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Day 04 Feb 03 Chemothermal sensation.
Properties of gases.

Fire and Ice

1-1-2016

4.0.A Daily Outline

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Purpose:

Reinforce importance of group process

- Continue to use nametags
- Bring closure to jigsaw activity

Use complementary applications as a source for evaluating

- Presentation quality
- Identifying new questions and insights

Start building understanding of particulate nature of matter and how heat and temp fit with that

- Confirm homework observations and ideas
- Link with liquid nitrogen experiments (motion, volume, flexibility)

Board

Find your poster group

Make a stick-on name tag with first name

Bring me your notes to check – doubles as sign-in

Folders up here from original groups: last class's handouts (Qbank, assignments), Recorder Report

Take a look and take copies that you need

Materials

Name tags

Premade name cards

Poster paper

Poster markers

White board markers

Folder loaded with feedback on group work and new materials, incl recorder reports

In-progress posters from last class

Tape

Graph paper

Returns Return group notes from Day 3 in their folders

Distributions (if not retrieved last time, in the folders)

- Organized Q Bank from Day 1 and 2
- Standing Assignment

Starting Comments 3 minutes max

- Acknowledge standing assignment work
- During today's activities, will come around to take a picture. Posting on BB.
- Storing your eye protection here – how, where
- **NOTE: author Edm. Halley (of Halley's comet)**

Activity One Poster completion and presentation (est 40 min)

10 min I estimate you might be ready in less than 10 minutes.

On board in back:

- Put names on poster somewhere.
- Appoint someone as manager (to watch clock), someone as spokesperson (whoever was selected last class), and someone as recorder (role will be needed later).
- Tape up somewhere.
- Posters will be photographed, and placed on BB as record of this work.
- **Note: needed to kill time to let 1 group to finish: instructed others to allow spokesperson to practice**

2 min each Each Spokesperson will walk us through their group's poster.

Everyone else – listen, jot down questions that arise, think about how this compares with the task you were working on.

4:10 pm here

6 min After all posters have been presented, each poster group discuss (this is where Recorder is needed, to make Recorder Report of that discussion):

- a) Discuss what could have improved the information richness or accuracy of your poster? This could be things you saw in other posters, or fresh ideas that occurred to you.

This was a good idea to have them do a self-assessment rather than to “grade” other groups’ posters. I think their comments were more insightful and productive.

- b) Discuss in your group, and identify at least 3 questions and/or insights about thermal sensation.

10 min Report out round robin on questions or insight. Keep going around to milk this. See where it goes. Do not necessary try to bring to closure. Open questions can be added to question bank and could become projects later.

Notes: **Questions I noted:**

- **How does brain know that nerve was triggered by capsaicin?**
- **How does a receptor function?**
- **How does a temperature change cause first neuron to fire?**

Activity Two Extend exploration of gas behavior and temperature using PhET (est 40 min)

Organize new working groups of four consisting of two pairs.

- Who has a computer with the PhET downloaded onto it? Count off to 10. Remember your number. Two people with computers per table.
- For the remaining people, you will partner with one of the computer people. Count off to 10. Last person gets to choose; one trio.

I will distribute an outline of what I want you to explore.

Once settled at your table, introduce yourselves and say a little about yourself to the group, including how involved you were with SuperBowl on Sunday.

This is to “break the ice” of being paired with and sitting with new people.
Meanwhile, distribute the handout on “gas properties”

Once settled, indicate purpose (put on board):

Review *what you did for homework, and to extend the ideas.*

- Use *RECORDER REPORT* for your pair *ONLY* for the items with *.
- *Everyone do parts 1,2,3. Then split at table: one pair do 4, other pair do 5*

Circulate to check in on progress and on answers to key questions. See my annotated copy of activity. Don't over-explain in response to their developing answers regarding the particulate model. Hold back and let this emerge over time.

Get tables to report out on 1g, 2e, 2f, 3d, 3f, then 4 and 5 – goal is to develop idea we can agree on

- One table show graph of V vs T. Get confirmation from others.
- One table show graph of P vs T. Get confirmation from others.

Final comments based on what's been heard. Bring in the name Kinetic Molecular Theory

Link anything observed to play with liquid nitrogen: V vs T Flexible substances become more rigid

If the discussion finishes early, can pose these questions

Challenge Questions:

- 1) Things we did apply to the deflate-gate controversy. What and explain how it applies?
Does this confirm or dispute the claim that the Patriots let air out of the balls?
- 2) What are the major components of air? Predict (graph) their relative average speeds.
(dinitrogen, dioxygen, carbon dioxide, water, argon) – how to calculate mass of a substance
- 3) Apply any relationship we've discussed to explaining why the inner planets are devoid of H₂ and He, whereas the outer planets are rich in them. [name the inner and outer planets]
How can you use the PhET to test this?

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Your folder contains enough copies of materials for each of you to have a set.

Before you do anything else, look at the second page of the article by Kulatunga et al. Read about what Toulmin's scheme is.

Today's activities:

- 1) The groups will be finishing poster for about 10 min. Then presenting.

If you didn't get into this last class, think about what would be most valuable to do once the posters are created. Then compare that with what I actually decided to do.

There is no need to move around unless you want to listen in on groups as they finish their posters.

- 2) Students will work in pairs and be able to inspect the PhET simulation at the same time.

They're homework involved working individually through a set of guided questions to explore the simulation.

They will be given another set of guided instructions that should reinforce and extend their understanding. They all do the first 3, then they split at each table to do 4 and 5. I will be monitoring conceptual progress.

If timing works well, we will also debrief specific questions to see how well the ideas are coming across.

Once they get started with this, move around and eavesdrop.

Listen in on the conversations. What is the nature of the talk you hear?

- Do you hear fact exchanging? (Claims)
- Evidence? (Data)
- Warrants? (Explanations)
- Backings? Rebuttals (Validity of the explanation)