

American Chemical Society AMA: Hi Reddit! We are Adam Boyd and Jenn Parsons, from the American Association of Chemistry Teachers (AACT), an initiative of the ACS. Ask us anything about K–12 chemistry education or working with science teachers.

AmerChemSocietyAMA¹ and r/Science AMAs¹

¹Affiliation not available

April 17, 2023

Abstract

ACS AMA Hi Reddit! I'm Adam Boyd, the Program Director for AACT (<https://teachchemistry.org/>). I have a background in chemistry and business. I work with our extremely talented staff and teacher leaders throughout the country to help provide resources, networking opportunities, and professional development for K–12 teachers of chemistry. And I'm Jenn Parsons, Education Resource Specialist for AACT. I spent 9 years teaching high school chemistry and forensic chemistry in northern Virginia. Now I help develop chemistry resources for use in K–12 classrooms and teachers of chemistry. I have led teacher content-writing teams in partnership with the Dow Chemical Company, as well as the Ford Motor Company. I also lead professional development sessions at science education conferences. Additionally I am the editor of our quarterly periodical, Chemistry Solutions (<https://teachchemistry.org/periodical/issues>). I'm always looking for contributors for our publication—interested? Or do you know someone who is? Let me know! We're happy to answer any questions you may have about chemistry education or AACT. We're eager to work with new teachers, as well as help K–8 teachers integrate more chemistry into their science curriculum. Ask us anything about these topics, we're here to help! We will be back at 1pm ET (10am PT, 6pm UTC) to answer your questions, ask us anything! We're here and happy to answer your questions about chemistry education or AACT. We're eager to work with new teachers, as well as help K–8 teachers integrate more chemistry into their science curriculum. Ask us anything about these topics, we're here to help! Thanks so much for all of your questions! We have to get back to work, but we will try to check back later if we can. Thanks again, all!

[REDDIT](#)

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AMERCHEMSOCIETYAMA [R/SCIENCE](#)

[ACS AMA](#)

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CORRESPONDENCE:

DATE RECEIVED:

January 11, 2017

DOI:

10.15200/winn.148404.49041

ARCHIVED:

January 10, 2017

CITATION:

AmerChemSocietyAMA ,

Hello! High school chemistry teacher here.

Do you know if ACS provides access to JCE (Journal of Chemical Education) or some other professional-level resources to educators at low-cost or even free? Almost all resources available to science teachers tend to be geared more toward elementary/middle school, and I'd love to be using higher level material and resources with my students (and also be reading up on modern pedagogy practices) but am stopped by the prohibitive cost of the subscription model (and my school can't help me with it).

EDIT: Browsing through teachchemistry.org has me excited and I will be exploring further, but I'd like to know of other resources you may be aware of

r/Science , American Chemical Society AMA: Hi Reddit! We are Adam Boyd and Jenn Parsons, from the American Association of Chemistry Teachers (AACT), an initiative of the ACS. Ask us anything about K-12 chemistry education or working with science teachers., *The Winnower* 4:e148404.49041 , 2017 , DOI: [10.15200/winn.148404.49041](https://doi.org/10.15200/winn.148404.49041)

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[ShenBear](#)

Thanks so much for being a teacher of high school chemistry! We're here to help however we can.

We're glad you are checking out teachchemistry.org. We're constantly collecting and publishing resources there, including labs, lesson plans, demos, simulations, videos, periodical articles, and more written by and for teachers of chemistry. We understand that affordability is critical, so we've tried to keep AACT membership as affordable as possible. For \$50 you get full access to our library of classroom resources, a subscription to a periodical about teaching chemistry in the K-12 classroom, a subscription to ChemMatters, professional development opportunities, and more. You can learn more about AACT by visiting us at:

<https://teachchemistry.org/about-us/learn-more>

We'd also like to commend our online periodical of practice, Chemistry Solutions, which you can find here:

<https://teachchemistry.org/periodical>

Regarding the second part of your question, the Journal of Chemical Education does offer discounts for K12 teachers. It's \$65 for web-only access for a K12 teacher, for example. To sign up, you can visit

<http://pubs.acs.org/page/subscribe.html?ref=jceda8>

Under individuals click on "review the subscription form" to download it in PDF format. Or, you can download it here:

<http://bit.ly/2jqEoed>

You may also want to check out the Chemical Education Xchange (ChemEdX) at www.chemedx.org. They have lots of great resources available, too. We hope this helps!

When I was a kid, they taught us biology first (probably because it was thought kids could more easily identify animals than abstract concepts) then chemistry, then physics. Biology was taught as chemical magic, and chemistry as physical magic -- the answers of *why* aren't revealed until the *what* is learned. There doesn't need to be a ton of math to get the concepts across to build up,

It is physics that is the foundation of chemistry, and chemistry that is the foundation of biology.

How has the methodology of teaching chemistry changed, and what is the future?

[spap-oop](#)

Hi there, thanks for your question! In our experience a lot of schools, districts and states vary the sequence of bio-chem-physics. Usually chem and physics are placed at the higher levels due to the heavy math content that is contained in their curriculum. We have also seen schools introduce "conceptual" chemistry and/or physics in early years so that the "why" can be addressed earlier.

We think you'll see there is a greater emphasis on interdisciplinary approaches these days. For example, it shows up in the "cross-cutting concepts" that are a part of the Next Generation Science Standards (NGSS) being adopted by many states today. If you aren't familiar, you can read more about those here:

<https://www.nap.edu/read/13165/chapter/8>

Hi - thanks for doing this AMA. Know that you are the heroes of societies as you are the ones charged with inspiring the next generation of scientists and world-changers. As an aside, my high school chemistry teacher was one of the most influential mentors in my life, and she set me on my path into academic medicine.

My question is twofold:

1. How do you balance the need to teach basic chemistry, which can be seen as dry, while making it practical and applicable to real-life, which is clearly is? And at the same time, inspire young minds to question, learn and grow?
2. At a systems level, what are your thoughts as to how society can be changed so that teachers are valued more - teaching as a profession is still remunerated relatively poorly, in the context of the actual role they play in society that has such a high impact on our future. We pay doctors, entertainers etc well - how do we start, as a community, taking teachers seriously, and valuing them properly?

Anyway, that's it from me! Thanks again, and keep up the good work!

[mvea](#)

Thanks for your question!

1. Our feeling is that chemistry is best taught through real-world connections. Working with teachers, we frequently hear that a way to interest students in science and get them involved in doing science rather than just reading about it. Through AACT, we've received great interest from partners such as Dow, Ford, PPG and others with whom we've collaborated to produce teaching resources that teach chemistry in this way. We also hear from teachers that differentiating instruction and offering experiences to students helps them to see how science is a fun (!) way to test their own ideas and better understand the world around them.
2. We hope that we can play a role in helping to highlight the great importance and value of teachers. Some ideas for how we might accomplish that include:
 - Help establish teaching as an important profession among potential future teachers. Communicate to students (at the undergraduate and even HS level), especially those interested in science, the tremendous impact that teachers make.
 - Help community stakeholders understand the contribution of teachers to society. We agree that teachers inspire the next generation of scientists, engineers, and scientifically literate citizens, which makes a great contribution to the economy, policy, and our country. The more clearly we can see that, the greater our esteem for teachers is likely to be.
 - Help position teachers as leaders, in their schools, in their communities, and within networks of other teachers.

I'm not in education, but I'm an environmental scientist (I'm a public employee, focusing on facility-level chemical pollution). Do you have any suggestions for those of us who aren't educators to get involved in community outreach, especially towards middle and high school students? What would you recommend as age-appropriate learning materials?

[FellDownRunning](#)

Thanks for your interest in supporting chemistry education! Through AACT, we have a program called Science Coaches which pairs classroom teachers up with practicing scientists to help the teacher over the course of a school year. You can find more information here:

<https://www.acs.org/content/acs/en/education/outreach/science-coaches.html>

ACS also runs a program called Kids & Chemistry, which encourages outreach to local schools to present guest lessons, or otherwise support a local teacher. You can learn more about this here:

https://www.acs.org/content/acs/en/education/outreach/kidschemistry.html?_ga=1.165875006.160363880.1480714578

You'll see they have sample activities created that you could use at different levels, along with talking points and everything you would need to make your experience as positive as possible for you, your collaborating teacher, and the students.

Here are a few suggestions for age-appropriate resources:

teachchemistry.org/classroom-resources middleschoolchemistry.com highschoolenergy.acs.org

Hi there! I'm a fresh science teacher moving to the big kid ranks soon! I have two questions:

- 1) How do you see the curriculum changing for science? Is it getting more complicated as kids learn more at a younger age or more basic because their iPhone can do everything for them?
- 2) My 7th graders are learning basic chemistry now. (What is an atom and chemical/physical properties and all that) and I cannot seem to get them excited over it unless things are exploding. Are there any effective ways to spin science to be cooler without losing my classroom?

Thank you very much for this AMA and all the work you do!

[KaitieLoo](#)

Hi there, thanks for being a new science teacher, we hope you are enjoying it!

- 1) We are seeing curriculum change with an emphasis on interdisciplinary connections between all the sciences, integration of NGSS, as well as a focus on implementing engineering practices.
- 2) Students are certainly captivated with the excitement of reactions (and explosions!), but many of those things cannot be done safely in a classroom. We think if you can find real-world connections to the science you are teaching, as much as possible, you will find you are able to hook your students. For example showing them the chemistry of baking; how candy is made; how sports drinks are made through chemistry; how their deodorant works, make-up, etc. If you can identify your student's interests and make the connection to science (that they may not see) you can hook them! Also, I'm sure you do this, but as much as you can allow students to explore through inquiry-based activities, and hands-on science, students will hopefully see how "cool" science really is!

Do you feel there has been an appreciable decline in basic understanding of Science? That is to say, has the job of teaching science gotten harder in recent decades?

[rasafrasit](#)

We think the job of a teacher these days is a very challenging one. There are a lot of requirements that are emblematic of the new era in which we're living, including a focus on standards, differentiating instruction, integrating technology into the classroom, new modes of learning and more. Through AACT, we aim to help teachers meet these needs by providing them with resources designed with these challenges in mind, and also by offering them opportunities to collaborate and learn from one another.

What are some fun try at home experiments I can with kids?

[roguehero](#)

Thanks for the question! Here's a site called "Adventures in Chemistry" that has several experiments you can try at home:

www.acs.org/kids

Hey, I am about to graduate college with a B.S. in chemistry and I am thinking about pursuing a career in chemistry teaching. How's your overall life as a chemistry teacher and would you choose the same career path if you got to choose again? Also, how would I go about becoming a chemistry teacher, preferably a high school teacher? Should I get my masters straight after? Teach English in a foreign country? Try to become a teacher assistant?

Thanks for reading sorry for the bad formatting

[xhitaaron](#)

Hi there! Congratulations! We hope you choose to become a chemistry teacher, and good luck in whatever path you choose. Neither of us are current chemistry teachers, although we work with many chemistry teachers every day. If you have your degree in chemistry, you can might be able to apply for a temporary teaching license from your state. You should be able to determine the requirements by visiting your state's DOE website. You may also want to considering substitute teaching and/or tutoring to decide if teaching is the right career path for you!

High School AP Chemistry student here. I just wanted to say thanks for the work that you do to bring chemistry to all. What are some of the ways you've seen teachers implement chemistry into lower grade since classes that don't have a focus on chemistry?

[Therearenoorks](#)

Hi there, we hope you are enjoying AP chemistry!

We try to help teachers at the lower levels implement chemistry into their classroom, by showing them simple chemistry-based activities, demos, labs, etc. Often these teachers might feel intimidated by chemistry, but we help to show them how they can teach a lot of important fundamental chemistry concepts to young students using very basic items, like vinegar, baking soda, Alka-Seltzer, oil, water and food coloring! To see some ideas, check out our elementary classroom resource library:

https://teachchemistry.org/classroom-resources/topics?grade_level=elementary-school

I am a chemical engineering graduate, currently pursuing a masters in ChE; if I wanted to volunteer my time to help with chemistry education in my area, what would you suggest?

[H3PO4](#)

Thanks for your interest in supporting chemistry education! Through AACT, we have a program called Science Coaches which pairs classroom teachers up with practicing scientists to help the teacher over the course of a school year. YOU can find more information here:

<https://www.acs.org/content/acs/en/education/outreach/science-coaches.html>

ACS also runs a program called Kids & Chemistry, which encourages outreach to local schools to present guest lessons, or otherwise support a local teacher. You can learn more about this here:

https://www.acs.org/content/acs/en/education/outreach/kidschemistry.html?_ga=1.165875006.160363880.1480714578

I am about to finish my MAT program to become a chemistry teacher.

I would love to teach students how to do research with a year-long research assignment. Starting with picking a topic, finding relevant information about it. Writing a proposal with procedures and materials. Followed by carrying out the experiments, peer review and then publishing their work (even if it's just in a school-wide journal).

Obviously it will be difficult to have students think up questions that are easy enough to answer while still challenging them. I was thinking of suggesting a few examples, such as determination of copper content in pennies, titration of sour candies etc.

Are there any programs where high school students can take part in research? Do you think a focus one laboratory chemistry would be beneficial to students rather than more lecture based?

Hopefully I will have a job next fall and can start to implement this idea!

[langis_on](#)

Congratulations on completing your MAT! We're very happy to hear you are entering a chemistry classroom. We're here to help however we can.

It's great to give students lab experiences and encourage them to do science. We're big believers in the importance of labs to help students learn and get them excited. One way you might be able to get started is to have students participate in a science fair. Or, if you don't have one, you could start one!

At IB schools, students have the opportunity to complete a self-guided, independent research prepare. More information is available here: <http://www.ibo.org/programmes/diploma-programme/curriculum/extended-essay>

You may also find this resource interesting:

<http://kids.frontiersin.org>

It's a collection of freely available scientific articles by distinguished scientists that are shaped for younger audiences by the input of their own young peers.

Hi Adam, Hi Jenn!

I recently became a middle school science teacher and though I am not directly teaching chemistry (I teach Earth, Life, and Physical Science) it seems like a chief science that underlies all the others.

I would love all possible resources especially ones that could aid me in stocking a lab...

I'll start with teachchemistry.org!

[haidaguy](#)

Hi there! Thanks so much for being a middle school teacher of chemistry. As you said, you can find

chemistry in everything.

We'd love for you to become an AACT member. In our newsletter, we compile as many resources as we can about grants and awards open for teachers to aid them in securing resources for the classroom.

You may also be interested in an upcoming webinar we're hosting titled "Enhance Your Chemistry Classroom with Other People's Money." It's free to attend. You can register here:

<https://teachchemistry.org/professional-development/webinars/enhance-your-chemistry-classroom-with-other-people-s-money>

I have hopefully just a quick question. In my High school the sciences went in the order of Freshman-Physics, Sophomore-Biology and Junior-Chemistry. I know of schools that mix up that order. So my question is when do you think it is most beneficial to the student to offer Chemistry?

[Jonnydrama2](#)

We see the benefit of chemistry being integrated into instruction at all grade levels, which is what we try to support. It can be helpful to offer a physical science class for students to experience chemistry in earlier grades or in high school. It's also common now for connections between sciences to be emphasized, which can help students to see the "big picture" of science across its component disciplines.

I'm a biology student, but I do some larger group tutoring for intro to chemistry at the university level. I have a general question about teaching chemistry. In your opinion, what is a good way to get 20-year-olds interested/excited about chemistry when they're first starting off? This is beyond K-12, but most first year college students are on par with 12th grade. I find it difficult because all (most) of the interesting topics in chemistry aren't covered until higher levels. What is a good strategy to keep them engaged and show them essentially that "it gets better from here"? It's hard for me to have demos and stuff because I don't have the resources nor do I run a lecture. Thanks :)!

[Infectious_Pen](#)

If you can demonstrate the many connections between chemistry and simply things, in every day life, you may be more successful in connecting with your audience. ChemMatters magazine has great articles written for students about the chemistry of everyday things and every day life:

<https://www.acs.org/content/acs/en/education/resources/highschool/chemmatters.html>

Also, there are some great video series that do the same, such as:

<https://www.acs.org/content/acs/en/pressroom/reactions.html>

Hello, Mr. Boyd and Ms. Parsons. Thanks for doing this and for seeing the value in teaching. When faced with students disinterested in Chemistry, feeling like they'll just never get it, or tuning out completely, how do you reach them?

As a fellow science educator, I have some of my own ideas and tricks but was curious to hear your thoughts. Thanks!

[MentalMarketer](#)

Great resources are always helpful. Here are some we find useful:

- ChemMatters Magazine
<https://www.acs.org/content/acs/en/education/resources/highschool/chemmatters.html>
- ACS Reactions <https://www.acs.org/content/acs/en/pressroom/reactions.html>

In terms of engaging students who have written themselves off as "not a science person," one thing that can be helpful to is emphasize science as a process for testing their own ideas. Sometimes, science can be misconstrued as a series of tables and charts to memorize, which can seem intimidating. Interdisciplinary approaches help, too. Helping students learn about great experiments which established the foundation of our modern understanding of chemistry can engage new learners and help them feel less intimidated. We have a video series through AACT that seeks to do that:

<https://teachchemistry.org/classroom-resources/ancient-chemistry-video>