EARTHLEARNINGIDEA -  
IDEAS AND DISCUSSION ACROSS THE GLOBE 
FOR THE INTERNATIONAL YEAR OF PLANET EARTH

Earthlearningidea plans to put up a new idea for learning about the Earth every week during 2008 – the International Year of Planet Earth. The ideas are aimed at teacher trainers in science and geography who will be training teachers in the teaching of Earth science - but we hope they will be widely used by classroom teachers who have access to the internet too. The ideas will be accompanied by a blog to encourage discussion around each of them to build up a worldwide discussion network of Earth science educators.

Each of the ideas involves simple practical activities or ‘thought experiments’ that require minimal resources so that they can be used in almost any classroom. They are designed to educate pupils about the Earth, in ways that will engage and interest them, whilst teaching important scientific or geographical principles and developing thinking skills – and they should be fun as well!

The ideas are being developed by voluntary effort, since no funding is immediately available, and are based on the development of a free website, http://www.earthlearningidea.com. By clicking on the website you will get access to sample activities, one of which is printed below. We would welcome feedback through the blog (see http://earthlearningidea.blogspot.com) on this and other activities, particularly if you have tried them out with your pupils and have hints for others on how they can be used most effectively. Please bear in mind though that, as we have no access to funds for design costs, as we have to consider download times and printing costs of the recipients, and as we cannot pay copyright costs for photographs or for high quality diagrams to be produced, we have to keep the format simple.

You have another crucial role in this initiative. The global nature of the enterprise will only work if we can obtain the email addresses of teacher educators across the globe so that we can alert them to the ideas that are available to them. So we hope that you will be able to help us, by using any international connections you have, to discover these addresses and send them to us. If you want to include the email addresses of ordinary classroom teachers who might be interested at the same time – that will be fine.

For each contact, please find the:
*Country  
*Name  
*Email address  
*Institution name

of the individual and email them to us at
If you want to track our progress and receive the ideas yourself – then just email us your name and details as well. If you subscribe to the blog, you will be informed automatically every time a new activity is published.

We also hope to set up a support group of scientists/ geographers/ educationalists who will respond to technical queries raised through the blog and so enhance the discussions that will develop.

Our timeline is:
• **Ongoing**: publicise the initiative; collect email addresses of teacher trainers and teachers across the globe; prepare earthlearningideas for web publication;
• **September – December 2007**: publish one activity per month in a run up to the International Year of Planet Earth in 2008; encourage discussion around each activity using the blog; continue to develop earthlearningideas;

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• **January 2008 – December 2008**: publish one activity per week, continuing to encourage discussion around each activity;

• **January 2009 onwards**: receive earthlearningideas from members of the global discussion network, edit them and publish them as they appear.

So – do please send us email addresses and do please contribute by testing the activities with children and feeding back your experiences through the blog. In this way we can bring earthlearningideas to parts of the world that other ideas find difficult to reach!

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**A sample activity**

**Quake shake – will my home collapse?**

*When an earthquake strikes – investigate why some buildings survive and others do not*

Set up the demonstration out of sight of the class. Place a flat piece of wood in one end of a tray and then fill the whole tray evenly with sand, so that the wood is hidden. Soak the sand thoroughly with water, then pour off the surplus water. Place two heavy objects, of identical shape and mass, representing buildings, gently on the sand at each end of the tray.

Explain that when earthquakes occur, the ground shakes violently. The model represents two buildings standing on wet sandy ground. Ask the pupils to say what they think they will see when the tray is shaken from side to side. Then shake the tray repeatedly whilst the tray is resting on a table.

After a few shakes, the sand can be seen to liquefy, and water rises to the surface. One „building“ either topples over, or sinks into the sand, while the other one stays upright and does not sink. Ask the pupils to explain why they think this might be. They usually offer many ideas for what they have seen, but they seldom think that the teacher has done anything so underhand as to hide a solid object under the sand! The shaking reduces the load bearing strength of the sand, as the water forces the grains apart so that the „building“ without a solid support underneath falls over or sinks. This happened when Mexico City, which is built on an old lake bed, was hit by an earthquake and many buildings with poor foundations collapsed. An earthquake of the same magnitude will cause far less damage to a building built on rock.

The shaker tray in action

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**The back up**

**Title:** Quake shake

**Subtitle:** Will my home collapse?

**Topic:** When an earthquake strikes – investigate why some buildings survive and others do not. How buildings with different foundations respond to earthquakes.

**Age range of pupils:** 7 – 18 years

**Time needed to complete activity:** 5 minutes
Pupil learning outcomes: Pupils can:
- demonstrate how the shaking of damp sand, as if by an earthquake, reduces its strength
- explain how providing a foundation increases the strength of shaken sand, allowing it to bear loads. The foundation does not increase the strength of the shaken sand. The piece of wood provides a raft-type foundation which allows the building to ‘float’.

Context: The activity could form part of a lesson about earthquakes and their effects. It could also form part of the preparation for the best way people should respond to an earthquake in earthquake-prone areas.

Following up the activity: Try a websearch for real data.

Underlying principles:
- the slow movement of the Earth’s plates causes stress to build up in the rocks underground.
- eventually the rocks break (brittle failure) at a fault, and the rocks spring back (elastically) causing shock waves.
- two forms of shock waves are produced, longitudinal (primary, P-) waves and transverse (secondary, S-) waves.
- these waves reach the surface and cause surface waves – undulations of the Earth’s surface.
- the waves cause solid rocks to move, but when they hit waterlogged sand, the sand can lose cohesion and ‘liquify’ causing heavy masses (eg. buildings) to sink, fall over or collapse.
- people are hurt or killed by the collapsing buildings, falling broken glass or subsequent fires.
- the safest place during an earthquake is usually out in the open, away from buildings that might collapse.

Thinking skill development:
- the contrast between one ‘building’ sinking and the other not causes cognitive conflict (mental challenge)
- further discussion about what we should do when an earthquake hits causes bridging (application) of the ideas seen into potentially real contexts

Resource list:
- Shallow tray, e.g. about 20 x 15 x 5 cm.
- Sand, to fill the tray
- Water
- Two small heavy objects, e.g. large metal nuts, 3cm lengths of lead pipe, etc.
- Flat piece of wood, or similar material, to bury under the sand at one end of the tray

Useful links:
Guide to selected sites for earthquake education - http://mceer.buffalo.edu/infoservice/Reference_Services/earthquakeEducation.asp

Source: This activity was developed by Peter Kennett of the Earthlearningidea team.

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