Unit 5-7 Newsletter: October 2023 - January 2024

Hello everyone and welcome to year 3 of the newsletter. This year the newsletter will build upon the last two years and hopefully expand in a meaningful way!

Happy New Year! I want to apologize for not putting out a newsletter for October, November, and December. As I work to finish grad school the work/life balance has been hard to maintain and unfortunately some things had to take a backseat.

I hope that everyone had a restful winter break and is gearing up for a great spring semester. If you are teaching year long courses you should be wrapping up unit 5 and solidly entering Unit 6. If you are not, consider condensing unit 5 (see notes below) and test. I would encourage you to do an assessment on 5 as it is very foundational and there is ALMOST ALWAYS an FRQ on unit 5 - either in terms of agriculture or sustainability. Then count how many teachable days you have. You probably don't have time for review if you aren't finished with 5 at this point - maybe 2-4 but nothing more than that.

Since 55% of the test is still left to go, I took the percentages of Units 6,7,8,9 and found their proportion of days. Therefore you should spend:

- 30% of the days you have on Energy/Unit 6 (for me this is roughly all of January)
- 20% of the days you have on Air pollution / Unit 7 (for me this is February)
- 20% of the days you have on Land Water Pollution/ Unit 8 (All of march)
- 30% of the days on Global Chance/ Unit 9 (All of April)

Don't count on May as an opportunity to review as you will start to lose students as AP exams start.

I love the content of Units 7-9 as "lightbulbs" start to click for students and the connections are bountiful. I hate Unit 6 and you won't change my mind - its boring, although probably one of the more relevant units to life outside the classroom.

We left off giving advice at Unit 5, so we will pick up there. This newsletter will have Unit 5,6,7 helpful advice and then notes from Tony!

Unit 5 Helpful Advice:

In terms of pacing, most people suggest:

- Breaking this up into agriculture and non-agriculture sections
- Keeping like topics together - Example: Aquaculture and Overfishing; Sustainable forestry and clearcutting
- Consider saving mining for Unit 6 (I do this! - KS)

Biggest misconception that students have is…

- Confusing pesticides and nutrient runoff
- IPM means no pesticide
- What a commons truly is for 5.1
- What GMOs are (too much polarization on this topic)
- Connecting the agriculture impacts to soil from Unit 4 and nutrient cycles from Unit 1

If you have to cut time from Unit 5…

- Combine your agriculture objectives into a project where students have to analyze them all at the same time - you get the application but it saves you time in class. I provide a couple of work days, then the rest is done on their own. It took me from doing an activity for each of 5-6 objectives to only using 2 class days.
- I had students watch videos for sustainability, fishing and tragedy of the common

The one thing students need to talk away knowing from Unit 5 is…

- Anthropogenic impact with food production
- That agriculture is very important to our survival and sustainable techniques help to prolong our previous food supply
- The connections to Unit 4 and Unit 1 - how the impacts of land use affect soil, nutrient cycles, etc.

One "must do" activity is…

- Tragedy of the commons (Sustainability Lab in AP Classroom - KS)
- Radish seed germination vs salinity (Salt Toxicity in AP Classroom - KS)
- If your students don't live in an area where they are used to agriculture, they need to see a documentary for the visual. Fresh, Biggest Little Farm

My piece of advice for new teachers is…

- It's a long unit, so help kids chunk the information in a way that is meaningful.
- Spiral content back to previous content in discussion and activities as much as you can - this is where students need to really make connections between multiple concepts, as that will be expected of them on the AP exam.
- Rearrange to focus on common practice, environmental problems the solutions.

This year, I will be sharing my unit multiple choice tests. You can find the one I gave in 2021 here. Here is mine from 2023. These may or may not include FRQ's. I select an appropriate FRQ from this list. As a reminder, I share my lesson plans for this school year. These are done in a gradual release style and include my bellwork. You can see my daily agenda here. Please note that my unit calendars are also being updated as I teach this year.

Information previously shared in Unit 5 Newsletters:

Unit 5 Master Spreadsheet

Unit 5 Newsletter from November 2021 continuing information regarding:

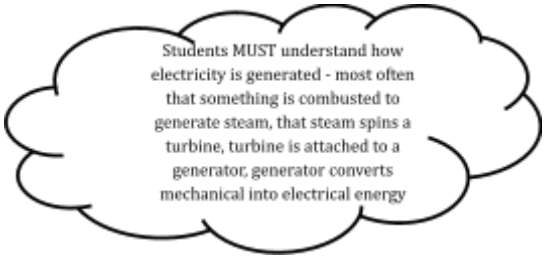
1. Science practices
2. Unit 5 Resources
3. Approaching FRQs by Tony Villareal

Unit 6 Helpful Advice:

In terms of pacing, most people suggest:

- Group all of the nonrenewable energy together, as well as the renewable - you can teach them in groups and then have students analyze.
- 2-3 weeks or 10 days
- 2.5 weeks on this unit. We go fast, but loop back to the environmental impacts in units 7-9.

Biggest misconception that students have is…



- Energy consumptions and production - too many people getting misinformation from the internet
- Not getting the burn the fuel - make steam - pressurize steam - turn turbine - spin generator - get electricity order.
    - Students need to understand these steps, but the CED doesn't require that they understand how a generator works (nothing about copper or magnets etc)
    - Students should understand how different energy types all have common features of using turbine and generator to be converted into electricity
- Energy is "one size fits all" and that the solution to our energy problems is ONE SINGLE energy source instead of a combination of all of them.
- Fossil fuels have no benefits - they fail to understand how ingrained they are in our current infrastructure system and how they can be stored and transported in ways that renewables can't.
- That all nonrenewables are bad and all renewables are good.
- Energy math isn't as hard as you think it is, just practice a few different type of problems
- That nuclear power is renewable
- Renewable energy resources do not have shortcomings.
- Fracking is drill for oil
- Students think energy and electricity are the same thing

If you have to cut time from Unit 5…

- Do jigsaws and have students share out with each other, flipped classroom videos with many topics will help cut down time.
- Use Switch Classroom to cover the various fuel/energy types. Lots of great resources and quizzes for understanding.

- Make sure they at least know the advantages and disadvantages of each energy source
- Teach the issues, topics 6.1 to 4 and have them make presentations to present on each of the remaining topics.

The one thing students need to talk away knowing from Unit 5 is…

- Need to be able to explain specifically how different types of renewable energy are more sustainable than nonrenewables, and also drawbacks of renewables.
- That is takes a variety of energy sources to solve our energy problems.
- Transitioning to alternative energies is a lot more complicated than just installing more wind and solar
- That everything we do requires energy and there are pros and cons to each option.
- The overall process of all energy sources (other than solar) involve finding a way to spin a turbine to make electricity.

One "must do" activity is…

- I love the heroes/villains project.
- Kilowatt lab
- Energy consumption analysis with math - can include a released FRQ
- Switch energy website/documentary.

My piece of advice for new teachers is…

- Look at the objectives and what students are truly asked to know - many students have more background knowledge in this unit because of what they see in media, so you can get through the information faster. Sometimes the best way to get through the info is to just do old school lecture - you can still get through a lot of content fast because it's all connected.
- Use the resources that are available for you - Switch classroom is the best for a good review before the AP exam as well.
- Take your time with energy, pollution, and global change. Be thorough especially with these last few units!
- Don't get overwhelmed with the details of how each energy type works. Focus on the environmental impacts of nonrenewable and you will be ok.

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Information previously shared in Unit 5 Newsletters:

Unit 6 Master Spreadsheet

Unit 6 Newsletter from December 2021 continuing information regarding:

I. CER
II. Unit 6 Resources

Unit 7 Helpful Advice:

In terms of pacing, most people suggest:

- Do 7.1 first, to cover the actual molecules and basics, then do outdoor air pollution (7.2 - 7.4 and 7.7), then do indoor air pollution. Cover 7.6 throughout.
- I combine this unit with half of unit 9.
- About 2-2.5 weeks (non block)

Biggest misconception that students have is…

- Photochemical and industrial smog - they get them backwards, or want to link smog to the ozone layer.
- Ozone hole lets in heat.
- Tropospheric ozone is same as stratospheric ozone
- Students think CO_2 is like the word air pollutant because it's the only one they have ever heard of.
- They also conflate carbon emissions and global warming with ozone depletion
- That all fossil fuels release NOx, but only coal releases SOx.
- Mold as an indoor air pollutant is the same as mildew or mold on food

If you have to cut time from Unit 7…

- Can do noise pollution as just a homework activity.
- Work on equations and less other stuff
- Make indoor air pollution a quick HW.

The one thing students need to talk away knowing from Unit 5 is…

- The actual molecules of the pollutants - they can't just say "air pollution" on the exam.
- Green house effect - infrared radiation. Ozone layer- UV radiation
- How photochemical smog forms- the chemistry of air pollution
- Most air pollution is caused by fossil fuel combustion. Climate change isn't the only problem with fossil fuels.

One "must do" activity is…

- An acid rain lab - they have trouble understanding this concept, especially if they didn't get enough info on pH in chemistry, or don't remember. There is one on College Board - KS
- car exhaust/air pollution collection lab. There is one on the master spreadsheet - KS
- Particulate lab. There is one on College Board - KS
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My piece of advice for new teachers is…

- Make your students use the molecule names on their answers in every activity you do - being strict with them on this makes them write about the molecules vs just "pollution."
- Know your chemistry!
- Illustrate equations with module models and tell them to learn the equations in words and use words if possible. With words you can slightly misspell the molecules but if you miss a number or letter in the chemical equation, then they miss it.

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Information previously shared in Unit 5 Newsletters:

Unit 7 Master Spreadsheet

Unit 7 Newsletter from January 2022 continuing information regarding:

III. Backwards by Design
IV. Unit 7 Resources

I hope that this is helpful! Check out more resources at schoolofshap.com or reach out to me at kshapiro86@gmail.com

From Tony Villarreal:

Hi Everyone and Happy New Year!

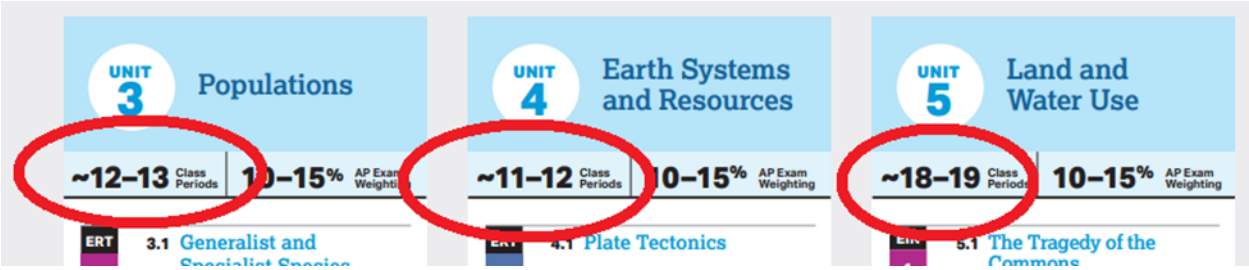
I hope you've come back from your break ready to go as we are now 5 months away from the AP Exam!

Since time is an issue, my focus this time is going to be to talk to you about pacing and scheduling.

I know some of you are on a year-round schedule and others are on an accelerated block schedule. In the last few years I have done both and I wanted to share some insights with you:

Year round Schedule Peeps:

So in an ideal world, those of you who are on a year-round schedule are following the CED layout. The CED has the number of days according to 45-minute periods. I like to use the course at a glance to follow that pattern.



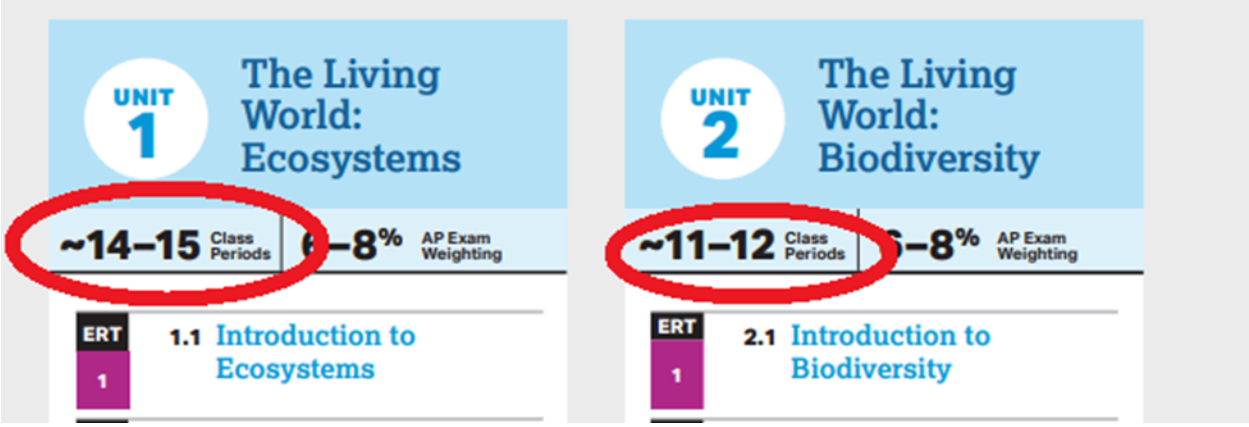
Now using that time, I like to front-load the course, so by the time we go off for the Winter Break, that would mean that we are done with Unit 5 and can start with Unit 6 in January. I do this because the first part of the course, Unit 1-3 are materials the kids are comfortable and familiar with, so we don't take as long on those. Then Units 4 & 5 start getting into topics they haven't really had much experience with until this course. Plus units 6-9 are topics they don't hear about or have heavy misconceptions about and need to be dealt with more detail.

Now, I know that may not have worked for people because of scheduling, so my advice is this: get through the material quickly. You want to be starting Unit 9 at the beginning of April, so you will have time to finish, give a mock, and then have good review. Here's my year long schedule from last year:

https://drive.google.com/file/d/1-1GPURHJNIMxWdXK1GAIX34Z-ohSkZJg/view?usp=sharing

Semester Block Schedule Peeps:

So, at my school, we have an accelerated block, so I see my kids every day for 1 hour and 30 minutes at a time. This sounds awesome, but the downside with this, is you can tend to get caught up and go really slow. For teachers in this group, you have to take those days and cut them in half.



In this situation, I use the lower number of the suggested time period and cut that number in half, since 1.5 hour blocks technically equals 2 days. So for Unit 1, I will be using 7 class days, then 1 for an exam. Unit 2, I'll use 5 class days then 1 for exam. This is so that I can have some more time, because with the block schedule, we'll be going almost right up to the AP Exam, and review days will be light.

The plan here should be do get done with Unit 5 by mid-march, which is Spring Break here in Texas. State testing goes on early and goes on foreeeeeeever, so the frontloading concept really does apply. This year I'm off the year round and back to this accelerated block schedule, so here's my calendar now:

https://drive.google.com/file/d/1-zSr32-RBIJPUrnV9FrY3T2SR079C8-k/view?usp=sharing

Final tips:

1. Make sure to give timed exams. There are 80 questions in 90 minutes on the AP exam, this breaks down to 67.5 seconds per question. So, if you have a 45 minute period, once the kids sit and you start your exam, plan on 35 minutes so a 30-31 question exam fits.

2. If you are giving FRQs, I would not too heavily weigh those on your gradebook, points are usually low on those questions, so weighting them 40% like the AP exam will discourage kids, but that doesn't mean skip the frqs!

3. Here's all my links for multiple choice exams for those of you that missed them in previous newsletters and for those of you on the block schedule like me:

    https://docs.google.com/document/d/1N4j6Cz4aaBUsnWL94RfMvsOwlBkD_WqU3jlss1gkap4/edit?usp=sharing

Here's my resource website with videos, short powerpoints, study guides, and reviews:

APES Course Resources

Hope this has been helpful, if you have any questions, feel free to email me:
vscienceclasses@gmail.com

- Tony Villarreal