Unit C1 - Revision Lesson 2 Rocks

Specification learning outcomes	HSW statements	Exemplar teaching activities	Main differentiation	Resource sheets
0.1 Recall the formulae of elements and simple compounds in the unit. **0.2** Represent chemical reactions by word equations H and simple balanced equations. H **0.3** Write balanced chemical equations including the use of state symbols (s), (l), (g), and (aq) for a wide range of reactions in this unit. **2.1** Describe that igneous rocks, such as granite, are: a) formed by the solidification of magma and lava, b) made of crystals whose size depends on the rate of cooling. **2.2** Describe chalk and limestone as examples of sedimentary rocks. **2.3** Describe how sedimentary rocks are formed by the compaction of layers of sediment over a very long time period. **2.4** Recall that sedimentary rocks: a) may contain fossils, b) are susceptible to erosion. **2.5** Describe marble as an example of a metamorphic rock. **2.6** Describe the formation of metamorphic rocks by the action of heat and/or pressure, including the formation of marble from chalk or limestone. **2.7** Recall that limestone, chalk and marble exist in the Earth's crust and that they are all natural forms of calcium carbonate. **2.8** Demonstrate an understanding of the balance between the demand for limestone and the economic, environmental and social effects of quarrying it.	**HSW 3, 4, 5, 7, 6, 8, 11, 13, 14**	The theme of this lesson is rocks - and specifically limestone. **Starter:** *Sorting rocks.* Provide cards with the names of different rocks – e.g. limestone, sandstone, marble, slate, granite, basalt. Students work in groups to sort the cards into three groups. They feed their answers back to the class for discussion. What is the basis for their groups? Have they recalled the three main rock types from Key Stage 3, or have they used some other basis for sorting? **Main:** *Rock to rock.* Divide the class into *a multiple of three* groups. For example, a class of 24 might be divided into *six* groups of four, with two groups each working on one of these problems: what are the features of metamorphic rocks and how does metamorphic rock become igneous rock; what are the features of igneous rocks (including crystal sizes) and how does igneous rock become sedimentary rock; what are the features of sedimentary rock and how does sedimentary rock become metamorphic rock (including limestone and marble). Groups working on the same problem share their ideas to devise a simple flow chart or written explanation of the process. They feed their work back to the class. You could divide each task in two if necessary. [Note that students need not recall the rock cycle.] *Products from limestone.* Worksheet C1.6c allows students to revise the issue of limestone quarries and moves on to look at uses of limestone. This would be a good point to help students make the link between the variety of uses that limestone has and the demand for it. *Thermal decomposition*. Remind students of the term thermal decomposition and the order in which calcium carbonate, zinc carbonate and copper carbonate decompose. You could then remind students of the practical work they did in this area and ask students to each contribute one comment each on the practical. This could be a way of planning it, what they found out or how they analysed their results. *Definitions.* Ask students to give definitions for key terms such as atom, molecule, compound, word equation, reactant, product and conservation of mass. Ask students to practice word equations by writing out the equation for the thermal decomposition of different carbonates. **Plenary:** *Quiz questions.* Students work in pairs to write four quiz questions about this spread, and then use them with at least one other pair. **Homework:** Worksheet C1.9c for students requiring extra support contains questions on calcium compounds.	**Stretch:** With Higher tier students, you also need to explain how to balance equations. It is enough only to cover thermal decomposition reactions, showing why they are balanced and using state symbols to show that a gas is evolved in the decomposition of carbonates. Students working at this level should complete worksheet C1.9d. **Support:** Students may need support with the revision work on rock types and features. You could give them some sentence starters to help.	Worksheet C1.6c Worksheet C1.9c Worksheet C1.9d

2.9 Demonstrate an understanding of the commercial need for quarrying calcium carbonate on a large scale as a raw material, for the formation of glass, cement and concrete. **2.10** Describe the thermal decomposition of calcium carbonate to form calcium oxide and carbon dioxide. *2.11 Investigate the ease of thermal decomposition of carbonates, including calcium carbonate, zinc carbonate and copper carbonate.* **2.12** Describe the ease of thermal decomposition of different metal carbonates. **2.13** Demonstrate an understanding that: a) atoms are the smallest particles of an element that can take part in chemical reactions, b) during chemical reactions, atoms are neither created nor destroyed, c) during chemical reactions, atoms are rearranged to make new products with different properties from the reactants. **2.14** Describe the effect of water on calcium oxide. **2.15** Describe how calcium hydroxide dissolves in water to form a solution, known as limewater. **2.16** Demonstrate an understanding that the total mass before and after a reaction in a sealed container is unchanged, as shown practically by a precipitation reaction. **2.17** Explain how calcium oxide, calcium hydroxide and calcium carbonate can be used to neutralise soil acidity. **2.18** Explain how calcium carbonate can be used to remove acidic gases from coal-fired power station chimneys, reducing harmful emissions and helping to reduce acid rain.				