

## JANUARY APES NEWSLETTER

Hello!! I am so sorry that this is delayed yet again. I have been experiencing some burn out this year and needed to step away for anything extra. I appreciate you being patient with me.

Please enjoy the following newsletter - as always if you have questions or comments feel free to reply to this email or reach out at [kshapiro86@gmail.com](mailto:kshapiro86@gmail.com)

The January newsletter will have several times below - they include:

- I. [Backwards by Design](#)
- II. [Unit 7 Resources](#)

### I. Backwards by Design

To me, backwards by design is something that PD presenters always talked about but I somehow could never find the time to do. However, a few years ago, I made backwards by design an area of growth in my evaluation and made a concerted effort to write my tests first. I will say that this gives me a better grasp of the course content and helped me understand the CED better because I had a better understanding of the questions that are both available, and what my kids would see on my unit tests. When building a test, I utilize the AP Classroom test and select the following settings:

- I pick the standards one by one - yes its a little slower but it helps for me to see how many questions there are for each standard - ie - how often does CB write a question about this topic:
- I don't narrow the questions by practice or skill - so I just leave all those blank.
- I only select summative test questions. I put practice 1 exam questions on my

Filter by:

Unit and Topic

☐ 6.12: Wind Energy

☐ 6.13: Energy Conservation

☐ 7: Atmospheric Pollution

☒ 7.1: Introduction to Air Pollution

☐ 7.2: Photochemical Smog

☐ 7.3: Thermal Inversion

☐ 7.4: Atmospheric CO<sub>2</sub> and Particulates

☐ 7.5: Indoor Air Pollutants

☐ 7.6: Reduction of Air Pollutants

☐ 7.7: Acid Rain

☐ 7.8: Noise Pollution

☐ 8: Aquatic and Terrestrial Pollution

☐ 8.1: Sources of Pollution

☐ 8.2: Human Impacts on Ecosystems

☐ 8.3: Endocrine Disruptors

Practice

Stimulus

Select All Clear Show labels only

☐ Formative

☐ AP Topic Question

☐ My Question

☒ Summative

☒ AP Course and Exam Description

☒ AP Exam

unit tests. I leave practice 2 questions for things like exit tickets or bell work, and then practice 3 is the mock exam I give my students in the spring. That way there is a mix of previous questions and questions that may be more aligned to what the students see in the spring. Even though there are older questions, they are still valid - they should be tied to a science practice and be relevant content. When I export the older questions out, I only put in four of the five answer choices. I don't pick things that are straight recall of minut facts - a past question about use of arsenic or some other chemical to purify gold comes to mind - while there may be some random questions on the AP exam, I don't want to stress my students out with that stuff and choose to leave trivia questions off if they do appear in the AP Question bank.

- Exam alignment - I select high. This doesn't mean there won't be some random questions I don't like, but it helps select against it.
- I leave big idea, stimulus type blank
- I select on MCQ because [I use this list](#) to help me pick out my FRQ's
- I leave the rest blank - because I manually copy and paste these questions into exam view and then print them off for distribution in my classroom where cell phones are collected, I'm not concerned with test security. I never let my students take tests in AP Classroom or the internet.

After my specific selections are made, I'm generally left with anywhere between 5-15 questions per standard. How many questions I select from each standard depends on how many standards there are in a unit. In unit 7 there are 8 and my tests have between 25 and 30 questions so that is 3-4 questions per standard. How you pick 3-4 out of the possible 15 is up to you - I tend to pick questions that my students are weakest in - so experimental design, math, and environmental problems and solutions.

Doing this allows me to know exactly what kind of questions have been asked in the past. While question writers don't use this to write new questions (we use the EK, LO statements from the CED), it is helpful information. Backwards planning also helps you put in place exit tickets and other formative assessments that may help students practice before the unit exam. Doing this with FRQ's you may practice during the unit, as well as your reading quizzes, etc will help set students up for success, and make you feel more confident in the type of content asked on the exam.

## II. Unit 7 Resources

- 7.1: For 7.1 - I like to review the Clean Air Act - I use NOSCLP to help my students remember the criteria air pollutants: NO<sub>x</sub>, Ozone (tropospheric/ground level), SO<sub>x</sub>, CO, Lead, and Particulate Matter. When discussing lead, I like to utilize the [Half Century of Progress](#) data figure [found in this guide](#) and do a practice CER (see example in Newsletter 5) for why lead levels have decreased, where lead is still found, and why students purchase "unleaded" gasoline. They know that this is something they do, but they don't understand why. I find this guide to have some great data analysis figures for

this unit. John Baccman also does a great presentation if you have time in this unit. His contact information can be [found here](#).

Additionally, for 7.1 I choose to do speed dating here - if you search the facebook group for speed dating, there are LOTS of posts. But essentially I break the class into four groups and assign them each a pollutant. They do background knowledge research to answer questions about the pollutant and generate enough info in order to “date” one another. I have to explain speed dating to them because they have no idea that it's an actual thing. [You can see my folder of resources here](#). This is a great introduction to the air pollutants and I refer to these throughout units 7,8,9.

- 7.2 - this one is hard for students. I like to use the figures found in the HCP linked above and straight up lecture over the formation and impacts. Students need to know the exact chemistry. I use the phrase “good up high, bad nearby” in reference to where O<sub>3</sub> should and should not be found. They need to differentiate between photochemical smog (brown smog, LA smog) and gray or industrial or london smog. [Then we do chalk drawings for several days](#). I have the black lab top tables, so I use chalk markers from Amazon, but if you live in a place with nice weather you can go outside.

I have students draw in pairs. Then they rotate to a new drawing and double check. I draw it on the board and they check the drawing in front of them. Then they rotate again - write environmental impacts. Then rotate again - human health impacts. Then rotate again - I might ask them, what would happen to levels if ABCDEF happens - I pick things like, there was less sunlight, there was more cars, there was an inversion, etc They don't write in these rounds, they just discuss with their partners and cold call on all groups to hold them accountable. If groups don't answer I'll say “ I see you need a few more seconds - here is the question again, feel free to consult your textbook or notes if you need” then call on same group again - it holds them accountable. The last rotation I ask what legislation addresses this and how.

- 7.3 - Thermal inversions - this is something I just discuss and usually in terms of smog above, but I do like [this clip from the Netflix Show “The Crown”](#) to show and explain the inversion. Some teachers show the whole episode.
- 7.4 - Atmospheric CO<sub>2</sub> and particulates - again this is something I discuss but some teachers choose to do a car exhaust lab. I don't because my husband is a lawyer and well liability. I have never gotten great results either. [I have this lab saved](#) - I'm not sure where I found it, so if it is yours - THANK YOU! And let me know so I can give credit. I have heard that old cars, old SUV's and the school buses give the best results. I bet if you search in the facebook group, lots of threads come up.
- 7.5 Indoor air pollutants - I choose to do an indoor air pollutant lab. [Here is mine](#) and I know that [Kristi has one as well](#). I also have this [scavenger hunt](#) saved that I believe I got from the FB group - so that would be a fun alternative. If this is yours, again please

let me know so I can give you credit. [I also do this free! Case study from Science Outside about Radon.](#) All their stuff is WONDERFUL.

- 7.6 Reduction of air pollutants - this is one that I honestly just discuss and we view scrubbers and electrostatic precipitators. I mention catalytic converters and vapor recovery nozzles because they are in the CED, but honestly - I have to study and read up on them every year (this also goes to show its okay if you have to review year to year and that you won't know everything - this class has so much breadth!)
- 7.7 Acid rain. Again we do more chalk drawings. We do an acid rain lab. I do a different one very year -sometimes I give them water, vinegar, and HCl (0.1M) and then we look at percent change of various things - egg shells, rocks, leaves, sample of their choosing - then we write a CER about it. Day 1 is setup, Day 2 remove from solutions - dry for 24 hours, day 3 measure and CER. I have found this [lab from Flinn](#), [this one from Cornell](#), and [this lichen one](#). I'm not sure where I found the lichen one - so if it is yours please let me know! I really like this [Crash Course Video](#) to discuss buffers and why certain areas are more prone to acid rain. This helps reinforce their chemistry, spiral back in soils, and gives an opportunity to practice visual diagrams with maps that show areas with high levels of acid rain.

This unit is the beginning of when students have to know and understand a lot of chemistry. [Here is my chemistry review that shows the required knowledge.](#) Students need to know the exact chemistry and how to fix it - I teach them that "add a base such as lime" will fix most acidic environments (acid rain, acid mine drainage, acidic soil, etc - IT WON'T FIX OCEAN ACIDIFICATION).

- 7.8 - Noise Pollution - again this is something we just discuss. I don't have an activity for it - so if you do - send it my way and I can include it! I also like to take this opportunity to discuss light pollution because even though it is in the CED, I still think it is of value, and some of my students live very close to this [official dark sky community](#).
  - ETA: Jill Lisius shared this [Noise Pollution CER](#) with me and I love it!

I hope that this is helpful to you! As always please reach out with questions or comments!

Kristin Shapiro. Florence Jr Sr High School. Florence. Co

[schoolofshap.com](http://schoolofshap.com)