

Lesson Plan for Mount Kinabalu Trek. Mark Thompson's "A Mountain, Some Celebrities and STEM"

<b>Aim: Develop skills in interpreting and presenting scientific data</b>	<b>Session Length</b> 60 min	<b>Class</b> Years 9-11
<b>Learning objectives:</b> Present data as tables and graphs. Interpret data to suggest conclusions. Evaluate and apply findings to other situations.		
<b>Prior learning:</b> students should be aware of how to draw a results table and plot graphs (this skill will, however, be further developed during this lesson)		
<b>Literacy:</b> Written descriptions for presentation. Introduction to unfamiliar words.	<b>Numeracy :</b> Graphs, tables, calculations and conversions using data.	
<b>Resources required:</b> Computer access or printed data from <a href="http://www.markthompsonastronomy.com">http://www.markthompsonastronomy.com</a> website. Information about wildlife in Borneo (e.g. <a href="https://www.worldwildlife.org/places/borneo-and-sumatra">https://www.worldwildlife.org/places/borneo-and-sumatra</a> ). Information about rainforests (e.g. <a href="https://kids.mongabay.com/">https://kids.mongabay.com/</a> , <a href="http://www.bbc.co.uk/schools/gcsebitesize/geography/ecosystems/tropical_rainforests_rev1.shtml">http://www.bbc.co.uk/schools/gcsebitesize/geography/ecosystems/tropical_rainforests_rev1.shtml</a> , <a href="http://www.bbc.co.uk/nature/habitats/Tropical_and_subtropical_moist_broadleaf_forests">http://www.bbc.co.uk/nature/habitats/Tropical_and_subtropical_moist_broadleaf_forests</a> ). A3 paper, graph paper, clipboard for project leaders.		
Overview: Students will work as a team in different groups collect and analyse data, and develop a presentation.		
Grouping: For main task, five groups of 3-4 students and two project leader. For additional students, I suggest having additional groups doing similar tasks rather than making the groups larger.		
<b>Differentiation</b> can be based on selection of groups for students, by the amount of assistance given and by careful selection of combinations of students in groups (e.g. grouped by level or mixed-ability).		

Time	Teacher's Activities	Pupils' Activities
5 min	<b>Starter:</b> Provide students with some questions Where is malaysia? Where is Borneo? What do you know about it? (you may wish to provide resources to help the students). (By the time you use this plan, there could be a trek video available that you could show all or part of).	Students suggest answers to any of the questions that they can.
5 min	<b>Main:</b> <u>Introduction</u> Introduce information about the trek (see <a href="http://www.markthompsonastronomy.com/a_mounta_in_some_science_and_charity/">http://www.markthompsonastronomy.com/a_mounta_in_some_science_and_charity/</a> ). A group of celebrities including astronomer will be climbing up Mount Kinabalu in Borneo and collecting scientific data on atmospheric pressure, humidity and temperature as they climb. This is a tropical region with dense rainforest but at the top, above the treeline, it is rocky and exposed. As students how they think conditions like temperature, air pressure, oxygen level and humidity might change as they climb.	Divide into groups based on atmospheric pressure, humidity, temperature, wildlife and rainforests.  (Depending on preference and the facilities that you have in your classroom, the tasks could be done on sheets of A3 paper or on computers) Groups collect and record data from Mark Thompson's website ( <a href="http://www.markthompsonastronomy.com">http://www.markthompsonastronomy.com</a> )

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	<p>Tell students that they will be a team of scientists monitoring and analysing the data collected during the trek. They will divide into different specialisms and then combine their findings at the end to report to a <b>project leader (played by a pair of higher ability students)</b>.</p>	<p>Students in groups select roles:</p> <ol style="list-style-type: none"> <li>(1) <b>Team Leader</b> (guides and keeps people on track, and spots any errors)</li> <li>(2) <b>Data collector</b> to find and read out data/info.</li> <li>(3) <b>Data recorder</b> to write down data/info.</li> <li>(4) If 4th person in the group, they should be thinking and writing a summary of what the data is telling them.</li> </ol> <p>The <b>project leaders</b> will move around between groups with their clipboard and try to build up a summary of what data is telling us overall. They will record key facts, trends and any interesting interpretations. This will continue through all tasks so that by the end they can read out a short summary statement to the class.</p>
15 min	<p><u>Data Collection/Recording Task</u>                  Divide class into groups of about 3-4:                  Group 1: Atmospheric pressure data                  Group 2: Humidity data                  Group 3: Temperature data                  Group 4: Research wildlife of northeast Borneo                  Group 5: Research conditions in a rainforest</p> <p>Provide data to the groups either via computers and access to Mark Thompson's website (<a href="http://www.markthompsonastronomy.com">http://www.markthompsonastronomy.com</a>) or printed on sheets if no internet access. Each group will be asked to collect the data or information on their part of the project and record it as a results table or, in the case of groups 4 and 5 lists, descriptive text and pictures as they choose.</p>	<p><u>Data Collection/Recording Task</u>                  Each group uses the resources provided to make a table recording how the factor that they are studying varies with altitude. They could also use information to show where conditions change from forest to open areas. Nice, clear, easily read tables should be produced. Preferably large so that it can be displayed to the class later.</p> <p>Groups 4 and 5 can record their information as descriptive information on an A3 sheet of paper. This could also use pictures.</p>
15 min	<p><u>Data Analysis Task</u>                  Ask groups 1-4 to plot their data onto a large graph (Could be on paper or using Excel). Let the students decide as much as they can about what goes on the axes but help as you feel appropriate (this is a chance to help with graphing skills and differentiate between abilities).</p> <p>Group 1: Altitude on x-axis and pressure on y                  Group 2: Altitude on x-axis and humidity on y                  Group 3: Altitude on x-axis and temperature on y</p>	<p><u>Data Analysis Task</u>                  Groups 1-3 plot data onto large graphs showing the factor that they are studying. They should then use what they have seen to write a conclusion about their results tell them.</p> <p>Groups 4 and 5 continue to produce a poster of their findings but ensure that they are thinking about where on the trek particular animals and plants would be found and why. If available, they could also use any information collected</p>

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<p>15 min</p>	<p><b>Presentation Task</b></p>	<p>by the trekkers about what types of wildlife and conditions they experienced as they climbed.</p> <p><b>Presentation Task</b> Each group will present and explain their data to the rest of the class in a short (max. 2 min.) presentation. They should include a suggested reason for trends and evaluate giving potential improvements. Students watching and listening should write a one sentence summary of each presentation (maybe in their exercise books).</p>
<p>5min</p>	<p><b>Plenary</b></p> <p>Teacher could ask the class any pertinent questions about reasons for trends, what they have learnt or what further things they would like to learn.</p>	<p><b>Plenary</b> Project leaders will present a short 2 minute summary of what they have learnt overall.</p>

