

TEN TIPS TO BECOME A STEM SUPERSTAR



Written by Andy the Science Wiz, the National AfterSchool Association's STEM Specialist Andy Allan.

Do you want to have clear skin and lose weight? The secret is to teach STEM! Well, perhaps not, however, STEM continues to be a driving force in education. STEM is fun, it is an increasingly important part of education, and parents are placing it higher on their priority lists when selecting programs for their kids. Make STEM a

priority this year. Both you and the young people you work with will evolve as learners, and who knows? It might even improve your skin and make you thinner. **To get you started, here are 10 tips to make you a STEM Superstar.**

1 STEM TOPICS ARE NOT SILOS. Good STEM programs integrate the concepts of science and math with the tools of technology and then apply them as engineering to problems in the real world. For example, an activity to measure the speed of a toy car can involve the science concepts of speed and acceleration with the technology of a timer and the math of $\text{Speed} = \text{Distance} / \text{Time}$. Young people can then be challenged to apply their new knowledge through engineering to make the cars go faster. An integrated approach highlights connections to other knowledge and helps to build a framework of understanding.

2 MAKE ACTIVITIES RELATABLE AND TANGIBLE. Making concepts relatable and tangible to young people involves them in the learning. At the start of an activity, use open-ended discussion questions to draw out existing knowledge and experiences. You can explore friction as the next science topic, or you can challenge the kids to make a skateboard roll further.

Which sounds more interesting? The second approach allows young people to draw on their own experiences and provides a personal investment in the discoveries.

3 INSPIRE CURIOSITY AND CRITICAL THINKING. The entire collected knowledge of the world is now available in our pockets via our smartphones. Young people no longer need to just know facts and figures; they need the critical thinking skills necessary to interpret and use that information. One of the most important benefits of STEM is that topics are taught against a background of analysis and questions. Learn the art of asking open-ended questions and use discrepant events to pique curiosity. Inspire young people to ask questions and become self-sufficient learners.

4 LEARN BY DOING. STEM learning begins with play and exploration. One of the key advantages of the afterschool environment is the ability to provide small-group, hands-on,

inquiry-based learning in a nontraditional setting. Choose hands-on activities where materials are provided for small teams to explore, experience and experiment with.

5 MAKE CONNECTIONS. Learning does not take place in compartments. When you learn a new idea, you do so in the context of what you already know. For example, if exploring the concept of friction, connections can be made to slipping on ice. Drawing existing knowledge or experiences provides a framework of understanding and improves retention. It also provides the groundwork for then applying concepts to new problems and challenges.

6 INSPIRE COLLABORATION. Create an atmosphere of teamwork. Actively teach and role model teamwork skills. Promote an inclusive, respectful, relaxed environment that supports new ideas and questions. The control of the learning process should be transferred to the young people. Create new roles and rules for your groups that stress responsibility.

7 CELEBRATE FAILURE. We often learn more when something does not work than when it does. Promote an atmosphere that rewards risk taking and experimenting. Failure is a natural part

of experimenting and taking risks.

8 FACILITATE, DON'T DICTATE. The old model of teaching facts from the front no longer provides the skills needed in the 21st century. Provide problems not answers, encourage questions and celebrate experimentation. Be prepared to deviate from your lesson plan, depending on where the kids' investigations and decisions take them.

9 PROCESS THE STEM EXPERIENCE. Ask open-ended questions that encourage everyone to discuss and reflect on what they have learned. Keep evaluation child-centric and experiential by designing activities that assess knowledge by applying it to new scenarios. For example, an activity on friction can be evaluated by challenging the students to race wind-up cars, where the wheels spin ineffectively until more friction is created.

10 BE A ROLE MODEL. Be passionate about experimentation and enthusiastic about what the young people are learning. Be a cheerleader for STEM: Draw connections to real-world benefits and careers. Evolve as a learner yourself, and pay attention to the art of teaching. Ask yourself: Are your activities inclusive, gender neutral, relatable, inquiry-based and fun?

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Research shows that afterschool programs can have a huge impact in promoting STEM. Being successful with STEM requires a few specific facilitation skills. The goal is to replace content based teacher led models with open ended student driven inquiries that promote the processes of critical thinking. When facilitating STEM you need to create an atmosphere of discovery where young people are engaged in creative critical thinking, collaboration and communication. Creating the right atmosphere and helping young people develop the skills they need to meet these challenges requires intention and practice. TEN TO TIPS TO BECOME A STEM SUPERSTAR provides an overview of some of the practices that educators can focus on to develop as STEM superstars.

SEE MORE AT: <http://naaweb.org/professional-development/item/460-10-tips-become-a-stem-superstar>

OPENING DISCUSSION

Are you regularly teaching inquiry based STEM activities with your young people?

What are some of the challenges of teaching STEM when compared to other subjects?

Share a tip from the list that resonates with you and share why.

What questions or other thoughts do you have about the article?

APPLICATION ACTIVITY

What are some of the ways that you can make sure a STEM activity is student and not teacher driven?

Demonstrate the difference between an open and a closed ended question?

Think about a STEM activity you recently taught. What are some strategies you could have employed to improve it?

CLOSING REFLECTION

We are all very busy in our professional lives what are some of the steps can you take to be more intentional when teaching a STEM activity?

CERTIFICATE of PROFESSIONAL DEVELOPMENT



TEN TIPS TO BECOME **A STEM SUPERSTAR**

_____ **PROFESSIONAL DEVELOPMENT HOURS, EARNED BY:**

CONTENT INCLUDED:

- STEM topics are not silos • Making activities relatable and tangible
- Inspiring curiosity and critical thinking • Learning by doing • Inspiring collaboration
 - Learning to celebrate failure • How to facilitate and not dictate • Processing the STEM experience • Being a role model

FACILITATOR: _____ **DATE:** _____

| Why is it important that STEM activities involve young people coming up with and answering their own questions?

| List three techniques you can use to improve your STEM facilitation?

- a.
- b.
- c.

| How can you be a STEM role model when facilitating STEM?

Supports Content Areas 2-5 Levels 1-3, of the NAA Core Knowledge and Competencies for Afterschool and Youth Development Professionals