

The Fever of '57

EXPLORATION 6: What are the NASA technological Spin-offs from the time of Sputnik?

Disciplines: Environmental Science, Chemistry, and Physics

Suggested Age: 14 and up

Background: As seen in the film, the birth of NASA is a direct legacy of the Sputnik year. *Spinoff* is NASA's annual premier publication featuring successfully commercialized NASA technology. For more than 40 years, the NASA Commercial Technology Program has facilitated the transfer of NASA technology to the private sector, benefiting global competition and the economy. The resulting commercialization has contributed to the development of commercial products and services in the fields of health and medicine, industry, consumer goods, transportation, public health, computer technology, and environmental resources.

NASA's *Spinoff* magazine is the result of a U.S. Congressional mandate issued through the Space Act of 1958, whereby NASA was formed. More specifically, Section 203 of the Act called for dissemination of NASA research and development to the public. Since 1958, over 1,500 documented NASA technologies have benefited U.S. industry, improved the quality of life, created jobs, and rewarded the taxpayers.

Exploration 6 Activity Ideas for Students

Use the Spin-offs sheet to allow students to freely explore spin-off technology on their own. Here are some other ideas for activities:

1. Among the most successful NASA spinoffs is the perfection of the lyophilization process used to make freeze-dried food. One of the most intriguing lyophilized foods is freeze-dried ice cream that is always ready to eat, with no need for refrigeration.

Explain how the freeze-dried process works and more importantly make a case for serving Astronaut Ice Cream (a trademark of American Outdoor Products, Inc.) at a birthday party.

2. Water purification technology spun-off from NASA is now used to kill bacteria, viruses, parasites, and algae in community water supply systems and to remove lead (Pb) from potable water.

As far as waterborne diseases go typhoid fever is one of the most captivating. The reason for this is that it can be transmitted by healthy, asymptomatic carriers. The first person in the United States to be identified with this peculiar attribute was Mary Mallon (i.e., Typhoid Mary). Research the life of this urban legend and explain how she infected 47 people (three of whom died) via the fecal-oral route during her lifetime (1869-1938).

3. "The Exxon Valdez, an oil tanker exporting millions of gallons of oil, ran aground just after midnight on March 24, 1989 in Alaska, creating what is, to this day, the worst environmental disaster in American history. The affected area of coastal Alaska continues to feel the toxic results of that disaster that killed more than 250,000 seabirds, thousands of marine mammals, and countless numbers of other coastal marine organisms in just its first months. Oil is notoriously difficult to clean from water, and it is still emerging from subsurface reservoirs (http://www.sti.nasa.gov/tto/Spinoff2006/er_1.html).

In order to cleanup oil spills environmental remediation companies have turned to NASA's PRP (Petroleum Remediation Product) microencapsulation technology. According to NASA it is almost alchemical in its perfection. Develop a poster or flyer to promote this amazing product given that it stimulates indigenous bacteria to consume spilled crude oil.

4. Protecting the vision of astronauts in space is a top priority for NASA. After studying the eyes of eagles and hawks Jet Propulsion Laboratory (JPL) scientists discovered unique oil droplets that protect them from intense radiation (blue, violet, and ultraviolet), while allowing the vision enhancing rays (green, orange, and red) to pass through. This research led to lens technology that eliminates 100% of the harmful wavelengths and promotes a sharp, crisp viewing perspective.

Explain how UV-A, UV-B, and welding arcs damage the human eye. Moreover, go to the Eagle Eyes High Performance Eyewear website (<http://eeo.com/>) and critique the four testimonials. In other words, do you feel these 4 short video clips are scientifically accurate?

Related Media:

- Part 3 – The Fever of '57 (DVD) – birth of NASA

Student Handouts and Helpers:

- Exploration 6 Student Activity
- Online Homework Helper for Exploration 6 at www.theefeverof57.com
- Spin-Offs Handout

Additional Question for Classroom Discussion on Spin-offs/Legacy of Sputnik

The Lifestraw® is an instant personal water purification device for the prevention of waterborne bacterial and viral diseases (e.g., cholera and hepatitis A). Go to the following web site (<http://www.lifestraw.com/en/low/low.asp>) and explain how this device has revolutionized water purification in developing countries with severely contaminated water. Would you use this device to procure drinking water from a lake contaminated with parasites? Explain your answer!

Online Homework Helper for Exploration 6

Links are available for students from the website www.thefeverof57.com under “Homework Helper”.

Spinoffs

<http://www.nasatech.com/Spinoff/>

<http://www.ip.nasa.gov/>

Freeze-dried food

<http://inventors.about.com/library/inventors/blfrdrfood.htm>

<http://www.madehow.com/Volume-2/Freeze-Dried-Food.html>

<http://recipes.howstuffworks.com/food-preservation4.htm>

Typhoid Mary

<http://history1900s.about.com/od/1900s/a/typhoidmary.htm>

<http://www.pbs.org/wgbh/nova/typhoid/>

<http://www.snopes.com/medical/disease/typhoid.asp>

<http://www.newsday.com/community/guide/lihistory/ny-history-hs702a,0,6698943.story>

Oil Spill Remediation

<http://www.envirosales.com/>

<http://www.virtualviz.com/oilspill.htm>

http://www.technologyreview.com/read_article.aspx?id=17230&ch=biotech

<http://www.bioremediate.com/oilspill.htm>

Ultraviolet Light and Vision

<http://www.bio.bris.ac.uk/research/vision/4d.htm>

<http://www.allaboutvision.com/sunglasses/spf.htm>

<http://www.tsbvi.edu/Outreach/seehear/fall99/ultraviolet.htm>

Related and Appropriate YouTube Videos

<http://www.sti.nasa.gov/tto/>

<http://youtube.com/watch?v=uiIutzZdPOw>

<http://youtube.com/watch?v=WSSBAvUP9Rs&mode=related&search=>

<http://www.nasa.gov/multimedia/podcasting/nasaedge/index.html>

http://www.sti.nasa.gov/tto/Spinoff2006/er_1.html

http://www.sti.nasa.gov/tto/Spinoff2006/ch_9.html

<http://www.sti.nasa.gov/tto/apollo.htm>

Exploration 6

Student Activity Sheet

The Fever of '57

YOUR EXPLORATION: What Was the Radioactive Fallout Legacy of the Sputnik Year?

The birth of NASA is a direct legacy of the Sputnik year. *Spinoff* is NASA's annual premier publication featuring successfully commercialized NASA technology. For more than 40 years, the NASA Commercial Technology Program has facilitated the transfer of NASA technology to the private sector, benefiting global competition and the economy. The resulting commercialization has contributed to the development of commercial products and services in the fields of health and medicine, industry, consumer goods, transportation, public health, computer technology, and environmental resources.

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Here's What to Do

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**Visit The Fever of '57 Homework Helper for videos and links to help you with Exploration 6.
www.thefeverof57.com**



Companies use NASA technology to make commercial products. These products are called spinoffs.

Spin-offs From the Space Program (i.e., the Legacy of Sputnik)

1. Personal Computers
2. Cable Television, H B O, Showtime, etc.
3. Microwave Ovens
4. Digital watches and thermometers
5. GPS Navigation Systems
6. Colorization of black and white movies
7. "Mylar" balloons
8. "Kevlar" for bullet proof vests and fishing line
9. "Vortec" engines in GM cars
10. Juice boxes
11. Football helmets for the NFL
12. Pacemaker batteries that last 20 years and can be recharged through the skin
13. "Sound Guard" record cleaner
14. Aluminized bags for snack food
15. Halogen lights for cars
16. Electronic ignition in automobiles
17. "Bulb Miser" devices for long life light bulbs
18. Breathing systems for Mt. Everest climbers, Scuba divers and Firefighters
19. Pens that write upside down and under water
20. Scratch resistant coatings on sunglasses
21. Solar powered calculators
22. Weather satellites
23. Sports domes
24. Pocket calculators
25. Phone calls by satellite
26. Laser guided missiles
27. "Blue Blocker" sunglasses
28. "DirecTV", "Dish Network", etc
29. "Mini Mag" flashlights
30. Fiber optics for phone calls
31. "Ovation" guitars and helicopter blades
32. Compact Disks
33. M R I medical scanners
34. Laser scanners in stores
35. Weather Maps on television
36. "The Patch" medical device
37. "Flexon" eyeglasses and dental braces
38. Cellular phones and beepers
39. Sunglasses that block 99% of U. V. light
40. Anti corrosive paint for bridges, boats, & the Statue of Liberty

Other spinoffs include: Dustbusters, shock-absorbing helmets, home security systems, smoke detectors, flat panel televisions, high-density batteries, trash compactors, food packaging and freeze-dried technology, cool sportswear, sports bras, hair styling appliances, fogless ski goggles, self-adjusting sunglasses, composite golf clubs, hang gliders, art preservation, and quartz crystal timing equipment.