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Kim Wiens, science teacher at Warren Jr. High School in Bakersfield, California, contributed to this issue's Teacher's Edition.

Science World has a Web site! Visit www.scholastic.com/scienceworld to find issue-related PowerPoint presentations, downloadable Teacher's Editions, article-specific Web links, and more. We'll be updating the site with every new issue. We hope that you will enjoy using both Science World magazine and its Web site.

As always, e-mail any comments or Teacher-to-Teacher tips to us at: scienceworld@scholastic.com.

—The Editors

Features

PAGE	CONTENT	TITLE SUMMARY	NATIONAL SCIENCE EDUCATION STANDARDS	LESSON IDEAS
8	Life: Parasites	Biting Back What's being used to fight bedbug infestations?	Grades 5-8: Regulation and behavior Grades 9-12: Interdependence of organisms	Bedbug numbers are on the rise. Check out the graphing activity on TE 6 to learn more.
10	Earth: Fossils	Teen Dinosaur Hunters California students find and study fossils.	Grades 5-8: Earth's history Grades 9-12: Geochemical cycles	
14	Life: Endangered Species	In Search of Snow Leopards Learn more about this elusive endangered species.	Grades 5-8: Populations and ecosystems Grades 9-12: Behavior of organisms	
18	Physical: Atoms	Saving the Ozone Layer Earth's protective atmospheric layer is on the rebound.	Grades 5-8: Properties and changes of properties in matter Grades 9-12: Chemical reactions	How do CFCs break down ozone? Check out the hands-on activity on p. 21 .

Coming Next Issue

Science Project Success Guide

- The Scientific Method
- Procedure Writing
- Organizing Data

Teacher to Teacher

Tips for using Science World in the classroom

Science World's "I Want THAT Job!" feature informs students about the diversity of jobs available to those with a degree in a science-related field. Each issue profiles a scientist with a cool career and includes information about how teens should prepare for the career, where and for whom they might work, how much they would earn, and the job's daily duties. I save all my issues and have my students do an "I Want THAT Job!" survey. Students work in groups and summarize the facts of about four to eight careers, noting whether or not each career interests them and if so, why. Visit www.scholastic.com/scienceworld to download the survey form.



Kim Wiens





LIFE: Parasites
Biting Back

PRE-READING PROMPTS:

- What is a parasite? What human parasites can you think of?
- What are bedbugs? Do you think that they are a problem in the United States?
- What factors might be allowing bedbugs to spread?

DID YOU KNOW?

- While you may think that bedbugs are attracted to blood, it's actually your body's warmth and the carbon dioxide you exhale while sleeping that lures these mainly nocturnal creatures from their daytime hiding places.
- Bedbugs prefer human hosts, but they have been known to also feed on rodents, dogs, cats, bats, and even birds.
- Unlike head lice, which live on human scalps and hair, bedbugs usually do not live on people. Rather, these pests hide near where people sleep. They seek out places such as cracks and crevices in furniture and baseboards, seams of mattresses and carpeting, and behind loose wallpaper.

CRITICAL THINKING:

- Bedbugs are notorious hitchhikers, and scientists believe that their recent resurgence is due to an increase in people traveling internationally. What are some other pests, invasive species, and diseases that have (or could) come to the U.S. with an unaware globetrotter? What sort of precautions do you think can be taken to avoid the importing of each of these types of undesirables?

CROSS-CURRICULAR CONNECTIONS:

LANGUAGE ARTS: Have your students create an informational brochure about bedbugs that could be placed in travel agent offices and airports. Using some of the Web sites in the Resources section below, students can find information about the life cycle of bedbugs, how to look for evidence of bedbug infestations, and how dogs can help hotels, hospitals, and homeowners stay bedbug-free.

RESOURCES

You can access these Web links at www.scholastic.com/scienceworld.

- The Harvard School of Public Health's Web site answers your frequently asked questions about bedbugs: www.hsph.harvard.edu/bedbugs.
- Check out a slide show about bedbugs at WebMD: www.webmd.com/skin-problems-and-treatments/slideshow-bedbugs.
- The University of California's Integrated Pest Management Web site has information about the life cycle and management of bedbugs: www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7454.html.

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EARTH: Fossils
Teen Dinosaur Hunters



PRE-READING PROMPTS:

- What is a fossil?
- How is a fossil formed?
- Would you want to attend a high school with a museum on its campus and special paleontology classes? What other specialized science classes do you wish your school offered?

DID YOU KNOW?

- The word "fossil" comes from the Latin word *fossilis*, which means "dug up."
- The first nearly complete dinosaur skeleton ever found in the U.S. was that of a Hadrosaurus. While on vacation in Haddonfield, New Jersey, in 1858, amateur geologist William Parker Foulke heard that workers had found a giant bone 20 years earlier. He decided to explore the site, and excavated most of the dinosaur's skeleton over the next several months.

CRITICAL THINKING:

- The fossils that the Webb students study are petrified fossils, where minerals replace an organism's bones. Amber is another type of fossil; it forms when an organism is trapped within a plant's resin and then the resin hardens into amber. Based on this knowledge of how petrified and amber fossils form, how might the information gathered by studying these two types of fossils be different?

CROSS-CURRICULAR CONNECTIONS:

HISTORY/MATH: Create a geologic timeline by taping together sheets of paper to make a 4.6-meter-long (15 feet) strip. The timeline's scale will be: 1 centimeter (.39 inches) = 10 million years. Label the left end "Earth formed" and the right end "Today." Using textbooks or other research materials, mark the length of time on the paper that represents the Cenozoic, Mesozoic, Paleozoic, and Precambrian eras. Take it further by adding major events of geologic time (e.g. K-T extinction) and illustrations of each era's organisms.

RESOURCES

You can access these Web links at www.scholastic.com/scienceworld.

- Check out the University of California Museum of Paleontology's Web site for teacher and student resources: www.ucmp.berkeley.edu/education.
- Visit the San Diego Natural History Museum's Dinosaur Dig Web site: <http://sdnhm.org/kids/dinosaur/index.html>.
- Play games, take quizzes, and more at the American Museum of Natural History's PaleontOlogy Web site: www.amnh.org/ology/index.php?channel=paleontology.

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LIFE: Endangered Species
In Search of Snow Leopards

PRE-READING PROMPTS:

- Snow leopards are big cats that live in the Himalayas. What sorts of challenges would these animals encounter in such a high, rugged terrain?
- The snow leopard is an endangered species. What threats might snow leopards face?
- There is great tension between snow leopards and some local farmers and herders. What might be the source of this tension?

DID YOU KNOW?

- A snow leopard is able to kill prey up to three times its weight. Usually, it hunts wild sheep and goats. Once they successfully catch their prey, snow leopards will eat slowly, taking three or four days to consume the entire animal.
- The snow leopard was declared “endangered” and added to the International Union for Conservation of Nature and Natural Resources’ Red List of Threatened Species in 1972.
- While they are members of the cat family, snow leopards can neither purr continually like small cats can, nor can they roar like most big cats do.

CRITICAL THINKING:

- Snow leopards are rarely seen in the wild, even by people who live in the same remote mountain habitat. Yet, humans are the main threat to their existence. What do you think is the most important strategy for preserving snow leopards? What would you do to help keep the farmers and herders from killing these cats?

CROSS-CURRICULAR CONNECTIONS:

ART: Snow leopards are perfectly adapted to their harsh environment. They have white, yellowish, or smoky-gray fur patterned with dark-gray-to-black spots and rosettes. These markings camouflage them against the rocky slopes, helping them sneak up on their prey. Each cat’s spot pattern is unique and can be used to identify it. Check out the pictures of snow leopards at this Web site: www.snowleopard.org/photos/photogallery, and draw a habitat that you believe reflects this unique patterning.

RESOURCES

You can access these Web links at www.scholastic.com/scienceworld.

- Check out some classroom activities provided by the Snow Leopard Conservancy at this Web site: www.snowleopardconservancy.org/kids/text/activities.htm.
- The Planet Earth “Mountains” segment shows rare footage of a snow leopard hunting prey: <http://dsc.discovery.com/videos/planet-earth-mountains-snow-leopard-hunt.html>.
- Learn more about threatened species at the International Union for Conservation of Nature and Natural Resources’ Web site: www.iucnredlist.org.



PHYSICAL: Atoms
Saving the Ozone Layer

Note to Teachers: In “Hands-On Science” on p. 21, students will act out the key steps in the breakdown of ozone by CFCs. This is only part of the complex interaction among UV light, chlorine, and ozone taking place in the upper atmosphere. While chlorine atoms further break apart oxygen molecules, ozone is also constantly being created and destroyed as UV light strikes pairs and trios of oxygen atoms.

PRE-READING PROMPTS:

- What is ozone? Why is it important?
- A major hole in the ozone layer has formed over one continent. Which continent do you think that is?
- What human activities do you think contributed to the hole in the ozone layer?

DID YOU KNOW?

- Just as the ozone hole expands over Antarctica in the fall, an ozone hole forms over the Arctic Ocean each spring.
- French physicists Charles Fabry and Henri Buisson first discovered the ozone layer in 1913.
- Ozone molecules are constantly being broken apart by ultraviolet light and recombining to form new ozone in the upper atmosphere.

CRITICAL THINKING:

- How is the issue of ozone depletion similar to today’s topic of global warming? Do you think the Montreal Protocol could be used as a prototype to tackle climate change? Why or why not?

CROSS-CURRICULAR CONNECTIONS:

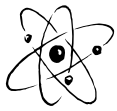
SOCIAL STUDIES: CFCs aren’t the only chemicals to be banned after they were discovered to damage the environment. Last summer, Spokane, Washington, banned the use of phosphates in dishwashing detergents, due to concerns about the chemicals’ effect on the local waterbodies. Should this ban be made national? Split into two groups: those in favor of a national ban, and those against it. For more information on phosphates, check out this site on reducing phosphorus from Washington State’s Department of Ecology: www.ecy.wa.gov/programs/wq/nonpoint/phosphorus/PhosphorusBan.html.

RESOURCES

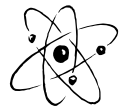
You can access these Web links at www.scholastic.com/scienceworld.

- For lesson ideas using atmospheric data from NASA, go to http://myasadata.larc.nasa.gov/L9_Murphy.html.
- Learn more about what you can do to protect yourself from harmful UV rays, at the EPA’s SunWise Kids Web site: www.epa.gov/sunwise/kids/kids_ozone.html.
- NASA’s Ozone Hole Watch Web site has a multimedia gallery full of ozone-related videos and animations: <http://ozonewatch.gsfc.nasa.gov/multimedia/index.html>.

Name: _____



Science News



DIRECTIONS: Read the Science News section on pages 3 to 7.

Then, test your knowledge by filling in the letters of the correct answers below.

1. How many countries recently agreed to enforce a set of tourism guidelines for people visiting Antarctica?

- (A) 5
- (B) 12
- (C) 27
- (D) 43

2. Which of the following is NOT one of the new guidelines for tourists visiting Antarctica?

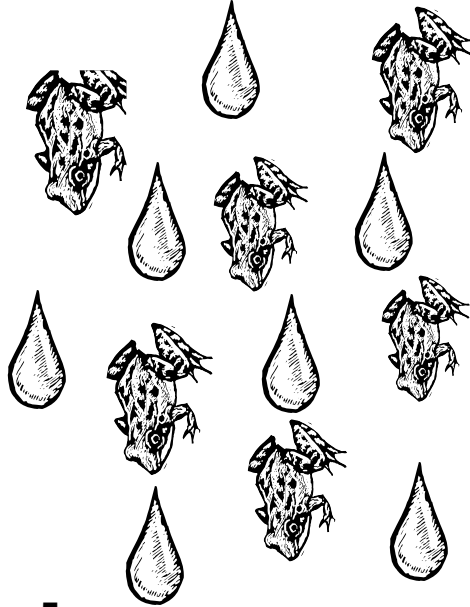
- (A) Only 100 tourists are allowed ashore at a time.
- (B) The number of ships traveling to the region will be limited.
- (C) Tourists must keep a safe distance from wildlife.
- (D) Cruise ships visiting Antarctica must anchor 6 meters (20 feet) from the shore.

3. An animal that relies on the environment to regulate its body temperature is called an ____.

- (A) epidermis
- (B) endotherm
- (C) ectotherm
- (D) isopod

4. Chameleons get vitamin D from ____.

- (A) the foods they eat
- (B) bacteria in their gut
- (C) their skin, which makes the vitamin with the help of sunlight
- (D) both A and C



5. What do scientists think causes unusual things, like frogs and fish, to rain periodically from the sky?

- (A) an invention that controls the weather
- (B) waterspouts
- (C) cargo dropped from planes
- (D) frog and fish eggs evaporated from pond water

6. Which of the following statements about the H1N1 influenza is TRUE?

- (A) The virus is considered to be very virulent.
- (B) Last April, the World Health Organization became concerned that an outbreak of H1N1 could become a pandemic.
- (C) The yearly flu vaccine will protect you from H1N1.
- (D) The first worldwide case of H1N1 was seen in the United States.

7. The H1N1 flu was first identified as a virus that infects ____.

- (A) pigs
- (B) chickens
- (C) humans
- (D) horses

8. The British Steam Car Challenge team's race car is powered by ____ engine.

- (A) an external-combustion
- (B) a solar-powered
- (C) an electric
- (D) an internal-combustion

9. Why are scientists releasing five robot fish into a Spanish port next year?

- (A) to patrol the waters for litter
- (B) to take underwater pictures of shipwrecks
- (C) to scare away sharks
- (D) to sniff out the source of water pollution

10. Which object belonging to a famous scientist was recently put on display at The Franklin Institute in Philadelphia?

- (A) Darwin's diary
- (B) Edison's phonograph
- (C) Galileo's telescope
- (D) Pasteur's microscope

Name: _____

PAGE **8** **Biting Back****DIRECTIONS:** Fill in the blanks to complete the summary paragraph below.

Bedbugs (*Cimex* _____) are small, flat, and _____ in color. Most bedbugs lie low during the day, and come out at _____ to feed on the _____ of sleeping humans. Luckily, bedbugs are not known to spread _____; however, their bites can cause itchy, red _____. They can be very hard to get rid of because they can live for more than _____ without feeding. Three ways exterminators try to kill these pests are: spraying them with an effective _____, heating the rooms to temperatures greater than _____°C (_____°F), or freezing the bugs with _____ spray. Some people have businesses that use _____ to sniff out bedbug infestations.

PAGE **10** **Teen Dinosaur Hunters****DIRECTIONS:** Match the words in the left column with the words or phrases in the right column.

- | | |
|--------------------------|---|
| ____ 1. fossil | a. meat-eating |
| ____ 2. paleontology | b. animal with a backbone |
| ____ 3. vertebrate | c. study of prehistoric life |
| ____ 4. sedimentary rock | d. preserved remains of a once-living organism |
| ____ 5. carnivorous | e. type of rock formed when particles from other rocks are cemented together over millions of years |

PAGE **14** **In Search of Snow Leopards****DIRECTIONS:** Answer the following questions in complete sentences.

- Which one of the snow leopard's body parts make the cat so well adapted to walking through snow? Explain.
- What characteristic of snow leopards makes them so hard to study in the wild?
- What are three reasons that people might kill snow leopards?
- Choose one strategy that Snow Leopard Trust is using to help protect the big cats, and explain how it aims to help prevent their extinction.

PAGE **18** **Saving the Ozone Layer****DIRECTIONS:** Below are five major events related to the creation of the ozone hole and efforts made to save the ozone layer. Read each sentence, then place the letters of the sentences in the order in which they occur, from first to last.

- The ozone layer repairs itself over time.
- Manufacturers use CFCs as coolants in products such as air conditioners.
- The first countries sign the Montreal Protocol, agreeing to phase out the use of CFCs and other ozone-destroying substances.
- A hole in the ozone layer over the South Pole is discovered.
- The amount of CFCs in the atmosphere starts to decline.

First → _____, _____, _____, _____, _____ ← Last

Name: _____

Bedbugs Are Back!

In “Biting Back” (p. 8), you read that bedbugs are making a comeback in cities across the United States. The chart below shows the number of complaints about bedbugs made to the New York City Department of Housing Preservation and Development over a period of five years. Look at the chart and follow the directions below.

Bedbug Complaints in New York City’s Five Boroughs*

*A borough is a subsection of the city.

Borough	2004	2005	2006	2007	2008
Brooklyn	52	665	1,642	2,382	3,401
Manhattan	35	427	1,107	1,729	2,107
Queens	80	562	1,278	1,602	1,927
Bronx	25	193	570	1,117	1,682
Staten Island	0	8	41	59	96
New York City Total	192				

SOURCE: NYC Department of Housing Preservation and Development

Graph It

Calculate the total number of bedbug complaints made in New York City each year by tallying the data for the five boroughs. (We did the first one for you.) Then, create a line graph showing the total number of bedbug complaints made in New York City from 2004 to 2008. Be sure to give your graph a descriptive title and to label the *x*- and *y*-axes.

Analyze It

- Between which two years was the increase in the total number of bedbug complaints greatest?
- Which borough had the most bedbug complaints in 2008? The fewest?
- What was the total percent increase in the number of bedbug complaints made in New York City from 2004 to 2008? (Hint: First, find the increase in complaints from 2004 to 2008. Then, divide that total by the number of complaints in 2004 and multiply by 100. Round your answer to the nearest whole percent.)
- Between which two years was the percent increase in the number of bedbug complaints in Queens greatest? What was the percent increase in that period?

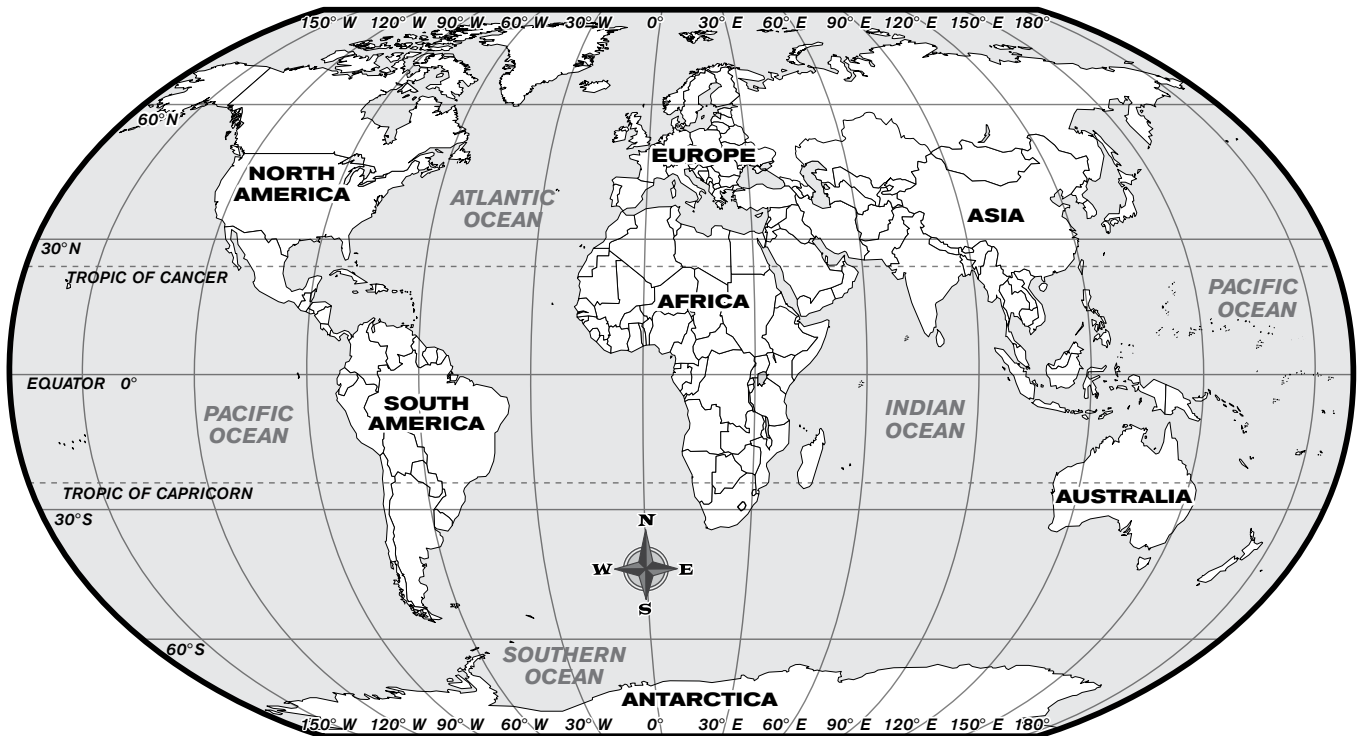
Name: _____

Dig This!

Students in “Teen Dinosaur Hunters” (p. 10) travel to the Rainbow Basin in California to collect fossils, but there are many other places around the world where fossils are found. Use the information in the table (right) of some of the world’s most famous fossil dig sites. Plot the location of each site on the world map (below), then answer the questions that follow.

Location	Types of Fossils Found	Coordinates
Rainbow Basin, California	Camels, horses, and mastodons	35°N, 117°W
Como Bluff, Wyoming	Stegosaurus, Allosaurus, and Apatosaurus	41°N, 106°W
Valley of the Moon, Argentina	Earliest dinosaur fossils, such as Eoraptor and Herrerasaurus	31°S, 68°W
Messel Oil Shale Pit, Germany	Various animals and plants, including the recent find <i>Darwinius masillae</i> , or “ <i>Ida</i> ”	50°N, 9°E
Lyme Regis, United Kingdom	Jurassic sea animals, such as Ichthyosaurs and Plesiosaurs	51°N, 3°W
Olduvai Gorge, Tanzania	Early humans and hominids	3°S, 35°E
Chengjiang Biota, China	Arthropods, sponges, and trilobites	24°N, 103°E
Flaming Cliffs, Mongolia	First dinosaur (Velociraptor) eggs	44°N, 103°E
Edicaria Hills, South Australia	Edicaria, which are the earliest-known multicellular organisms	29°S, 138°E

SOURCE: Dinosaur Encyclopedia, DK Publishing, 2001



Answer the following in complete sentences:

- How many sites are located in the Northern Hemisphere? Southern Hemisphere?
- To what coordinates would you travel if you wanted to see where *Darwinius masillae* was discovered?
- Which site is located closest to the equator?
- If you were in Flaming Cliffs and wanted to go to Chengjiang Biota, in what direction would you have to travel?

ANSWERS

IT'S YOUR CHOICE, p. 17

1. e 2. d 3. b

HANDS-ON, p. 21

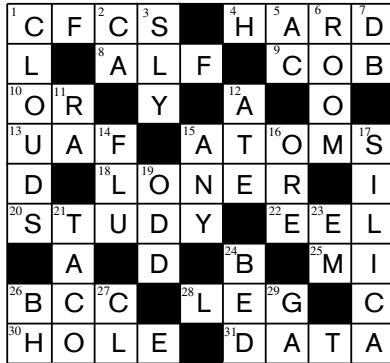
- Answers will vary.
- The chlorine atoms released by the CFCs broke down the ozone molecules.
- If countries had not agreed to ban CFCs in 1987, we would still be adding harmful CFCs into the atmosphere. The extra CFCs and chlorine atoms would break down more and more ozone until there was none left.

YOU CAN DO IT, p. 23-24

Mystery Photo: Erasers.

Explain This!

Are there really busloads of ghoulish skeletons driving through town? No, but there are X-ray machines capable of taking such large pictures from a distance! This X-ray image was taken by a \$5 million machine that is used by U.S. Customs agents to scan passersby at the borders for illegal goods. X-rays are a highly energetic form of electromagnetic radiation. They easily pass through soft particles in the human body, but when the rays hit denser material, such as bone or metal, they are stopped and absorbed. The dense material shows up white on the X-ray film, while the airspace and soft materials appear black.



Brain Teaser: Possible answers include:

- LESS COLD
- LOSS CORD
- LOSE CARD
- LOVE HARD
- MOVE HARM
- MORE WARM

NEWS QUIZ, TE 4

1. c 2. d 3. c 4. d 5. b 6. b 7. a 8. a 9. d 10. c

CHECK FOR UNDERSTANDING, TE 5

Biting Back

lectularius; brown; night, blood; disease, welts; one year; pesticide; 49, 120, carbon dioxide; dogs

Teen Dinosaur Hunters

1. d 2. c 3. b 4. e 5. a

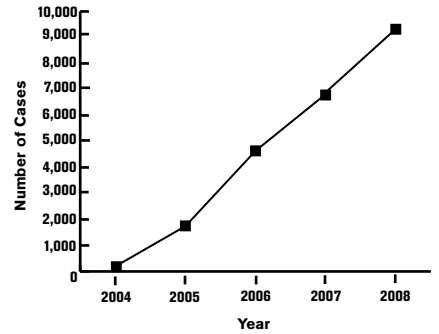
In Search of Snow Leopards

- A snow leopard's large paws act like snowshoes, helping it walk through snow.
- Snow leopards are hard to study in the wild because they are very shy, elusive creatures.
- People might kill snow leopards because the cats eat their livestock, to sell their fur on the black market, or to smuggle their bones to China for use in traditional medicines.
- Answers will vary but may include: Snow Leopard Trust is vaccinating livestock in Pakistan so that if a snow leopard happens to kill an animal, it won't be as devastating for the farmer; it sells Mongolian herders' handicrafts online and at zoos to give the herders additional income; and it has established livestock insurance policies to pay for snow leopard kills.

Saving the Ozone Layer

b, d, c, e, a

Total Number of Bedbug Cases in New York City



- The total number of bedbug complaints made in New York City increased the most from 2005 to 2006.
- In 2008, Brooklyn had the most bedbug complaints and Staten Island had the fewest.
- The total percent increase of bedbugs in New York City from 2004 to 2008 was 4,698 percent.
- With a 603 percent increase, Queens had the greatest percent increase in bedbug complaints between 2004 and 2005.

BEDBUGS ARE BACK!, TE 6

Borough	2004	2005	2006	2007	2008
Brooklyn	52	665	1,642	2,382	3,401
Manhattan	35	427	1,107	1,729	2,107
Queens	80	562	1,278	1,602	1,927
Bronx	25	193	570	1,117	1,682
Staten Island	0	8	41	59	96
New York City Total	192	1,855	4,638	6,889	9,213

DIG THIS!, TE 7

- Six of the dig sites are located in the Northern Hemisphere. The other three are located in the Southern Hemisphere.
- If you wanted to see where *Darwinius masillae* was discovered, you would have to travel to 50°N, 9°E.
- At 3°S, the Olduvai Gorge in Tanzania is the dig site closest to the equator.
- You would have to travel due south to get from the Flaming Cliffs to the Chengjiang Biota.

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