

How could Mind Maps help to enhance science and sustainability in our outdoor activities?

One element for delivering successful outdoor science is connecting teaching to big science issues. Bringing understanding of these big issues is a challenge, especially when they seem invisible to the learner. We have been searching for the links between science, sustainability, and real world learning. In our discussions and research words such as interconnections and context were often highlighted as difficult issues to tackle in outdoor learning. Ten Science Mind Maps were therefore developed as teaching aids to try to address this problem.

These Mind Maps were designed particularly for outdoor learning providers and they introduce some big issues in science in a broad context as well as demonstrating the interconnections between them (see for example Fig.1). The themes of nine of the Mind Maps; Climate change, Biodiversity loss, Biogeochemical, Ocean acidification, Land use, Freshwater, Ozone depletion, Atmospheric aerosols and Chemical pollution, were inspired by the planetary boundaries thinking (Fig.2) (Rockström *et al.* 2009). Last but not least 10th Mind Map illustrates the the scheme of planetary boundaries in general.

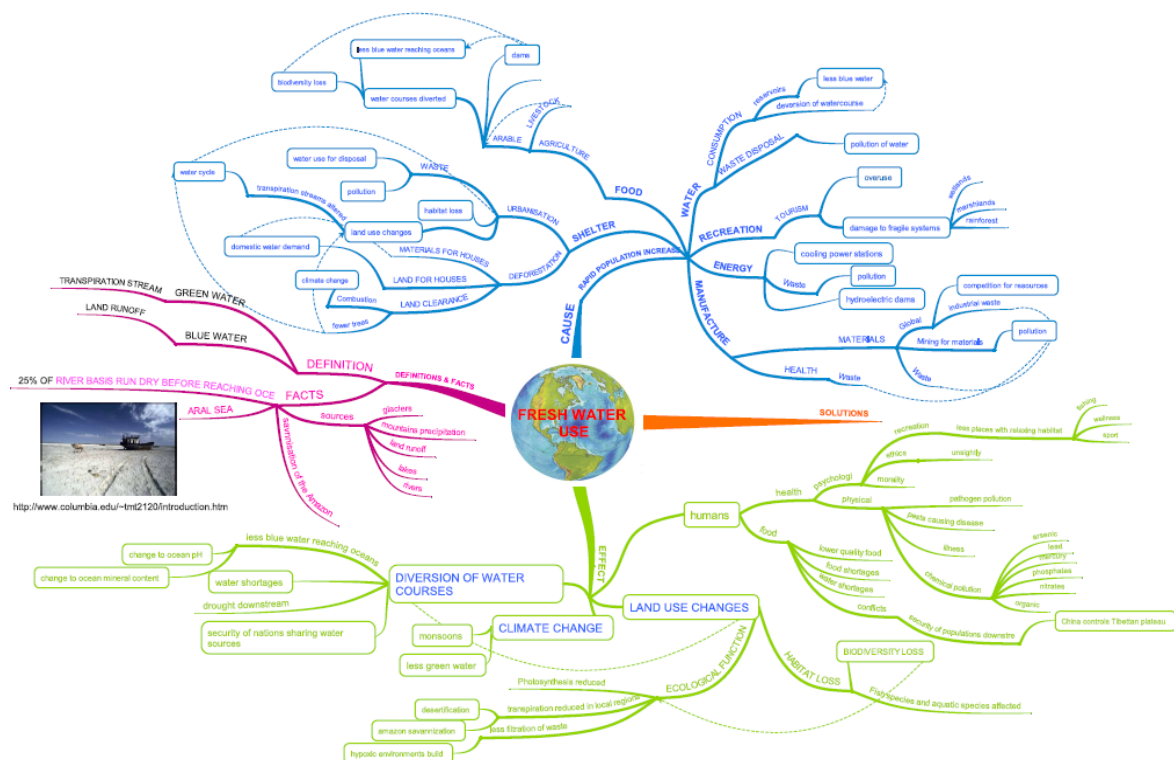
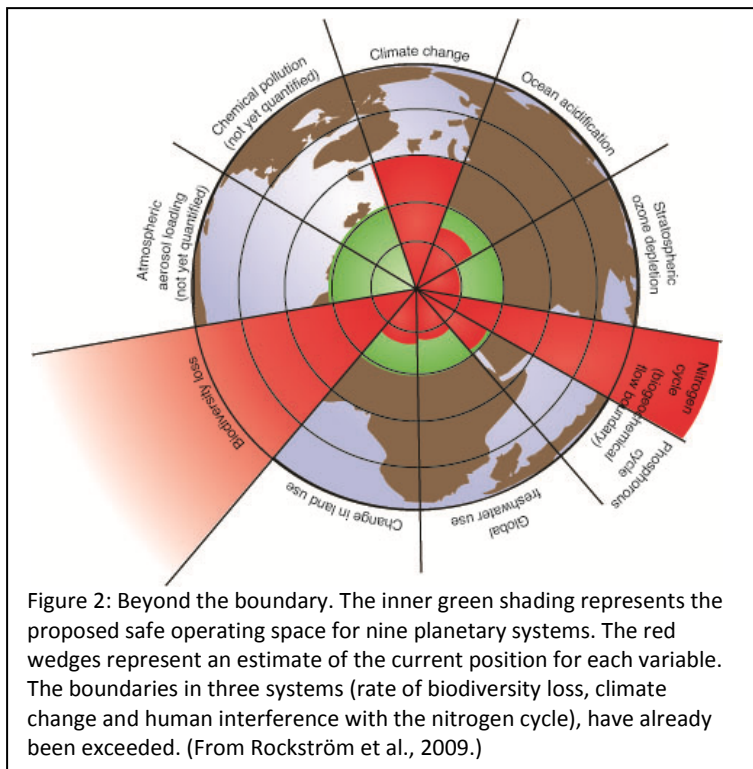


Fig.1. Freshwater use Mind Map

How could be the Mind Maps used?

The way to work with the Mind Maps can vary according to the providers' teaching aims, the age of the students, the learning locations etc. The Mind Maps should inspire the teacher while searching for interesting topic for a new lesson or while innovating existing ones. To expand the information presented in the Mind Maps, there are also web links embedded

within them. These web links offer a range of information, figures, pictures, schematics, activities etc. these are designed to support and deepen the teacher's knowledge and understanding of the science issues. The Mind Maps illustrate interconnections in the world



and demonstrate complexity. It is exciting to reveal how earth systems are affected by each other. Using the Mind Maps makes it very easy to find the links between the topic of a lesson, both in terms of sustainability and science, while reflecting on or creating programmes. The range of topics covered by the mind maps means there is something that can appeal and be relevant to teachers of a big range of ages. For example concrete issues, such as Freshwater or Land Use work well for the younger age groups (6-12 years). The more abstract issues, such as Climate change, Biogeochemical Ocean acidification etc. may be more useful for teachers of older students.

Since some big issues, such as Climate change, Ozone depletion, Biogeochemical cycles etc. are often not introduced by outdoor learning providers, it is our hope that the Mind Maps will inspire them to see the issues from a new perspective and feel comfortable to include them in their lessons.

Note: to view draft versions of the mind maps click [here](#).

References

Rockström J. et al. 2009. Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society*. 14 (2).

Rockström J. *et al.* 2009. A safe operating space for humanity. *Nature*. 461 (7263): 472–475.