

Science education



I. BASICS

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“Science education” refers to the teaching and learning of science, beginning in the early years and continuing throughout life. Science education is a broad field that encompasses the content, processes and practices of science and – by extension – the pedagogy and didactics of teaching science. Science education in a broad sense can take place in formal and informal learning settings, such as forests, museums and playgrounds, and with a range of disciplines spanning physics, chemistry, biology, geology, astronomy and environmental sciences, for example. Learning science involves developing an understanding of the concepts, theories and laws of the natural world, as well as developing important scientific practices such as observing, experimenting, analysing and interpreting, and applying these practices through scientific critical decision-making processes ^[7, 8].

Science education should strive to nurture a sense of curiosity and wonder, as learners ask questions, design experiments, collect and interpret data, and draw evidence-based conclusions. At the same time, science education can also develop critical thinking skills and promote problem-solving abilities. A central goal of science education both in and out of school is to foster scientific literacy, which refers to the ways in which people can use scientific knowledge and skills to think critically, analyse data and make informed decisions based on evidence.

Science education should build upon learners’ curiosity, interests and wonder, and science teaching approaches should ideally encourage active learning and discovery and emphasise the connection between scientific concepts and their applications in

everyday life. Inquiry-based learning approaches can help to achieve this goal, as they build on what students think about when examining questions that are relevant to them, and they engage critical-thinking and problem-solving skills. Science education plays a crucial role in developing an appreciation of the natural world and in preparing individuals for careers in scientific fields – as informed citizens who can engage with and participate in scientific discourse relevant to our rapidly changing planet.

Science is a dynamic and rapidly evolving field. Science education should therefore integrate new discoveries, emerging technologies, and contemporary scientific issues and challenges. To work towards contemporary scientific literacy, science curricula should be reimagined ^[9]. At the same time, it is critical to provide professional development for teachers in ways that integrate current scientific research into instructional materials and approaches.



life long
LEARNING



Key issues in science education relate to equity, access and inclusion, as ensuring equitable access to quality science education is a significant challenge internationally. Disparities in resources, funding and opportunities to learn disproportionately affect students from marginalised communities, which leads to gaps in achievement across different groups. Females continue to be underrepresented in scientific professions. Addressing gender disparities and creating structures and approaches for fostering inclusivity in science is crucial to promoting diversity and equity in scientific fields. Addressing these disparities and fostering inclusivity requires recognition and collaborative efforts from educators, policymakers, scientists and the community at large. By working towards equitable access to science education contexts and learning resources, fostering inclusivity, promoting inquiry-based learning and keeping pace with scientific advancements, the field and practice of science education can better prepare individuals for the challenges and opportunities of the future.

Recommended reads:

- ♦ Adams *et al.* (2018). *The role of science education in a changing world*. Lorentz Center, Netherlands. <https://www.lorentzcenter.nl/lc/web/2018/960/extra.php3?wsid=960&venue=Snellius>