

Making a tilt-o-meter & clinometer – Student Activity



People live in volcanic areas because soils are rich for agriculture, hydrothermal power can be harnessed and economic rocks and minerals can be exploited. It is however dangerous if the volcano is still active.

It is difficult to predict when a volcano will erupt. The survival of people living close to the volcano depends on recognising when this may occur.

The ancient Romans noticed that the sides of a volcano usually bulged before an eruption. They tried to monitor the degree of tilt by filling clay vessels to the top with water and noting how much water was lost as the angle of tilt increased.

This was not a very good idea! What difficulties could there be using this method?

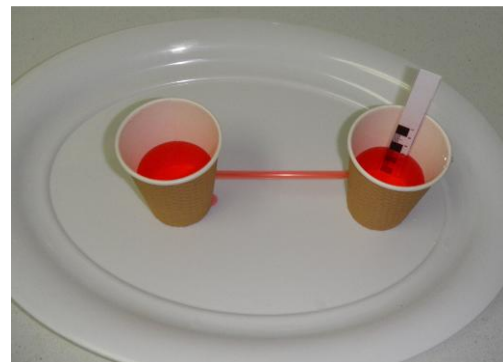
A. Making a tilt-o-meter

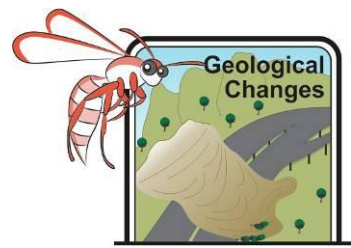
Materials

- Two paper cups
- Coloured water
- A plastic ruler or piece of cardboard with millimeters marked on it.
- A drinking straw (clear plastic if possible)
- A nail or old ball point pen to drill a hole in the cups
- A little Blu-tack, plasticine or modeling clay
- A plastic plate or the empty tray from under a student's desk
- Text books, blocks, bricks or other objects with which to progressively raise one end of the tray or plate

Method

1. Drill a hole into the side of each paper cup near the base. They should be at the same level and be small enough for the straw to fit snugly into it.
2. Place straw into holes between the cups as shown.
3. Test for leakage by pouring a little water into both cups.
4. Seal off leaks using Blu-tack, tape or plasticine.
5. Place depth measurer into one cup.
6. Read the depth measurement
7. Place the first object under the other cup and read the depth
8. Repeat the last step four more times





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Observations

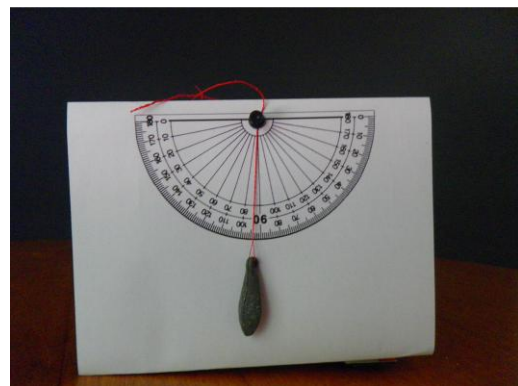
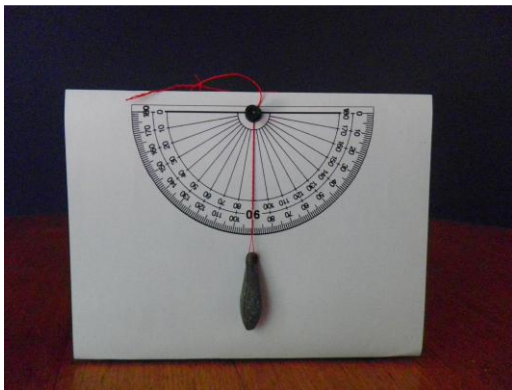
First decide how precise you wish to make readings of the depth. _____

	Reading
Horizontal (flat)	
First rise	
Second rise	
Third rise	
Fourth rise	
Fifth rise	

Conclusion

Can you use a tilt-o-meter to measure changes in the slope of a volcano? _____

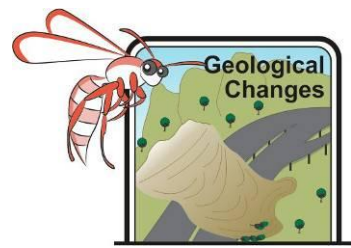
B. Making a clinometer



Paper clinometer on horizontal surface (left) and with one end raised (right)

Materials

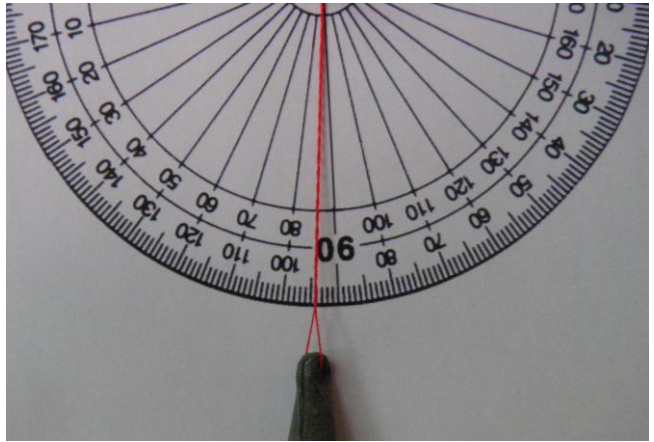
- A cardboard box or empty milk carton.
- A protractor with Blu-tack or tape.
- Thread or string with a weight attached. A fishing weight is perfect.
- A drawing pin.
- Textbooks, blocks, bricks or other objects with which to progressively raise one end of the box.



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Method

1. Using a drawing pin, attach the top of the string to the box so that the weight hangs freely and is vertical.
2. Slip the protractor under the string and align the 90° vertical line with the string.
3. Place the first object under one end of the box.
4. Read the inclination measurement on the protractor. In the example beside the land is inclining 4° to the left.



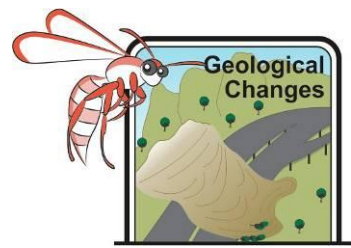
Observations

First decide how precise you wish to make readings of the depth. _____

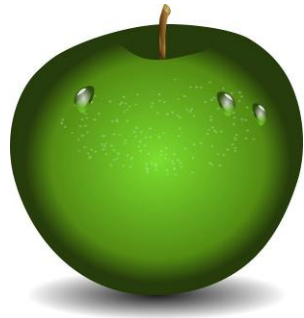
	Reading in degrees
Horizontal (flat)	
First rise	
Second rise	
Third rise	
Fourth rise	
Fifth rise	

Conclusion

Can you use a clinometer to measure changes in the slope of a volcano?



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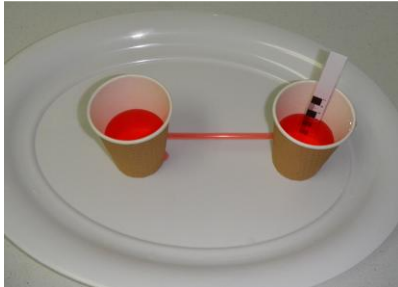
When we compare things look for _____

When we contrast things we look for _____

In what ways do the two apples compare? _____

In what ways do the two apples contrast? _____

Compare and contrast the devices

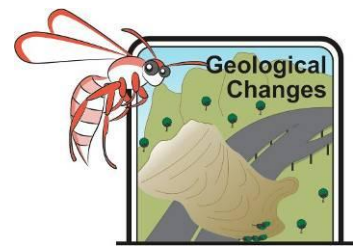


In what ways do the two devices compare? _____

In what ways do the two devices contrast? _____

Which device do you think is better to predict the possibility of a volcanic eruption? Explain your answer.

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List five ways in which volcanic activity changes the surface of the Earth.

1. _____

2. _____

3. _____

4. _____

5. _____
