MudWatts – Discover the POWER beneath your feet!
Royal Norfolk Show 2017

Prof Julea Butt / Dr Tom Clarke
UEA's School of Chemistry & School of Biological Sciences

A team of biochemical scientists at the University of East Anglia (UEA) are researching how clean energy may be generated with help from a surprising source – bacteria found in soils and sediments. In the build up to this year's Royal Norfolk Show UEA is inviting schools to test the **power** of their soil using a MudWatt!

The MudWatt is a renewable power source that turns chemical energy into electrical energy, using micro-organisms to drive the process. It requires electricity-generating microbes to function – fortunately these microbes are already abundant throughout the world's soils.

Bringing together microbiology, energy, chemistry, physics, and environmental engineering, MudWatts engage children in STEM subjects using the power of electricity-generating bacteria living in the soil beneath our feet

Click here to watch a video about how MudWatts work

How to enter:

- Email confirming your schools involvement (places are limited).
- Send two cups of soil (in a sealed bag or container) to UEA using the address at the end of this document – **samples must be received by Monday 12th June.**
- Please record the GPS location of your soil sample and email this to Dr Tom Clarke (Tom.Clarke@uea.ac.uk), along with a short description of the sample location and a photo of the location. *If you would like to send photos of the pupils collecting the sample too this is at the school's discretion.*

The will be a 1st, 2nd and 3rd prize for the following three categories:

1. The maximum power level of electrical energy
2. The largest total power over the period tested
3. Longevity of power output

Winners will be announced at the Royal Norfolk Show, 28-29 June, so don't forget to visit UEA in the Discovery Zone and check out the leader board!

FAQs

What kind of soil shall we send?

Rich soil works best so we recommend sending soil from your playing field, or garden/environmental area if you have one. Please send two cups full in a sealed bag or container. UEA will set the MudWatts up in our laboratories to test the power supply.

The team will bring the MudWatts to the Show so you can see yours in action. Teachers can download the free **MudWatt Explorer App** to discover the power in your school's soil.

How does the MudWatt work?
The MudWatt uses microbes commonly found in most soils, sediments, and streams. Among the diverse communities of microbes are particular species with unique metabolic abilities that enable them to expel electrons onto oxidized metal compounds, such as rust. In a sense, these so-called 'electrogenic' microbes are able to 'breathe' metal compounds much like humans and other organisms breathe oxygen. The MudWatt employs these unique metabolisms by providing electrogenic microbes with a certain configuration of two graphite-based electrodes placed in environments with different amounts of oxygen.

How is the MudWatt different from a lemon/potato battery?
The MudWatt is a renewable power source that turns chemical energy into electrical energy, using micro-organisms to drive the process. The lemon/potato battery, on the other hand, is a simple battery that involves the corrosion of two different metals (typically zinc and copper) to produce electricity. So while the result of a mudwattt is the removal of waste from the soil, a lemon battery results in two corroded electrodes and a metal contaminated lemon!

For more information, please email Dr Tom Clarke at the University of East Anglia, Tom.Clarke@uea.ac.uk.

All soil samples should be addressed as follows:
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