

just for fun



This activity is part of Challenger Center's Vista Station™ Program. For more information on how to purchase Vista Station™ to use in your classroom, visit www.challenger.org/store.

Another Series of Challenger Learning EdVentures™ from



© 1999, Challenger Center for Space Science Education

No portion of this guide may be reproduced without written permission except for individual classroom use.

overview



OME TOOLS THAT WE USE EVERYDAY CANNOT BE USED IN SPACE. FOR EXAMPLE, BALL-POINT PENS WORK ON EARTH BECAUSE OF THE FORCE OF GRAVITY.

GRAVITY PULLS INK FROM THE INK CARTRIDGE ONTO A ROLLER BALL AT THE TIP. THE INK IS ROLLED FROM THE ROLLER BALL ONTO THE PAPER. WHEN YOU HOLD A BALL-POINT PEN UPSIDE DOWN, HOWEVER, THE INK CANNOT FLOW ONTO THE ROLLER BALL AND THE PEN WILL NOT WRITE. A PENCIL IS ACTUALLY GRAPHITE, A SOFT, BLACK FORM OF CARBON FOUND IN NATURE. WHEN THE PENCIL POINT IS RUBBED AGAINST THE PAPER, SOME OF THE GRAPHITE IS LEFT BEHIND. GRAVITY DOES NOT AFFECT HOW A PENCIL WORKS. THIS IS A SIMPLE ACTIVITY THAT GETS THE STUDENTS THINKING ABOUT THE EFFECT A WEIGHTLESS ENVIRONMENT HAS ON SIMPLE TOOLS.

materials

- *TWO SHEETS OF TYPING PAPER*
- *HARDCOVER BOOK*
- *BALL-POINT PEN*
- *PENCIL*
- *TWO RUBBER BANDS*

procedures

1. PUT ONE SHEET OF PAPER ON THE BOOK. USE THE PEN AND PENCIL TO WRITE DIFFERENT WORDS.
2. PUT THE OTHER SHEET OF PAPER ON THE BOOK. SECURE THE PAPER TO THE BOOK WITH THE RUBBER BANDS. LIE ON YOUR BACK. WITH YOUR ARMS OUT STRETCHED, HOLD THE BOOK IN FRONT OF YOU.
3. USE THE PEN AND PENCIL AGAIN TO WRITE DIFFERENT WORDS. HOW DO THE PEN AND PENCIL WORK WHEN WRITING UPSIDE DOWN?
4. CAN YOU THINK OF SOME OTHER SIMPLE TOOLS THAT WOULD NOT WORK IN SPACE?



Challenger Center Programs



The internationally acclaimed **Challenger Learning Center** Network currently consists of state-of-the-art, innovative educational simulators located at 49 sites across 29 states, Canada, and the United Kingdom. Staffed by master teachers, the core of each Center is a two-room simulator consisting of a space station, complete with communications, medical, life, and computer science equipment, and a mission control room patterned after NASA's Johnson Space Center. See www.challenger.org for information.

A joint initiative of Challenger Center for Space Science Education, the Smithsonian Institution, and NASA, *Voyage — A Journey through our Solar System* is a space science exhibition project that includes permanent placement of a scale model solar system on the National Mall in Washington, DC, and at locations all over the world. See www.voyageonline.org for information.



Space DaySM launches new *Design Challenges* created by Challenger Center each school year. The inquiry-based challenges are designed to inspire students in grades 4-8 to create innovative solutions that could aid future exploration of our solar system. See www.spaceday.org for information.

Challenger Center's *Journey through the Universe* program provides under-served communities with diverse national resources, including K-12 curriculum materials, teacher workshops, classroom visits by scientists from all over the country, and Family Science Nights. See www.challenger.org/journey for information.



The **MESSENGER** spacecraft (MErcury Surface, Space ENvironment, GEOchemistry and Ranging) is to be launched in 2004 and go into Mercurian orbit in 2009. Challenger Center is one of the partner organizations charged with MESSENGER education and public outreach activities. See www.messenger.jhuapl.edu for information.

Through the Challenger Center **Speakers Bureau, Voyages Across the Universe**, staff members speak to student audiences of 30-1,000, conduct workshops for 100-300 educators, give keynote and featured presentations at conferences, as well as conduct Family Science Nights at the National Air and Space Museum, and other facilities across the nation, for audiences of 300-1,000 parents, students, and teachers. See www.challenger.org/speakers for information.

For information about other Challenger Center programs, or to purchase our classroom resources, visit www.challenger.org/store.