GOVERNMENT OF INDIA

MINISTRY OF EDUCATION

DEPARTMENT OF SCHOOL EDUCATION & LITERACY

RAJYA SABHA

UNSTARRED QUESTION NO. 3568

ANSWERED ON 02.04.2025

Science, Technology, Engineering and Mathematics (STEM) education

3568 **Shri Iranna Kadadi:**

Will the Minister of ***Education*** be pleased to state:

(a) whether Government could provide data on the initiatives that have been launched in 2024 to promote Science, Technology Engineering and Mathematics (STEM) education in schools;

(b) whether Ministry plans to engage underrepresented groups in these fields;

(c) the resources being allocated to enhance STEM curriculum development; and

(d) the manner in which student outcomes in STEM subjects be tracked and reported?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF EDUCATION

(**SHRI JAYANT CHAUDHARY**)

(a) to (d) As a follow-up of the National Education Policy (NEP), 2020 and the National Curriculum Framework for School Education (NCF-SE) 2023, the National Council of Educational Research & Training (NCERT) has developed Science Textbooks for Grade 6, that supports Science, Technology, Engineering and Mathematics (STEM) education by fostering inquiry-based learning, encouraging students to ask questions and explore concepts through hands-on-experiments and activities. The textbook emphasizes critical thinking, problem-solving and the use of technology. By focusing on interactive learning and real-life problems, it cultivates a deeper understanding of STEM concepts, preparing students for future challenges in these areas. Educational Kits developed by NCERT are helpful in contributing towards enhancing STEM curriculum development. For this, five new Educational Kits Resource Centers (EKRC) have been established in five Regional Institutes

of Education (RIE) of NCERT. Resource persons from different States/UTs of the country were oriented for utilizing these resources for better learning-teaching experiences. Following initiatives are undertaken to promote STEM education in schools:

- Development of science textbooks to promote STEM.
- Organising webinar series 'Listening to Learn' that are telecasted live and uploaded on NCERT's Youtube Channel.
- Promotion of research attitude among the students by its programme "Promotion of Research Attitude in Young and Aspiring Students (PRAYAAS)".
- Organizing Rajya Stariya Bal Vaigyanik Pradarshani (RSBVP) and Rashtriya Bal Vaigyanik Pradarshani (RBVP).
- Organising Rashtriya Avishkar Saptah (RAS).
- INSPIRE (Innovation in Science Pursuit for Inspired Research), a flagship program of the Department of Science & Technology (DST), encourages young talent to take up science and research as a career. It includes scholarships, mentorship programs, and research internships for students at the school and undergraduate levels.
- Vigyan Jyoti Program aims to increase the participation of girls in STEM fields. It provides mentoring, scholarships, and exposure to science and technology careers. Special focus is given to students from underserved and rural areas.

Additionally, Atal Tinkering Labs provide students access to tools and technologies like 3D printing, robotics, and the Internet of Things (lot). More than 10,000 ATLs have been set up across the country to nurture problem-solving skills and innovation. Their aim is to cultivate 21st-century skills such as critical thinking, collaboration, and an entrepreneurial mindset through hands-on, experiential learning, preparing students to become the innovators and problem-solvers of tomorrow. According to UDISE 2023-24 data, India has over 1.2 lakh Government Secondary schools.

The concerns of addressing under-represented groups for their inclusive participation in STEM education in schools is integrated in all these activities. For example, in Rajya Stariya Bal Vaigyanik Pradarshani (RSBVP) and Rashtriya Bal Vaigyanik Pradarshani (RBVP), extra weightage is given to the entries of the students from rural/backward/semi-urban regions and also to differently abled students of the country.

As per NEP, 2020 assessments of educational approaches in undergraduate education that integrate the humanities and arts with STEM have consistently showed positive learning

outcomes, including increased creativity and innovation, critical thinking and higher-order thinking capacities, problem-solving abilities, teamwork, communication skills, more in-depth learning and mastery of curricula across fields, increases in social and moral awareness, etc., besides general engagement and enjoyment of learning. Research is also improved and enhanced through a holistic and multidisciplinary education approach.

PARAKH, the National Assessment Centre, employs a structured framework for tracking and reporting student outcomes in STEM education through a combination of formative and summative assessments, and periodic competency-based assessments. The PARAKH Rashtriya Sarvekshan (previously known as National Achievement Survey) uses standardized tests to monitor the learning levels of students in different subjects including Science and Mathematics to track the learning progression over the years. NAS conducted in 2017 and 2021 assessed students' performance in Mathematics at Standards 3, 5, 8 and 10 while learning indicators in science were assessed in Classes 8 and 10. The district wise report cards of the surveys are available in public domain and may be accessed at https://nas.gov.in/report-card. PARAKH Rashtriya Sarvekshan (earlier known as NAS) was conducted on December 4, 2024.

Stage specific Holistic Progress Cards (HPCs), developed by NCERT, have been adopted /adapted by various States and UTs. Classroom assessments using Holistic Progress Cards (HPCs) are being used to understand the achievement of the learners in Science and Mathematics along with other subjects as well.

The school educational boards, at the State as well as the National level, conduct examination in various subjects including STEM subjects. These summative examinations at the end of grade 10 and 12 help to understand the system level performance by looking at the pass percentages of the students in the different boards over the years. Results of Secondary and Higher Secondary Examinations show that there has been a 40% increase in students passing Science stream 2014 vis-à-vis 2023, comprising a 20.4% increase in the case of boys and 75.3% increase in the case of girls.

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