Curriculum and Assessment Review: RAS Response

The Department for Education is in the process of reviewing the existing national curriculum (for England) and the assessment system from Key Stages 1 to 5 (so from primary to A level), with the aim of ensuring it is fit for purpose for children and young people.

As the 'expert group' for the RAS, the Education and Outreach Committee (EOComm) considered the review, submitting the following response. Council should note that many other organisations responded, and that the review covers many areas outwith our expertise. Nonetheless EOComm saw it as an opportunity to argue for our sciences to play a greater part in the English education system.

The review panel, chaired by Prof. Becky Francis CBE, the CEO of the Education Endowment Foundation, will publish its findings in 2025.

DfE: Curriculum and Assessment Review:
https://www.gov.uk/government/groups/curriculum-and-assessment-review

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RAS response to specific questions in the review:

22. Are there particular curriculum or qualifications subjects where:
a. there is too much content; not enough content, or content is missing;
b. the content is out-of-date;
c. the content is unhelpfully sequenced (for example to support good curriculum design or pedagogy);
d. there is a need for greater flexibility (for example to provide the space for teachers to develop and adapt content)?

The Royal Astronomical Society represents astronomy, space science and geophysics. These are subjects with proven inspirational value that barely feature in the existing curriculum, with the exception of specialist qualifications (such as GCSE Astronomy and modules in some A level Physics courses). The seminal review of the school curriculum by Jonathan Osborne and Sue Collins in 2000 identified astronomy and space as the one subject that generated universal enthusiasm among pupils. (See https://www.kcl.ac.uk/archive/website-resources/education/web-files2/news-files/ppt.pdf)

We therefore recommend that the curriculum has sufficient flexibility to allow the inclusion of subjects like astronomy and space science, not least given their apparent role in enthusing pupils about science.

26. In which ways do the current secondary curriculum and qualification pathways support pupils to have the skills and knowledge they need for future study, life and work and what could we change to better support this?

The RAS suggests that the curriculum could be improved with the inclusion of core ideas associated with astronomy and geophysics, and skills associated with their practice.

Aspects of knowledge resulting from astronomy and geophysics support scientific literacy in general, notably around an understanding of our place in the universe. A description of these ideas can be found in the EU Horizon 2020-funded GoLab project, particularly the sections on 'Planet Earth' and 'Our Universe', and set to be taken forward in the Erasmus Astrojourneys programme running to 2027.

They include the Earth being a very small part of the universe and the solar system, the origin and age of the universe, and how the internal structure of our planet and movement of tectonic plates determine life.

These fundamental sciences also deliver core skills. For example, understanding how to handle data on very small and very large scales, data associated with purely observational sciences (most facets of the Earth as a whole and the wider universe are immutable by human hands), large datasets and prioritisation. They also rely on the numerical and mathematical techniques to model systems, skills that can be applied to a plethora of situations in society as a whole.

Critical thinking, a key curriculum priority for the Government, is central to the development of science, including astronomy and geophysics. The historical examples illustrate this effectively, with the Copernican Revolution a case in point. Here a centuries old consensus came to an end in the face of new evidence, moving from an Earth-centred to a Sun-centred universe, and the eventual recognition that even our galaxy is one among many billions.

These subjects also embrace uncertainty, for example in the search for extraterrestrial life, or the nature of dark energy and dark matter, and how new telescopes help answer and raise new questions, as do scientific facilities in general.

29. To what extent do the current secondary curriculum and qualifications pathways support pupils to study a broad and balanced curriculum? Should anything change to better support this?

As in the answer to question 26, the RAS notes the cross-curricular value of astronomy and geophysics. These are subjects that link to history, mathematics, IT, creative writing, and art and design, among others. Including components of them is a prerequisite for the kind of broad and balanced curriculum under discussion here.

54. Do you have any further views on anything else associated with the Curriculum and Assessment Review not covered in the questions throughout the call for evidence?

Astronomy in particular is a very accessible discipline. At a basic level, a sense of wonder can be the result of simply seeing a night sky, and leads to deeper questions that are the focus of scientific endeavour. The RAS therefore sees it as an important component of a reformed school curriculum, and one that leads pupils to scientific literacy and to careers in science and engineering.