



TEACHER'S GUIDE

FALCONIUM

OVERVIEW OF TOPICS DISCUSSED

Alternative Energy	Health	Misc
10: "Fossil Fuels" 11: "Basics of Alt. Energy" 13: "Blowing Strong" 14: "Fuels of the Future" 21: "Going Green"	7: "Secret of the Secret Ingredient" 15: "Watermelon Wonder" 16: "Ocean of Discovery" 17: "Laugh out Loud"	3: "GMOs: A Question of Ethics" 5: "Bending Water" 6: "Science of the Muses" 20: "Stress: the Silent Killer"

Cover: Alternative Energy

- Having read Falconium's feature articles, you should have a basic understanding of the current energy situation. Do your own research, then answer the following questions.
 - One author suggests that wind is the most promising alternative energy source. Refute this argument with appropriate scientific evidence.
 - Are the "fuels of the future" credible or worth the time and resource expenditure? Why or why not?
 - In your opinion, what alternative energy source(s) show(s) most potential? How should society transition to maximizing their use of that energy source?
- Application: The author of "Going Green" argues that, despite outward appearances, Americans are not truly attempting to minimize their carbon footprint. How environmentally-friendly are you? Fill out this table as completely as possible.

Activity in your daily life	Environmental Effects

Check out these sites!

- <http://www.footprintcalculator.org/> (animated environmental footprint calculator)
http://css.snre.umich.edu/css_doc/CSS08-08.pdf (US environmental footprint fact sheet)

Blowing Strong

- "Wind Energy Basics". 2009. *American Wind Energy Association*. 16 Apr. 2009. <http://www.awea.org/faq/wwt_basics.html>.
- Bergeron, Louis. "Wind, water and sun beat other energy alternatives, study finds". 10 Dec. 2008. *Stanford University*. 16 Apr. 2009. <<http://news.stanford.edu/news/2009/january7/power-010709.html>>.
- "Wind Industry Statistics". 2009. *American Wind Energy Association*. 16 Apr. 2009. <http://www.awea.org/faq/wwt_statistics.html>.

Basics of Alternative Energy

- Asaravala, Amit. "How Nuclear Power Works." 05 July 2005 Web. 27 Aug 2009. <<http://www.wired.com/science/discoveries/news/2005/07/68074>>.
- "How much energy do solar panels produce?." *SPI*. 27 Aug 2009 <<http://www.solarpanelinfo.com/solar-panels/solar-panel-energy.php>>.
- Treviño and Alatorre, Celina, Omar. "Advantages & Disadvantages ." Web. 27 Aug 2009. <<http://gvctemp18.virtualclassroom.org/Nenergy/adva.htm>>.
- V., Ryan. "Technology and the Environment." 2008. 27 Aug 2009 <<http://www.technologystudent.com/energy1/engex.htm>>.

Not your Average Energy Source

- Wakefield, Julie. "Researchers and Space Enthusiasts See Helium-3 as the Perfect Fuel Source." *space.com*. 30 June 2000. Web. 01 Aug 2009.
- Murphy, Mark. "Poop Power: The Energy Emitted from Excrement." *Associated Content*. 17 Jan 2008. Web. 01 Aug 2009.
- Ayres, Chris. "Scientists Find Bugs that Eat Waste and Excrete Petrol." *Times Online*. 14 June 2008. Web. 01 Aug 2009.



Science of the Muses

Word unscramble

- Brain's hearing center: Imprateo obsle
- Limbic system is responsible for: nmeooti
- Ventral striatum, amygdala, midbrain, and regions of the frontal cortex are all associated with: werdar
- Steven Pinker's theory: tuvneolairyo hecaeeckse
- Brodmann's areas 18 and 19: disnm yee

- "Why music?" *Economist*. 18 Dec 2008 Web. 30 June 2009.
- "The Biology of Music." *Economist*. 12 Feb 2000 Web. 30 June 2009.

An Ocean of Discovery

- Why are the oceans worthy candidates for medicinal exploration? List at least three reasons.
- How might the chemical secreted by certain sponges and fungi battle tumors?
- What are the three stages that pharmaceutical drugs must undergo before reaching the consumer shelf?

- Dell'Amore, Christine. "Blockbuster Ocean Drugs on the Horizon?" *National Geographic News*. 14 May 2009. 20 May 2009 <<http://news.nationalgeographic.com/news/2009/05/090514-marine-drugs.html>>.
- Fell, Andy. "Drugs from the Depths of the Ocean." *Medical News Today*. 02 June 2005. 20 May 2009 <<http://www.medicalnewstoday.com/articles/25483.php>>

Watermelon Wonder

Matching

- | | |
|------------------------------------------------------------------------------|---------------------------------|
| 1. A pigment and antioxidant | A. lycopene |
| 2. A fruit widely recognized for its high levels of lycopene | B. ethanol |
| 3. Traditional sources of ethanol | C. tomatoes |
| 4. Can be fermented from glucose, fructose, and sucrose in watermelon juices | D. corn, sorghum, and sugarcane |
| 5. Describe antioxidants in relation to oxidation and free radicals. | |

- Arnold, Jennifer. "Watermelon Packs a Powerful Lycopene Punch." *Agricultural Research*. June 2002. Web. 02 July 2009.
- USDA/Agricultural Research Service. "Watermelons Tapped For Ethanol." *ScienceDaily*. 27 May 2009. 02 July 2009



Laugh Out Loud

True/ False; for questions 1-3, correct the sentence if false.

1. Humor is the only stimulus of laughter.
2. Laughter causes lymph fluid to stabilize and stay in organs and tissues.
3. Laughter increases blood flow by dilating the inner lining of blood vessels.
4. How does laughter assist the suppression of pain?
5. The Berk HDL-cholesterol study tested the health-related effects of laughter by having the experimental group watch a humorous film. It is likely that the control group in the experiment
 - A) Watched no film
 - B) Watched a film that is not humorous
 - C) Performed an unrelated task in addition to watching no film
 - D) None of the above
6. Experimental design: Movies are used in many studies on laughter. Why is this? What are other methods that may evoke laughter? Can these methods be used in experiments? Why or why not?

- Hasan, H., and TF Hasan. "Laugh Yourself into a Healthier Person." International Journal of Medical Sciences 6.4 (2009): 200-11. Pubmed. Web. 18 May 2009.

- Morse /Temple University, DR. "Use of Humor to Reduce Stress and Pain and Enhance Healing in the Dental Setting." Journal of New Jersey Dental Association 78.4 (2007): 32-36. Pubmed. Web. 17 May 2009.

- "Stress Relief from Laughter? Yes, no joke." MayoClinic.com. Web. 17 May 2009.

The Secret of the Secret Ingredient



Fill in the blank

Once upon a time, in a land far far away, there lived a little duck who loved to eat Ramen. She delighted in its ____ taste, which was caused by activation of her mouth's ____ receptors. One day, after reading a very inspiring science magazine, she realized that the source of Ramen's salivating flavor is ____, also known as MSG. She learned that MSG is processed free ____ acid, which, unlike the non-____ amino acid L-glutamic acid, cannot be digested properly by her body. She became quite alarmed, and was slightly relieved when she learned of her body's glutamate moderators, such as ____ (helper neurons) and the blood brain _____. Intrigued, she continued on, reading about MSG-sensitivity, long-term health problems, and ____ degeneration caused by excessive consumption of MSG. The article stated that MSG tricks the brain into thinking the food being eaten tastes good. Angry and upset that she had been tricked by her own brain, the duck stormed off and decided that never again would ____-toxins and ____-toxins affect her life...except perhaps when consumed in an occasional cup of Ramen.

Genetically Modified Organisms: A Question of Ethics

1. Comprehension: Describe and provide an example of a GMO. Use the terms "recombinant DNA" and "transgenic organism."
2. What are some consequences of GMO implementation?

- Fleming, James Rodger, and Henry A. Gemery, Eds. Science, Technology, and the Environment Multidisciplinary Perspectives. Akron: University of Akron Press, 1994. 139-172.

- Levine, Harry. Genetic Engineering: a Reference Handbook. Santa Barbara: ABC-CLIO, Inc., 1999.

- Parkin, Gene F. "Bioremediation: A Promising Technology." Biotechnology—Science, Engineering, and Ethical Challenges for the Twenty-First Century. Ed. F. Rudolph and L. McIntire. Washington, DC: Joseph Henry Press, 1996. 113-127.

Stress: The Silent Killer / What about my Graying Locks?

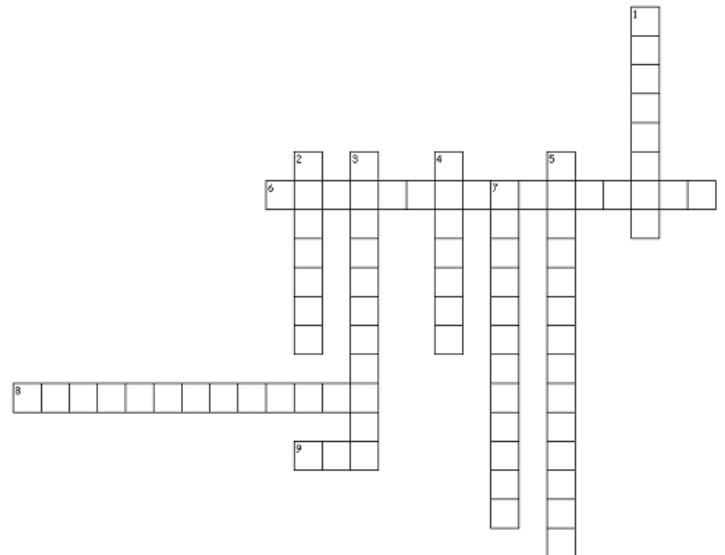
* Delete the space between words in your answer (e.g. "Science is cool"
→"scienceiscool")

Down

1. Hormone involved in both stress and hair loss
2. Substance that gives hair its color
3. The ability to sustain constant internal conditions
4. A hormone necessary to maintaining blood glucose level
5. A disorder in which the immune system attacks hair follicles, resulting in hair loss in patches
7. Unstable molecules with the capability of damaging cells

Across

6. A condition in which hair follicles stop growing prematurely, resulting in diffuse hair loss
8. Epidermal cells and main construction workers of hair
9. Does stress affect hair loss?



Bending Water

Define:

1. Static Electricity:
2. Triboelectric Effect:
3. Electrostatic Induction:
4. Polarity:

5. Draw a diagram of the comb and the water. Label the comb, the water (with hydrogen atoms and oxygen atoms properly oriented with respect to the comb), and the location of the positive and negative charges.

- Helmenstine, Anne Marie. "Bend Water with Static Electricity." about.com. Web. 26 June 2009.

A Few Words on Innovation

Porges, Seth. "10 Awesome Gadgets You Should Grab for 2008." Popular Mechanics. 24 June 2008 Web. 9 Sep 2009.

"Diabetes innovation scoops award." BBC News. 25 Oct 2006 Web. 9 Sep 2009.