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SPACE STATION ALPHA

Lesson 7: Radiation Health I

Depending on which of the following hands-on explorations you choose, only one preparatory reading is absolutely necessary. However, all the readings will need to be completed for the next lesson.

Ready, Aim, Mutate! (hands-on)→ *The Human Recipe*
Sweet Dreams are Made of These (hands-onn)→ *In the Kitchen with Poly*
Are You Too Hot? (hands-on)→ *Measuring Exposure to Radiation*

Other Homework Due: (none)

Subject
The ALARA guidelines, radiation shielding, OR radiation absorption

Description of Student Activities
During this class the students will explore radiation using the *You Are Too Hot* OR *Sweet Dreams Are Made of These* OR *Ready, Aim, Mutate!* explorations.

Duration
45 min. Radiation exploration

Materials
Materials for chosen exploration

Main Topics:
1. Using the ALARA guidelines (limiting time of exposure to radiation, increasing distance from radiation, or using shielding), humans can protect their DNA or cells from dangerous radiation. (*Ready, Aim, Mutate*!)

Or

2. Shielding may be made of various materials and may be configured to minimize exposure to dangerous radiation. (*Sweet Dreams are Made of These*)

Or

3. Dangerous radiation is measured in rads and rems. Astronauts (humans) may receive radiation from terrestrial sources, workplace sources, and while in orbit. (*Are You Too Hot?)*

Outcomes
(*Ready, Aim, Mutate*!)
- Students will explain what ALARA means and summarize the shielding options available to the astronauts during a severe coronal mass ejection.
- Students will explain how radiation can affect human DNA and cells.

Or
(*Sweet Dreams are Made of These*)
- Students will explain the best materials to use for radiation shielding and explain how to arrange it to minimize radiation exposure

Or
(Are You Too Hot?)
- Students will explain the dangers of radiation on board Space Station Alpha using the terms "rad," "rem," and "dose."
- Students will calculate the amount of radiation exposure a human may receive over a lifetime

Special Comments:
These explorations were highly successful during field testing. They generated a lot of student excitement and creative thinking. Your choice of exploration may be based upon available materials.

During the field tests, the teacher's questions during the wrap-up of the exploration brought out a lot of new ideas. Ask questions such as, "What did you like about your solution?" "What would you do differently if you could do this exploration over again?"

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Procedure:

Exploration of choice (45 minutes). The students, in groups, perform their exploration and each group reports on its findings, successes, and what they would do differently a second time.

Ready, Aim, Mutate! Uses squirt guns. Please apply all necessary precautions. Suggestion: Assign only one student per group to handle the guns and a have students handle and squirt the guns in a test area to get over the novelty and excitement of it before the exploration. 20-30 min.

Sweet Dreams are Made of These: Uses $20 of materials and two hours of preparation for the teacher. 30-40 min.

Are You Too Hot?: Board game. Requires printing boards and taping together and preparation of game materials. 20-30 min.

Homework for Lesson 8

Read any remaining articles from this list

- New Frontiers & New Dangers
- Electromagnetic Radiation: Friend and Foe?
- The Human Recipe
- In the Kitchen with Poly
- Measuring Exposure to Radiation

Complete answers to *Closure* questions from today's hands-on exploration