

Gaia Science

Your Help Needed!

Neil Herrington

University of East London

Peter Horton Gaia's Company

“[Gaia’s Company](#), with the support of [James Lovelock’s Gaia Charity](#), is launching an initiative to devise and develop a range of teaching materials for use in primary and secondary schools, which explore the science of Gaia Theory and its wider implications for the whole area of education for sustainability.”

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What is Gaia?

- Gaia is the name of the Earth system comprising all living things (the biosphere), the surface rocks, the oceans and the air we breathe.

Accessed 02/01/13 <http://gaiacharity.org/what.php?showsplash=0>

Teaching Gaia Science in the Context of Sustainability

- When we talk about sustainability we are talking about how human activity affects systems. Gaia science shows us that systems in which organisms and their environment evolve together exist at all scales, from the smallest cell to the whole planet, and a 'well-balanced' sustainable planet is made up of well-balanced sustainable systems at all other scales.

Gaia Science as Challenge

- assumption one: humans are somehow separate from, and superior to, the rest of the natural world... (Gaia's view: in Gaia we are just another species; bacteria are the most important living organisms)
- assumption two: it's still, basically, a linear and predictable world... (Gaia's view: the Gaia system emerges over time; self-organisation and self-regulation are major features; superorganisms e.g. bee colonies, are non-linear dynamic entities)
- assumption three: we are all going to get richer from the planet's infinite resources... (Gaia's view: Gaia is open to energy, but closed to materials; recycling is fundamental to Gaia; how do we 'recycle the wealth'?)
- assumption four: competition and conflict are the main drivers of evolution and human social behaviour... (Gaia's view: cooperation is the norm; networks are vital; superorganisms thrive on cooperation)
- assumption five: some humans are superior to others... (every organism has a role in Gaia, so design human systems to reward everybody for their role in society, to make them feel worthwhile for what they're naturally good at; the Gaia renaissance!)

- 'The view of evolution as chronic bloody competition among individuals and species, a popular distortion of Darwin's notion of 'survival of the fittest', dissolves before a new view of continual co-operation, strong interaction and mutual dependence among life forms.'

Lynn Margulis

- 'Life is social. It exists in communities and collectives. You and I are both composed of a collection of organs and tissues; the organs are made up of billions of living cells, each of which can also live independently. Then the cells themselves are communities of micro-organisms that once lived free.'

James Lovelock

Examples of Existing Practice

- I am an upper KS2 teacher and science co-ordinator ...In the units on living things and Earth sciences I allude to Gaia theory and cite James Lovelock when explaining this.
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- In our consideration of what constitutes "living", I show pupils an image of planet Earth and ask the question "Is the planet alive; can earth be regarded as a single or communal/ colonial organism?". The reasons and answers are often very well thought out by Y5 & 6 pupils.
- We also use Dr. Iain Stewart's series "Earth - Power of the Planet" in order to understand how changing one aspect of a closed system has effects on other parts, illustrating the connections between all the planet's systems. We have compared Earth to ourselves in terms of linked systems, circulation, control and maintenance of a stable environment.
- I feel planting the seeds of the theory in young minds, simply to make them aware that such ways of thinking exist, is justification for including Gaia in KS2 science and geography curricula.

The Science Museum and the James Lovelock Archive

- The Lovelock Archive, which is valued at £300,000, comprises numerous and varied scientific notebooks; charts and data; manuscripts of Professor Lovelock's books; articles and lectures; patent material, photographs, audio-visual material and offprints.
- Notable items include correspondence with high profile individuals including the Duke of Edinburgh, Margaret Thatcher, Carl Sagan, Victor Lord Rothschild, Professors William Hamilton, John Maynard Smith and Lynn Margulis and Linus Pauling.
- In addition to the Archive, the Science Museum has also been donated various items of equipment previously stored in Professor Lovelock's laboratory and which include a Hewlett Packard computer that he used to program an artificial world, known as the '[Daisy world](#)' model, to explore his Gaia theory.
- The museum are planning to upload images of Lovelock artefacts to Wikipedia as they become available - there is already a picture of the Electron Capture Detector (ECD) on there: <http://en.wikipedia.org/wiki/>

Proposed Workshop Structure

- The first section gives an overview of Gaia theory, with some content and philosophical input. This will lead to an activity which explores the implications of this input or the curriculum.
- The second section of the workshop will be based around/ draw upon the work that colleagues are already doing. We present this work, along with its rationale and context, and ask workshop participants to critique the activity's approach, suggesting amendments and enhancing that which was presented.
- The third section draws upon the previous two sections to develop a piece of work which utilises the principles developed in the construction of a new piece of work.

Your Help Needed!

- Feedback and thoughts