties of assessing the risk associated with the geological hazard.	As above Discussion of findings about data gathering techniques, about difficulties in trying to predict such events, about difficulties in attempting to assess the risks involved with these events
COMMUNICATING IN SCIENCE Use accepted science knowledge, vocabulary, symbols and conventions when evaluating accounts of the natural world, and consider the wider implications of the methods of communication and/or representation employed.	<u>element 4</u> Discuss two techniques for reducing the risk from a selected geological hazard. <u>performance criteria</u> 4.1 The discussion outlines how each technique reduces the risks associated with the hazard. 4.2 The discussion evaluates the effectiveness of each technique.	As above

CURRICULUM CONCEPTS SCIENCE LEVEL 8	LEARNING OUTCOMES AS 90729 Describe Genetic Processes (4 credits)	LEARNING ACTIVITIES AS 90729
<p>LIFE PROCESSES – ECOLOGY & EVOLUTION</p> <p>Understand how humans manipulate the transfer of genetic information from one generation to the next, and make informed judgements about the social, ethical and biological implications relating to this manipulation</p>	<p>Describe the structure of a typical cell, and explain the function of the nucleus and the chromosomes.</p> <p>Review concept of atom/molecule Describe the structure of DNA and RNA</p> <p>Describe DNA replication & link the role of replication to cell reproduction. Discuss the role of enzymes such as DNA polymerase in this process</p> <p>Describe the structure of proteins and explain their role in living things.</p> <p>Describe and explain the process of protein synthesis, including the roles of DNA, RNA, chemical bonds, organelles</p> <p>Explain how mutations may occur in DNA and discuss the possible consequences of these.</p> <p>Research the applications of gene technology and offer description, explanation and discussion of techniques such as DNA sequencing and profiling, Gene cloning, Transgenesis and Gene Therapy Project should also include a discussion of the possible implications of these techniques</p>	<p>Review knowledge and understanding of cell structure and function, including some microscope work</p> <p>Review k&u of DNA & RNA structure Build models of DNA</p> <p>Review k&u of cell division and of DNA replication. Base review & explanation on key diagrams/video</p> <p>Review k&u of protein structure & function</p> <p>Intro process of protein synthesis Use as many “concrete” forms of explanation as possible – diagrams, cut & paste, video, etc. Include ideas on stability of DNA & how mutations may occur – use exercises from “Biozone”</p> <p>Research Project – Applications of Gene Technology</p>
<p>UNDERSTANDING ABOUT SCIENCE Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate</p>	<p>Describe /explain/discuss a range of gene technologies,</p>	<p>Project Work - Discuss the possible benefits/problems of the new technologies</p> <p>Human Genome Project</p>
<p>INVESTIGATING IN SCIENCE Develop and carry out investigations that extend their scientific knowledge, including developing their understanding of the relationship investigations and scientific theories and models.</p>	<p>Review & research at least one of the technologies outlined</p>	<p>Project work, plus DNA practical</p>
<p>COMMUNICATING IN SCIENCE Use accepted science knowledge, vocabulary, symbols and conventions when evaluating accounts of the natural world, and consider the wider implications of the methods of communication and/or representation employed.</p>	<p>(Participating and Contributing)</p>	<p>Project presented in written form, with a brief oral summary/explanation of possible implications.</p>

CURRICULUM CONCEPTS SCIENCE LEVEL 8	LEARNING OUTCOMES AS 90730 Describe selected organic compounds & their uses. (4 credits)	LEARNING ACTIVITIES AS 90730
<p>MATERIAL WORLD – THE STRUCTURE OF MATTER</p> <p>Relate properties of matter to structure & bonding.</p> <p>Develop an understanding of and use the fundamental concepts of chemistry (eg equilibrium & thermochemical principles) to interpret observations.</p>	<p>Review basic atomic structure of various elements, especially carbon, hydrogen, chlorine, oxygen, nitrogen.</p> <p>Review & compare ionic & covalent bonding</p> <p>Review the presentation of formulae – empirical, molecular, structural, condensed structural.</p> <p>Name & give structural formulae of alkanes, alkenes, alcohols, carboxylic acids, fats & oils</p> <p>Physical properties of each group Size of molecule & physical properties – MP, BP, solubility, pH.</p> <p>Chemical properties of each group to include Combustion & Addition reactions, Polymers Oxidation & esterification of alcohols & acids Tests for unsaturation of fats/oils</p>	<p>Model building activity using molymod etc.</p> <p>Periodic Table activity</p> <p>Formula writing activity</p> <p>Model building activity revisit</p> <p>Practical on combustion/solubility</p> <p>Practical on Alkenes – test for saturation</p> <p>Practical on alcohols – combustion & solubility</p> <p>Class activity monomers to polymer</p> <p>Graphing activity molecule size</p> <p>Practical on Carboxylic acids & esters</p> <p>Practical on fats & oils, soap making</p>
<p>UNDERSTANDING ABOUT SCIENCE</p> <p>Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate</p>	<p>Uses of alkanes as fuels</p> <p>Uses of alkenes in polymerisation/plastics</p> <p>Uses of alcohols as solvents & fuels</p> <p>Uses of fats in human diet/health</p> <p>Soap and the effect of soap/detergent anion</p>	<p>Range of combustion practicals</p> <p>Plastics activity recycle etc?</p> <p>Solvents Demo</p> <p>Research Project on saturated & unsaturated fats & oils</p> <p>Cleaners comparison</p>
<p>INVESTIGATING IN SCIENCE</p> <p>Develop and carry out investigations that extend their scientific knowledge, including developing their understanding of the relationship investigations and scientific theories and models.</p>	<p>Review & research at least one of the technologies outlined</p> <p>Either fuels & efficient combustion</p> <p>Or saturated-unsaturated fats & diet</p> <p>Or plastics & recycling</p>	<p>Homework research project</p>
<p>COMMUNICATING IN SCIENCE</p> <p>Use accepted science knowledge, vocabulary, symbols and conventions when evaluating accounts of the natural world, and consider the wider implications of the methods of communication and/or representation employed.</p>	<p>(Participating and Contributing)</p>	<p>Project presented in written form, with a brief oral summary/explanation of possible implications.</p>

CURRICULUM CONCEPTS SCIENCE LEVEL 8	LEARNING OUTCOMES AS 90732 Electromagnetic Radiation, Etc.	LEARNING ACTIVITIES AS 90732
<p>PHYSICAL WORLD Investigate physical phenomena in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics.</p> <p>Produce qualitative and quantitative explanations for a variety of unfamiliar situations.</p> <p>Analyse data to deduce complex trends and relationships in physical phenomena.</p> <p>Use physics ideas to explain a technological or biological application of physics</p>	<p><i>Investigate the Properties of :</i> EMR: wave propagation, wave type, wavelength, frequency, period, wave velocity, amplitude, two point source interference, reflection, refraction, diffraction, EMR spectrum, absorption Radioactive decay: alpha and beta particles, gamma rays, conservation of atomic and mass number in alpha, beta and gamma decay, half life, isotopes, ionisation, penetration Sound and ultrasound: wave propagation, wave type, wavelength, frequency, period, wave velocity in different media, amplitude, pitch, loudness, reflection, diffraction, transmission, absorption.</p> <p><i>Use formulae, graphs or diagrams in problem solving.</i> Recall and use of the following formulae is expected:</p> $c = f\lambda, v = f\lambda, v = \frac{d}{t}, f = 1 / T$ <p>If other formulae are required, they will be provided. The use of graphs or diagrams could include reading information directly from graphs (including interpolation and extrapolation), drawing graphs from given information, or extracting information from a diagram. Standard form, correct units and sensible rounding is expected in solving problems.</p>	<p>Slinky spring activity</p> <p>Graphing exercises</p> <p>Tuning fork & oscilloscope,</p> <p>Problem solving exercises</p>
<p>UNDERSTANDING ABOUT SCIENCE Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate</p>	<p><i>Describe & explain applications</i> Examples of applications could include: EMR: shadows and eclipses; radio wave transmission; radio receivers; microwave oven; optical, radio and infrared telescopes; photographic imaging in different parts of the spectrum; medical diagnosis and treatment; radar; speed guns Radioactive decay: Geiger counters, radiometric dating, irradiation of food, sterilisation, medical diagnosis and treatment, smoke detectors, density and thickness measurements Sound and ultrasound: acoustics, ultrasound scanning, Doppler effect, animal communication.</p>	<p>Selection of applications used to explore applications</p>
<p>INVESTIGATING IN SCIENCE Develop and carry out investigations that extend their scientific knowledge, including developing their understanding of the relationship investigations and scientific theories and models.</p>	<p>Selected applications may be chosen to investigate.</p>	
<p>COMMUNICATING IN SCIENCE Use accepted science knowledge, vocabulary, symbols and conventions when evaluating accounts of the natural world, and consider the wider implications of the methods of communication and/or representation employed.</p>	<p>(Participating and Contributing) Use of written, electronic and verbal forms of communication to be encouraged.</p>	<p>Project presented in written form, with a brief oral summary/explanation of possible implications.</p>