Mission

Swift is a medium-sized NASA satellite mission dedicated to discovering the cause (or causes) of gamma-ray bursts, one of the greatest mysteries in modern-day science. These amazing events last only a few seconds or minutes, never repeat, and produce incredible amounts of energy.

Swift will:

- carry optical, ultraviolet, X-ray, and gamma-ray detectors,
- be able to respond to a burst and point to its location in the sky in about 60 seconds,
- be launched in Fall 2003.

Education & Public Outreach

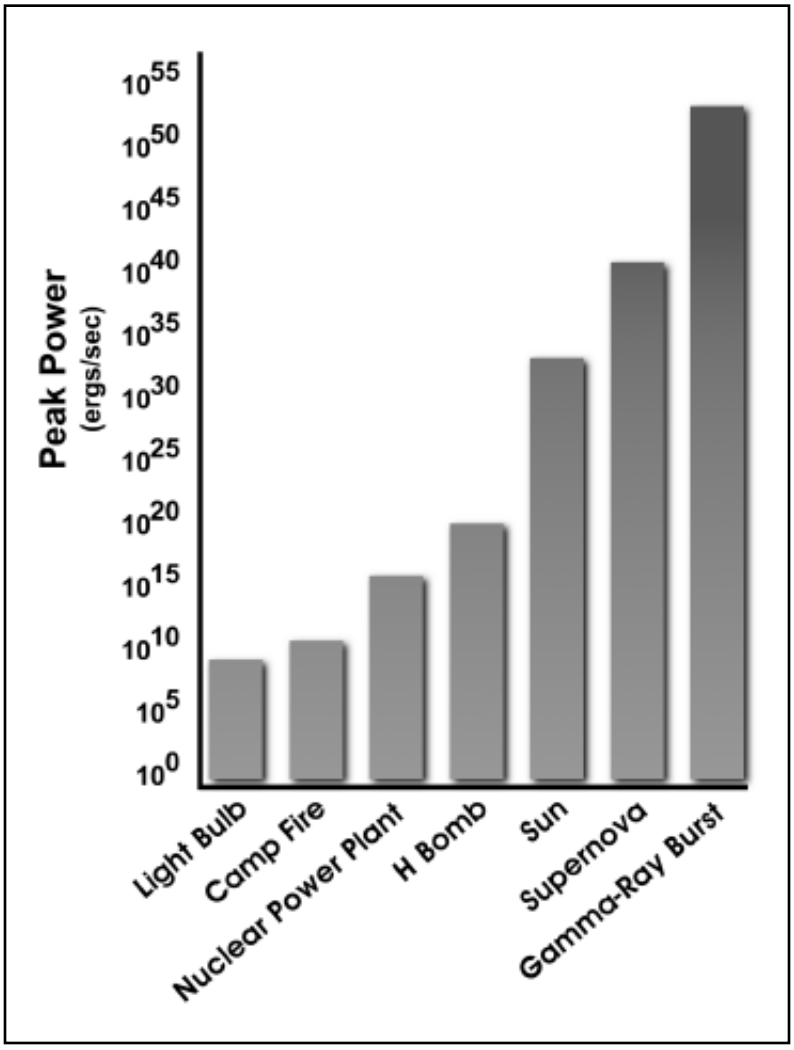
A multifaceted program is underway for Swift EPO which includes:

- development of cutting-edge curriculum materials for the Grades 7-12 classroom
  - download them free from the Web
  - have your students interact with us on the Web
  - request printed copies
- educator workshops presented by Swift scientists
  - every year at NSTA
  - every year at NCTM
  - special week-long Summer Institutes
- GEMS Guide on the Invisible Universe
  - available in Spring 2003
- *What's in the News*? broadcasts focusing on Swift and Swift science
  - seven segments during years 2001-2006
  - broadcast via public television
  - classroom materials available on the Web

Keep track of all this and find the materials at
http://swift.sonoma.edu/education

The Most Powerful Explosions in Today's Universe

Gamma Ray Bursts (GRBs) are the most powerful phenomena in the Universe today! Just examine the bar graph to the right to see how they conpare to other sources of enregy.



• How many Suns would you need to generate the same peak power as a gamma-ray burst?

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• How many times more powerful is a gamma-ray burst compared to a standard light bulb?

_____

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• How many Nuclear Power Plants would you need to power a gamma-ray burst?

_____

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_____

Answers:
1. You would need 10^{20} Suns (that's 100,000,000,000,000,000,000 or one hundred million trillion Suns!) 2. The gamma-ray burst is 10^{46} times more powerful. 3. You would need 10^{39} nuclear power plants to generate the same power as a GRB!

Our Amazing Universe!... How well do you know the gamma-ray Universe and gamma-ray bursts? Test your knowledge! Which of the following statements are true and which are false?

a. "If we could harness 1% of the energy emitted during a typical GRB, the Earth would have enough energy to last over 1,000,000,000,000,000 years, based on current usage statistics."
b. "Because of its enormous power, a gamma-ray burst which was detected on January 23, 1999 posed a significant health threat to humans on Earth."
c. "The Earth emits gamma-rays that can be detected by orbiting satellites."

Answers:
a. True. A single GRB at 1% efficiency could serve Earth's power needs for a hundred thousand billion billion (10^{23})years. GRBs can emit about 10^{54} ergs of energy. Worldwide energy use is approximately 10^{29} ergs/year.
b. False. Most GRBs, including the one which occurred on 1/23/99, originate very, very far away. The flux from them that reaches Earth is easily absorbed by the Earth's protective atmosphere. Only a GRB which occurs close by could pose a problem. Such GRB blasts are thought to occur rarely in our own Galaxy, perhaps once every million years. Researchers have estimated that an intense burst within 3,000 light-years of Earth could produce radiation at sea level equal to about 100 times the fatal dose for humans.
c. True. Events known as Terrestrial Gamma Flashes (TGFs) were discovered with the BATSE onboard the Compton Gamma Ray Observatory. They originate high in the Earth's atmosphere, and are believed to be associated with large thunderstorm activity.