Sustainability concepts in STEM: The importance of embedding SDGs

Dr Steven Rogers, Keele Uni.

Email: s.l.rogers@keele.ac.uk

Twitter: @SLRogersGeol

Keele UNIVERSITY

This Workshops aims to:

- help delegates better recognise how SDGs may be embedded in their work;
- allow for some reflection on how they can continue to embed SDG's;
- share some best practice of the embedding of sustainable development within teaching;

SUSTAINABLE DEVELOPMENT GOALS

Tracking Sustainability Concepts in Geology and Earth Science Teaching and Learning, Keele University, UK

Dr Steven L. Rogers, Dr Stuart S. Egan and Dr Ian G. Stimpson

Abstract

Sustainability of the planet is fundamental to our common future, and geologists and geoscientists are key stakeholders in this process. Better understanding of the Earth, its processes and utilisation of its resources, through successful science communication, is necessary for the effective creation of sustainability policy. Whilst the synergy between geoscience and sustainability is often obvious, the framing of the links is often neglected or downplayed within the UK Higher Education setting. This results in geoscientists lacking in familiarity with sustainability issues, including the ability to communicate geoscience issues to non-specialists effectively. Using the United Nations Sustainable Development Goals, the inclusion and embedding of sustainability issues within Geology and Geoscience modules (offered by the School of Geography, Geology and the Environment, Keele University, UK) is framed in an effort to consolidate and enhance our current standing on sustainability issues. Further tracking of the emphasis and positioning of sustainability issues within these modules will enable a better articulation of the importance between geology and society.

Our findings and future work…

- Much of our teaching links to one or more SDG, and some modules are explicitly linked (e.g. ESC-10048 The Earth System and ESC-20037 Geoscience and Society)
- We have lots of work to do emphasising links through teaching, assessment and materials
- Ensure our students are co-creators on this journey
- Decarbonising the curriculum...

Activity 1: SDG speed-dating

Partner up	Partner up! (with anyone – it doesn't matter if you know them or not)
Introduce	Introduce yourselves, include: name, subject area and/or job role, institute and how well you think the SDGs are embedding in your practice (partner to help write this down).
Outline	Outline, in explicit detail, the subject you teach or job role you hold, partners listen and take notes. 10 mins
Work through	Together, work through your notes (one persons at a time) – assign SDGs to the practices noted – think about how explicit those links may or may not be… 10 mins

Activity 1: SDG speed-dating

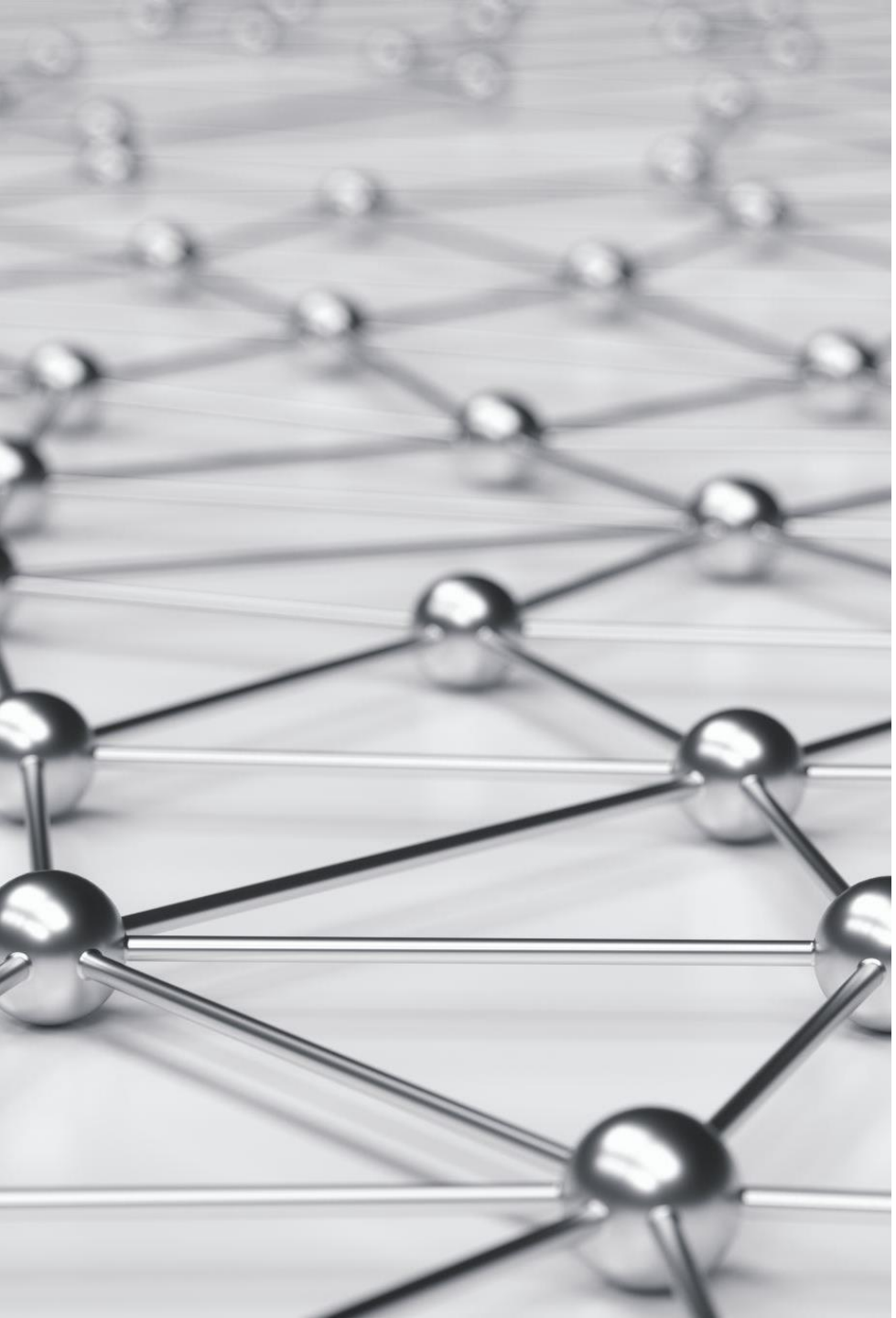
Hopefully this has allowed you to reflect on your own practice, and benefit from an others perspective.

Most STEM teaching and learning is inundated with sustainability themes and practice – its just not always obvious to the teacher, or the learner! An exception is applied methodology teaching.

Examples of best practice from Keele Uni

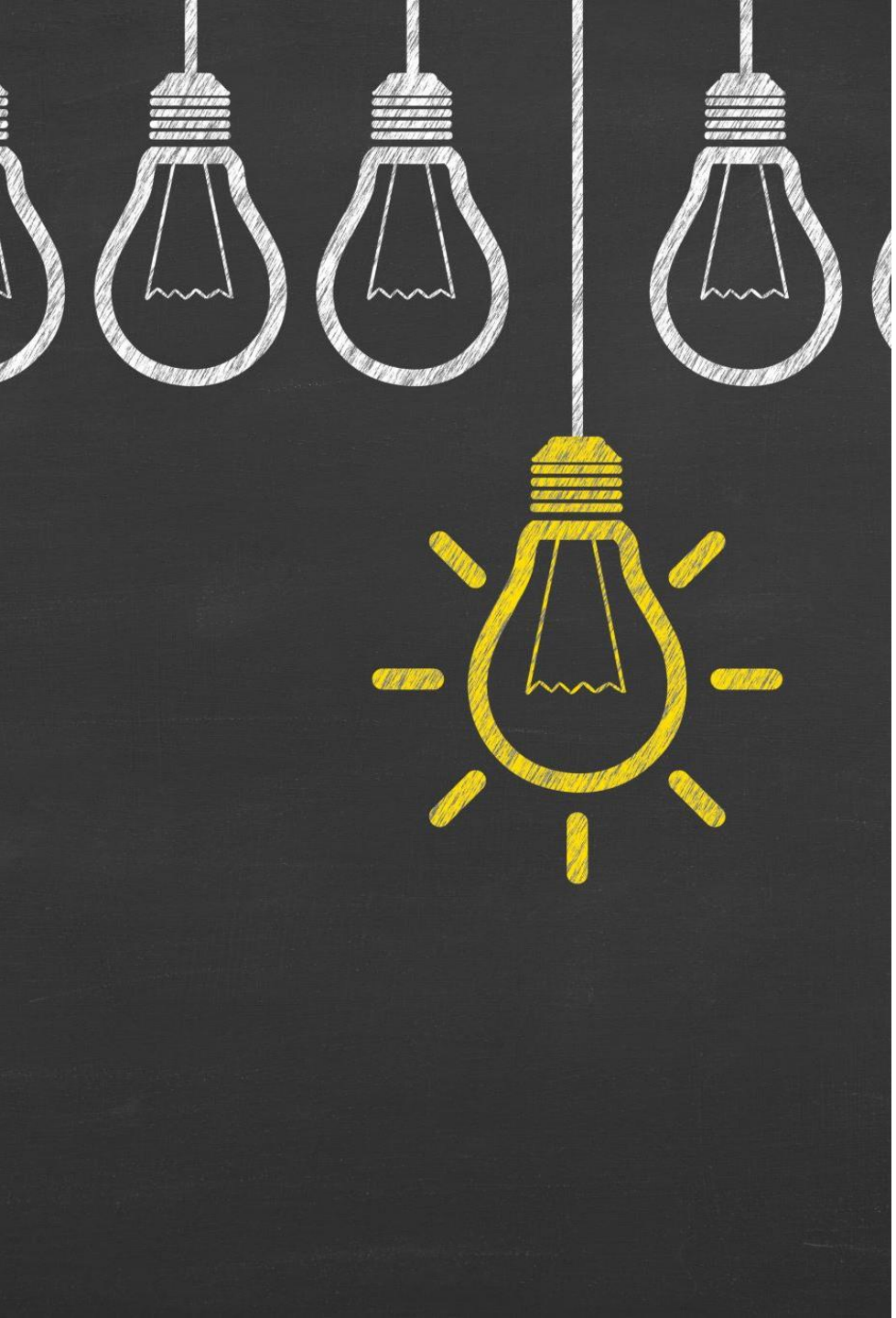
Geoscience and Society

- develops an awareness of the essential contributions of geoscience to the economic, environmental and cultural needs of Society. It contains four main sections:
  - "Georesources and Society" investigates the sustainability of energy and mineral resources (oil, gas, coal, geothermal; platinum, copper, gold, etc.) and other associated issues (radioactive waste disposal, CO2 sequestration, 'fracking').
  - "Geohazards and Society" studies the human impact of geological phenomena such as earthquakes, tsunamis, landslides, and subsidence.
  - "Geoscience and Health" examines topics such as asbestos, heavy metals and radon and diseases related to geology.
  - "Geodiversity and Geoconservation" examines the designation and maintenance of sites important to geoscience (World Heritage, Geoparks, SSSIs, RIGS), together with their place in planning and public understanding of geoscience. Level 5, ran by Dr Ian Stimpson



Sustainable Chemistry

- This module puts sustainable chemistry within a global context, looking at processes and technology that influence everyday life. The use of chemistry in human processes and the associated environmental implications will be analysed. Issues surrounding the sustainability of chemical processes form key aspects of the course content with students developing problem solving, information retrieval, team working and communication skills
- Level 5, ran by Dr Katherine Haxton



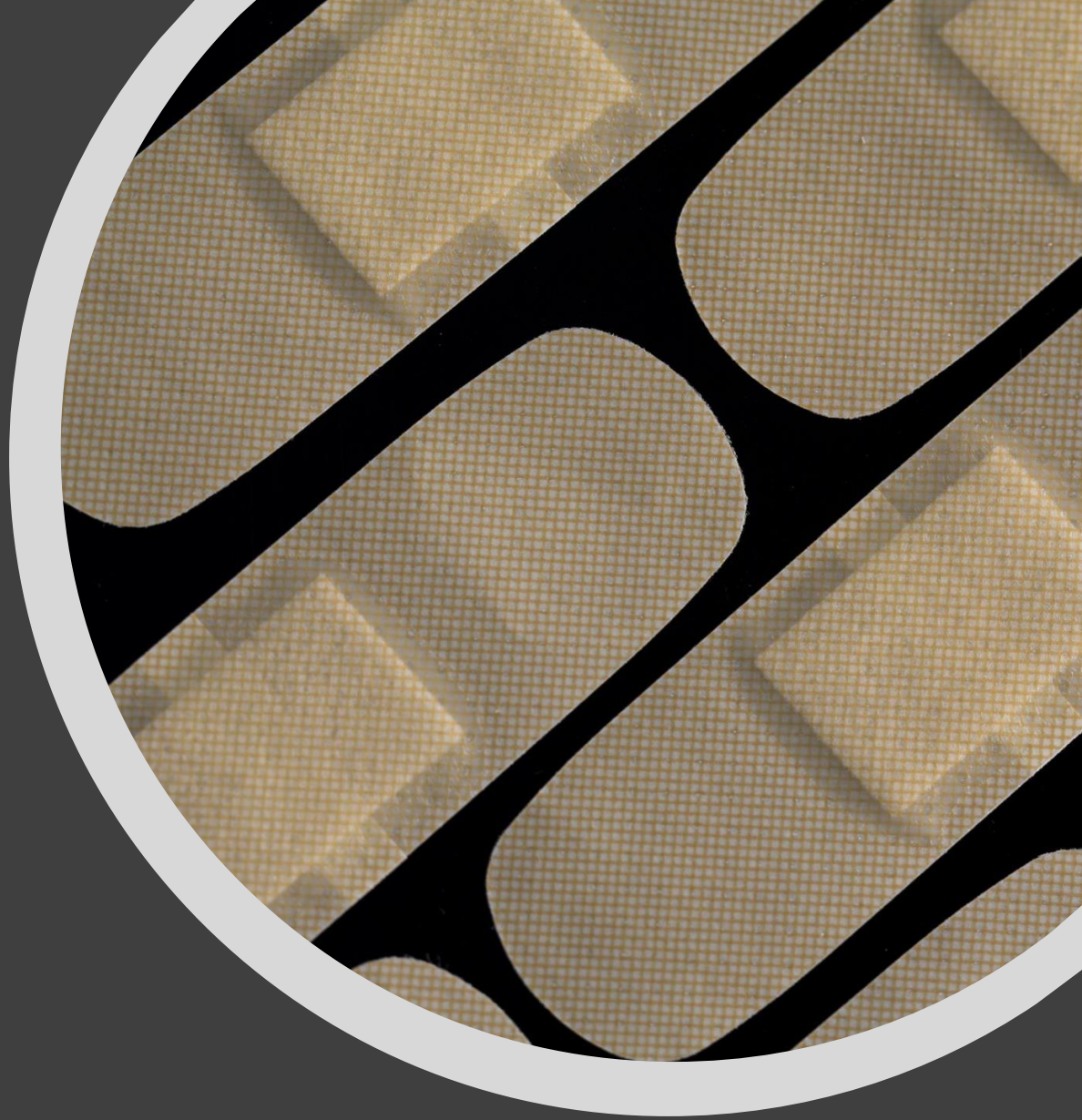
Economic Development and Environmental Transformation

- Are economic development and environmental concerns always opposed? Why doesn't environmental conservation seem to work? And what areas should be conservation priorities to sustain global ecosystems? What does international development assistance do for the people who depend most directly on their local environments for their livelihoods? This module helps students find their own answers to some of these pressing questions by introducing them to development geography. Students explore key ideas from this subdiscipline including political ecology - the study of environments as products of social action - and performative economy - the idea of 'economy' as an abstract realm we bring into being by describing it. The coursework involves using in-depth case studies of economy and ecology to evaluate different pathways towards - and definitions of - 'development.'

Level 6, ran by Dr Deirdre Mckay

Health and the Environment

- This module will be delivered within the School of Health and Rehabilitation mostly by health professionals with an interest in how the home, work or immediate environment may affect a person's health. Each session will introduce the student to a new topic area but the module will commence by exploring the student's understanding and appreciation of the concept of health. Subsequent areas explored will include the respiratory system and the affect of pollution. Mental health will be explored by looking at social and societal environmental stressors that are implicated in the causation of mental health problems. Also included will be the role of physical activity and exercise for health exploring links to obesity, chronic disease and reduced exercise tolerance. Current thinking regarding the affect of temperature (global warming or the ice age) on physical activity will be explored along with the implications for health regarding the spread of disease due to insect vectors. Level 5, ran by Dr Helen Humphreys



Activity 2: Sustainable facing "module in minutes"

Modify

Modify a module you currently teach, or make up an entirely new module – the only stipulation is that it must be explicitly linked to an SDG (or multiple SDGs if you like). 5 mins

Pitch

Now pitch this module to a partner (can be the same partner from activity 1, or not) from a sustainability issue perspective. What is your module equipping students with from an SDG perspective. 10 mins

Feedback

Feel free to leave your module designs for some comments or to share (leave your email address too and I can share some ideas across the group!)

Thankyou!