

“What
can we
believe?”

Objectives

Students will:

- read prepared tabloid articles about meteorites.
- determine whether news articles are fact or fiction.

Background

Truth is often stranger than fiction and sometimes it is difficult to distinguish between the two. Newsstands are filled with tabloids thriving on our fascination with the outlandish. Articles pertaining to space and associated subjects are common and sometimes sound plausible. Since many of the things scientists have learned from meteorites are hard to believe, they lend themselves perfectly to this type of media.

Procedure

Advanced Preparation

1. Copy articles from *The Daily Shooting Star* or prepare transparencies.

Classroom Procedure

1. Instruct students to read articles and determine which are fact or fiction. Each may privately record decisions and keep for future reference if this is being used as a preassessment.
2. If desired, take a true/false class vote and keep results for later review.

Note: Just as the scientific study of meteorites leads us to question the early origins of the universe, these articles were designed to engender uncertainty. Competition is not the focus of this exercise.

3. Ask students to justify their decisions on a voluntary basis and allow non-judgmental discussion — students just might have to eat their words otherwise!
4. Upon completion of the unit, repeat steps 1 and 2. Compare the two sets of responses. Requiring justification for answers that changed would be a good assessment tool.

About This Lesson

The Daily Shooting Star uses a tabloid format to generate interest in meteorites. The articles may be used as an introduction or preassessment before any lessons are started, or it may be a final assessment after the units are completed.

Materials

- The Daily Shooting Star* (pgs. 19.3-19.8)
- writing materials
- blackboard and chalk
- overhead projector and markers



Questions

1. Is there one or more specific thing(s) in the article which influenced your decision about its truth or falsehood?
2. Describe articles you have read in the past which remind you of those you just read. What topic was addressed, did you believe the material presented, why or why not?
3. What difficulties might an author of articles about space encounter?
4. Identify concepts in any of the articles which might be considered to be beyond today's technology but within reason in the future.

Extensions

1. Allow students to write their own sensational scientific articles, based upon truth or fiction. Local newspapers often run material related to scientific topics which may be used for the "truth" articles and "the sky is the limit" when composing the fiction. "Yellow journalistic" tabloid articles provide useful models; however, care should be taken. Some of these articles tend to be risqué.
2. Allow students to prepare and present a dramatic presentation of either true or false articles. A showcase might be presented for younger students where the audience votes on whether they believe the dramas to represent truth or fiction. This could be followed by a "confession session" in which actors emphasize the amazingly true vignettes and tell what was wrong with the fictional ones.
3. If it is available, play a tape of the original "War of the Worlds" radio broadcast for the class. If it is unavailable read a shortened version to them. Follow up with information about the panic audiences experienced when this broadcast aired in the late 1930's. Instruct students to compare the response of that first audience to the response they would expect of a modern day audience.
4. Have groups create and perform commercials for products using meteorites, micro-meteorites, etc., claiming an end to baldness, super-human powers, etc. Packaging and promotional considerations may be included.

Tabloid Answer Key

1. True Amateur Astronomer Discovers Comet
2. True Annihilation Narrowly Avoided
3. False Intelligence Enhancing Meteorites No studies have been done, nor has the need for any been confirmed.
4. False Extraterrestrials Hurl Rock at Earth No evidence has been found of extraterrestrial life; however, 65 million years ago an impact did cause massive destruction.
5. False Longevity Secret Revealed No studies have been done.
6. True Giant Impact Thought to Cause Mass Extinctions
7. False Huge Diamond Discovered in Meteorite Although diamond chips have been found in meteorites, none of significant weight has ever been discovered.
8. True History of Solar System Revealed
9. True Oldest Meteorite Found
10. False Phenomenal New Energy Resource Discovered No technology exists for the harnessing of either lightning or streaking meteors.
11. True Microbes from Mars

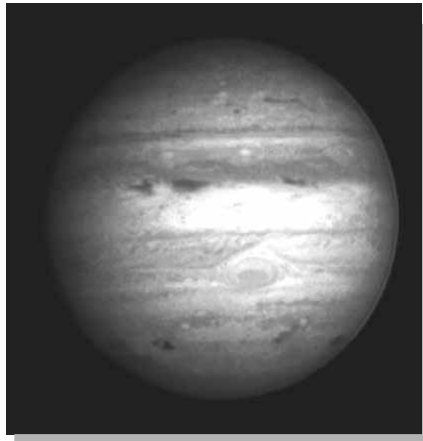
The Daily *Shooting Star*

Amateur Astronomer Discovers Comet

A discovery by an amateur astronomer has focused the world's attention on the most exciting astronomical event in history.

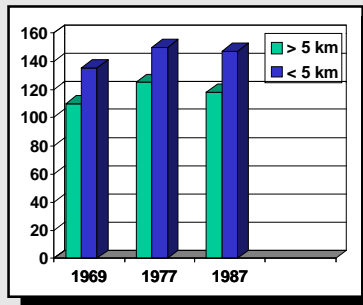
David Levy, using an 18-inch telescope on Mount Palomar, California, discovered a comet which later collided with Jupiter. Surprisingly, seventy percent of all initial comet sightings are made by amateurs. Professional astronomers Carolyn and the late Eugene Shoemaker co-discovered the comet which was designated as Comet Shoemaker-Levy 9.

As the comet approached Jupiter, it was torn apart to resemble a "string of pearls" with at least 17 chunks the size of mountains and thousands of smaller fragments. Scientists are now studying data on these collisions gathered by telescopes and spacecraft located in different parts of the solar system. The orbiting Hubble Space Telescope was aimed at Jupiter during the impact. The results of the impact with Jupiter have far reaching implications for the planet Earth. Could we survive an impact of this magnitude? ★



ANNIHILATION NARROWLY AVOIDED

Scientists recently detected an asteroid, named 1993 KA2, which passed within 145,000 kilometers of Earth. It was spotted by David Rabinowitz, an astronomer in Arizona, several hours after it passed Earth. The asteroid was not detected earlier because of its low visual magnitude. Its estimated mass is about five and one-half tons—about the same as an oil tanker. The asteroid's speed was calculated at 77,000 km/hr., relative to Earth. Most objects aimed at Earth burn up in the atmosphere, but scientists speculate that 1993 KA2 could have created a significant crater had it entered our atmosphere, survived, and impacted. The affects of the collision would have been felt worldwide! In his paper entitled "Collision of astronomically observable bodies with the Earth," G. W. Wetherill concludes, ". . . that impacts of half a km-diameter Earth-crossing objects, energetic enough to produce a 10 km-diameter crater, occur with a frequency of about once every hundred thousand years!" ★



INTELLIGENCE ENHANCING METEORITES

A fifteen year study conducted by an international team of psychologists has determined that fetal exposure to newly fallen meteorites increases I.Q. scores. Scientists became interested in effects from meteorites after Mexican educators, working with 7 child prodigies, discovered that all were born shortly after the Allende meteorite fell there in 1969. A world-wide study was set up encompassing areas within 5 kilometers of meteorite falls occurring between 1977 and 1987. The results strongly indicate that intelligence is affected in developing fetuses by one or more of the atmospheric changes which occur as a result of meteorite impacts. I.Q. scores 20 points above average appear to be common in children whose mothers were exposed to meteorite impact areas during the second trimester of pregnancy. Additional studies are planned. ★

Extraterrestrials Hurl Rock at Earth!

Scientists say they have proof that sixty-five million years ago extraterrestrials hurled a massive rock at the Earth and almost destroyed it! The

the growth of all oceanic organisms.” When asked about the extraterrestrials, Dr. Brashier responded, “I know it sounds far fetched, but Dr. Io has convinced me.”

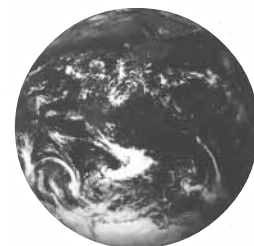


Dr. Io, a theoretical physicist, could not be reached for comment but his assistant told us about

heat and pressure created by the meteorite landing in the ocean injected a vast amount of water vapor into the atmosphere and caused a tsunami over a kilometer high.

“The fossil record proves the tsunami covered the continent with water,” says Dr. Charlene Brashier. “The tsunami instantly killed several species of land plants and animals, but created a vast ocean full of life. The warm water caused by the meteorite impact accelerated

his theory. “The only force strong enough to hurl an asteroid of that magnitude had to be extraterrestrial. The Hubble telescope sent us some very interesting pictures of the planet Venus. On the surface of the planet are many fossils. The fossil remains clearly show the signs of a planet at war.” ★



LONGEVITY SECRET

Revealed

A geographical study conducted by graduate students has linked micrometeorites to longevity. Researcher Doug Jackson, while reviewing data compiled by his longevity study team, noted a significant similarity to a study his wife, Karen, is working on. She is a geology student specializing in micrometeorites.

It was really quite by

accident,” Jackson said. “We were sitting around talking about our work and it suddenly hit me



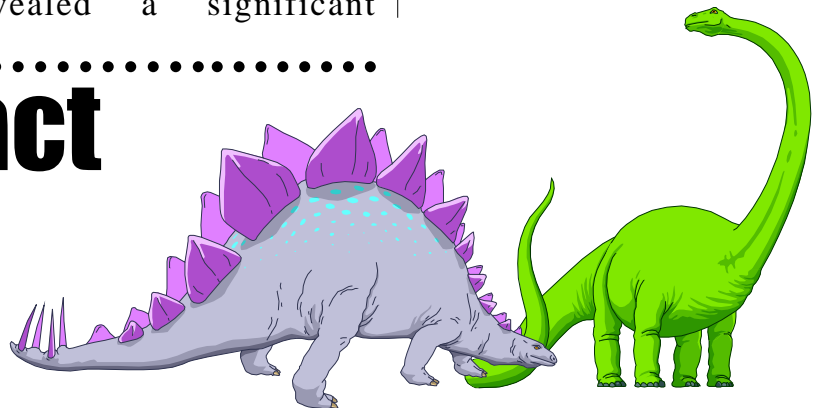
that Karen’s data tables were almost identical to mine.”

Further investigation revealed a significant

relationship between long life and heavy micrometeorite concentrations. “These people have probably been ingesting micrometeorites for years,” Jackson added. Initial studies indicate that a unique nutrient, found in the tissues of centenarians, is a component of most micrometeorites which appears to be the key to long life. Systemic Supplies, Inc. has proposed a patent for vitamins containing the newly discovered nutrient. ★

Giant Impact

Thought to Cause Mass Extinctions



Meteorologists and geologists around the world have confirmed the occurrence of a major catastrophe in Earth’s history which led to the deaths of numerous life forms including the giant sea nautilus.

Scarring of the ocean floor and land on the Yucatan Peninsula identify that area as the site of a huge



have confirmed the occurrence of a major catastrophe in Earth’s

meteorite fall. Fossils found in the area show that massive extinctions occurred as a result of the impact. Not only land inhabitants but also oceanic species were endangered when the lower organisms on the food chain began to disappear. Among those unique creatures lost forever was the giant sea nautilus, a valuable link to understanding adaptations of species.

Scientists regularly undertake worldwide stud-

ies of corings of glacial ice, geological strata, and mature trees to trace climate changes. The percentage of carbon dioxide found in Antarctic ice from that ancient time changed dramatically following the impact of the huge meteorite on Earth. Based on current knowledge of the “greenhouse” effect, scientists recognized the indications of the ancient change in climate. Along

Extinction continued on page 19.6

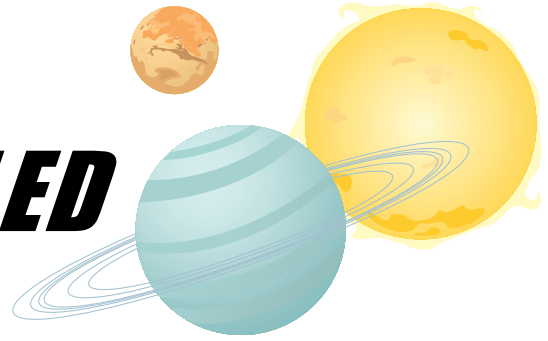
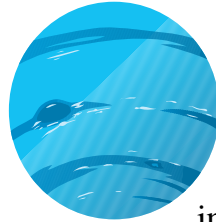
Huge Diamond Discovered in Meteorite

Meteorite researchers at a prestigious scientific institute in Houston, Texas have discovered a massive 6.74 carat diamond in an Antarctic meteorite. Scientists have been collecting meteorites in Antarctica for several years. After collection the samples are packaged and shipped to Houston for scientific analysis. A number of diamond chips have been recovered from meteorites, but the largest total weight to date had been less than .07 carats.

Dr. Lynn Allen, investigative team leader, expressed mixed feelings over the find. "Funding for the Antarctic project will not be such a problem now," she told this reporter. "This stone is obviously very valuable and will enhance the viability of our research. Scientific knowledge is important to many people, but when a dollar figure can be assessed, financiers are more willing to support our work. The sad part is that people who might have willingly relinquished meteorites to the scientific community may be more reluctant to do so now."

Officials have made no decisions as to the disposition of the diamond. ★

History of the Solar System **REVEALED**



Scientists at the Lunar and Planetary Institute have released startling information which supports the theory that the solar system arose from gaseous and particulate matter. This information was obtained through intensive study of meteorites from the Moon, Mars, and the asteroid belts. Dr. Allan H. Treiman states, "Meteorites are the best clues to how the solar system formed. In our labs, we can take meteorites apart and learn just how they were put together, whether it was on the Moon, on Mars, or in a dusty gas cloud orbiting a very young Sun."

Previous studies of rocks have helped scientists understand the Earth's formation. Materials and structure found in Earth rocks and meteorites are very similar. Those similarities led researchers to the conclusion that, as they are learning about how meteorites were formed, they were also learning how other planetary bodies were formed. Just as planets have layers (core, mantle, crust), meteorites discovered on the Earth's surface reveal samples of the same types of layers from other celestial bodies. Though small in size, meteorites provide windows to explore the processes that formed the solar system.

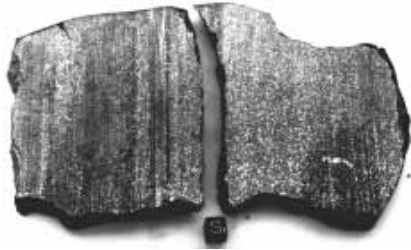
As more meteorites are discovered and studied, scientists feel confident that more information about the origins of the solar system and perhaps life itself will be understood. ★

Extinction continued from page 19.5

with the change in weather patterns, food chains broke down and massive extinctions resulted.

In response to a reporter's questions about what would happen if a similar impact were to happen in modern times, geologist Dr. Virgil L. "Buck" Sharpton quipped, "It would be a real bad day. But it would solve the problems of nuclear proliferation and global warming!" ★

OLDEST METEORITE FOUND



A meteorite which fell in Japan in 861 has been identified as the oldest witnessed fall of which pieces are preserved.

Masako Shima and associates recently presented information to the Meteoritical Society about the Nogata-Shi meteorite, a chondrite. The Nogata-Shi meteorite fell at a Shinto shrine on May 19, 861, by the Julian calendar. It has been preserved at the religious site as a treasure of the shrine in a specially marked wooden box .

Many meteorites have been on the Earth's surface for thousands of years. However, only specimens whose sightings have been documented may be considered in the category

of "observed falls." "It appears to us that observation of this meteorite fall has been handed down by word of mouth," states Akihiko Okada of the Institute of Physical and Chemical Research in Japan.

Scientists had previously considered the Ensisheim stone, which fell in Germany in 1492, to be the oldest witnessed fall. The Nogata-Shi predates the Ensisheim stone by over 600 years and renews speculation about the existence of other undiscovered, preserved meteorites. ★

Phenomenal New Energy Resource DISCOVERED

Lewis Berkeley Lab (LBL) has announced the development of a new process which will harness the vast energy available from streaking meteors.

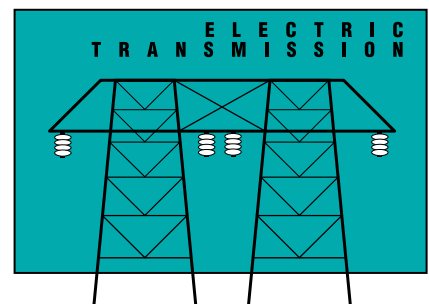
"The technology necessary to construct a functioning plant utilizing this type of power is available now," Dr. Robert Faraday states. "Much

depends upon whether or not utility companies are willing to make this drastic a change in their operations."

Based on techniques used in collecting electricity from lightning flashes, LBL has projected the harnessing of billions of kilowatts of power, during periods of active meteor showers. This could be equivalent to the production of three nuclear power plants. It is estimated that the savings to the consumer would be substantial once the system

has been placed "on line."

No official comments were offered by utility industry representatives, but one was heard to remark after the news conference with LBL, "This is a hare-brained scheme — a waste of public resources." ★



Microbes from Mars !

In August 1996, a panel of scientists revealed a secret held for two years. They unveiled the first evidence of possible life on the Red Planet. The Mars meteorite research team, led by Dave McKay and Everett Gibson, described startling findings in an ancient meteorite which was blasted off Mars and landed in Antarctica. This rock contains organic molecules and microscopic bits of iron oxides like those produced by bacteria. Even more amazing are images of worm-like forms so small that they can only be seen by the most powerful electron microscope. Even though there are other interpretations of each of the pieces of evidence, taken together, “we believe that these tiny guys can be interpreted as (fossil) bacteria,” says McKay.

Reaction of other scientists to the discovery has been skeptical, and in some cases, downright hostile. Some scientists, who have studied the meteorite, say that the carbonate minerals containing these features formed at temperatures too high for life to exist. Ralph Harvey suggests the worm-like forms aren't microfossils, but are elongated iron oxides, formed in volcanic fumaroles too hot to support life. Luann Becker suggests that the organic molecules are produced by contamination in Antarctica.

The debate rages hot and cold. The Life on Mars team continues to collect more data—magnetics and isotope chemistry suggest a cold origin. Meanwhile, the naysayers add more lines of negative



evidence—the fossil-like forms are too small to hold a molecule of DNA. Tim Swindle, who took an informal poll of planetary scientists, says it came out even, with most scientists sitting on the fence waiting for more data. ★

