

<p>Theme: Shaping our environment Specific theme Volcanoes Week: Term 1 Grade level: Grade 5</p>		
Subject: Science	Subject: Math	Subject: English
<p>ADEC Learning Outcomes (with term and code) Content: 5ES2Term 1 describe characteristics of Earth that make human life on it possible -</p>	<p>ADEC Learning Outcomes (with term and code) Content: 5SGP3Term 3 create and describe designs involving reflection and translation 5sgd4Term 2 identify, describe, sort and compare 3d solids by their geometric properties, including shape of base and number of edges 5MDD5Term 2 write a conclusion answering the original ‘big question’ and make ‘i wonder’ statements and related predictions within the statistical inquiry cycle 5MDD1Term 2 plan an appropriate process from a given ‘big question’ involving time series or category data within the statistical inquiry cycle 5MDT5 Term 3 create and interpret timelines 5MDM4 Term 1 find, record and explain the perimeter of simple shapes with straight sides and curved edges 5MDM3 Term 2 select and justify appropriate units and estimate, measure, and record capacity (ml, l) 5PA2Term 2 build more than one pattern to meet the same two given conditions 5NFD1Term 1 model and describe the unit fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{8}$ and $\frac{1}{10}$, and their multiples up to a complete whole, of an object and set</p>	<p>ADEC Learning Outcomes (with term and code) Content: 5WTT1 Term 1 rewrite procedural texts in an innovative way 5RRM2Term 2 gather information from different sources and texts and use it without plagiarism when writing or discussing topic 5SLLT2Term 1 listen attentively to a variety of presentations and evaluate presented content 5SLLT1 Term 2 plan collaboratively with a team a project and share the process and the result of work with familiar and unfamiliar audience 5SLT1 Term 1 <i>plan and deliver presentations to support a cause or a point of view and accommodates for other’s points of view or opinions</i></p>
<p>Specific Learning Outcomes Student will be able to: Describe the role of volcanoes in shaping our atmosphere through making a model.</p> <ul style="list-style-type: none"> capture a 3D terrain map of volcano 	<p>Specific Learning Outcomes Students will be able to:</p> <ul style="list-style-type: none"> use design software to create 3D shapes to represent volcano features (cone, vent, magma chamber, crater) 	<p>Specific Learning Outcomes Students will be able to:</p> <ul style="list-style-type: none"> research features about volcanoes: scientific; social; economic write a procedural text to describe experiment

<ul style="list-style-type: none"> research features about volcano: scientific; social; economic make a science experiment model (clay) for eruption (possible addition of data logging of CO²) <p>Sub outcomes</p> <ul style="list-style-type: none"> identify the parts of a volcano explain the structure of a volcano explain the processes of a volcanic eruption 	<ul style="list-style-type: none"> measure and record duration of eruption experiment timeline of eruptions <p>Sub outcomes</p>	<ul style="list-style-type: none"> create a presentation about a volcano <p>Sub outcomes</p>
<p>Learning Outcome that addresses one 21st century skills – this LO is covered in all three subjects (e.g. presentation skills: collaboration)</p> <p>Student will be able to:</p> <ol style="list-style-type: none"> create a presentation about a volcano (multimedia with a 3D printed as part) video or photograph experiment (or 3D process) work cooperatively in groups on a research project 		
<p>ICT</p> <ul style="list-style-type: none"> print a 3D model of volcano use design software to create and manipulate 3D shapes to represent volcano features (cone, vent, magma chamber, crater) video or photograph experiment use information literacy skills to search for and summarise content from the internet and other sources 		
<p>Possible Assessment</p> <ul style="list-style-type: none"> Technical Vocabulary – geography; gases; shapes (quizzes and worksheets – formative and summative) Creation of 3D model 	<p>Possible Assessment</p> <ul style="list-style-type: none"> Accuracy of timeline (formative) Recognition of 3D shapes Accuracy of measurement (distance/scale) Successful combination of shapes into 3D software to represent volcano 	<p>Possible Assessment</p> <ul style="list-style-type: none"> Technical Vocabulary – geography; gases; shapes (quizzes and worksheets – formative and summative) Persuasiveness of argument for living nearby (formative – draft; summative)
<p>An assessment for the skill which is interdisciplinary – across the subjects - to address the common learning outcome/LO</p> <ul style="list-style-type: none"> Presentation of research – project material & presentation skills (3D models, multimedia report - summative) Software proficiency – use of google earth (measurement and location); Use of Tinkercad or Design123 (manipulation of shapes) Organisation & teamwork skills (formative – give feedback) 		

<p>Resources Da Vinci 3D printer Computer with internet connection Computer software – Google earth, Tinkercad, Meshmixer, Baking soda, vinegar, modelling material</p>	<p>Resources Computer – google earth, Tinkercad, internet 3D shapes Stopwatch/computer timer</p>	<p>Resources Computer – Word, PowerPoint, Excel Video or still camera – multimedia capture</p>
<p>Teaching strategies Lesson – Volcano types Video – Gases Investigation – volcano characteristics – internet sources</p>	<p>Teaching strategies Lesson –revision of 3D shapes Algebra sequences Depiction of timelines Measurement of time Scale and slope</p>	<p>Teaching strategies Writing a narrative. Writing a procedure. (recipe, experiment – transactional writing) Take pictures or sketch illustrations for procedure. Creating a multimedia presentation</p>
<p>Activities</p> <ul style="list-style-type: none"> • Choose a volcano to study (pair – group) [choice by map search (google earth) or database http://volcano.si.edu/] • Research the volcano – type; height; eruptions; population nearby; (S,M,E) • Create a 3D section of selected volcano (terrain2stl) • Modify 3D section to include vent, magma chamber and divide in half. • Print volcano. • Conduct physical vinegar/baking soda experiment. If possible include CO2 data logging for classroom and volcano experiment (depends on availability of equipment). • View videos about volcanic activity. • Investigate difference between organic smoke/ash and volcanic ‘smoke’/ash. (NB no ‘smoke’ comes from volcanoes, it is volcanic ash, whereas smoke is organic residue) • Investigate particulate content in air (analogous to sand/dust in desert sandstorm). 	<p>Activities</p> <ul style="list-style-type: none"> • Create a timeline of eruptions (M) • Distance from Abu Dhabi: google maps surface measurement in KM. • Measure height around 5km radius of volcano and the calculate slope. • Create 3D shapes (combination of cones, spheres and cylinders). • Combine 3D shapes in software1 to represent the classic volcano types (also can do physically with clay, playdough or plasticine {even Lego}) • 3D Print shape after modification (adjust slope ratio; flatten base;) (M,ICT) • Create 3D algebra sequencing worksheets for younger grades to use. • Revise shapes with 3D Battleships game and online games. • Measure time periods of clay model volcano experiment. Chart. 	<p>Activities</p> <ul style="list-style-type: none"> • Volcanoes often have people living very nearby or commercial activities in the vicinity. Make an argument for allowing or prohibiting people from ‘being’ near your chosen volcano. How close can they be? Who is responsible for their safety? If volcanic activity threatens, who should help (pay)? {5SLT1 Term 1 presentation; 5WC3 Term 1 writing legibly; 5WWP1,2,3&4 Term 1, 2 & 3 publishing) (E) • Describe the myths and legends associated with chosen volcano. • Image you live beside the volcano. How do you feel about it? Do you feel confident about your safety, why? • Create and format an evacuation plan for a scientist who is studying your volcano. • Imagine you have been given 1 hour to evacuate your house. You can take one large suitcase with a maximum weight of 30kg. What would you put in the suitcase and why? Make a list describing

<ul style="list-style-type: none"> • Catalogue benefits vs dangers of volcanos • Examine images and descriptions of classic types of volcanoes (stratovolcanoes - cinder cone, shield, caldera, etc.). • Consider weight of gases – CO2 heavier than air therefore can asphyxiate (analogous to avalanche) 		<p>each item and an explanation of its importance to you.</p>
<p>Your volcano stats:</p> <ul style="list-style-type: none"> • Type of volcano • Latitude; longitude • How dangerous is it • What kind of eruption could occur. 	<p>Your volcano stats:</p> <ul style="list-style-type: none"> • Height above sea level • Last eruption & timeline of eruptions. • Distance from Abu Dhabi • Shape <p>Key vocabulary Slide, handle, rotate, drag, click, hold, shift key, Scale, proportion, prism, workplane, hole, zoom, select, axis, undo, radius,</p>	<p>Your volcano stats:</p> <ul style="list-style-type: none"> • Does the name have a special meaning? • Are there alternate names? • Country • Closest town/city • Myths and legends about it <p>(e.g. Japan's oldest recorded story claims that Fuji means immortality (fushi, 不死). According to the legend, Mount Fuji's fires were ignited by an Emperor who was love sick over a girl from the moon.)</p> <p>Key vocabulary: ash, cone, core, crater, crystals, the earth's crust, to erupt, lava, magma, magma chamber, mantle, molten, rocks, vent, volcano, pyroclastic, carbon dioxide, caldera, gas</p>
<p>Smithsonian institute site http://volcano.si.edu/ Best starting place and also source of the Google Earth KMZ information UAE based information site http://edu.environmentalatlas.ae/Tutorials/Learn/Volcanoes</p>	<p>What is average slope of your volcano (measure height at cone, height x km away and calculate) Reproduce slope in 3D and 2D with graph paper and software. Extension of 5MDM6 – find volume of model volcano (maybe shown in 3D software information), formula volume of cone $v = \frac{1}{3} h(\pi) r^2$</p> $V = \pi r^2 \frac{h}{3}$	<p>http://englishonline.tki.org.nz/index.php/ESOL-Online/Teacher-needs/Teaching-and-learning-sequences/Secondary-mainstream/Volcanoes Specific Learning Outcomes: Students will be able to: Text features of explanations: Structure:</p>

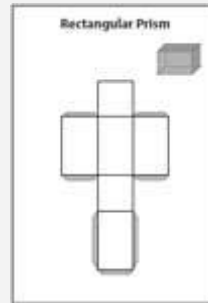
<p>Scholastic information site http://teacher.scholastic.com/activities/wwatch/volcanoes/ Volcanic gases site http://www.geology.sdsu.edu/how_volcanoes_work/ Volcano worksheets http://www.3dgeography.co.uk/#!/geography-worksheets/c1r57 Lesson plan and activity PDF https://msnucleus.org/membership/html/k-6/pt/pdf/pt5v.pdf</p> <p>http://www.pbslearningmedia.org/resource/ess05.sci.ess.earthsys.lp_volcanoes/volcanoes/</p> <p>good site with very good videos.</p> <p>http://www.3dgeography.co.uk/#!/volcano-worksheets/c1t16 worksheets</p> <p>http://www.eslprintables.com/vocabulary_worksheets/environment_and_nature/volcanoes/ worksheets</p> <p>worksheet with multi country standards https://www.studyladder.co.nz/games/activity/volcanoes-17532</p>	<p>Find the angle of slope of volcano. Use known height of volcano or use google earth to read summit height. Use google earth ruler to measure out a 5km radius around volcano. Read elevation from google earth as moving around the the circle. Eg. Bazman height 3450, 5 km radius give values ranging from 1874~2361. Use lowest point and minus from height to give base and height of right angled triangle. Calculate slope http://serc.carleton.edu/mathyouneed/slope/slopes.html Rise over Run - 1.5/5 →30% Students can use this rise over run ratio or percentage to create their 3D model cone. In TinkerCad a cone starts off with a diameter of 20 and height of 20, rise 20 / run 10 = 200% They should start by lowering the height to achieve the correct approximate slope. Since the run will remain as 10 (1/2 width, radius) , a rise of 10 would =100%. To get to 30% we will decrease to 3. However, since as we discovered with the terrain model this produces a rather unimpressive visual product we will use the same ratio of two:one, ie with will work with double (3) and use 6 instead. Essentially, with the standard cone from Tinkercad, first reduce the height to 10 then reduce to the percentage times .2 (30 x.2 = 6units) so our cone would have a base still of 20 but height of 6. Then making sure they hold the shift key while dragging a white corner square, enlargen the base to a diameter of 60. Modify the cone with the addition of cylindars, spheres etc, to create volcano and split in half to expose interior.</p>	<p>logical sequencing classification / description followed by explanatory sequence Language:</p> <ul style="list-style-type: none"> • general nouns and noun phrases e.g. • timeless present tense e.g. cools, burn, • relating verbs e.g. is, has • action verbs e.g. heats, flows • passive voice e.g. is forced • cohesive devices including conjunctions <p>showing cause /effect (e.g. because, as a result, so), temporal relationships (e.g. first, when, then, finally)</p> <p>Learning task 1 Learning task 2</p>
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3D shapes

<http://www.mathworksheets4kids.com/solid-shapes.php>

Solid Nets: With Tabs

To create the shape, cut the net along the corners and glue the tabs.



[Cube](#) | [Cylinder](#) | [Cone](#)
[Rectangular Prism](#) | [Triangular Prism](#)
[Pentagonal Prism](#) | [Hexagonal Prism](#)
[Octagonal Prism](#)
[Square Pyramid](#) | [Triangular Pyramid](#)
[Pentagonal Pyramid](#) | [Hexagonal Pyramid](#)
[Octagonal Pyramid](#)
[Download All Solid Nets](#)

<http://www.math-salamanders.com/5th-grade-geometry.html> worksheets

computer game – select 3D

http://www.sheppardsoftware.com/mathgames/earlymath/shapes_shoot.htm

<http://www.snappymaths.com/other/shapeandspace/3dshapes/interactive/3dshapeimm/3dshapeimm.htm>


Resources

Link address to download google earth volcanoes location

- <http://volcano.si.edu/ge/GVPWorldVolcanoes.kml>
- http://volcano.si.edu/learn_products.cfm?p=9

Create a 3D section of selected volcano - <http://jthatch.com/terrain2stl/>

ADEC readers

- 9780170098632  
- 9781863749794  

Information

Closest volcano to Abu Dhabi

- (Maar type) Qal'eh Hasan Ali 29°23'60.00"N 57°34'12.00"
- (composite type) Bazman 28° 4'12.00"N 60° 0'0.00"E

Full ADEC Science 5ES2 LO

5ES2 Term 1	describe characteristics of Earth that make human life on it possible	outline characteristics of Earth that make human life on it possible	identify characteristics of Earth that make human life on it possible	<ul style="list-style-type: none"> ▪ Describe the role of volcanoes in shaping our atmosphere through making a model. ▪ Describe the greenhouse effect and how it makes life on Earth possible through creating a concept map.
Explanatory Notes:				

- Our atmosphere today contains mostly nitrogen and oxygen. However, the moisture of gases in the atmosphere has changed over the lifetime of the Earth. The early atmosphere contained other gases that would not support today's life forms, including carbon monoxide, methane, ammonia and sulphur gases. **Volcanic eruptions were key in creating the early atmosphere** and probably also in bring about early life forms. An atmosphere was formed **as volcanoes spewed out their gases**. These gases acted as greenhouse gases and allowed the temperature of the Earth to become suitable for life. The water vapour also eventually condensed and formed our oceans.
- Show students **videos, slide shows and pictures of volcanoes erupting and spewing out lots of material into the air**. Explain how the gases being released are carbon dioxide and water vapour. Give a brief explanation of the Earth's early atmosphere.
 - Tell the students that they are going to make a **model volcano**. They will need flour, salt, water, oil, an empty plastic bottle, a deep bowl, food coloring, liquid soap, baking soda and vinegar.
 - Split the students into groups of 4-5 and allow them to make their volcano. Have them draw a diagram of their volcano erupting. Ask the students what gas they think was given off during their eruption. Ensure they know that its carbon dioxide, the same gas as in a real volcano.
- The greenhouse effect is a natural phenomenon. If the students have heard of it, they will probably relate it to something bad and entirely caused by humans. This is a misconception. Greenhouse gases act like a blanket around the Earth, trapping or absorbing heat energy that is radiated from the surface. This phenomenon keeps the temperature on the Earth high enough for life to exist. The main greenhouse gases that we have in our atmosphere today are carbon dioxide and methane. Most scientists believe that we are adding to the greenhouse effect through polluting the atmosphere with gases such as carbon dioxide from burning fuels, car exhaust, etc. This added gas adds to the thickness of the blanket that is around the Earth and is known as the enhanced greenhouse effect. Trees help remove carbon dioxide from the atmosphere, however, with deforestations, there are fewer trees to do this important function.
- Present slide shows, videos and pictures to students showing greenhouses in garden nurseries. Explain how they work (in cooler climates people use greenhouses to keep plants warm and to help them grow.) Explain with diagrams and illustrations how they work and make the connection to the Earth's greenhouse effect. Tell the students that one of the main gases in Earth's greenhouse is carbon dioxide. Arrange students into groups of 4 and provide A3 paper to each. Ask students to create a concept map of what they know about carbon dioxide. (Teachers will need to provide resources e.g., internet, books, articles. Some information may be; it is created by burning fuels, too much in the atmosphere contributes to global warming, it is used in fire extinguishers, it is heavier than air, plants use it in photosynthesis.) Have the groups share their responses and create a similar concept map on chart paper to record all ideas. Ensure that students realize that the greenhouse effect has always been there and is necessary for life to exist on the planet Earth. Ask the students record their work (print and visuals) in their science journals/notebooks.