Assessment Schedule – 2008

Science: Describe geological processes affecting New Zealand (90731)

Evidence Statement

Question	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	Volcano has erupted or is inactive, or is asleep, and could erupt or become active again in the future. Or similar statement. Both points required.		
(b)(i)	• Earthquakes / shaking of ground. • Ground/side of volcano could 'swell'. • Increase in geothermal activity. • Increase in the release of gases or smoke. • Increase in temperature of ground / water in vicinity / crater lake. • Increase in temperature of gases escaping. • Water in crater lake disappears or the level of the water rises. • Cracks appearing in the ground • Rumbling noises coming from the volcano. TWO of the above.		

(b)(ii)	Examples: • Earthquakes/shaking of ground because of molten magma pushing its way through cracks in the rock / towards the surface /pressure of gases underground. • Ground / side of volcano could swell or bulge because the ground swells as the rising magma / gas puts pressure (greater forces) on the ground surface. • Increase in geothermal activity because the rising magma increases the temperature of the ground / water feeding the activity. • Increase in the release of gases or smoke because the pressure of gases underground causes some to escape through cracks in the ground. • Increase in temperature of ground/ water in vicinity / crater lake because rising magma heats the ground above which heats the water. • Increase in temperature of gases escaping because the heat from the rising magma is transferred to the gases. • Water in crater lake disappears or the level of the water rises because magma is rising in the volcano. • Cracks appearing in the ground because the pressure of rising magma or gases in the magma chamber stretching the ground above. • Rumbling noises coming from the volcano because the pressure of rising magma or gases in the magma chamber stretching the ground above. ONE explanation needed	Examples: • Earthquakes / shaking of ground because of molten magma pushing its way through cracks in the rock / towards the surface / pressure of gases underground . • Ground/side of volcano could swell or bulge because the ground swells as the rising magma /gas puts pressure (greater forces) on the ground surface. • Increase in geothermal activity because the rising magma increases the temperature of the ground / water feeding the activity. • Increase in the release of gases or smoke because the pressure of gases underground causes some to escape through cracks in the ground. • Increase in temperature of ground / water in vicinity / crater lake because rising magma heats the ground above which heats the water. • Increase in temperature of gases escaping because the heat from the rising magma is transferred to the gases. • Water in crater lake disappears or the level of the water rises because magma is rising in the volcano. • Cracks appearing in the ground because the pressure of rising magma or gases in the magma chamber stretching the ground above. • Rumbling noises coming from the volcano because the pressure of rising magma or gases in the magma chamber stretching the ground above. TWO explanations needed.	

(c)	One of the following: • Shield volcanoes produce basaltic magma and dome volcanoes produce rhyolitic or dacite magma. • Shield volcano (basalt) magma has a higher temperature than dome volcano (rhyolitic) magma. • Shield volcano magma has a lower silica content than dome volcano magma. • Shield volcano magma is less viscous (runnier) than dome volcano magma. • Shield volcano magma is basic while dome volcano magma is acidic. • Basalt magma is low in silica, and not very viscous / produces runny lava OR rhyolitic magma is high in silica, and very viscous / produces stiff lava. • Basalt magma runs further to form low sloping shape whereas rhyolite magma oozes out forming dome shape.	One linked aspect, such as silica amount, viscosity, runniness or stiffness or temperature of each type of magma linked to the shape of the relevant volcano. Examples: • Low silica content or less viscous magma makes (basaltic) lava flow further before it cools forming shield shape while a higher silica content or more viscous magma makes rhyolitic lava stiff so that it doesn't flow at all giving a steep sided dome. • Because the basalt magma is hotter, the magma takes longer to cool, forming gentle slopes while the cooler rhyolitic (or dacite) magma forms steeper slopes as it cools rapidly.	At least 2 linked aspects including temperature of magma or the amount of gas in the lava and name of each type of magma linked to the shape of the relevant volcano. Example: • Low silica content of basaltic magma produces less viscous magma, which is runny and at a high temperature resulting shield volcano having gently sloping sides because magma travels further and takes longer to harden forming the low shield shape **and** the higher silica content found in de-gassed rhyolitic (or dacite) magma produces more viscous and thicker magma which is at a lower temperature and slowly oozes out and hardens quickly, forming a steep-sided dome-shaped volcano.
TWO (a)	• Seismic waves release energy. • Seismic waves release heat. • Amplitude is a measure of energy. • P waves travel faster than S waves. • Amplitude of both waves decreases. • The ground absorbs energy of the wave. ONE of the above.	• Amplitude of the earthquake reduces because the waves release heat energy into the ground as they travel / ground absorbs energy of the wave. • Time difference between P and S waves increases over a greater distance because P waves travel faster than S waves. ONE explanation needed.	
(b)	• The difference between the P and S wave (for each reading) is used to calculate the distance from the seismometer. • Three circles are drawn using each distance (as the radius) which intersect at a common point to locate the epicentre of the earthquake. ONE of the above.	• The difference between the P and S wave (for each reading) is used to calculate the distance from the seismometer. Three circles are drawn using each distance (as the radius) which intersect at a common point to locate the epicentre of the earthquake. OR accurately labelled diagrams. BOTH explanations needed.	

(c)	• Richter scale is a measure of magnitude or energy. • Modified Mercalli scale is a measure of the intensity or amount of shaking of an earthquake. BOTH needed.	• Richter scale measures the magnitude of an earthquake, which corresponds to the level of energy released OR is a log scale. • Modified Mercalli scale is a measure of the intensity or amount of shaking of an earthquake as determined by the effects on people and their environment. BOTH needed.	
(d)	• Both plates either side of the Alpine Fault are continental. • Both plates are of equal density. • Neither plate subducts under the other. • Convergence or pressure of the two plates results in an increase in the height of the Southern Alps. ONE correct answer needed.	The two plates are made of continental crust show both collision (convergence) and lateral movement. Both plates are about equal density / buoyant, resulting in no subduction. The convergence pressures have resulted in an increase of the height of the Southern Alps. TWO of the underlined points clearly linked	The two plates are made of continental crust show both collision (convergence) and lateral movement. Both plates are about equal density / buoyant, (and don't subduct). The convergence pressures have resulted in an increase of the height of the Southern Alps. ALL underlined points clearly made Must say continental for excellence

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Total of FOUR opportunities answered at Achievement level (or higher). $4 \times A$	Total of FIVE opportunities answered with TWO at Merit level (or higher) plus THREE at Achievement level. $2 \times M + 3 \times A$	Total of SIX opportunities answered with ONE at Excellence level plus TWO at Merit level (or higher) plus THREE at Achievement level (or higher) OR total of SIX opportunities answered with TWO at Excellence level plus FOUR at Achievement level. $1 \times E + 2 \times M + 3 \times A$ or $2 \times E + 4 \times A$