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7th November 2014

‘SECRET ROLES OF SOIL’

Win £500* for your class!

Science-Art competition for S1, S2 and S3 pupils

Organised by Aberdeen Biodiversity Centre, University of Aberdeen

Dear Head Teacher, Teachers of Social Sciences, Science and Art

To celebrate the International Year of Soils 2015 Aberdeen Biodiversity Centre is inviting S1 to S3 classes to take part in a competition investigating the varied and important roles of soils in our environment.

The winning class entry will win £500* towards the cost of a field trip, or approved resources that will support classroom activities to help the pupils increase their understanding of this valuable resource. The Secret Role of Soils has been generously supported by the Mains of Loirston Trust.

The class will also hold the prestigious Aberdeen Biodiversity Centre Secondary School Shield at their school during 2015.

In small groups, pupils should create an A3 poster depicting at least one concept portrayed in the icons of our promotional flyer and show how the soil helps to achieve a healthy environment.

The terms and conditions and teacher guidance notes with further information are enclosed along with a flyer to display within your school. Additional copies of the flyer and guidelines can be downloaded from our website www.abdn.ac.uk/biodiversity

This competition aims to support cross-curricular links, not only in science and art but also with any pupils involved in eco-school activities etc. I do hope that your pupils will take part in this competition by representing their ideas in a poster (no larger than A3 size) which should be received by Aberdeen Biodiversity Centre no later than Friday 8th May 2015.

All entries should have the names of the pupils, their class, year and school clearly printed on the reverse of their poster and be addressed to: **Aberdeen Biodiversity Centre, University of Aberdeen, Zoology Building, Tillydrone Avenue, Aberdeen, AB24 2TZ**. If you require further information please contact Aberdeen Biodiversity Centre: Tel: 01224 274545 or email: biodiversity@abdn.ac.uk

Yours sincerely,

Mrs J Marie Fish
Aberdeen Biodiversity Centre Manager

Terms and Conditions

- The competition is open to S1-S3 pupils.
- The posters should be presented on one side of **A3** sized paper or card with the pupils' names, class, or year group and school clearly printed on the reverse. They may also be digitally generated and posted or emailed to the organisers.
- Further information about the role of soil and suggestions of helpful websites can be found in the teacher guidance notes.
- The first prize will be awarded to the **best overall class attempt**.
- Entries should reach Aberdeen Biodiversity Centre, University of Aberdeen, Zoology Building, Tillydrone Ave, Aberdeen AB24 2TZ (biodiversity@abdn.ac.uk) by **Friday 8th May 2015**.
- The posters may include up to 100 words and should clearly describe the importance of soil, and how it supports life on earth with respect to one of the icons on the promotional flyer.
- All the posters are non-returnable.
- Entries will be judged by an independent panel of soil scientists as a whole class submission.
- Posters must represent the ideas from at least one of the concepts from the promotional flyer. They will be judged on their factual accuracy and detail, visual attractiveness and creativity.
- The winning class entry will win £500 towards the cost of a field trip or resources for their school. The prize must be spent in a way that furthers the pupils' understanding of the role of soil in the environment.
- The class will also hold the prestigious Aberdeen Biodiversity Centre Secondary School Shield (which should be returned in April 2016) at their school during 2015.
- Entry to the competition indicates permission for Aberdeen Biodiversity Centre to use the posters for promotional and educational purposes.
- A representation of the entries will be displayed during the University of Aberdeen's May Festival, which will be held at the University of Aberdeen from the 29th – 31st May 2015.



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Please complete all the information and return with your entry.

School Name: _____

Class Name: _____ Number of entries: _____

Teacher Name & Designation: _____

Telephone: _____ Contact email: _____

TEACHER GUIDANCE NOTES

Soil is needed to create food, water, clean air and is the foundation of our beautiful countryside. It preserves our history, providing us with a window to our past; but soils also govern our future. Globally, soils are valuable but vulnerable. The Scottish government has identified soils as one of the nation's greatest assets, an essential natural resource. To ensure we maintain our healthy soils, everyone needs to be aware of how important soil is. We hope you enjoy taking part in our competition and finding out about the precious resource beneath your feet.

Pupils should choose one of the concept icons displayed on the flyer. They should work in small groups to design a poster (no larger than A3) that details the importance of the soil with regard to the concept icon that they have chosen. The ideas for each icon are further developed below and the following websites provide useful information:

<http://www.soils.org.uk/young-soil-explorers>

<http://www.hutton.ac.uk/learning/schools-colleges-and-universities/introduction-to-soils>

<http://www.sepa.org.uk/land/soil.aspx>

<http://www.soils4teachers.org/soil-by-subject>




http://www.soil-net.com/dev/page.cfm?pageid=secondary_functions

<http://soilquality.org/functions.html>

Also, keep checking the ABC website for more information and events.




ECOSYSTEM SERVICES

Soils help to maintain planetary systems e.g. the balance of gases in the air, water quality, regulating global temperature and support plant, animal and human life.

Concept Icon	Ideas and Information
	Soils play an important role in the water cycle by regulating the flow of water through the landscape as it travels into water courses, underground reserves and into plant material, and this helps to prevent flooding. The soil also filters and purifies the water as it passes through it, making it fit to drink.
	Carbon is present in the oceans, the earth's rocks, the atmosphere and every living organism. Atmospheric carbon is 'fixed' by growing vegetation and when it decays it returns to the soil. Globally, more carbon is contained in the soil than either the atmosphere or vegetation. The way the land is used will determine how much carbon can be stored in the soil.
	The climate of our planet has changed greatly during the earth's history, affecting biodiversity and landscape. However, scientists attribute the recent alarming rate of climate change to human activity. Soil is both affected by, and contributes to, climate change as the soil both stores carbon and releases greenhouse gases when the land is disturbed.




SUSTAINABILITY

Soil takes hundreds of years to form and influences plant growth and land use, whether natural or agricultural.

 <p>NATURAL Vegetation</p>	<p>Native plants and the habitats they help to create vary widely between continents, and this contributes to the tremendous biodiversity found on earth. When plants die, they decompose and release important nutrients which are then recycled through the soil. This maintains stability in the ecosystem. Changes in land use can disrupt this natural cycle.</p>
 <p>FOOD SECURITY</p>	<p>The challenge of feeding future generations, or our 'food security', relies on soils with adequate nutrients and good structure which produce healthy plants with good yields. Sustainable farming techniques, including crop rotation and mixed farming, have traditionally replenished the soil but increasingly costly fertilizers are used to replace nutrients and increase productivity.</p>
 <p>Land Use</p>	<p>How land is used is determined by the type of soil present, the climate, and the nature of the landscape. These all influence the suitability of the land for different uses and its degree of productivity. In turn, how the land is used affects the condition and sustainability of the soil itself. If the land becomes degraded or eroded its future use may need to be re-considered.</p>

THE LAST BIOTIC FRONTIER

Billions of living organisms are present in one teaspoon of soil; they influence health and local environment.

 <p>HABITATS</p>	<p>Soil is a habitat which contains a vast number of invertebrates and is said to have greater diversity than a rainforest. These animals usually form the basis of all the different food webs which support larger vertebrates. Many play an essential role in the decomposition of dead plant material; worms, especially are a sign of a healthy soil. Some larger mammals can cause damage to fragile soils and banks of rivers.</p>
 <p>NITROGEN FIXING</p>	<p>Nitrogen, the most abundant gas in the atmosphere, is required by all plants and animals, but it cannot be directly absorbed by them. Some of the bacteria in the soil change nitrogen into nitrates and this enables it to be incorporated into proteins and enter the food chain. The soil regulates the release of nitrogen - too much nitrate in the soil may result in weeds, or pollute waterways through run off.</p>
 <p>MICROSCOPIC Lifeforms</p>	<p>The huge diversity of bacteria and fungi in the soil are responsible for many processes including releasing minerals, improving soil structure, decomposing and recycling of organisms, and the uptake of essential nutrients by plants. It is thought that the genetic material in these organisms may be important for future drug development. The delicate balance of micro-organisms in the soil forms the basis of food webs in the environment.</p>