Igneous rocks: completing the 3D picture: teacher's notes

Level

This activity is designed for students aged 11-14, to support work on the formation of rocks and on **igneous** activity.

Topic

Igneous rock.

Description

Students make a paper model that shows various features related to igneous activity. They use this to help them answer questions based on the model.

Context

Students will need to have covered igneous activity before attempting this exercise. This would be a good exercise to be used for revision or in the case of teacher absence.

Teaching points

Students may need access to their lesson notes, text books or reference books to help them answer the questions

The activity encourages the development of three-dimensional thinking skills, a key aspect of the understanding of many geological processes.

Timing

Approximately 30 minutes.

The exercise

Apparatus

Each student will need

- A copy of the worksheet *The igneous activity model*.
- Scissors
- Glue or paste

Answers to questions

Q 1. On the east side, the **batholith** should be completed as a huge structure, getting bigger with depth. A volcano feeder pipe should be added.

On the north side, the vertical dyke feeding the **sheet lava flow** should be added. A vertical dyke feeding the sill may or may not be present too.

On the West side, the base of the lava flows should be shown.

See also Figure 1.

Q 3. (a) the **batholith** would have cooled most slowly, and so would have the largest crystals;

(b) the **sheet lava flow** (or lavas in the volcano) would have the smallest crystal size, having cooled very quickly;

(c) an **igneous** rock with medium-sized crystals could be found in the sill, in the dykes or in the volcano feeder pipe.

(d) ash layers might be found between lava layers in the volcano.

Q 4. (a) the batholith might be made of the dark, iron / magnesium-rich rock **gabbro** (it might also be made of the pale, silica-rich rock, **granite**);

(b) the sill, dykes and volcano feeder pipe might be made of dark, iron / magnesium-rich **dolerite** (or of pale silica-rich **microgranite**);

(c) the lava flows might be made of basalt (silica-rich **magmas** rarely flow to the surface as they are very viscous; they form explosive volcanoes instead, resulting in catastrophic eruptions producing thick ash layers).

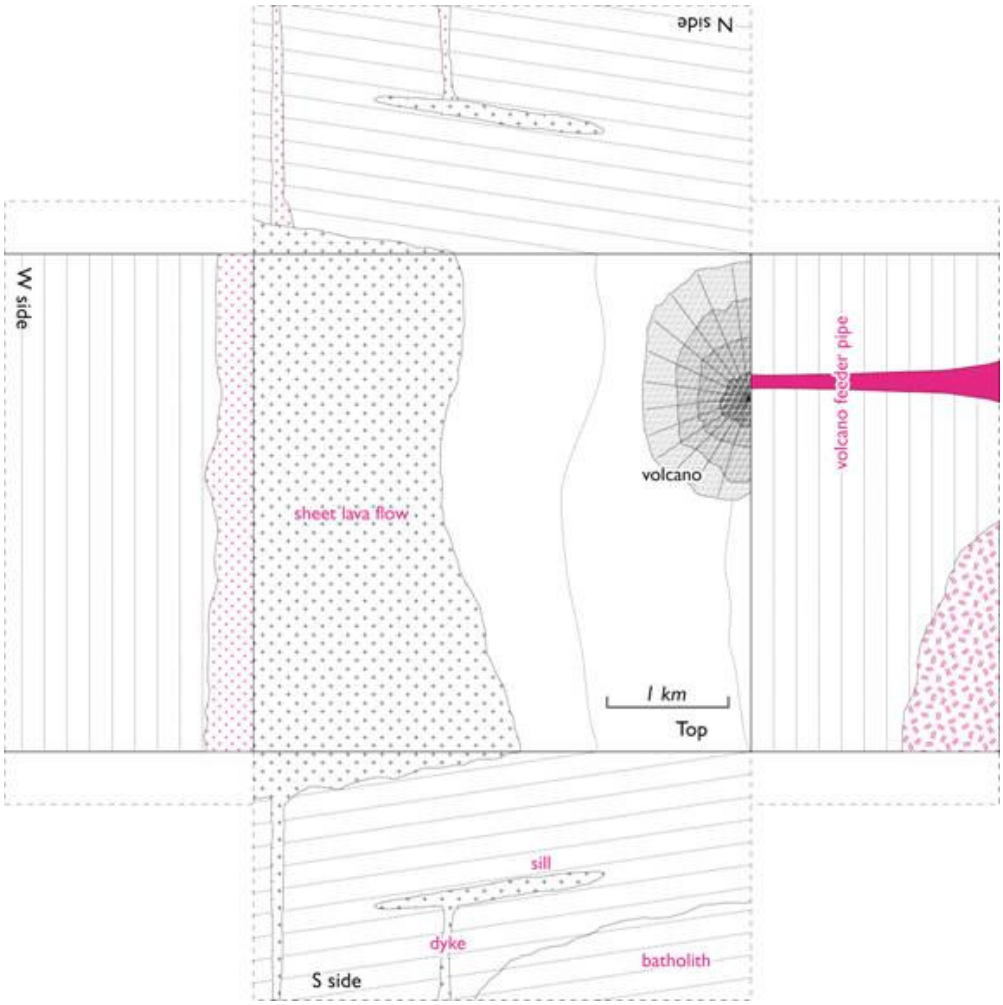

Figure 1 Answers