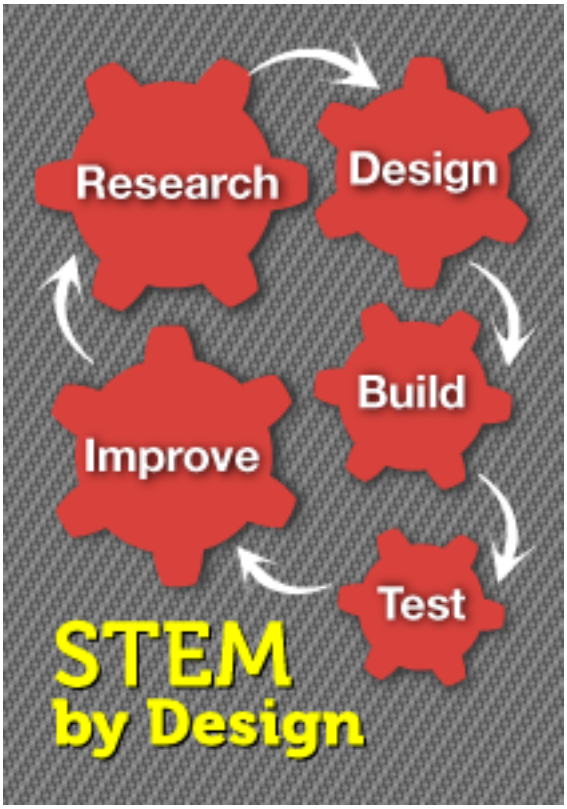
Time for a Quick Midyear STEM Checkup

BY ANNE JOLLY · 12/20/2015



The school year is half gone, and you may have been implementing STEM lessons and projects for 16 weeks or so by now. How's it going?

You might want to pause and do a quick midyear STEM checkup. As you step back and look at your classroom program, look for successes and for opportunities to improve certain aspects. I have a few ideas (nothing surprising there). If you have some ideas, successes, or fix-ups, I hope you'll grab a moment and share them here. As you read my five STEM progress indicators, take a moment to jot down some specific examples of your own success and perhaps some improvements you want to try in the months ahead.

1. Indicators of STEM lesson progress

Let's start with a glance at the STEM lessons you taught. What did those lessons, taken collectively, accomplish for your students? Are your students improving in their abilities to do the core STEM tasks I've listed here?

1. Focus on solving real problems.
2. Apply some specific grade-level science and math concepts.
3. Use the engineering design process to guide their thinking and solve problems.
4. Create successful devices (technologies) as solutions.
5. Use current digital technology to help with engineering solutions.

2. Indicators of STEM teamwork progress

Next consider students' progress in working as productive team members. You can find some teamwork self-assessments in my Teamwork Tips handout (pp 8-10). These self-assessment tools are "work in progress" but I don't mind sharing where I am so far – **you can download the PDF here**.
In addition, one day soon ask teams to take a moment to brainstorm together and answer questions such as these*: What behaviors did we do well today? What behaviors do we need to improve?* Other progress indicators include:

1. Each team has set norms for productive behaviors they value in one another.
2. Teams conduct regular self-assessments of their behaviors.
3. Teams respond positively and successfully to guidance when needed.

3. Indicators of student attitude and confidence development

A primary goal of STEM lessons includes developing specific attitudes that will help kids to be more successful students, citizens and members of the workforce. Think about how your students react during and following their STEM lessons. Do you see any of these things taking place? Remember to jot down examples for the ones you notice.

1. Feel "safe" in expressing out-of-the-box, imaginative ideas.
2. Believe that it's safe to fail and use failure as an opportunity to improve.
3. Suggest increasingly creative ideas for solving a problem.
4. Show increasing persistence in sticking with solving problems.
5. Are beginning to take ownership of their own learning.
6. Demonstrate increasing curiosity and inquisitiveness.
7. Are beginning to transfer STEM practices to other areas of learning.

4. Indicators of student skill development

Today's fast-moving culture demands citizens and workers who understand how to tackle emerging problems as well as longstanding issues. STEM projects help to build these skills. During the first half of the year have you seen evidence that your students are growing in their abilities to do these things?

1. Come up with multiple possible solutions for a problem.
2. Combine materials and ideas in clever and imaginative ways to create a solution.
3. Design and conduct testing to see if their prototypes work to solve the problem.
4. Successfully evaluate the results, and analyze and interpret data.
5. Perceive what needs to be changed to improve the design of the prototype.
6. Communicate ideas in new and innovative ways.

Probably one of the biggest and best indicators that STEM lessons are having an impact on students is an increase in student enjoyment and interest in their learning. They no longer feel disconnected from the real world when studying science and math. Positive responses to at least some of the indicators listed, plus an increase in student engagement and understanding of subject matter, are a real testament to your teaching.

5. Indicators of strong STEM instruction

Take a moment to think about how teaching and learning takes place within your STEM lessons. Hopefully you are enjoying teaching STEM more and more, and you're beginning to better understand how to integrate math and science through

an engineering challenge. You understand the multiple roles of technology, and use current digital technology if available, as well as having your students create problem-solving devices (technologies).

STEM classes should involve students in hands-on exploration and critical thinking. If you've successfully taught problem- or project-based learning in the past, then chances are you made this transition with ease. The PBL teaching approach is STEM-friendly and contains the necessary ingredients for STEM instructional success. If you were not familiar with PBL, you may have abandoned some old familiar practices as you taught STEM lessons and dived into new open-ended strategies to encourage student interaction, innovation, invention, and creativity. If so, that can't have been comfortable. Thank you for doing that. If you're still working out the kinks, let's talk!

A STEM-happy New Year!
As you look back on your year so far, focus on strengthening the areas in which you and your students are already successful. Their continued success will encourage them, create positive attitudes, and prepare them to take on areas where change and/or improvement is needed.
…With an even greater focus on STEM learning (and funding) in the just-passed **Every Student Succeeds Act (ESSA)**, we all need to pitch in and help each other out!

Anne Jolly's 2016 book, STEM by Design: Strategies and Activities for Grades 4-8, will be available in time for summer curriculum planning. A joint project of Routledge/Eye on Education and MiddleWeb, Anne's step-by-step guide to STEM program building and lesson creation will include dozens of planning tools, plus techniques for establishing self-governing student teams ready to dive in to design-driven project learning.