
بسم الله الرحمن الرحيم

TOPIC NO: 1

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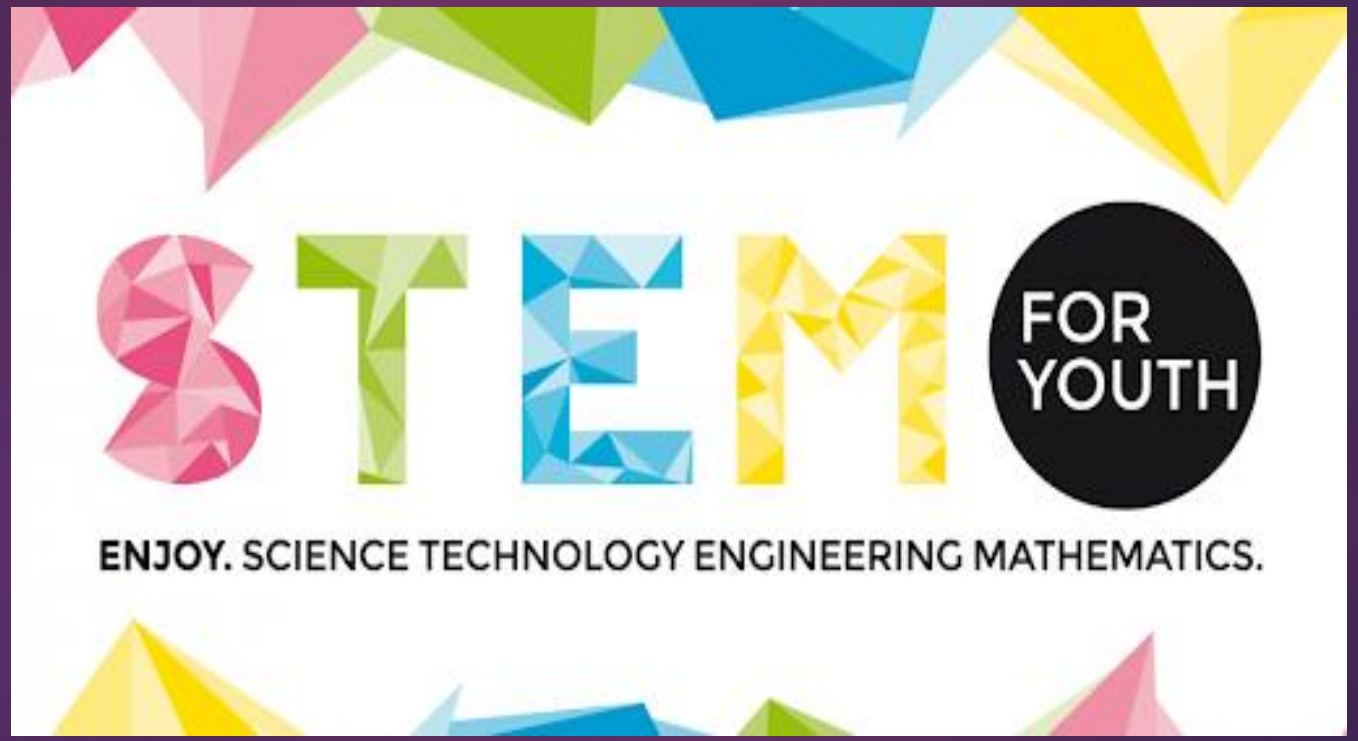
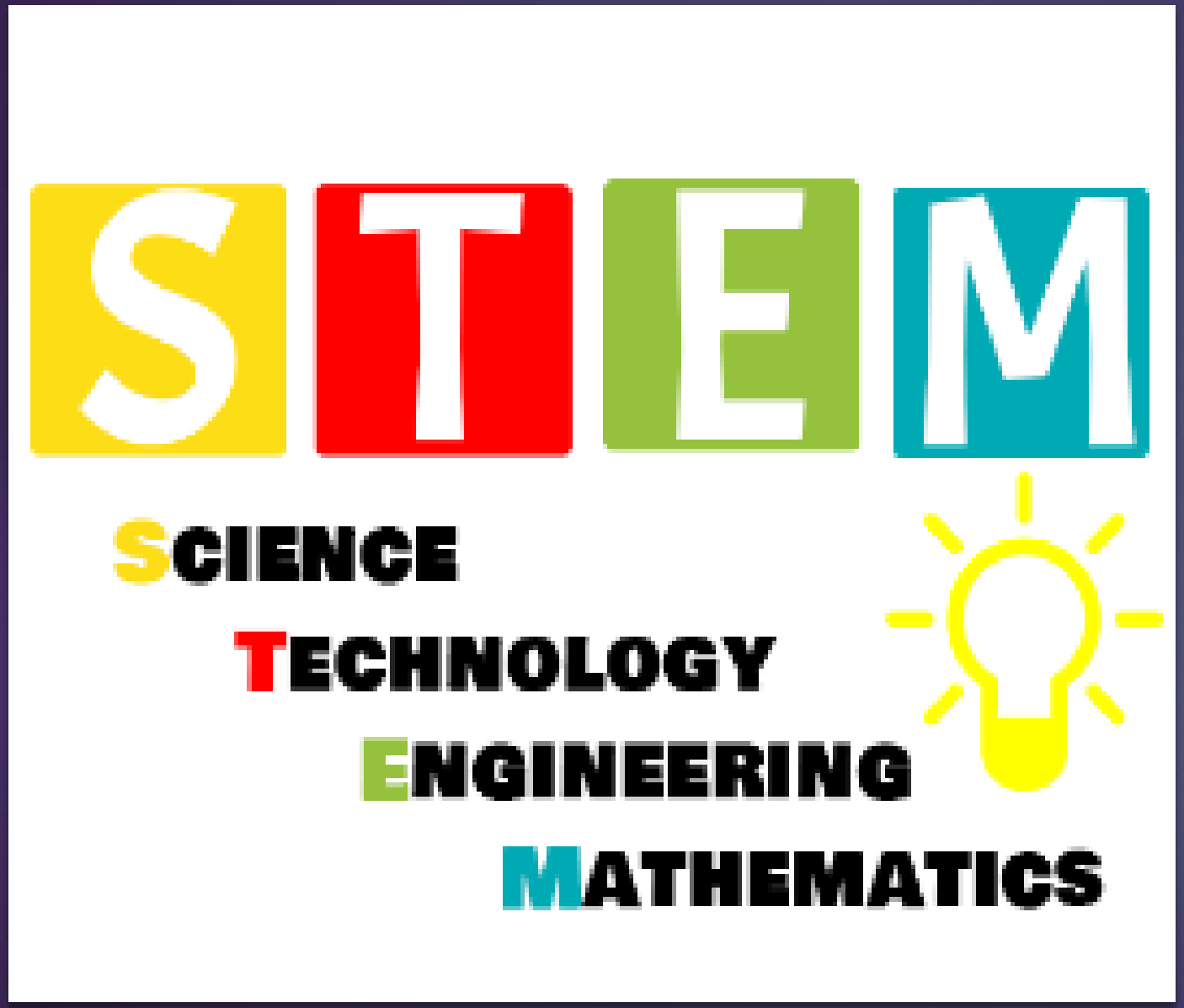
❑ Youth and Stem Learning





BASIC IDEA about STEM:

STEM IS AN ACRONYM FOR SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS.

❑ What is STEM education?

- The STEM acronym was introduced in **2001** by scientific administrators at the U.S. National Science Foundation (NSF).
- STEM is a curriculum based on the idea of educating students in four specific disciplines — science, technology, engineering and mathematics — in an interdisciplinary and applied approach. Consider the definitions of each discipline which are:
  - Science: The process of finding out about the world and how it works by exploring, gathering data, looking for relationships and patterns, and generating explanations and ideas using evidence.

- ❖ Technology: The tools that have been designed to meet human needs such as balance scales to compare weights, lenses to look closely at living things, and digital tools like computers and tablets.
- ❖ Engineering: The process of designing tools, systems, and structures that help humans meet their needs or solve problems.
- ❖ Mathematics: The study of quantities (how many or how much), structures (shapes), space (angles and distances), and change.

- STEM integrates them into a cohesive learning paradigm based on real-world applications.
- So basically, STEM learning is about building brains of students without books.

❑ Why STEM Education?

- In the 21st century, scientific and technological innovations have become increasingly important as we face the benefits and challenges of both globalization and a knowledge-based economy.
- To succeed in this new information-based and highly technological society, students need to develop their capabilities in STEM to levels much beyond what was considered acceptable in the past.

❑ Relation between youth and STEM learning education:

- As we know, STEM is important because it pervades every part of our lives.
- By exposing students to STEM and giving them opportunities to explore STEM-related concepts, they will develop a passion for it and hopefully pursue a job in a STEM field.
- A curriculum that is STEM-based has real-life situations to help the student learn. Programs like Engineering For Kids provide opportunities to see how concepts relate to life in order to hopefully spark a passion for a future career in a STEM field.
- STEM activities provide hands-on and minds-on lessons for the student. Making math and science both fun and interesting helps the student to do much more than just learn.

❑ Why is STEM Education so important?

- According to the U. S. Department of Commerce, STEM occupations are growing at 17%, while other occupations are growing at 9.8%.
- STEM degree holders have a higher income even in non-STEM careers. Science, technology, engineering and mathematics workers play a key role in the sustained growth and stability of the country’s economy.
- STEM education creates critical thinkers, increases science literacy, and enables the next generation of innovators.

- Innovation leads to new products and processes that sustain our economy.
- This innovation and science literacy depends on a solid knowledge base in the STEM areas.
- It is clear that most jobs of the future will require a basic understanding of math and science. Here's how STEM education can be so important to young students.

❑ STEM Education in U.S:

- Though the United States has historically been a leader in these fields, fewer students have been focusing on these topics recently.
- According to the U.S. Department of Education, only 16 percent of high school students are interested in a STEM career and have proven a proficiency in mathematics.
- Currently, nearly 28 percent of high school freshmen declare an interest in a STEM-related field, a department website says, but 57 percent of these students will lose interest by the time they graduate from high school.

- As a result, the Obama administration announced the **2009 "Educate to Innovate"** campaign to motivate and inspire students to excel in STEM subjects.
- This campaign also addresses the inadequate number of teachers skilled to educate in these subjects. The goal is to get American students from the middle of the pack in science and math to the top of the pack in the international arena.

STEM Learning at Educational Levels

STEM education begins while students are very young.

- **At Elementary school:**
  - STEM education focuses on the introductory level STEM courses, as well as awareness of the STEM fields and occupations.
  - This initial step provides standards-based structured inquiry-based and real world problem-based learning, connecting all four of the STEM subjects.
  - The goal is to pique students' interest into them wanting to pursue the courses, not because they have to.
  - There is also an emphasis placed on in-school and out-of-school STEM learning opportunities.

❖ **At Middle school:**

- At this stage, the courses become more rigorous and challenging.
- Student awareness of STEM fields and occupations is still pursued, as well as the academic requirements of such fields.
- Student exploration of STEM related careers begins at this level, particularly for underrepresented populations.

❖ **At High school:**

- The program of study focuses on the application of the subjects in a challenging and rigorous manner.
- Courses and pathways are now available in STEM fields and occupations, as well as preparation for post-secondary education and employment.
- More emphasis is placed on bridging in-school and out-of-school STEM opportunities.

❑ Benefits of STEM Learning:

1. **Fosters ingenuity and creativity:**
   - Ingenuity and creativity can pair with STEM and lead to new ideas and innovations.
2. **Builds resilience:**
   - During STEM education activities, students learn in a safe environment that allows them to fall and try again.
   - STEM education stresses the value of failure as a learning exercise.
   - This allows students to build confidence and resilience.

3. Encourages teamwork:

- STEM education can be taught to students of all ability levels.
- Students of varying levels of ability can work together in teams to find solutions to problems, record data, write reports, give presentations, etc.
- The end result is students who understand how to collaborate with others and thrive in a team-oriented environment.

4. Encourages knowledge application:

- In STEM education, students are taught skills that motivates them to use those skills in the real world.

5. **Encourages experimentation:**
   - STEM learning encourages the students to do new or creative experiments which leads to technological advancements.

6. **Teaches problem-solving:**
   - STEM education teaches students how to solve problems by using their critical thinking skills.
   - By engaging in STEM learn experiences, students learn how to examine problems and then create a plan to solve them.

7. **Encourages adaption:**
   - STEM education teaches them to adapt the concepts that they learn to various iterations of a problem or issue.

❑ STEMS Occupations:

- Following are some occupation which can be achieved by STEM education:

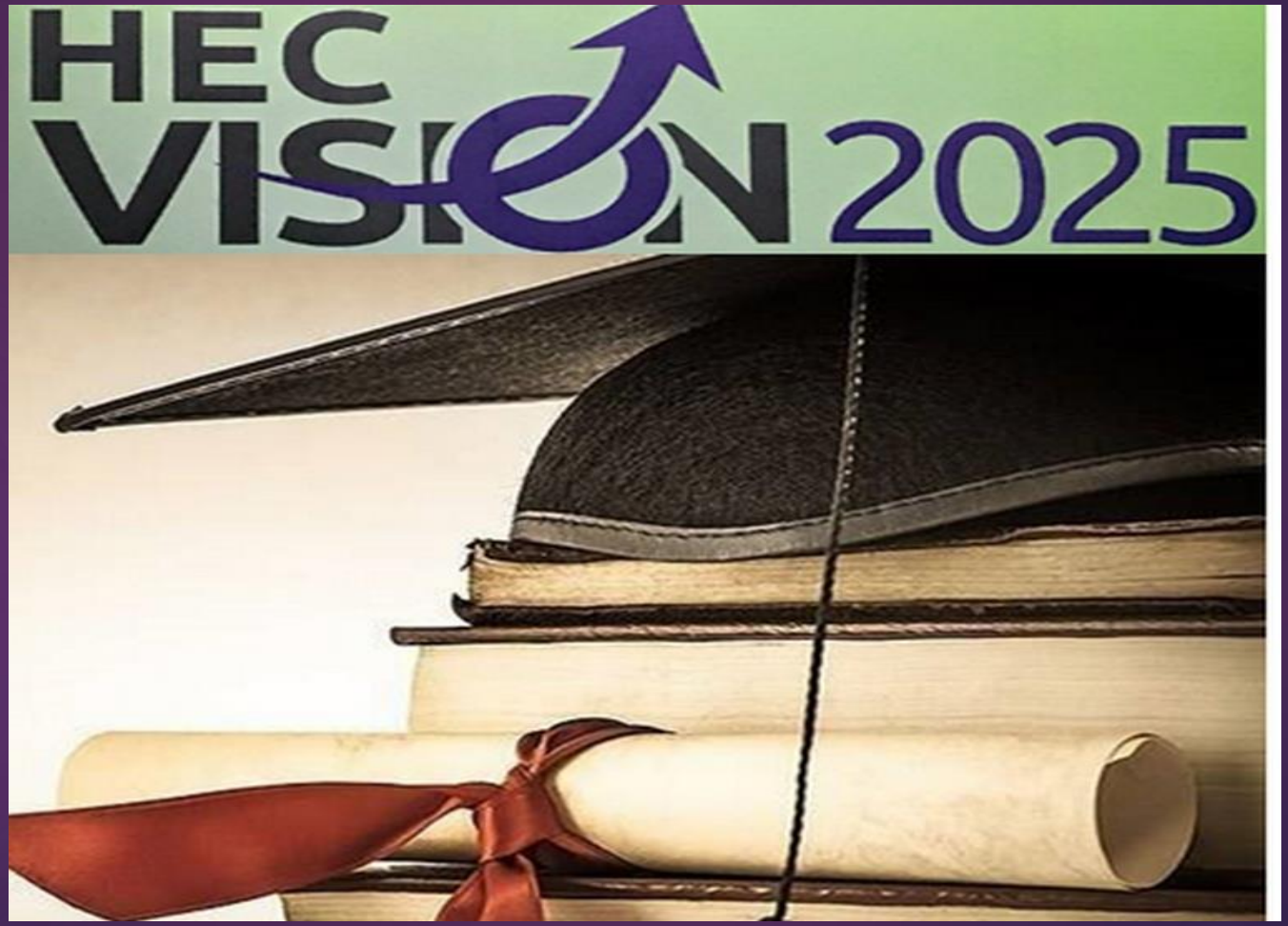
1. Automotive Technicians.
2. Biomedical Engineers.
3. Biofuels Productive Managers.
4. Biomass Power Plant Managers.
5. Civil Engineers.
6. Climate Change Analysts.
7. Construction Managers.
8. Electrical Engineering Technologists.

- STEMS Organizations

9. Marine Engineers
10. Mechanical Engineering Technologists.
11. Environmental Restoration Planners.
12. Microsystems Engineers.
13. Photonics Engineers.
14. Precision Agriculture Technicians.
15. Software\Systems Developers.
16. Transportation Planners.
17. Water Resource Specialists.

TOPIC NO: 2

Vision 2025



❑ Mission of HEC

- Pakistan started with the establishment of higher education commission in **2002.**
- The mission of HEC is to “facilitate institutions of higher learning to serve as an engine of socio - economic development of Pakistan”.

❑Policy overview

- The centrally driven approach of higher education commission vision 2025 document is the reflective of Pakistani boarder vision 2025 policy.
- Vision 2025 contains six pillars or properties that are alinged with the at least one of UN ‘s Sustainable Development Goals.

❑ Pillars of vision 2025

- **1. People:**

  Developing social and human capital and empowering women.

- **2. Growth:**

  Sustained indigenous and inclusive growth.

- **3. Governance:**

  Democratic governance institutional reform and modernization of public sector.

❑ Pillars of vision 2025

- 4. **Security:**

  Energy , water and food security.

- 5. **Entrepreneurship:**

  Private sector and entrepreneurship led growth.

- 6. **Knowledge economy:**

  Developing a competitive knowledge economy through value addition.

❑Institutional Clarity

- The document notes the establishment of two provincial higher education commission in Punjab and sindh pointing out the potential for confusion , ambiguity of authority and risk to the objective of vision 2025.

❑ Major challenges

- There is list of major challenges to HEC to achieve or overcome.
- Depoliticized the process for the recruitment of university leaders.
- Development of alternative source of funding.
- Closer connection between academia and industry.
- Professionalization of administrative staff and increase in number of academic staff with advance degree.

❑ Action plan of vision 2025

- **Objective no 1:**
  - "Implement three tier integrated system of tertiary education".
- Activities to be performed to achieve 1st objective:
  - Establish **20** new tier **1** research universities by **2025** with a disciplinary focus on arts, agriculture,bussiness, design, engineering ict, mathematics, medicine, health science, and technology.

❑ Action plan of vision 2025

- Establish **120** new public and private tier **2** universities with a professional focus.
- Establish **150** tier **3** institutions or community colleges.
- Increased funding for research and development triennial research grants.
- Tier **1** universities establish a collaborative Research Hub.

❑ Action plan of vision 2025

- **Objective no 2:**
  - "Research innovation and commercialization".
- Activities to be performed to achieve 2nd objective:
  - Targeted increase in research and development funding.
  - Establish 100 new business and technology centers.
  - Direct 15 tier 1 institutions to increase collaboration with the international sponsored research project.

❑ Action plan of vision 2025

- Establish offices of research innovation and commercialization at **30** tier **1** institutions and **100** tier **2** universities.

❑ Action plan of vision 2025

- **Objective no 3:**
  - "Enhance equitable access to the higher education".
- Activities to be performed to achieve 3rd objective:
  - Establish new universities to increase equitable access to higher education.
  - Enroll and graduate **200,000** students in postgraduate programs.

❑ Action plan of vision 2025

- Increase capacity for teacher training programme.
- Increase funding for existing tuition fee wavier and laptop distribution scheme.
- Increase the number and quality of affiliated colleges.

❑ Action plan of vision 2025

- **Objective no 4:**
  - "Excellence in leadership governance and management".
- Activities to be performed to achieve 4th objective:
  - Establish search committees to identify and appoint vice chancellor of public universities.
  - Strengthening the institutional monitoring through quality enhancement cell at public universities.

❑ Action plan of vision 2025

- Revision of rules of affiliation of tier 3 colleges with universities to monitor and promote quality.
- Implement a higher education leadership programme.

❑ Action plan of vision 2025

- **Objective no 5:**
  - "Increased quality with highest academic qualification".
- Activities to be performed to achieve 5th objective:
  - Ensure that 40% of academic staff have PhD degree.
  - Increased total number of academic staff to service increased student enrollment target.

❑ Action plan of vision 2025

- Encourage successful postgraduates to apply for scholarship for doctoral programmes.
- Allocate unawarded **PhD** scholarships.
- Prepare **10,000** Pakistani scholars to complete their doctoral studies in ranked U.S Lard grant universities over the next **10** years.

❑ Action plan of vision 2025

- **Objective no 6:**
  - "Enhanced quality of curricular content for all levels of qualification offered"
- Activities to be performed to achieve 6th objective:
  - Replace all the **1** & **2** years bachelor with the four year program by 2018.
  - Develop **2+2** courses with strong professional component.

❑ Action plan of vision 2025

- Expand training in quality assurance for university staff.
- Train **150** evaluators to perfome program assessment.
- Institution of accreditation councils for new discipline.

❑ Action plan of vision 2025

- **Objective no 7:**
  - "Planned ICT for Education 2017-25".
- Activities to be performed to achieve 7th objective:
- Provision of **30,000** internet enabled laptops to well performing students by **2019**.
- Provide free WIFI to **94** public universities.
- Create **350** smart classroom.

❑ Action plan of vision 2025

- Institutionalize a learning management system at **50** new universities.
- Upgrade the Pakistan education and research network telecommunication infrastructure.
- Setup **5** IT academies and testing centers.

❑ Action plan of vision 2025

- **Objective no 8:**
  - "Financial management to sustain growth".
- Activities to be performed to achieve 8th objective:
  - Develop and implement college improvement plan.
  - Introduce a requirement for financial auditing at universities.
  - Financial training for public university staff.

❑ Summary

- The higher education vision 2025 sets out an ambitious and centrally led plan for development of Pakistani higher education sector that is designed to support country's national objective to become next Asian tiger.
- This plan include a considerable reference to international collaboration with a significant funding allocation for overseas postgraduate scholarship.


Thank
You