Landforms and Mountain building

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This lesson plan conveys to students the fascinating natural process of mountain formation by combining their knowledge of the structure of the earth and the concept of plate tectonics in as simple a manner as possible.

Duration:
03 hours 20 mins
Introduction:

The origin of mountains is very imprecisely written in most of the text books ; and most of the content is based not on how the mountains, plateaus or plains are formed but rather focused upon the location and description of such regions. From my teaching experience I found that the origin of mountains has always captured the imagination of all students across classes. So I felt it necessary to combine the knowledge of the structure of the earth (which is taught in 4^{th}/5^{th} standard) and plate tectonics as simply as possible to convey to children the fascinating natural process of mountain formation.

Support Material:
landforms_and_mountain_buildings-_resource_1.pdf
landforms_and_mountain_buildings-_resource_2.pdf
landforms_and_mountain_buildings-_resource_3.pdf
landforms_and_mountain_buildings-_resource_4_young_fold_mountains.pdf
landforms_and_mountain_buildings-_resource_5.pdf
landforms_and_mountain_buildings_-_resource_6_and_7.pdf
landforms_and_mountain_buildings_-_resource_8_-_block_and_rift_valley.pdf
landforms_and_mountain_buildings-resource_9_-_volcanic_mountain.pdf
Steps:

Support Material

Session 1: Setting the context with a game

Resource 1 - Flash cards for 'Matching Object with Height'

Item ideas: pine cones, stones, a bottle of water with silt, a packet of sands, picture of a Bedouin, a hand full of ragi, jowar, a packet of tea/coffee, etc.

Keep cards with heights written on them or simply the words: river-plains, plateaus, mountains, deserts, and coastal plains.

Actual objects will create real interest amongst the children in the class. You can also use any other item you think is suitable for your students.

Session 2: Identifying the characteristics of Landforms

Resource 2: Pictures of mountains, plateaus, great river plains, deserts and coastal plains

Resource 3: Work Sheet 1

Session 3

Resource 4: (to be kept ready by the teacher)

To show folding:

1. A rubber/tennis ball.
2. Atta dough with a thickness of 5 cm wrapped all around the ball.
3. A thin cloth of red color, to cover the top of the dough, leaving the sides uncovered.
4. Another cloth colored green to be placed on the red colored- cloth.
5. Diagrams of structure of the earth, fold mountains as Resource 5

To show faulting:

6. Three solid blocks of the same size and shape, preferably square.
7. Diagrams of Block Mountain and rift valley

Resource 5: Diagrams of structure of the earth, folds, faults and rift valleys

Session 4

1. Pictures of Block Mountains, Volcanoes, Fold mountains and Residual Mountains.
2. A list of these mountains in India. A physical map of India.(Keep this ready)
3. A list of characteristics of mountain, plateau, plain, desert is given in Resource 6 and 7
4. A list of important mountains, plateaus, plains and deserts in various continents is given in the above resource.

Steps

Session 1: The teacher can use this game before she starts her lesson on 'landforms', in order to set the context.

Step1: The teacher asks the students to pick up an object and also a card having a matching height, from the card tray.

Step2: Once all the students have finished matching the objects with the height, the teacher brings out the connection between the object and the height if not already derived by the students.

She must make sure that children understand that any landform whether mountain, hill, plateau, or plain, is characterized solely on the basis of their height above sea level.

Also ask the students to share the basis of the correlation they have made.

Give some examples from daily life, e.g. show how shells are collected only from coastal areas.

Session 2

Step1: The teacher is going to distribute a set of pictures (e.g. a set of pictures showing only mountains) to each group of 4-5 students.

Use these pictures to get the students to bring out the characteristic features of each of these landforms themselves.

Step2: Allot 15 minutes to observe the pictures carefully and ask them to list the main characteristic features of the particular landform that has been given to them.

Step3: Instruct them to make a presentation based on their findings

Step4: The facilitator must write these observations, while the presentation is going on and later wrap up the discussion.

Session 3

Step1: Draw the internal structure of the earth showing the crust (with its two layers of Sial & Sima), the mantle and the core, on the board. (Resource 5)

Step2: Help the students make a working model of the earth's structure, as shown in Resource 4.

To do so take the ball, wrap it up with the dough, not covering the sides, so that the ball can be viewed from the sides. Then cover the top of the dough first with the red cloth and then with the green cloth. Mention that the force applied here for folding is called 'Compression'.

Step3: Compare the diagram and the model, and speak about each layer.

Step4: Compress the dough with your fingers along the sides and see how the two pieces of cloth buckle up to form Fold- Mountains.

Step5: Similarly stretch the dough (tension) to show how new crust is formed (basin/depression), these can in time become water bodies.

Step6: Draw the diagram of Block Mountain and rift valley on the Black Board. (Resource 5)

Step7: Take 3 solid blocks of the same size. Hold and lift the three blocks with your index finger and thumb in such a way that even without holding the central block directly it is not falling off. Now slowly move the two blocks you are holding in opposite directions. Observe the central block slipping downwards, so that the two blocks look like Block Mountains on either side of the central block which represents the rift valley. (As shown in Resource 8)

As you are showing the formation of Block Mountain and rift valley, match it up with the diagrams already drawn on the Board. Mention the force active in faulting; it is called 'tension'. Show how the diagram and your activity matched.

Step8: Squeeze the 'squeeze bottle' filled with dosa batter, so that the batter spills and gets accumulated around the snout. Let it dry. Squeeze a few more times, and let it dry every time you squeeze so that you can see the layers as well as the height gained through consecutive eruptions. This is how a volcanic mountain is formed. (Resource 9)

Draw the diagram given in Resource 4. Now as you are squeezing the bottle to show eruption of magma, explain and match your activity with the diagram.

Session 4: Classification of Mountains

Step1: Divide the class into 5 groups; each group having no more than 4/5 students.

Step2: Distribute the pictures to the groups.(Resource 2)

Instruct them to observe the pictures carefully and bring out the characteristics of each.

Step3: Let them present their findings. Record their observations on the board.

Step4: Wrap up the discussion by giving the names of each type of mountain.

Assessment:

Session 2

Ask students to take out their atlases to find the important mountains, plateaus, great river plains and deserts in each continent and fill up the worksheet given in Resource 3. The students should work in pairs.

Session 3

List two activities where you use tensional force in daily life.

List two activities where you use compression force in daily life.

Session 4

The presentation made by the students can be considered as an assessment on the characteristics of each landform.

Personal Reflection:

References

1. 'Plate Tectonics Theory – Mountain Building Process – Origin and Formation of Fold Mountains- Mountain Building Process; Origin and Formation of Fold Mountains- Plate Tectonics Theory

http://enggpedia.com/science/plate-tectonics-theory-mountain-building-process-origin-_and-_formation-of-fold-mountains/

2. Video on 'Structure of the earth'

http://www.youtube.com/watch?v=Sxd5YrEPyMY&feature=related

3. http://www.teachersdomain.org/resource/ess05.sci.ess.earthsys.shake/ http://www.teachersdomain.org/asset/ess05_int_shake/

4. Plate Tectonics@pppst.com

5. Reading on Rift Valley: http://en.wikipedia.org/wiki/Great_Rift_Valley

Objective:

Session 1:

Connect the items with various heights.

To evaluate what students already know about various landforms and objects typically found at various landforms.

To create curiosity about heights and landforms

Session 2:

To study pictures and classify the landforms exhibited: mountains, plateaus, plains, deserts, and coastal plains.

To identify the chief characteristics of different landforms.

To identify the different landforms of a particular continent.

To make a list of mountains, plateaus, great river plains, and deserts in the world.

Session 3:

To recapitulate learning about the crust of the earth.

Develop an understanding of the plate tectonics.

Develop an understanding of mountains, plains, and plateaus.

Session 4:

Develop an understanding of mountains and be able to classify them.

Category:

Classroom Resources

Subject: Environmental Science
Social Studies

Board: All boards

Grade/Standard: Class 6-8