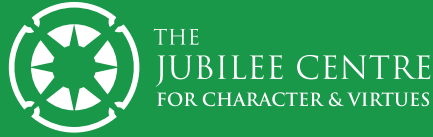


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SCIENCE

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Teaching Character Through Subjects - Science Suite 2 Key Information

Teacher	David Ashmore	School	University of Birmingham School
Overview			
Curriculum Area <i>e.g. Science, English</i>	Science		
Subject Focus <i>What is the topic? Does it correspond to an area of the national curriculum or equivalent? Which year groups is it appropriate for, and why?</i>	Elements and compounds, suitable for Year 7 science		
Identified Key Character Qualities <i>Which did you choose, which domain do they come from? e.g. respect from the moral domain</i>	Curiosity (intellectual domain) Focus (intellectual domain) Perseverance (performance domain) Neighbourliness (civic domain)		
Character Focus <i>How does your approach develop these key character qualities? How are they integrated across the lessons and subject elements? How do you utilize processes such as those seen in the caterpillar [stop, notice, look, listen, caterpillar] or EQ2 [acquiring, developing, consolidating, applying]? Where is the evidence [highlight one key source]?</i>	The lessons are designed to demonstrate how character can be taught by introducing and highlighting virtues used during each activity. This approach has a relatively low impact on lesson time, and enables curriculum content to be covered whilst promoting a consistent and long-term understanding and acquisition of virtues. Each lesson utilizes similar character virtues, so the virtue of curiosity is acquired in lesson 1, developed in lesson 2, consolidated in lesson 3 and applied in lesson 4. Neighbourliness can be practiced in lessons 1, 4 and 5,		
Differentiation <i>How have you taken into account students with differing levels of ability when you have planned and delivered your materials?</i>	The lessons planned include many open-ended tasks, where students can research elements and produce material without limitations (e.g. lessons 1 & 4). Additional support can be provided for each activity in the form of teacher support or support worksheets and materials. Lists of definitions for keywords could be provided for students to reference.		
Adaptability <i>When teachers come to use your resource how might it be adapted to suit their differing situations? e.g. can it be used with younger/older students, what might be needed if the lessons are longer/shorter than required?</i>	Each lesson contains activities that can either be shortened or extended. Lessons do not need to be exclusively lab-based, with only lesson 4 requiring use of Bunsen burners. The content of lessons are suitable for KS3 students, however materials such as the virtues self-assessment worksheet can be used for all ages. In addition, the way virtues are introduced and discussed for each activity can be repeated at all ages.		

<p>Affect on School Priorities <i>Have you seen any positive affect on attainment, behaviour, employability, or school relationships resulting from these materials either directly or indirectly?</i></p>	<p>Students already have a good virtue vocabulary within the school – continually reinforcing the virtues required in activities has improved cooperative behaviour in the classroom, particularly in group work. In addition, students recognize when they have remained motivated and focused during a task, and the benefits of focusing.</p>
<p>Things That Worked Well <i>In your opinion what were you really pleased with, try to be specific to areas of both subject and character education.</i></p>	<p>Students remembered the story of the discovery of ununtrium well, and has inspired students to be curious and discover more about elements beyond what is “required” for an A level student. This was shown in the elements chosen by students in the research projects.</p>
<p>Things That Might Be Improved <i>In your opinion what were you really pleased with, try to be specific to areas of both subject and character education.</i></p>	<p>Students often required more guidance in creating the quiz in lesson 5 – by combining the best questions from different students, a more useful quiz could be created.</p> <p>Including another example of the work that research scientists do would allow for the performance virtues of perseverance and resilience, and the moral virtues of honesty and integrity, to be developed and consolidated. However, as these are virtues common to most research scientists, they can be highlighted in other curriculum topics.</p>
<p>Lessons</p>	
<p>Subject Focus <i>Include the subject focus, outcome, or objective for this lesson</i></p>	<p>Lesson One: Define an element Describe the properties and uses of an element</p> <p>Lesson Two: Describe how scientists discover new elements Describe the structure of an atom</p> <p>Lesson Three: Describe how the periodic table is arranged Describe the common properties of groups and periods</p> <p>Lesson Four: Define a compound Identify risks and take precautions during a practical</p> <p>Lesson Five: Describe the properties of metals and non-metals Explain the properties of metals and non-metals</p>
<p>Character Focus <i>Include the character focus, outcome,</i></p>	<p>Lesson One: Demonstrate motivation and focus while researching elements</p>

<p>or objective for this lesson</p>	<p>Lesson Two: Identify virtues required for research scientists – moral virtues such as honesty and integrity, and performance virtues such as resilience, grit and perseverance</p> <p>Lesson Three: Use curiosity and perseverance to complete your own periodic table</p> <p>Lesson Four: Use neighbourliness and curiosity during the practical</p> <p>Lesson Five: practise neighbourliness when working in groups to explore different element samples</p>	
<p>Lesson Activities <i>Please include all lesson activities with an explanation of their intended impact for both the subject, and most importantly, character education.</i></p> <p><i>Expand these boxes as necessary.</i></p> <p><i>Please attach your own lesson plans separately; this space is for a summary of all lesson activities, and their intended impact.</i></p>	<p>Lesson one</p> <p>Task 1 identify the similarities and differences between particle diagrams Students then work collaboratively to create a definition of an element.</p> <p>Task 2 Use periodic tables to explore different elements, and create words based on the symbols.</p> <p>Task 3 Research the chemical and physical properties, uses and history of a chosen element.</p> <p>Task 4 Complete the character virtues self-assessment to identify the virtues used during the lesson.</p>	<p>Character Virtues</p> <p>Task 1 Students practise neighbourliness to collaboratively decide on a definition of element</p> <p>Task 2 Students show curiosity while exploring the periodic table</p> <p>Task 3 Display motivation and focus while researching elements</p> <p>Task 4 Use honesty and integrity when self-assessing virtues used</p>

	<p>Lesson two</p> <p>Task 1 Explore the story of the discovery of ununtrium This is an opportunity for students to read, practise geography and some simple mathematics.</p> <p>Task 2 Choose an element from the periodic table and make a model of the atom using plasticine.</p> <p>Task 3 Complete the character virtues self-assessment to identify the virtues used during the lesson.</p>	<p>Character Virtues</p> <p>Task 1 Identify the character virtues required to be a research scientist – honesty and integrity in recording and publishing results, resilience, grit and perseverance in working on a project for a long time.</p> <p>Task 2 Practise curiosity while building the models by writing three questions they would like answering.</p> <p>Task 3 Use honesty and integrity when self-assessing virtues used</p>
	<p>Lesson three</p> <p>Task 1 Follow the worksheet attached to fill in their own blank periodic table, including key terms for groups and periods.</p> <p>Task 2 Students write a quiz based on the learning of the previous three lessons.</p> <p>Task 3 Students answer quiz questions and then peer assess answers.</p> <p>Task 4 Complete the character virtues self-assessment to identify the virtues used and discussed during the lesson</p>	<p>Character Virtues</p> <p>Task 1 Use curiosity and perseverance to complete the periodic table</p> <p>Task 2 Demonstrate and practise respect and neighbourliness while working with others to write a quiz</p> <p>Task 3 Practise using honesty and integrity when answering quiz and peer marking answers.</p> <p>Task 4 Use honesty and integrity when self-assessing virtues used</p>

	<p>Lesson 4</p> <p>Task 1 Describe the difference between a picture of magnesium and a picture of oxygen</p> <p>Task 2 Write a risk assessment of the practical (burning Mg using a Bunsen burner).</p> <p>Task 3 Undertake practical (burning Mg using a roaring flame of a Bunsen burner) and record any observations</p> <p>Task 4 Students describe their observations of the practical</p> <p>Task 5 Complete the character virtues self-assessment to identify the virtues used and discussed during the lesson</p>	<p>Character Virtues</p> <p>Task 1 Students use curiosity to study and identify the differences between the two pictures.</p> <p>Task 2 Show neighbourliness by considering the safety of themselves and others</p> <p>Task 3 Demonstrate curiosity and neighbourliness by working with others during the practical.</p> <p>Task 4 Students will practise motivation and conscientiousness by completing the task after the practical</p> <p>Task 5 Use honesty and integrity when self-assessing virtues used</p>
	<p>Lesson five</p> <p>Task 1 Students learn key words to describe materials</p> <p>Task 2 Describe the properties of a selection of metals and non-metals using the blank table provided.</p> <p>Task 3 Students' answers can be shared and compared,</p> <p>Task 5 Complete the character virtues self-assessment to identify the virtues used during the lesson.</p>	<p>Character Virtues</p> <p>Task 1 Practise honesty in discussion with peers and teachers</p> <p>Task 2 Practise neighbourliness in sharing element samples Demonstrate focus and curiosity in using research material available.</p> <p>Task 3 Students use neighbourliness in listening to each other's answers</p> <p>Task 5 Use honesty and integrity when self-assessing virtues used</p>

Notes on Differentiation and Adaptability

Being specific to each lesson offer advice on how your resources might be adapted for different settings and ability levels.

Lesson One:

Support students by providing examples for task 2 to help explain the task. Challenge students to produce longer words, and include greater depth in research.

Lesson Two:

Support students by providing half-completed models that need completing, or providing the correct number of protons, neutrons and electrons for particular elements. Challenge students by introducing the concept of isotopes. Models can be made from different materials or drawn instead.

Lesson Three:

Support students by providing partly-complete periodic tables, or completed tables that require labelling. Challenge students to write different styles of questions for quiz.

Lesson Four:

Support students by giving partly completed risk assessment and providing visual instructions for practical. Challenge students to explain why heat was required for the reaction to happen, or explain why different metals have different coloured flames.

Lesson Five:

Support students by using partly completed observations tables. Challenge students to predict their observations before testing the elements.

Other Points Worth Noting

Add comments on such things as forward planning, room organisation, or homework that might be important for others using your resource.

This scheme fits within the national curriculum for KS3 science, although it draws upon different strands within Chemistry. As a result, some lessons may be more applicable in other topics depending on the current schemes of learning used.