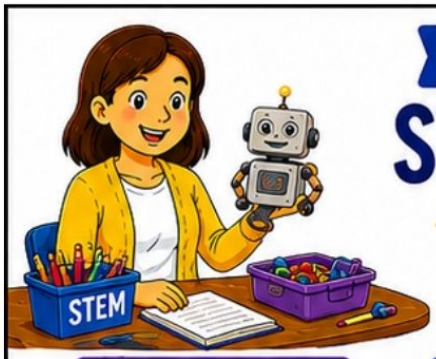


TEACHING ASSISTANCE GUIDE

STEM ACTIVITY GUIDE

Explore. Create. Innovate. Succeed!

SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS

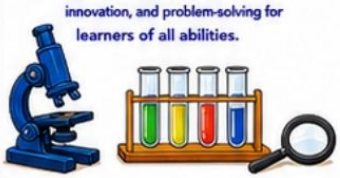


PURPOSE

STEM (Science, Technology, Engineering, and Mathematics) activities encourage students to investigate real-world problems, think critically, collaborate with others, and develop creative solutions through hands-on learning.

Effective STEM instruction helps students build confidence while strengthening academic skills that extend across every subject area.

This Teaching Assistance Guide provides educators with practical strategies for planning engaging STEM experiences that encourage inquiry, experimentation, innovation, and problem-solving for learners of all abilities.



WHO CAN BENEFIT

This guide is designed for:

- Transitional Kindergarten (TK)
- Kindergarten
- Elementary School (Grades K–5)
- Middle School (Grades 6–8)
- STEM Clubs
- Makerspaces
- After-School Programs
- Special Education Classrooms
- Homeschool Educators



WHY STEM EDUCATION MATTERS

STEM learning encourages students to ask questions, test ideas, and discover solutions through active exploration. Rather than simply memorizing information, students apply knowledge through meaningful challenges that promote curiosity and perseverance.

Benefits of STEM activities include:

- Develops critical thinking
- Encourages creative problem-solving
- Strengthens collaboration and communication
- Builds confidence through hands-on learning
- Reinforces science and math concepts
- Supports engineering design thinking
- Improves observation and reasoning skills
- Encourages innovation and creativity
- Prepares students for future careers and technologies



STEM IN ACTION!

STEM activities help students:

- Explore ideas
- Solve problems
- Build models
- Test solutions
- Make improvements
- Work as a team
- Think creatively
- Discover new possibilities



THE STEM DESIGN PROCESS

Successful STEM lessons often follow a simple design cycle that encourages students to learn from experimentation.

1 ASK

Identify the problem or challenge.

Students should consider:

- What problem are we trying to solve?
- What are the project goals?
- What limitations do we have?

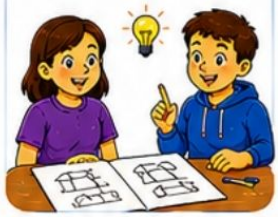


2 IMAGINE

Brainstorm possible solutions.

Encourage students to:

- Share ideas freely.
- Sketch possible designs.
- Compare different approaches.
- Work collaboratively.



3 PLAN

Develop a strategy before building.

Students should:

- Draw a simple design.
- List required materials.
- Assign team responsibilities.
- Predict possible outcomes.



4 CREATE

Build and test the solution.

Encourage students to:

- Follow their plan.
- Observe carefully.
- Record changes.
- Work safely.



5 IMPROVE

Evaluate results and make revisions.

Discuss:

- What worked well?
- What challenges occurred?
- How could the design be improved?
- What did we learn?



POPULAR STEM ACTIVITIES

Examples include:

- Building bridges with craft sticks
- Paper airplane engineering
- Balloon-powered vehicles
- Marble roller coasters
- Tower-building challenges
- Egg drop experiments
- Coding activities
- Robot construction
- Weather investigations
- Magnet exploration
- Water filtration models
- Simple machines
- Solar system models
- Recycling engineering projects



SUPPORTING DIVERSE LEARNERS

Every student can succeed in STEM when provided with appropriate support.

Consider including:

- Visual instructions
- Step-by-step diagrams
- Hands-on demonstrations
- Flexible grouping
- Adaptive tools
- Multiple solution pathways
- Extended work time
- Vocabulary supports
- Collaborative learning opportunities



CLASSROOM MANAGEMENT TIPS

Hands-on learning works best when expectations are clearly established.

Before beginning:

- Review safety procedures.
- Assign student roles within each group.
- Organize materials before distribution.
- Establish cleanup expectations.
- Encourage respectful teamwork.
- Celebrate effort and persistence.



RECOMMENDED CLASSROOM SUPPLIES

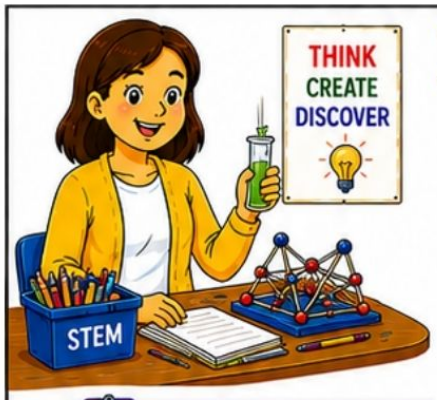
Helpful STEM materials include:

- Building blocks
- Craft sticks
- Cardboard sheets
- Plastic cups
- Paper tubes
- String
- Pipe cleaners
- Rubber bands
- Balloons
- Tape
- Glue sticks
- Scissors
- Measuring tapes
- Rulers
- Magnifying glasses
- Magnets
- Safety goggles
- Dry erase boards
- Clipboards
- STEM journals
- Storage bins
- Organizers



STEM today, skills for tomorrow! Together we can inspire the innovation leaders of the future.

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TEACHING ASSISTANCE GUIDE

PLANNING A STEM LESSON

Explore Ideas. Solve Problems. Build the Future!

SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS



BEFORE THE ACTIVITY

Prepare students for success.

Checklist:

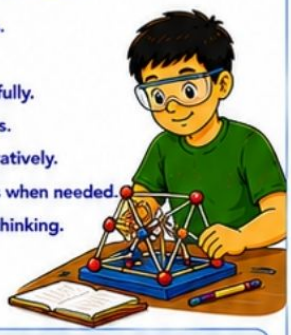
- [ ] Identify the learning objective.
- [ ] Gather all materials.
- [ ] Review safety expectations.
- [ ] Introduce the STEM challenge.
- [ ] Explain success criteria.
- [ ] Organize student teams if applicable.



DURING THE ACTIVITY

Promote active learning by encouraging students to:

- [ ] Ask questions.
- [ ] Test ideas.
- [ ] Observe carefully.
- [ ] Record results.
- [ ] Work collaboratively.
- [ ] Revise designs when needed.
- [ ] Explain their thinking.



Avoid solving problems for students. Instead, guide them with questions that encourage independent thinking.

AFTER THE ACTIVITY

Reflect on learning by asking students to:

- [ ] Share their designs.
- [ ] Explain their process.
- [ ] Compare different solutions.
- [ ] Discuss challenges.
- [ ] Identify improvements.
- [ ] Connect the activity to real-world applications.



POPULAR STEM ACTIVITIES

Examples include:

- Building bridges with craft sticks
- Paper airplane engineering
- Balloon-powered vehicles
- Tower-building coasters
- Egg drop experiments
- Catapult design
- Coding activities
- Robot construction
- Weather investigations
- Magnet exploration
- Water filtration models
- Simple machines
- Solar system models
- Recycling engineering projects



SUPPORTING DIVERSE LEARNERS

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Consider including:

- [ ] Visual instructions
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CLASSROOM MANAGEMENT TIPS

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- Organize materials before distribution.
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SAFETY FIRST!



STEM ACROSS THE CURRICULUM

SCIENCE

- Investigations
- Experiments
- Data collection
- Observation



MATHEMATICS

- Measurement
- Graphing
- Geometry
- Problem-solving



TECHNOLOGY

- Coding
- Digital research
- Educational software
- Robotics



ENGINEERING

- Designing
- Building
- Testing
- Improving



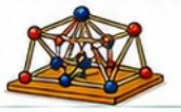
LANGUAGE ARTS

- Technical writing
- Presentations
- Reflection journals
- Research projects



VISUAL ARTS

- Design sketches
- Model creation
- Creative problem-solving
- Presentation displays

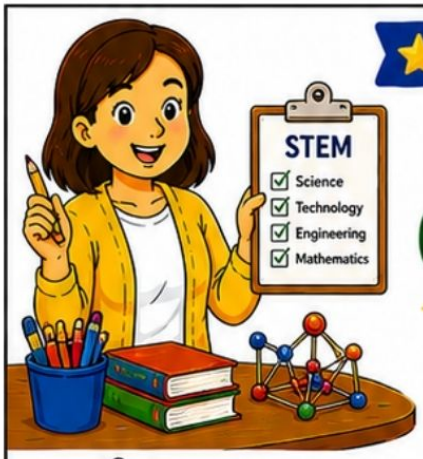


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Helpful STEM materials include:



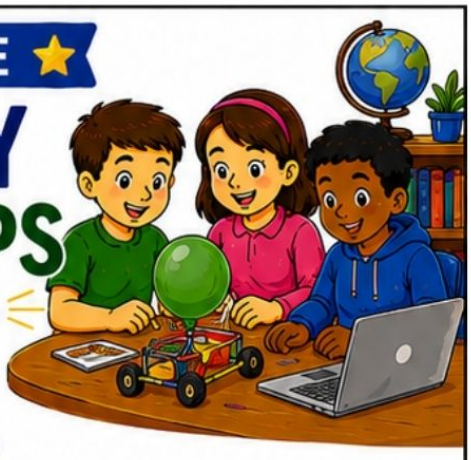
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TEACHING ASSISTANCE GUIDE

STEM ACTIVITY CHECKLIST & TIPS

Inspire Curiosity. Build Skills. Create Solutions.



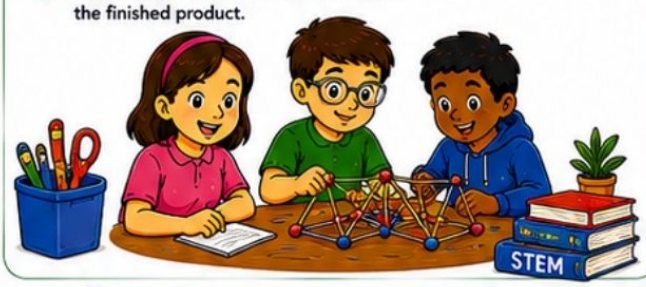
SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS

STEM ACTIVITY CHECKLIST

- [ ] Learning objective identified.
- [ ] Challenge introduced.
- [ ] Materials organized.
- [ ] Safety expectations reviewed.
- [ ] Students worked collaboratively.
- [ ] Students tested solutions.
- [ ] Students improved their designs.
- [ ] Reflection discussion completed.
- [ ] Classroom cleaned and organized.

PROFESSIONAL TEACHING TIPS

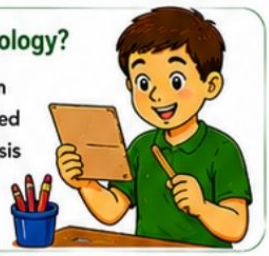
- Encourage curiosity before providing answers.
- Ask open-ended questions that promote deeper thinking.
- Allow students to make mistakes and learn from them.
- Celebrate creativity and persistence.
- Incorporate real-world problems whenever possible.
- Encourage students to explain and defend their solutions.
- Focus on the learning process as much as the finished product.



FREQUENTLY ASKED QUESTIONS

Do STEM activities always require technology?

No. Many effective STEM lessons use simple classroom materials such as paper, cardboard, craft sticks, recycled materials, and everyday household items. The emphasis is on inquiry, design, and problem-solving rather than expensive equipment.



Should every STEM activity have one correct answer?

No. Many STEM challenges encourage multiple successful solutions. Students learn valuable skills by testing ideas, making revisions, and explaining their reasoning.



How long should a STEM activity last?

Activities may range from a 20-minute classroom challenge to a multi-day engineering project. The length should match the learning objectives and the developmental level of the students.



How can I assess STEM learning?

Assess both the process and the product. Observe collaboration, problem-solving, communication, perseverance, and the ability to explain design decisions in addition to evaluating the final project.



DISCLAIMER

This Teaching Assistance Guide is intended to support educators in planning engaging STEM learning experiences.

Teachers should adapt activities, materials, and instructional strategies to meet grade-level expectations, district curriculum, available resources, and the individual needs of their students.

Always follow school safety procedures and provide appropriate supervision during hands-on investigations and engineering challenges.



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