Bonus Points for Chemistry Students

Each student can earn up to a maximum of **20 bonus points**. The points can be accumulated in any pattern during the entire semester.

All assignments must be turned in to the teacher before finals. Once finals have begun assignments will be graciously accepted for zero points.

All assignments must have the following information on an index card:

- Name (Last, First)
- Period
- Title of assignments

Example

Doe, Jane

Period 3

- Paper x 3
- Museum
- Scientific Questions 1, 2, 6, 7, 25

Scientific questions

Directions: A single **POWER PRESENTATION** for one question is worth **10 points.** Please cite any sources used to avoid plagiarism. Once an answer has been turned in, it is no longer worth points to prevent cheating. The power presentation must be one of the following and presented during the days of finals:

A. Interview of five people (1-family member, 1-9th grade student, 1-Adult over the age of 25 years, 1-your choice).
B. Public Service Announcement
C. Song or Poem with at least three versus
D. Picture Poster using ten words or less
E. Other Teacher approved projects

1. Why does H_2O_2 fizz when placed on a cut?
2. How does a Smoke Detector work?
3. Why is Radon gas so dangerous?
4. How does a hair permanent work?
5. What does an octane rating mean?
6. What is acid rain? What causes it?
7. How does sunscreen work?
8. Where does the ozone hole come from?
9. What is photochemical smog?
10. What are methods used in water treatment?
11. How do solar panels work?
12. What is a fuel cell?
13. How does a battery work?
14. How do they decide what to put in perfume?
15. How does fluoride prevent cavities?
16. How does a nuclear power plant work?
17. How does MRI imaging work?
18. Why does soda go flat?
19. Where does gasoline come from?
20. How does welding work?
21. How do food preservatives such as sodium benzoate work?
22. How does hair dye work?
23. How do they use carbon dating to determine age of things
24. How do trick candles work?
25. How do fireworks work?
26. What is a polyunsaturated fat?
27. How do they get Aluminum for soda cans?
28. Where do paint pigments come from?
29. Why are snowflakes always six sided?
30. What is vulcanized rubber?
31. How do glow in the dark paints work?
32. How does luminol work?
33. How do color-changing sunglasses work?
34. Why is carbon monoxide so poisonous?
35. How do detergents work?
36. How does Nuclear Medicine work?
37. How does film photography work?
38. Why doesn't polyester dye easily?
39. How do writable DVD's and or CD's work?
40. Why is diamond so hard?
41. How are alternative fuels made?
42. How do they make aspirin?
43. What is brominated vegetable oil? How/why is it used?
44. What is the origin of the "Mad Hatter"?

Projects: Each of the following is worth 10 bonus points.

A Scientist of Chemistry

Directions: Choose a scientist that has had an influence in chemistry. Discuss in a paragraph their life background. Describe in 2-3 paragraphs the main chemistry concept that was important to the scientist. Document your sources in MLA format.

Current Event on Science Issues

Directions: Choose an article that is relevant to class material, not older than one year, and adds new information for learning and discussion. A copy of the article should be attached to the summary. Summary should include the title, source, a description of the major facts of the article, and why it is important to chemistry.

Museum Exhibit

Directions: At the museum of your choice, you will write up **THREE** different exhibits, document what the exhibit looks like, where it is on a map of the museum, describe how it works, and explain how each one is related to class material. The write up will probably need to be about half a page (~100 words) for the description of each exhibit and another half page to explain the relationship between the exhibit and science. Each sheet should identify the exhibit with a name. Not every exhibit has a name. If there is a written description, the first line may be used as a name. A museum pencil is your proof of attendance.

Model of Chemistry Concept

Build a model or create a poster of a chemistry concept that you learned. Assume your audience is new student to chemistry. Include enough information so that someone can grasp the chemistry concept. Cut and pasting of information is not worth any credit. Use your creativity!

Science Video

Write a one page paper about a science video. Include the name of the video and the production company along with the year produced. Discuss the science concept and why it is important to understand.

Avogadro Number Analogies: Each analogy is worth 10 bonus points.

Avogadro's Number is so large many students have trouble comprehending its size. Consequently, a small sidelight of chemistry instruction has developed for writing analogies to help express how large this number actually is.

Directions: Depict Avogadro's Number in an analogy through pictures or drawings with the mathematical support. Some examples are listed below.

- Example 1: Avogadro's Number compared to the Population of the Earth:

  We will take the population of the earth to be six billion (6 x 109 people). We compare to Avogadro's Number like this:

  6.022×10^{23} divided by 6×10^{9} = approx. 1×10^{14}

  In other words, it would take about 100 trillion Earth populations to sum up to Avogadro's number.

- Example 2: Avogadro's Number as a Balancing Act:

  At the very moment of the Big Bang, you began putting H atoms on a balance and now, 19 billion years later, the balance has reached 1.008 grams. Since you know this to be Avogadro Number of atoms, you stop and decide to calculate how many atoms per second you had to have placed.

  1.9×10^{10} yrs x 365.25 days/yr x 24 hrs/day x 3600 sec/hr = 6.0×10^{17} seconds to reach one mole

  6.022×10^{23} atoms/mole divided by 6.0×10^{17} seconds/mole = approx. 1×10^{6} atoms/second

  So, after placing one million H atoms on a balance every second for 19 billion years, you get Avogadro's Number of H atoms (approximately).

- Example 3: Avogadro's Number in Outer Space:

  If all the matter in the universe were spread evenly throughout the entire universe, there would be approx. 1×10^{-6} nucleons per cm^3. We could do several things with that. For example:

  a) What volume (in cm^3) of space would hold Avogadro Number of nucleons?

  6.022×10^{23} nucleons/mole divided by 1×10^{-6} nucleons/cm^3 = 6.022×10^{29} cm^3/mole

  b) How many Earths would equal this volume of space (take Earth's radius to be 6380 km)?

- Other Ideas:
  - Avogadro Number of Coins: Take a common coin of your country and stack up 30 of them. Measure the height in cm and divide by 30. You now have the average height of one coin in centimeters.

    a) How high in cm is a stack of Avogadro Number of that coin?
    b) How many light years is this? (Light travels 3.00 x 108 km per second)
    c) How many "round-trips" is this to the moon? (Go there and back = one round-trip. The Earth-Moon distance (measured center-to-center is a bit more than 384,000 km.)

  - Avogadro Number of Pieces of Paper: If you had a mole of sheets of paper stacked on top of each other, how many round trips to the Moon could you make? (Hint: a stack of 100 sheets of ordinary printer paper is about 1.0 cm.)

Donations: Each of the following materials is requested for students' better learning in a safe, clean, and productive environment.

Item	Quantity	Points
Card Stock Paper (any color)	250 sheets	5
Color Copy Paper (NO RED)	500 sheets of same color	5
TI-30XIIS Sci. Calculator	1 calculator	10
Disinfecting Wipes	1 canister	2
Click Style Pens (Black/Blue/Red/Green/Purple)	12 of any color	2
3 Prong Portfolios (Blue/Orange)	10 folders	5
Packing Tape	1 roll ≈20yrds	3
Highlighters	Package of at least 4 colors	2
Rock Salt/Coarse Salt	1 box	2
Ziploc quart bags	1 box	2
Ziploc gallon bags	1 box	2