



## STEM EDUCATION 29-30 August 2022

### What is STEM education?

STEM, or Science, Technology, Engineering and Mathematics, is not merely a list of important subjects, but education in these subjects should be approached as a cross-disciplinary pedagogically integrative philosophy, explained by the [Redhill school](#). STEM is much more than the sum of its parts. STEM education combines these four subjects into an interdisciplinary approach of enquiry and problem-based learning. STEM helps children develop critical, analytical thinking skills to solve real world problems, and helps them become lifelong learners. They become competent and able to change with our rapidly changing times.

STEM education has developed to be more significant for the world as it poses a range of advantages in a myriad of fields. As most sectors are dependent on the STEM fields, it indirectly plays a significant role in the flourishing of the economy. In the coming years, the STEM sector is expected to be one of the largest employers in the world.

### Purpose and objectives

The purpose of this DF is to focus on particular aspects of STEM education that are currently of concern and interest, including:

- The effects of recent disruptions of education on STEM education
- The urgent need for career guidance and awareness of the importance of STEM subjects among learners
- Technology as school subject matter: including technology and engineering as school subjects, and technology-focused schools
- Creativity and STEM education (referred to as STEAM)
- Exposure to 4IR technologies, e.g. robotics and coding

Objectives include:

- Raising concerns on behalf of the SET professional associations in NSTF, both during the event and in subsequent publicity and communication with the Department of Basic Education
- To approach STEM education from the perspective of various stakeholders and experts
- To collate the best ideas for dealing with the huge challenges to STEM education in our education systems

## Background

Education is a vital component of building a great career. When it comes to STEM, there are many enriching opportunities and a great variety of meaningful careers. Moreover, with a scarcity of talent in the fields of STEM, some candidates are in high demand. Other skills attained through STEM education include problem solving, critical thinking, creativity, curiosity, decision making, leadership, entrepreneurship, acceptance of failure and more. Regardless of the future career path considered by schoolchildren, these skill sets go a long way to preparing them to be systematic and logical thinkers, as well as innovative. By learning to approach problems scientifically, children gain valuable analytical and information management skills, which can be applied to all areas of life. The best STEM learning is hands-on, and the best teaching helps children learn to solve problems in fun and meaningful ways. STEM-based education teaches children more than science and mathematics concepts. The focus on hands-on learning with real-world applications helps develop a variety of skill sets, including creativity and 21<sup>st</sup>-century skills.

## Questions to consider:

1. The past two years have seen dramatic disruptions in schooling across the world and in South Africa. How are schools, districts and education departments dealing with the need to catch up on learning that has been lost to the pandemic? What promising initiatives are there to catch up, and to deal with further disruptions?
2. How to convince learners in grade 9 to take mathematics, physical science, life science, technology and/or engineering? How can the teachers be trained, resourced and informed to convince the learners?
3. How successful are the subjects of technology and engineering in preparing learners for further studies or training? What examples are these of successful specialised schools?
4. How to teach learners to be innovative? Does it make sense to include creativity as an aspect of STEM teaching and learning?

5. How important is it for learners to do coding? How can coding and computer usage be made more accessible to poorly resourced schools? What is the importance of exposure to robotics, artificial intelligence and sensor based technology, and how should these be made more accessible to school learners?

## Conclusion

As always, we invite researchers, government officials, business people, NGOs and professional societies to make their contributions to these discussions.

Afterwards, the recordings of presentations will be posted on [www.nstf.org.za](http://www.nstf.org.za); and a media release will be written summarising the issues that were discussed, concerns raised and recommendations. All material will be available under [Previous Discussion Forums – NSTF](#).

NSTF/proSET looks forward to the fruitful sharing of insights and discussions on some of the burning issues that need to be addressed in our country.

## Sources

<https://www.samefoundation.org.za/stem-education-science-technology-engineering-maths-for-south-african-underprivileged-schools/>

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<https://www.smilefoundationindia.org/blog/stem-vs-steam-education-a-battle-of-mind-vs-matter/>

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