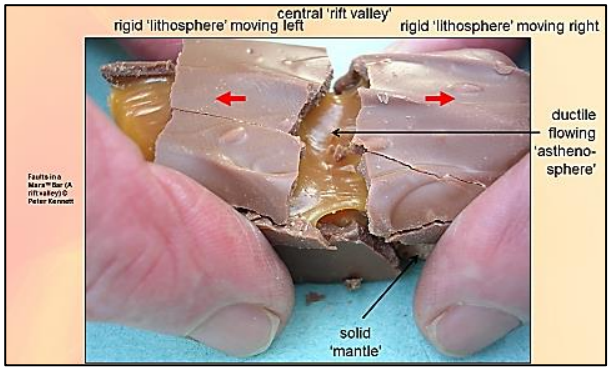
Mars™ margins – diverged, converged and transformed
Modelling plate margins with a Mars™ Bar – apart, together and side by side

In the *'Faults in a Mars™ Bar'* Earthlearningidea we saw how a divergent plate margin could be modelled using a Mars™ Bar, as in this picture.



The results of pulling apart a Mars™ Bar in the direction of the red arrows
(*Diagram courtesy of the Earth Science Education Unit).*

Here we extend that idea to show:

1. How a transform fault (or conservative plate margin) can be modelled

Take your Mars™ bar showing a divergent plate margin, as below:

Cut the bar length-wise:

Slide one side towards the left, (as in this photo) and then recreate the divergent margins:

Point out, or ask the pupils to label the following:

- show the movement directions of the two parts of the model on the front section; repeat for the back section;
- the two divergent margins;
- the transform fault;
- the zone between the two divergent margins where the plates are moving past each other, where frequent earthquakes can be expected;
- the zone of the fault to the left of the front divergent margin, where the plates are moving at similar speeds and so earthquakes are infrequent;
- the similar zone to the right of the divergent martin at the back;
- the parts of the model representing the lithosphere, asthenosphere and solid mantle beneath the asthenosphere;
- the parts of the model that are solid (*all of them*);
- the parts of the model that are rigid (*the top chocolate 'lithosphere'*);
- the parts of the model where plastic ductile flow happens (*the toffee 'asthenosphere'*).

2. How a convergent margin can be modelled

Take the Mars™ Bar that has been broken in half and push the two halves together to simulate a convergent plate margin, shown below:

Point out or ask the pupils to label:

- the movement directions of the two halves of the model;
- the zone where most compression has happened (*the area where a new uplifted 'mountain zone' has been formed*).

Consume the evidence.

The back up

Title: Mars™ margins – diverged, converged and transformed.

Subtitle: Modelling plate margins with a Mars™ Bar – apart, together and side by side.

Topic: A demonstration of the three types of plate margins, their stress fields and characteristics using a Mars™ Bar.

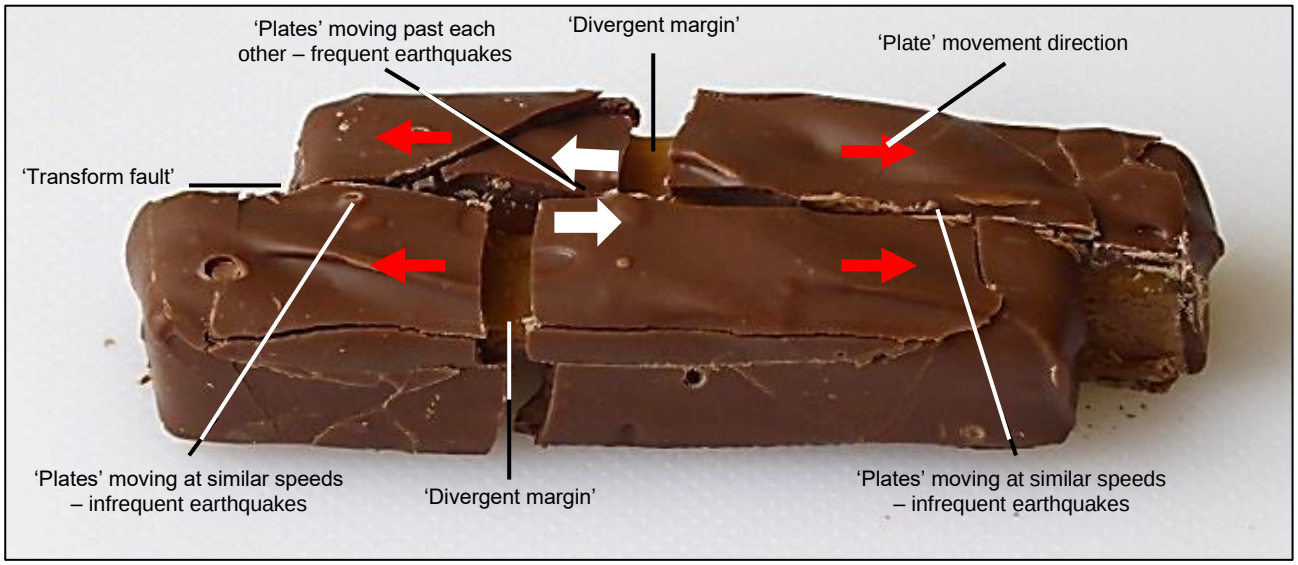
Age range of pupils: 11 years upwards

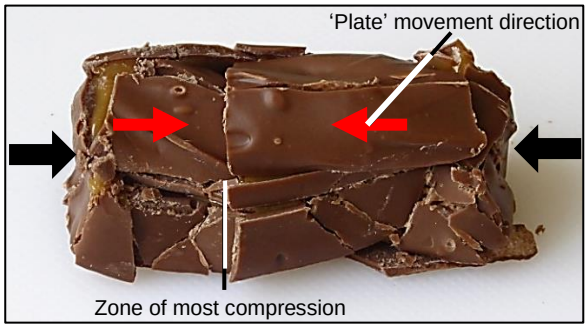
Time needed to complete activity: 15 minutes

Pupil learning outcomes: Pupils can:

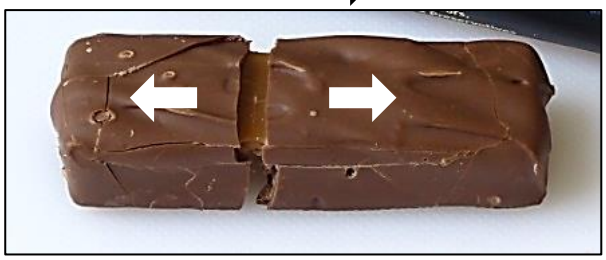
- describe the features of the three different sorts of plate margins;
- explain how the stresses involved have formed these features.

Context:
The Mars Bar™ could be labelled as follows:





Following up the activity:
Ask the pupils to show the stress directions on each of models. (the maximum stress directions have been added to the photographs using arrows like this in black or white: ➡).



Underlying principles:

- There are three plate margin types, divergent, convergent and transform (conservative).
- These can be modelled in different ways, and labelled with their features and the stress directions that caused them, by using a Mars™ Bar or other methods.

Thinking skill development:
Construction is involved in labelling the model to show the patterns of the different types of plate margin. Bridging between the model and reality is a key feature of this activity.

Resource list:

- a Mars™ Bar

Useful links:
See the Earthlearningidea teaching strategies involving all aspects of plate tectonics at: https://www.earthlearningidea.com/home/Teaching_strategies.html#platetectonics. See in particular the transform fault activity at: https://www.earthlearningidea.com/PDF/84_Transform_faults.pdf

Put 'plate margin animations' into a search engine like Google™ and click 'images' to see a range of plate margin animations.

Source: Chris King of the Earthlearningidea Team.