



Perspective

Earth Day and the role of chemistry in sustainable development

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The first Earth day was celebrated on 22 April 1970, at events held in many academic and community centres across the USA. It has since become an annual event marked in over 190 countries and a year-round, global environmental movement coordinated by the [Earth Day Network](#). The theme of Earth Day 2019 is the [unprecedented rate of extinction of species and habitats](#) across the planet.

The 1970 Earth Day saw the appearance of a figure depicting a cycle of three arrows, accompanied by the labels Reduce, Reuse and Recycle. The 3-arrow figure, inspired by work from the Bauhaus design school of the 1930s, has since become the [Universal Recycling Symbol](#) and variants of this recycling icon are displayed on products around the world to indicate they should not be discarded with general trash.



'3Rs' has grown from a slogan and an emblem of environmental concerns into a global movement. The G8 countries meeting at the Sea Island Summit in June 2004 adopted the 3R Initiative to promote building of a society based on recycling, to ensure the effective use of resources and materials. Japan, which was to host the following G8 Summit in 2008, convened a ministerial meeting in the spring of 2005 in order to formally launch the Initiative and provides a [website](#) with details of progress.

The 3R Initiative has subsequently been adopted by many countries and has become a core feature of a number of movements linked to the central idea of reducing waste and making more efficient use of materials. These include:

- the '[circular economy](#)' concept, which has been promoted by the [Ellen MacArthur Foundation](#). This approach aims at breaking the global 'take, make, consume and dispose' pattern of growth – a linear model implying that resources are abundant, available, easy to source and cheap to dispose of.
- the idea of '[cradle to cradle](#)' design, originating with Swiss architect [William Stahl](#) and later [developed](#) by architect William McDonough and chemist Michael Braungart.
- a new initiative for '[circular chemistry](#)', which applies the 'circular economy' concept specifically to provide design considerations for research and process development in the chemical sciences that emphasize "*the role of chemists in a world without waste*". This has been applied, for example, in the development of a [circular carbon economy](#) aiming to achieve net zero emissions, resource efficiency and conservation through a coupling of the energy, chemical and waste management sectors. The circular economy concept has been used to draw a set of [twelve principles](#), analogous to but extending beyond those originally enunciated for [Green Chemistry](#).

IOCD strongly supports and promotes the essential role that chemistry must play in achieving sustainable development. Its action group, [Chemists for Sustainability \(C4S\)](#) has published extensively on this topic. It has developed the concept of '[one-world chemistry](#)', which recognises that human and animal health and the biological and physical environments of the planet are all intimately connected. As a consequence, *C4S* emphasises the need for chemistry to adopt systems thinking as a core approach and is collaborating in a project of the International Union of Pure and Applied Chemistry to introduce [systems thinking in chemistry education](#).

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