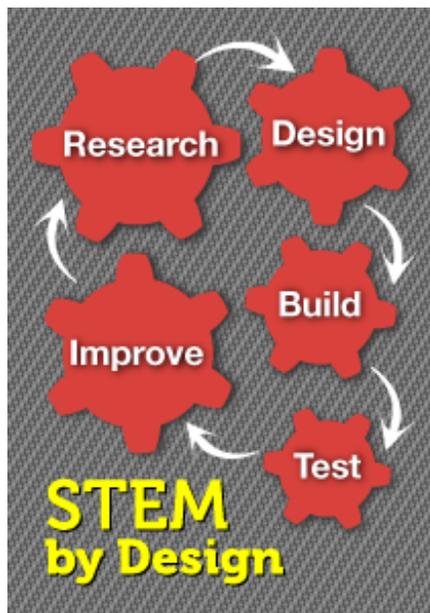


Real-World STEM Problems

www.middleweb.com/5003/real-world-stem-problems/

Anne Jolly

A MiddleWeb Blog



What do STEM teachers do?

According to [U.S. News and World Report](#), STEM teachers pose problems and combine problem solving with project-based learning across disciplines. They work together with students on activities to develop students' critical thinking, communication, assessment, and inquiry skills.

Problem solving is really the heart of STEM investigations. Providing students with real-world problems to solve fuels their curiosity and investigative interests. In its policy paper on [establishing effective K-12 STEM education programs](#), the National Research Council reports that students in high-performing STEM programs “have opportunities to learn science, mathematics, and engineering by addressing problems that have real-world

applications.”

Providing students with real-world problems and asking them to brainstorm solutions will bring their higher order thinking skills into play. But for me, identifying real-world problems that students can solve is one of the hardest parts of creating STEM lessons.

They have to be problems that students can reasonably grapple with. And those all-important problems may need to synchronize with a specific set of math and/or science standards from the school system's pacing guide. Hopefully you don't have that constraint, but realistically you probably do.

Sites for Real-World Problems

I've located some sites that help me come up with real-world problems, and I'm always on the look-out for more. I'm going to share several sites I've identified, and I hope that you'll share some as well. I invite you to click on these sites and mull over the possibilities.

The [National Education Environmental Education Foundation](#) is a great site for problem hunting. The site correctly avows, “Solutions to 21st century environmental challenges often result from STEM knowledge and skills. Hands-on environmental education projects enrich STEM learning and offer an exciting opportunity to engage more students in STEM. The possibilities are endless – from calculating school water usage to observing, documenting, &



protecting wildlife populations in the schoolyard.”

In the [Greening STEM](#) section on this site you'll find ideas for relevant problems. Most environmental topics can fit under standards for either life or physical science, so these may provide you with some real “kid-catchers,” or ideas that snag students' interest.

Topics include areas such as:

- Oil spills
- Water pollution
- Air quality
- Endangered species
- Environmental Health

Another favorite site of mine is the [Design Squad Nation](#). They have some real-world problems there that I find intriguing. For example student teams might invent these:

- Band Instrument
- Electric Gamebox
- Confetti Launcher
- Solar Water Heater
- Speedy Shelter

How cool are those ideas? As a middle school science teacher, I found STEM to be a natural fit for most of the topics I taught. Math, however, seems to be a different matter.

The Problem with Math

One issue I hear repeatedly is that math teachers find it difficult to identify real-world problems and implement STEM projects in math classes. (Note that these math teachers are not able to work collaboratively with science teachers to develop/implement lessons, and must therefore “go-it-alone.”) However, the math teachers who mentioned this are looking determinedly for ways to implement STEM lessons.

The Common Core Standards state: “Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.” This adds urgency to the search for real-world problems that bring in appropriate math standards.



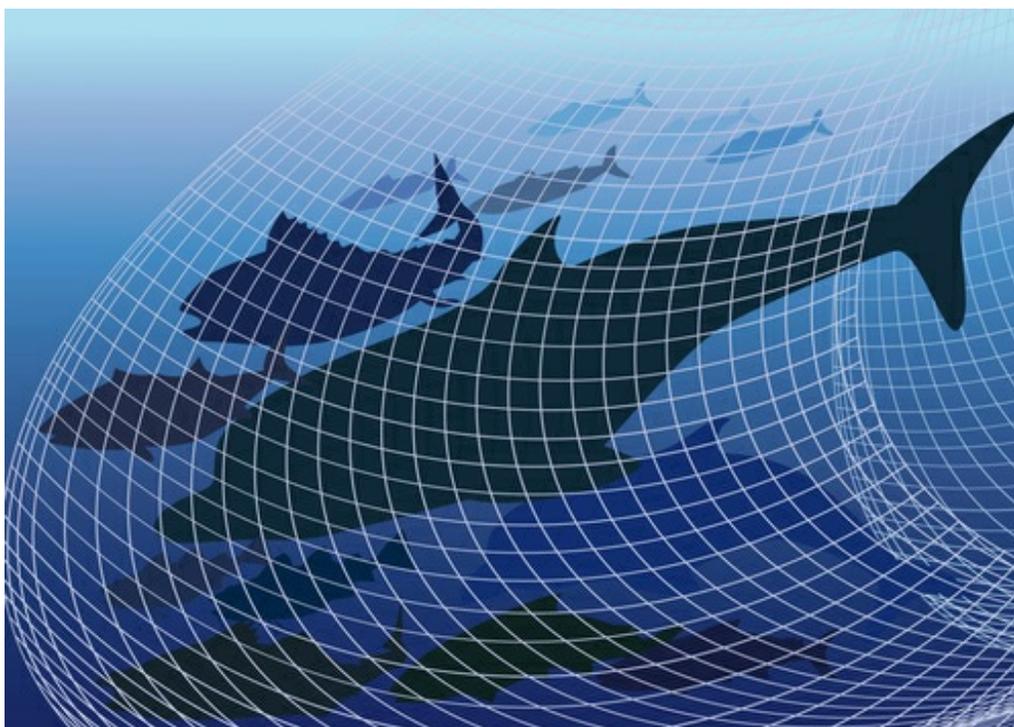
Among the places that may help with this dilemma is [The STEM Collaborative](#), which offers [lessons](#) that focus on key middle school math standards and content. While most of these focus on real problems, you may need to be selective if you want the activity to qualify as a true STEM project.

Math standards addressed by the lessons on this site include these and more:

- Fractions, decimals, percents
- Ratios and proportions
- Estimating and predicting
- Rates and unit rate
- Modeling problems with graphs, tables, and equations
- Comparing, graphing, and interpreting data
- Scale factors
- Geometry and measurement
- Probability
- Proportional reasoning



Another site that links math to real problems is [Middle School Math and Science](#). Students solve problems involving train races, global sun temperature, amount of water usage, and so on. Most of these are Internet-based, so you may want to design some of them as hands-on projects for students. (UPDATE: This Ohio State University site is now an archive, but you'll still find plenty of useful resources.)



Teach Engineering

No list of real-world problem ideas would be complete without mentioning the [Teach Engineering](#) lessons. As you peruse these, read the summary of the lessons rather than relying on the titles. Look for projects that include hands-on ideas, such as those involving microbes, rocket-powered boats, solid fuel reactants, [the fisheries bycatch problem](#), and so on. Notice that many of the lessons have hands-on “Associated Activities.” These generally hands-on investigations bring the “E” in STEM to your students.

I hope these sites will be of value to you, and will assist you in brainstorming ideas for real-world problems. Feel free to share comments or sites of your own. We're inventing a new specialty and need all the help we can get and share!

[Visit Anne's STEM by Design website](#)
for more real-world lesson ideas