

Solebury Science

A Journey into Inquiry-Based Teaching

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Blended Learning in Science Using QUIVERS (<https://jfreerscience.wordpress.com/2013/11/03/34/>)

POSTED ON NOVEMBER 3, 2013 ([HTTPS://JFREERSCIENCE.WORDPRESS.COM/2013/11/03/34/](https://jfreerscience.wordpress.com/2013/11/03/34/)) UPDATED ON OCTOBER 28, 2015
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As I continue to hone my teaching skills in my Biology class, I have found what I am hoping is a recipe for success. Up to this point, I have found my way into teaching through inquiry investigations and using video podcasts from Bozeman biology (<http://www.bozemanscience.com/>) and Crash Course (<http://www.youtube.com/user/crashcourse>) to augment the understanding. The students like the class, but it lacks some consistency and some students are wandering somewhat lost. In my attempt to gain focus, I reached out via Twitter to Paul Anderson of Bozeman Science (<http://www.bozemanscience.com/>) fame and he shared his video on Blended Learning (<http://www.youtube.com/watch?v=-apJD7cx9o>) with me. In it, Paul explains his QUIVERS learning cycle (that's his acronym to remember it) and this may be just what I need to gain the consistency I currently lack. There is no doubt that I still have a million questions ranging from "does this have to be a mastery learning set up?" to "where can I get ideas for all the different "hooks" to grab students attention?" to "what should be graded and what shouldn't?" However, it feels good to sit down with a system that I can work with.

Here is a summary of the **QUIVERS** cycle, along with my notes and thoughts on the individual parts of it.

QUIVERS

QU- Question

- Each unit should start with a 'hook' or question that grabs the students attention or piques their curiosity. This is essential to get them thinking about the topic. My initial sense is that it should be interesting/exciting, but I don't want to get too hung up on that if it is going to slow down my lesson creation. It is important that it is something related to the topic at hand and that it has some element that students can then explore

I- Investigate/Inquiry

- Once the students are engaged in the idea or concept, there comes a time when they explore different aspects of what they have seen. This would involve an inquiry activity around the Question. An example would be this: Question- Examination of a plant cell in distilled water vs a plant cell in 10% salt solution. Investigation- determine the concentration of the plant cells through experimentation.

V- Video

- Student watch a podcast or two to begin to build an understanding of the specific of the topic. While it isn't stated outright, I am starting to have an inclination that students should take some form of notes on this (and the next step) to ensure that they are doing the work. It is very easy to just hit play and tune out and have "watched the video." I wouldn't want to grade the notes, but if the students had a checklist that I marked off at each stage that then allowed them to move on to the next stage, that may help to ensure the work is being done.

E- Elaboration

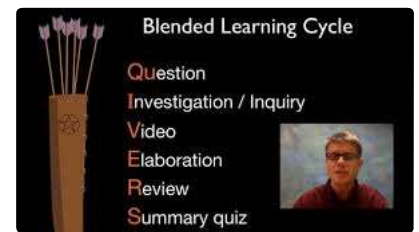
- The elaboration section seems a bit more vague. One thing that should happen is further research into the topic through reading of the textbook. Currently, I am using online resources and old textbooks in the classroom, so I should be able to find an appropriate reading level for most students. It seems like there is an opportunity for a second or more in depth inquiry investigation here too, but I am not entirely sure about that.

R- Review

- Paul indicates that this is the thing he does the most of now. The students are working through the other areas somewhat independently, so this becomes the teacher's role. The idea here is to check for understanding through questioning the students. Again, a checklist might be helpful to track this. Basically, a student (sometimes small groups of students) needs to demonstrate that they understand the concepts and that they will be successful when they move on to the Summary Quiz. If a student doesn't seem to have the ideas down, they could go back to the video, back to the reading or perhaps it would be good to have an additional activity/set of resources for them to use. My concern for heading back to the original material (video and reading) is that if it didn't work for them the first time, it may not work the second time. I could refer to other reading or perhaps even other students who could serve as peer tutors.

S- Summary Quiz

- This is a quiz that the students take to assess their understanding of the material. I am not sure what format Paul uses, but get the sense that it is on Moodle (I have seen Moodle or something like it in his examples) and that it is automated because students can take the quiz over and over. If it weren't automated, I would think grading, not Review, would be the primary role of the teacher. While I cringe at the use of multiple choice, they can be effective and are certainly the most efficient way to check for some level of understanding. Moodle Quizzes could be used. There are also options to create fill-in questions for Moodle. It doesn't seem as though a long answer question would be easily used here.

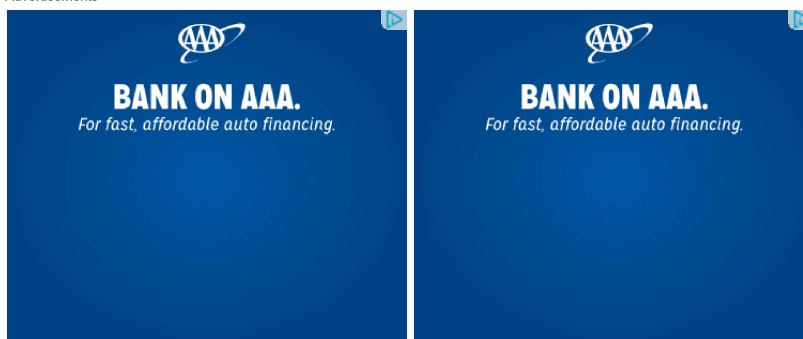


So, that's it. Like I said, I have many, many, many questions and wish that Paul was working in the same department so that I could learn more directly from watching and talking to him (he also mentions Vulcans, The Matrix, the Horta and the like, so we'd get along just fine). Even though he is not at the same school, Paul seems to have made it his mission in life to teach students and to share his perspectives and ideas on teaching with the rest of us, so I can learn as I go.

Random Questions as I begin to build QUIVERS Units:

- *How am I going to track down activities for all of the topics I teach?* This seems pretty important to grabbing students attention and should be something they can then investigate. I know there are tons of resources out there, but filtering them is the trick (unless I develop them all myself).
- *How much of this can I employ given that it is November?* The good news is that I have most of the pieces in place now, it's just that it isn't always QUIVERS. Sometimes it's QuVIE. Sometimes it's EVQuIS. Sometimes it's RRRVS. At least now, if I can spell, I can give my students some consistency. I love the idea of reinventing your class over the summer, but I need some change now.
- *How does this fit into my school's schedule?* I have 50 minute periods and an 80 minute lab once each week. I have chosen to simply treat lab as a separate class in terms of what we are doing and it has worked well. I think that may be the way to go until I can really sit down and develop my full year plan.
- *Grades? What counts, what doesn't?*
- This system implies self-paced, mastery learning and I am not ready for that. *Can I successfully make that change between trimesters or should I just plan to keep everyone on the same pace?* I know that self-paced, mastery is the way to go in the long run. I'm just not sure that change is appropriate mid-year.

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4 thoughts on “Blended Learning in Science Using QUIVERS”

Jessica (<http://rhhsbiology.com/wordpress>) said:

August 4, 2014 at 1:26 pm

I stumbled upon your blog looking for comments on the QuIVERS blended model. Thank you for writing all this out! I teach ninth grade biology in South Carolina and thought I would write you since you teach biology as well.

I watched his video during my first year of teaching, which was last year. I wanted to incorporate the blending learning model then, but I was far too overwhelmed. I am now at the same point you are but benefit from a few weeks of planning left before school starts. He teaches with around 50 blended cycles which I am assuming have 50 separate questions and investigations. This seems overwhelming to me! He does teach AP though so those students might be able to handle it better.

We have nine units:

Inquiry
Biochemistry
Cells
Cell Cycle

Cell Energy
DNA and RNA
Heredity
Evolution
Ecology

Questions: Instead of 50 questions across 9 units I was thinking a more manageable 2-3 per unit, at least to start out with.

Investigations: I have activities for all the units mentioned above if you wanted any ideas. These can be easily integrated into this model.

Video: I am in the process of creating my own screencast videos for all our units. I wanted also to give my students the option of hearing me lecture in person if they wanted.

Elaboration: I wanted students to read text while using Cornell notes. Also they will create a graphic organizer for every unit.

Review: Students love team review games so I will incorporate these here.

Summary Quiz: We will use USATestPrep as well as Canvas quizzing system that can randomly generate questions just as Moodle can.

Just thought I would share some thoughts on the process. I would love to talk to another teacher doing the same!

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jonfreer (<http://jonfreer.wordpress.com>) responded:

August 19, 2014 at 10:49 am

Hi Jessica,

It's great to hear from someone looking to utilize this method of teaching. It's funny, but I found the questions the most difficult aspect of this as I worked through the units I did last year. They should be interesting, provocative, engaging and set the unit up, but I found it difficult to come up with such questions under the gun. Paul seems to be able to distill a topic down into a relevant and engaging question. I ended up using some openers from the textbook I was using last year, but they didn't really engage the students the way I would have liked.

I am actually teaching two new courses this year, Honors Biology (similar to AP) and Honors Environmental Science (also similar to AP). It would be great to use the QUIVERS method, but am not sure I can get that together for both classes in time. I'll likely use it in the Biology class and go a more traditional route for the Environmental Science class given that it is my first year teaching that class.

I wonder if there are many other teachers out there trying to develop units like these. It seems like we could all benefit from a wiki or other site to develop units and share resources. Maybe I'll put something together if I get time in the next few weeks. If so, I'll post a link here and see where it can go.

Jon

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Harrison A said:

October 2, 2015 at 3:23 pm

I came across your blog in January of 2015 and have been curious to how the Quivers has gone? I am thinking about doing something similar with my general biology course.

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jonfreer (<http://jonfreer.wordpress.com>) responded:

October 28, 2015 at 9:08 am

Hi Harrison,

I first started using Quivers two years ago and it was OK. Not great, but it was a good learning experience for me. The issues I had were primarily around getting student buy in to this method. This issue was really more with the students understanding the process, especially in relation to the inquiry based investigations I was using. I moved away from this approach last year in favor of Project Based Learning (which went really well). This year, I felt a need to return to a curriculum that covered more material (mainly to stay in line with the other teachers in my department), so I am back to Quivers.

I like it overall. There is a learning process for both me and the students. Approaching the first test, there was a great deal of anxiety. They were unsure what they actually needed to know and understand. One student actually said that it seemed wrong for me to ask about things that had not physically come out of my mouth. I provide clear learning objectives for each unit to help with this. Because it is an honors class, I don't check notebooks for notes, but that might help as a way to make sure students are keeping up with the lectures and reading.

I find the process slower, but that's OK for me in my school. Depth and true understanding is more important here than breadth. I don't know that Paul Anderson has used this with some success (and he is very willing to engage with teachers), so you may want to reach out to him at <http://www.bozemanscience.com/> (<http://www.bozemanscience.com/>)

Because this is ongoing for me, I'd love to hear your approach to what you are doing. If you are on Twitter, look for me as @joncfreer (<https://twitter.com/joncfreer>) (<https://twitter.com/joncfreer>)

Good luck.

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