

Teaching basic skills: Science

Science – The ability to engage with science-related issues and ideas as a reflective individual, explaining phenomena scientifically, evaluating and designing scientific enquiries and interpreting data and evidence.

Science skills are essential for critical thinking and problem-solving. As part of the science, technology, engineering and mathematics (STEM) competencies, they are essential for lifelong learning and form the basis of more advanced careers in these fields. In the contemporary context of widespread information distortion, individuals must develop robust science skills to assess information critically, distinguish truth from falsehood and make evidence-based judgments. Basic skills in science must be developed by nurturing scientific reasoning and competence from an early age. Interdisciplinary approaches, inquiry-based learning and real-world problem-solving are important strategies.

In the EU:



approximately
1 in 4

tested 15-year-olds fails to apply
simple scientific knowledge

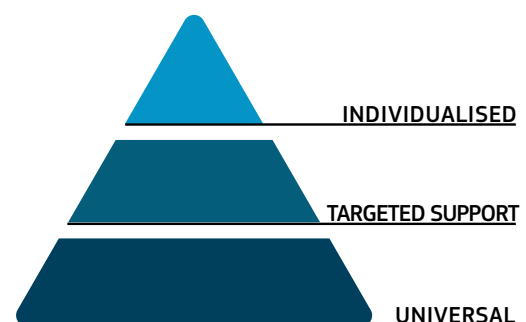


top performance in
science is at
7%
(PISA 2022)

too few lower
secondary school
pupils excel in
**engaging in scientific
practices**, compared
to pupils in Japan,
England and the US

The different levels of support in the whole school approach can be used for science learning:

- universal approach: all pupils have access to high-quality, engaging science education that nurtures **curiosity**, builds **core skills** and links learning to **real-world challenges**
- targeted support: in small groups or at individual level, to ensure **equity, diversity and inclusion** in science learning



CULTIVATING SCIENTIFIC LITERACY FOR ALL

Every learner should benefit from high-quality, inclusive science teaching, learning and assessment that fosters interest for science phenomena in everyday life and scientific thinking. This includes:

- **hands-on, inquiry- and project-based teaching** to incite pupils' natural curiosity, which can help overcome negative associations with or prejudices against science learning
- **interdisciplinary learning** to link science to other subjects, like history, arts and literature, developing science learning with real-life examples
- **a whole school approach** to ensure a holistic strategy that embeds science in everyday schooling and an inclusive approach
- **gamification and contests** to make science fun and motivating
- **creative classroom strategies** such as mysteries to spark curiosity, real-world simulations and interactive experiments, with the support of digital tools when appropriate



Explore further

[Science is Wonderful](#) classroom activities include teaching resources, games and videos prepared by scientists to be used with pupils or children throughout the year.

[Science on Stage](#) competitions motivate pupils by showcasing creative science projects and experiments developed by teachers and learners. The initiative's teaching materials provide concrete examples across different subjects.



BRIDGING GAPS AND EXPANDING OPPORTUNITIES

Targeted strategies address persistent barriers (e.g. gender and diversity gaps, access to equal opportunities) and enrich learning beyond the classroom. This involves:

- **providing access to appropriate equipment** for all pupils, e.g. science labs and makerspaces
- **working with families to address learners' attitudes** towards science topics and interest for science careers, especially for female pupils and those from low-income and migrant backgrounds
- **closing the gender gap** in science education by tackling social stereotypes and cultural biases through gender-inclusive approaches
- **developing partnerships with the local community** (e.g. industry and universities) in the form of school visits by professionals, fields trips or community science projects
- **supporting citizen science initiatives** where learners actively contribute to real scientific work



Explore further

[ECSITE](#) unites science centres, museums, universities and cultural institutions across Europe, fostering collaboration between schools and non-formal and informal learning spaces, making science accessible, engaging and relevant through exhibitions, outreach and community partnerships.

INDIVIDUALISED SUPPORT TO LEARNERS

Science education needs to be **learner-centred**, meeting diverse needs, interests and aspirations. This involves:

- **personalised projects** where pupils explore science through themes they care about, such as space exploration or ocean protection
- **open educational resources and digital tools** that adapt to the pace and style of different learners
- **inquiry tasks that promote voice and choice** in learning
- **cross-disciplinary learning challenges** that encourage creativity and deep thinking
- **teachers' continuous professional development** focused on inclusive, research-based pedagogies, collaboration with peers through professional networks and access to high-quality, adaptable teaching materials



Explore further

[Girls go STEM](#) enables pupils, especially girls, to engage in personalised, hands-on projects on digital and green topics they care about. By tackling real sustainability challenges, learners develop STEM skills, critical thinking and confidence through meaningful exploration.

[Scientix](#) empowers effective teacher collaboration by connecting educators across Europe in an active STEM community. It offers free resources, training and opportunities to share practices, helping teachers exchange ideas, learn together and inspire innovation in science teaching.

Explore the [European School Education Platform](#) and learn how strong science skills help pupils analyse evidence, make informed choices and approach real-life challenges with curiosity and confidence.

Via eTwinning – the community for schools in Europe – teachers can join featured groups to exchange with peers:

- [Mathematics, science and other STEM topics](#)
- [Basic skills in action: science](#)

More learning resources online

- [EU Learning Corner](#) – science quiz to explore scientific topics in ten different areas (multilingual)
- [ESA Kids](#) – using European Space Agency missions and European astronauts as examples, teaching science and environmental awareness with a European identity (multilingual)
- [ARTE.TV](#) – high-quality European creations (multilingual)
- [Lindau mediatheque](#) – mini-lectures on discoveries related to Nobel prize-winning innovations (multilingual)
- [Science in School](#) – European journal for science teachers, featuring practical ideas to deliver engaging science lessons (multilingual)



Bibliography

[Action Plan on Basic Skills](#), European Commission, 2025

[STEM Education Strategic Plan](#), European Commission, 2025

[The Union of Skills](#), European Commission, 2025

[TIMSS International Results in Mathematics and Science](#), IEA, 2023

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