Thermal Expansion (Heat) – Student Activity

Onion skin weathering develops in many homogenous rocks. Homogenous means they are pretty uniform and don't have layers or bedding. Soil processes and uneven heating and cooling turns them into the classic rounded boulders and hills we have in Western Australia, particularly in the desert. The outside of the rock heats and cools faster than the inside. At night the outside can be contracting whilst the inside is still expanding. Stress produces curved cracks.

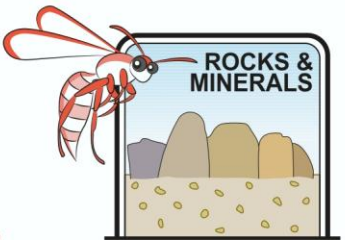
Onion skin weathering in igneous rock at John Forest National Park

Materials per student or group

- A large ball of plasticine (modeling clay) or potter's clay
- A laboratory thermometer
- Access to outside the classroom (preferably on a sunny day)
- Graph paper

Experimental set up

1. Roll the plasticine into a round ball. With a pencil, make a hole into the center of the plasticine ball
2. Measure the ambient temperature (surrounding air temperature), the temperature on the surface of the plasticine and the temperature at the center of the plasticine



ball. Enter these readings in the table provided. Care should be taken to avoid parallax by making sure your eyes are level with the gradations of the thermometer.

3. Place the ball outside in the sunshine with the thermometer remaining within.
4. Take readings every 5 minutes and enter them into the table provided.
5. After 20 minutes bring the ball and thermometer inside and repeat as above.
6. Compare your readings with those of other students

Time Mins.	Ambient temperature ^0C	Temperature of outside of ball ^0C	Temperature of centre of ball ^0C	Location
0				Inside
5				Outside
10				Outside
15				Outside
20				Outside
25				Outside
30				Inside
35				Inside
40				Inside
45				Inside

7. Graph your results after deciding which type of graph to use

HINT If you are comparing one thing with another you use a line graph. If you compare different things you use a bar graph

8. Why did we keep taking the ambient temperature? _____

9. What measurements will you use for the vertical axis of your graph? _____

10. What measurements will you use for the horizontal axis of your graph? _____

The title of your graph should contain both the X axis label and the Y axis label e.g. A graph comparing the change of temperature of the core and surface of a ball of plasticine over time.