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Practical Lessons Based on Seismology and Meteorology

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The Science Enhancement Programme have developed a series of low-cost and novel resources to support effective learning in science and to provide professional development opportunities for UK science teachers (www.sep.org.uk). This poster describes how ideas from their Seismology booklet have been incorporated into science lessons with twelve year old students. A series of hands-on practical experiments are described, which allow students to model the causes, effects, detection and location of earthquakes. These activities provide a context for students to use ideas such as energy transfer and wave properties and apply them to the interpretation of seismic data. The lessons encouraged some of the students to start analysing results from a seismometer within the school, which was donated by the British Geological Survey as part of their School Seismology Project (www.bgs.ac.uk/schoolseismology.) A box and several slinkies were used to show how an earthquake generates P and S-waves. A shake table was used with straws and jelly towers to investigate why some buildings remain intact, whilst others nearby are severely damaged. To simulate how seismologists locate an earthquake, two microphones were connected to a computer with Audacity sound editing software. A vibration detector was also used with this software to show how vibrations can be detected and displayed on a computer screen. The behaviour of an earthquake was modelled using a pulley system to drag a brick along a surface covered in sandpaper. The build up of tension in the string was related to the build up of stresses at a fault, and the brick movement over the sandpaper was likened to the slippage that happens in an earthquake.

The Royal Meteorological Society have a teacher internship scheme, which involves teachers working with the Society in the summer break to develop curriculum linked teaching resources in weather and climate. This poster will also explore the use of a series of downloadable lesson plans and teacher's notes for lessons based on the Gravity field and steady state Ocean Circulation Explorer satellite (GOCE). (http://www.metlink.org/weather-climate-resources-teachers/teacher-development/teacher-internship/goce-workscheme-2.html.) This included practical work to study the concepts of free fall, weight, gravitational field strength and the acceleration due to gravity. Investigations were carried out to determine g using both the period of a pendulum and Hooke's Law. Experiments demonstrating Newton's Laws were carried out and were then related to GOCE. Audacity sound analysis software was used to introduce the concepts of SONAR and RADAR within the context of oceanography. An Excel file of satellite altimetry data was then analysed by the students. Experiments on the Doppler Effect were used to show how GPS systems allow distances to be determined. Practical work on pressure was related to the effect of ice sheets melting. Lab activities related to interferometry highlighted how interference patterns can be used for monitoring the Earth. Fun experiments involving refraction were used to show how atmospheric pressure, temperature and moisture content can be studied by meteorologists. Experiments were carried out on convection, the Coriolis Force, the Bernoulli Effect, the Magnus Effect, the Coanda Effect, the melting point of ice and the behaviour of non-Newtonian fluids. They were then related to ocean circulation, glacier ice and lava flow.