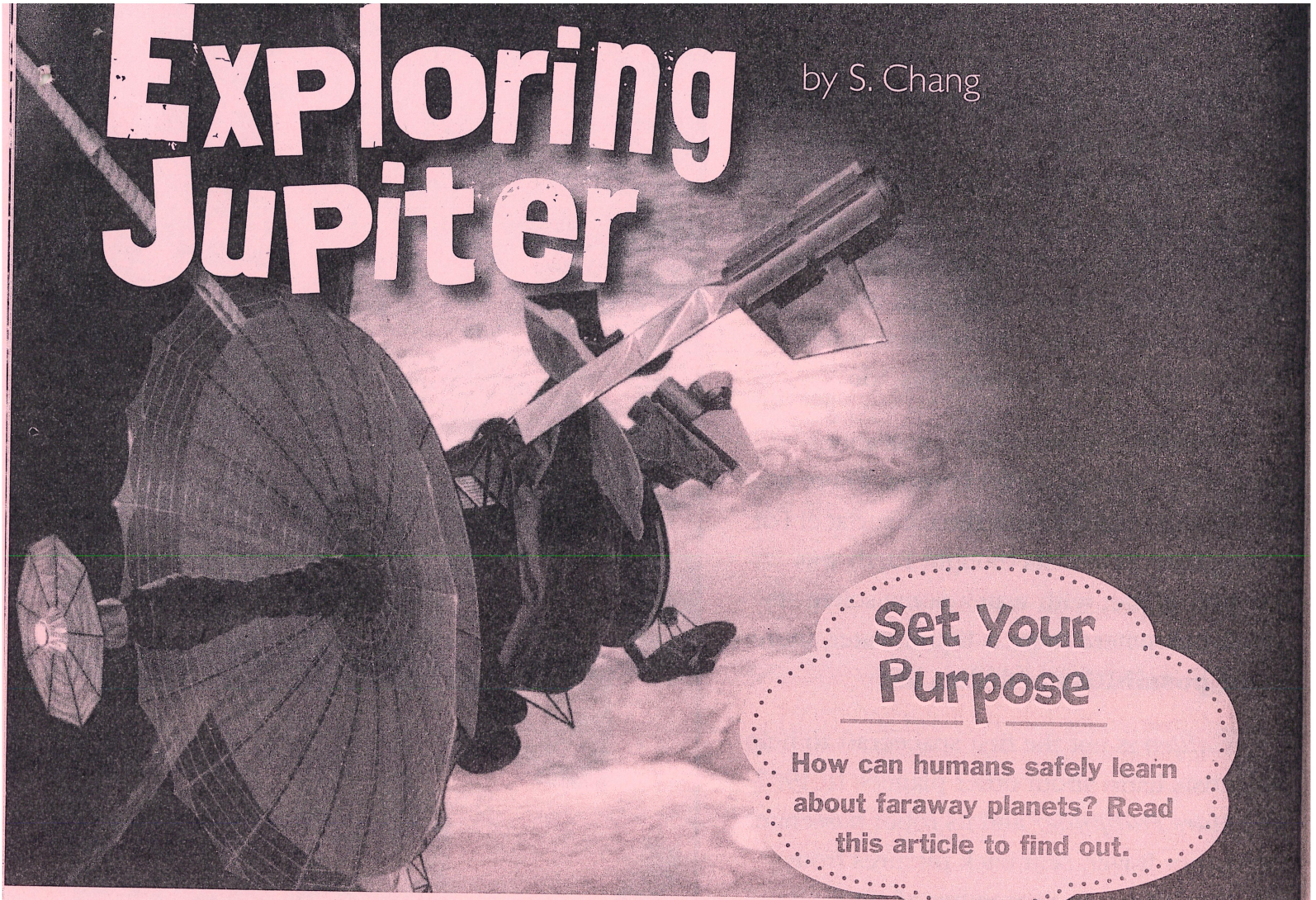
Exploring Jupiter

by S. Chang



Set Your Purpose

How can humans safely learn about faraway planets? Read this article to find out.

Did you hear? There's a storm **raging**. Its wind speeds are up to 250 miles per hour! And this is weird—the storm looks like a giant red spot.

Don't worry. You don't need to run for cover. The big storm is not on Earth. It's on Jupiter—two planets and millions of miles away. You might wonder how we know about weather on a planet way out in space. After all, it would be difficult to send humans to explore a place like Jupiter.

The trip would be dangerous for people. An explorer would need **protection** from Jupiter's poisonous gases. Since Jupiter is mostly made of gas, there isn't any ground for a spaceship to land on. It would take years to get there, so explorers would have to pack enough food and air for a round trip. That's a lot of food and air!

Scientists have a **solution** to these problems. They explore Jupiter and other planets using robots. Scientists stay safely on Earth and send electronic messages far away to **robotic** spacecraft. The messages tell spacecraft to orbit around planets or to land and explore. It's less expensive to send a robot than it is to send humans into space, too. For one thing, robots don't need food or air.

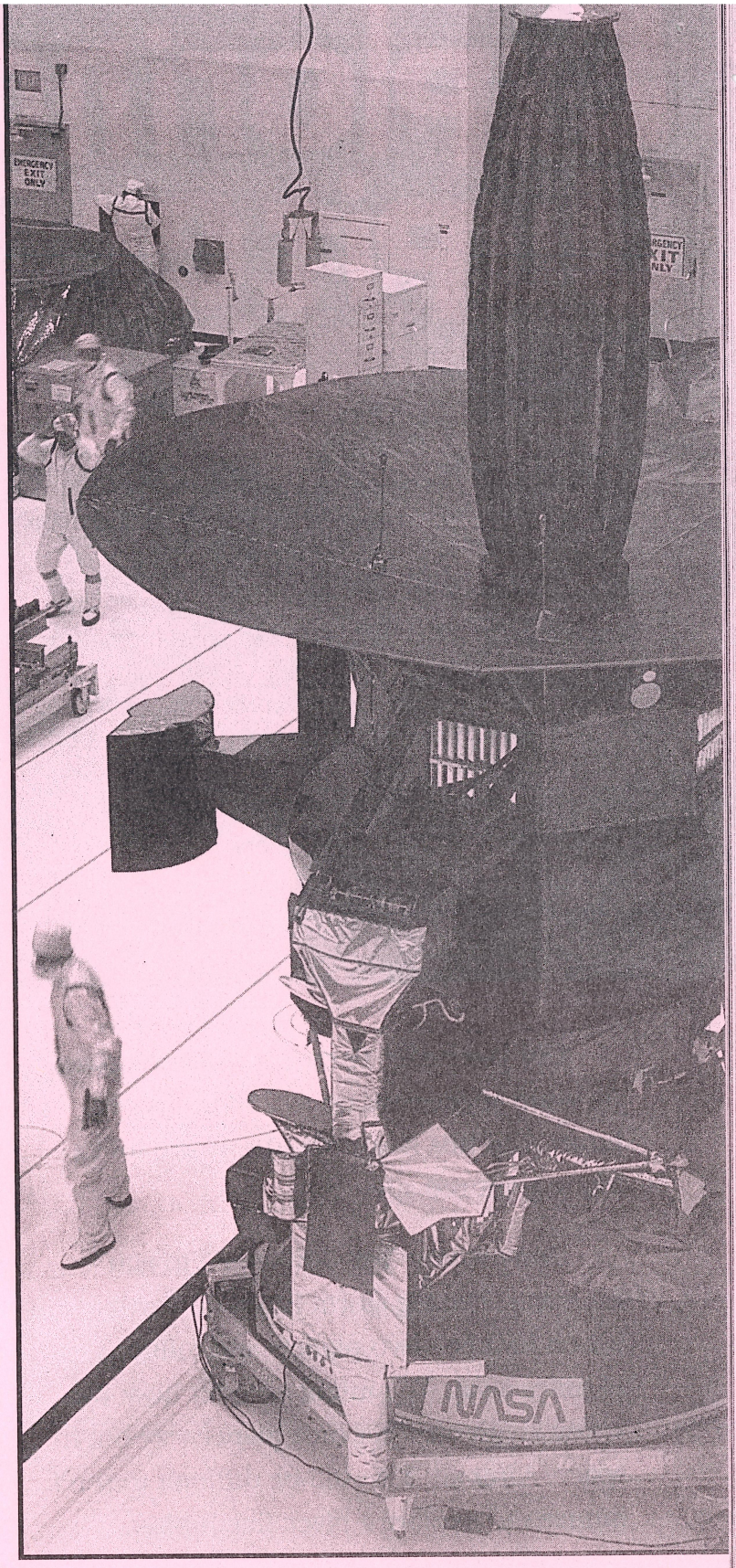
The robotic spacecraft *Galileo* took six years to get to Jupiter. Its 11 instruments collected information. Then *Galileo* beamed the information, including pictures, back to Earth. The spacecraft has helped scientists discover strong winds, lightning, and tornadoes on Jupiter. The spacecraft has studied some of Jupiter's moons, too.

One exciting bit of news was about Jupiter's icy moon, called Europa. There may be an ocean underneath the ice surface! For a long time, scientists thought Earth was the only planet with water. Some scientists think that where there is liquid water, there is the **possibility** of finding life!

Galileo is not the first spacecraft to help scientists learn about other planets. In 1997, the *Mars Pathfinder* and its robot passenger, Sojourner Rover, sent back pictures from the Red Planet. In September of 1998, the spacecraft *Cassini* was traveling toward Saturn at over 50,000 miles per hour. Where will robotic spacecraft take us next? What planet would you like a closer look at?

Think About It

What do you think is the biggest problem humans face when trying to find out about other planets?



Spacecraft *Galileo* at Kennedy Space Center before it was launched to the planet Jupiter.

Name _____ Date _____

Check Your Understanding

Fill in the letter with the best answer for each question.

1. Which is <u>not</u> a problem for human explorers?
- Ⓐ poisonous gases
- Ⓑ dangerous weather
- Ⓒ how to fly a spacecraft
- Ⓓ how to bring enough food and air

2. Which is the best solution that keeps people safe, yet still lets scientists gather information about other planets?
- Ⓐ send people who don't mind poisonous gas
- Ⓑ send robotic spacecraft to collect information
- Ⓒ use powerful telescopes to see planets
- Ⓓ send animals to collect information

3. Which is <u>not</u> a reason for sending robotic spacecraft instead of humans?
- Ⓐ It is more expensive to send humans.
- Ⓑ Robots weigh less than humans.
- Ⓒ Robots don't need to take food and air.
- Ⓓ Robots don't care about danger.

4. What did the spacecraft *Galileo* do?
- Ⓐ orbit the sun
- Ⓑ take passengers to Jupiter
- Ⓒ send electronic messages to other robots
- Ⓓ collect information and beam it back to Earth

5. Why do you think it took *Galileo* six years to get to Jupiter?
- Ⓐ Its instruments did not work properly.
- Ⓑ Jupiter is millions of miles away from Earth.
- Ⓒ It got lost and went to Mars instead.
- Ⓓ It was busy gathering and beaming information on the moon.

Vocabulary

Find each vocabulary word in the selection. The words and sentences around it will help you figure out its meaning.

Fill in the letter with the best definition of the underlined word.

1. There's a storm <u>raging</u>.
- Ⓐ tearing into strips
- Ⓑ leaving
- Ⓒ going out of control
- Ⓓ smiling

2. An explorer would need <u>protection</u> from the poisonous gases of Jupiter.
- Ⓐ type of lotion
- Ⓑ run away
- Ⓒ something that guards or shields against harm
- Ⓓ something that wakes you up

3. Scientists have a <u>solution</u> to these problems.
- Ⓐ mixture
- Ⓑ experiment
- Ⓒ question
- Ⓓ answer

4. Scientists on Earth send electronic messages far away to <u>robotic</u> spacecraft.
- Ⓐ like a machine controllable from a distance
- Ⓑ able to replace humans on Earth
- Ⓒ dangerous
- Ⓓ electronic messages from space

5. There is a <u>possibility</u> of life on other planets!
- Ⓐ reaction to something
- Ⓑ idea
- Ⓒ something that will not happen
- Ⓓ something that could happen

Name _____ Date _____

Word Work

A **suffix** is an ending that changes the meaning of a base word. Knowing the meaning of a suffix helps you figure out the meaning of the whole word. The suffix ***-ous*** means "having." The suffix ***-ful*** means "full of." The suffix ***-less*** means "without."

careless without care

Write a word that fits the definition by adding the suffix *-ous, -ful,* or *-less* to the base word.

1. having poison **poison**_____
2. without air **air**_____
3. having danger **danger**_____
4. full of wishes **wish**_____
5. full of hope **hope**_____

Add the suffix *-ous, -ful,* or *-less* to the base word in dark type to complete the sentence.

6. Scientists cannot be **care**_____ when collecting information.
7. To go to the moon on *Galileo* would be a **wonder**_____ experience.
8. Is there a way humans could live on a **water**_____ planet?
9. I wonder how it feels to be **weight**_____.
10. Daring to go where no one has gone before is a **courage**_____ feat.

Write Now

In "Exploring Jupiter," the writer presents problems and their solutions. The chart shows an example.

Problem	Solution
how to explore Jupiter, which is mostly made up of poisonous gas	use robots

- Plan to write about a fictional trip. It could be to any place—a high mountain, the bottom of the ocean, or even space. Make your own problem-and-solution chart by listing some problems you might run into on your way. Think about how you might solve them.
- Write a few paragraphs describing your fictional trip. Explain some of the problems that you expected and how you came up with solutions to those problems.

Foods With a Difference

by Shelley Francis

Sugar-free beets that still taste sweet, tastier tomatoes, and brighter-colored fruits and vegetables that stay ripe longer are all foods that are being grown now. How can they carry **traits**, such as being tastier, brighter, and riper? They are genetically engineered.

Genetic engineering is like making a change in a recipe. For example, when you make brownies, you mix together all of the usual **ingredients**. If you add an

Set Your Purpose

What happens to your food before it reaches your table? Read this article to find out what's new in the farming business.

extra ingredient, like salt, the brownies will taste differently.

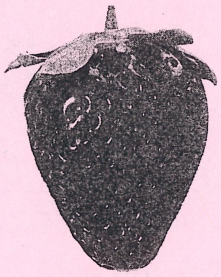
Genes are ingredients in the recipe for life. They carry the traits of living things. Your genes dictate what color hair and eyes you'll have, how tall you'll be, as well as many other traits. Genes carry traits for plants, too. By adding genes to a plant, you can sometimes create new traits. For example, adding a certain gene to a potato plant can make the potato plant **distasteful** to bugs. This makes some farmers happy because they don't have to use chemicals to keep bugs away from their plants.

It sounds great, but some people are **opposed** to the idea of food that is genetically engineered. Ronnie Cummins, from the Campaign for Food Safety, is against it. He says that one of the major **concerns** is allergies. Supermarkets don't always label foods that are genetically engineered. A customer could unknowingly buy food that has an added gene from another plant that he or she is allergic to. It could be dangerous.

Gary Burton from Monsanto, a seed company that engineers food, disagrees. He says his company tests for allergies. Burton believes that genetic engineering is a valuable tool for making better food. The technology can help farmers use less insecticide and grow healthier crops. Burton thinks there are many advantages.

But Cummins says that we just don't know what will happen in the future if we keep adding genes to foods. We could mistakenly create a monster.

People have different opinions about genetic engineering. One side supports it and thinks it will only help us. The other side is opposed to playing with nature and fears unknown danger. Which side do you think is right?



Think About It

How do you feel about food that is genetically engineered? Do you think the possibilities are exciting or scary?

Name _____ Date _____

Check Your Understanding

Fill in the letter with the best answer for each question.

1. In what ways could food that is genetically engineered be a good thing?
   - Ⓐ It is not labeled in the supermarket.
   - Ⓑ It could taste different.
   - Ⓒ It is more expensive.
   - Ⓓ It requires fewer insecticides.

2. In what ways could food that is genetically engineered be a bad thing?
   - Ⓐ We don't know what future dangers this new food could create.
   - Ⓑ Genetic foods will taste bad.
   - Ⓒ You could end up creating new fruits.
   - Ⓓ Tomatoes could be too red to eat.

3. In general, who does not support food that is genetically engineered?
   - Ⓐ people from seed companies
   - Ⓑ farmers who use engineered seeds to grow healthy crops
   - Ⓒ people from the Campaign for Food Safety
   - Ⓓ scientists who create foods that are genetically engineered

4. What do some people believe is a danger of food that is genetically engineered?
   - Ⓐ People will like eating sugar-free beets.
   - Ⓑ People may eat food that contains genes from another food that they are allergic to.
   - Ⓒ Some fruits will stay ripe forever.
   - Ⓓ Farmers will grow better crops.

5. Which sentence best describes how people feel about genetically engineered food?
   - Ⓐ Most shoppers don't care about it.
   - Ⓑ Most farmers oppose it.
   - Ⓒ Most scientists fully support it.
   - Ⓓ People have different opinions about it.

Vocabulary

Find each vocabulary word in the selection. The words and sentences around it will help you figure out its meaning.

Fill in the letter with the best definition of the underlined word.

1. Some foods carry <u>traits</u> such as being tastier, brighter, and riper.
   - Ⓐ features of something
   - Ⓑ bumps on a surface
   - Ⓒ writing utensils
   - Ⓓ long sticks

2. Genes are the <u>ingredients</u> in the recipe for life.
   - Ⓐ liquid things
   - Ⓑ questions
   - Ⓒ recipes
   - Ⓓ parts that make up the whole

3. A certain gene can make a potato plant <u>distasteful</u> to bugs.
   - Ⓐ not appealing
   - Ⓑ attractive
   - Ⓒ inviting
   - Ⓓ look like

4. Some people are <u>opposed</u> to the idea of genetic engineering.
   - Ⓐ in favor of
   - Ⓑ acted positively
   - Ⓒ against
   - Ⓓ misbehaved

5. Allergies are one of the major <u>concerns</u>.
   - Ⓐ things that one cares about
   - Ⓑ things that aren't good
   - Ⓒ things that one can't see
   - Ⓓ things that one is against

Name _____ Date _____

Word Work

A **suffix** is a word part that comes at the end of a base word. Knowing the meaning of a suffix helps you figure out the meaning of the whole word. The suffix ***-er*** means "more." The suffix ***-est*** means "most."

lighter	more light
lightest	most light

Write a word that fits the definition by adding the suffix *-er* or *-est* to the base word.

1. more loud **loud____**
2. most old **old____**
3. most great **great____**
4. more fast **fast____**
5. most sharp **sharp____**

Add the suffix *-er* or *-est* to the base word in dark type to complete the sentence. Write the new word.

6. Her tomato vines grew **high____** than mine.
7. It is the **red____** tomato I have ever seen.
8. These tomatoes stay ripe the **long____**.
9. Is this tomato **small____** than that one?
10. This is the **bright____** tomato ever.

Write Now

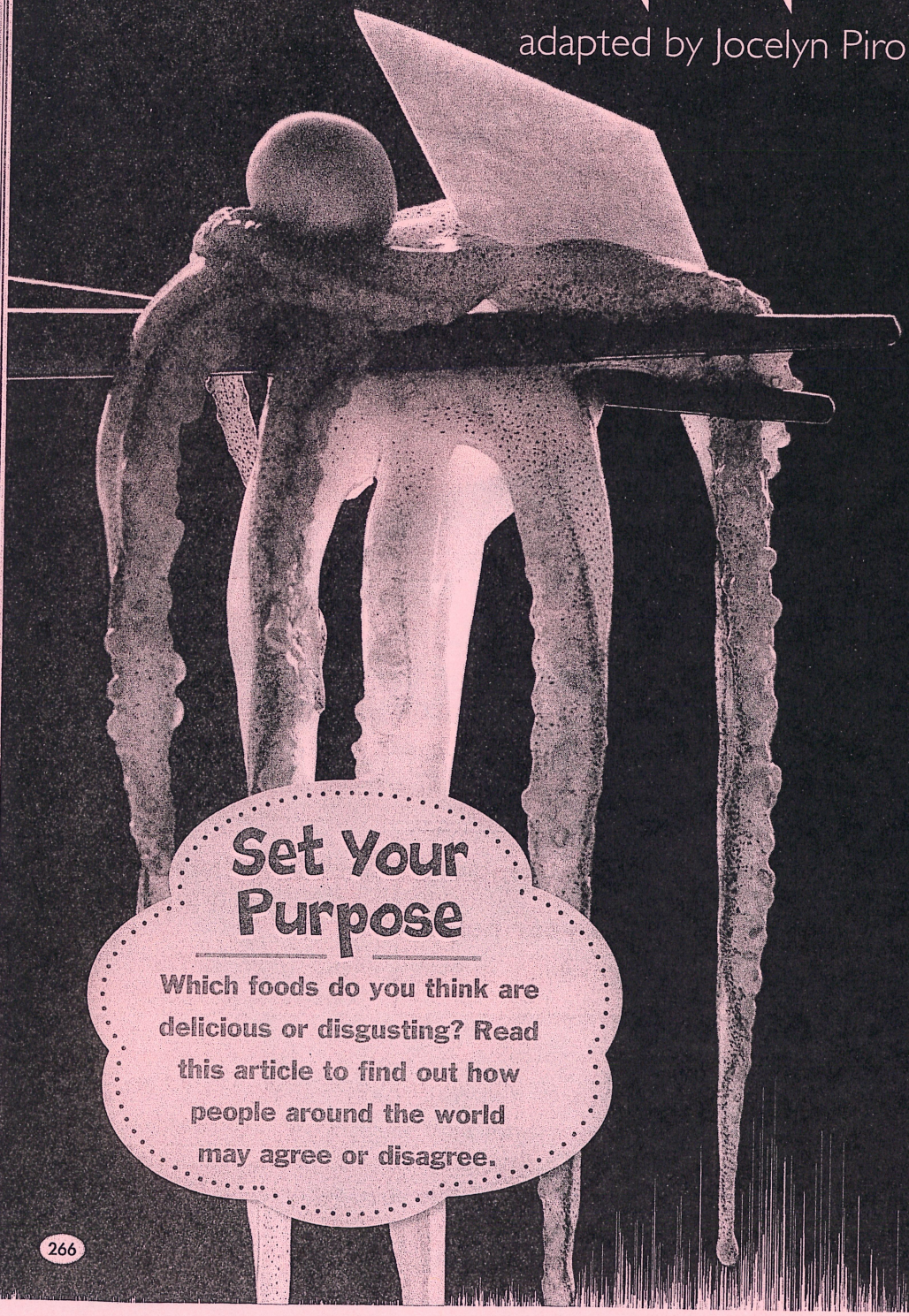
"Foods With a Difference" describes a debate that is going on in the food world. Some people are in favor of food that is genetically engineered, and some people are against it. Both sides have arguments that support their point of view. Look at the chart below.

For	Against
better nutrition	allergies
better crops	unknown dangers
not dangerous	lack of labels in supermarkets

- Plan to write a speech defending one side of an issue. First, think of an issue at school or in your community that has two sides to it. For example, should the school day be one hour longer? Or, should all students wear school uniforms? Make a chart like the one shown. List good arguments for both sides of the issue.
- Choose one point of view and write a speech explaining your opinion. Try to persuade others to agree with you. Use your chart to help you write. Think about how you can answer opposing arguments.

CRUNCHY CRITTERS

adapted by Jocelyn Piro



Set Your Purpose

Which foods do you think are delicious or disgusting? Read this article to find out how people around the world may agree or disagree.

It's time for lunch in Tokyo, Japan. Your friend Hiroshi is eating weird-smelling grilled octopus. "Want a bite?" he asks. "No way!" you reply. You watch the squiggly octopus legs disappear into Hiroshi's mouth. Gross!

But is it really? Octopus is good for you and very **nutritious**. Why not eat it?

On the other hand, Hiroshi is like people in many parts of the world. He grew up drinking very little milk or eating cheese. To him, cheese is just spoiled cow's milk, and that's disgusting! Hiroshi would rather eat a bug than your grilled-cheese sandwich.

Bugs on the Menu

Speaking of bugs, did you know there are millions of people who think insects are **delectable**? In parts of South America, fried grasshoppers are a snack food.

In Madagascar, an island off Africa, people eat fried crickets. In Asia, they like their crickets grilled. People in the U.S. used to eat crickets, too. Food fashions change.

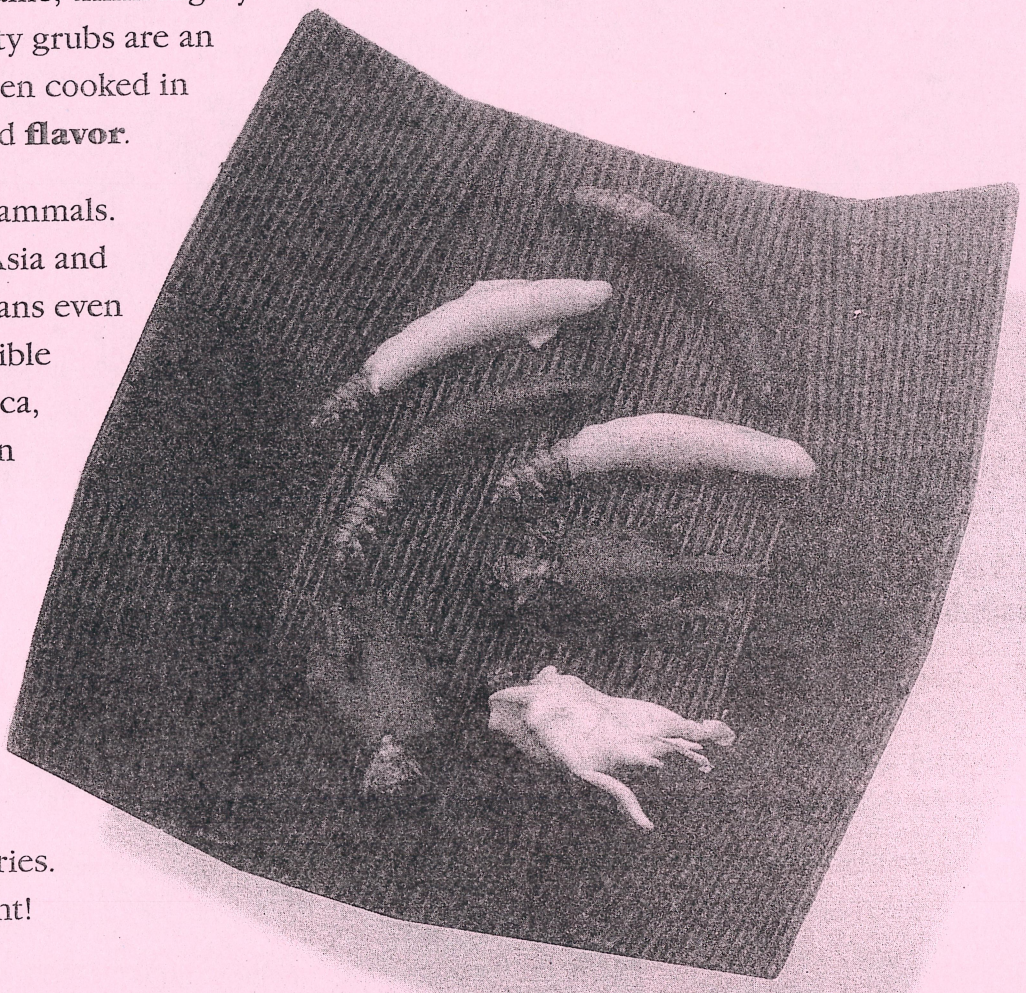
If you don't want your bugs plain, how about **candied**? Children in South Africa were recently served chocolate-covered termites (bugs that eat wood). It was part of a program about insects at the zoo. Chocolate-covered ants have been around for years. You can find them in some fancy food stores.

Think About It

Do you think there are any foods that everyone would agree are delicious?

Good Grub!

The word "grub" is slang for "food," but most of your friends would probably run for home if you served them grubs or worms. Yet in Australia, the aborigines, who lived there before European people came, think highly of witchety grubs. Witchety grubs are an Australian moth larva. When cooked in ashes, they have an almond **flavor**.



Then there are the mammals. Dogs have been eaten in Asia and in Mexico. The Aztec Indians even had a special **breed** of edible dog. In Peru, South America, guinea pigs can turn up on your dinner plate. And in Thailand, people smack their lips over roasted rat.

What you want to eat depends on where you live. You like the foods you grew up with. So do kids in other countries. And that's food for thought!

Name _____ Date _____

Check Your Understanding

Fill in the letter with the best answer for each question.

1. What is the best summary of the selection?

Ⓐ People from other parts of the world have weird taste in food.
Ⓑ People from different parts of the world enjoy different kinds of food.
Ⓒ Asians have better taste in food than Americans.
Ⓓ Eating insects will make you sick.

2. What is the best summary of the section "Bugs on the Menu"?

Ⓐ If you try a different food, you may like it.
Ⓑ Some people eat roasted rats.
Ⓒ Chocolate-covered ants are treats.
Ⓓ People in many parts of the world eat insects.

3. What is the best summary of the section "Good Grub!"?

Ⓐ "Grub" is a slang term for food.
Ⓑ What you like to eat depends on where you live.
Ⓒ People in Peru eat guinea pigs.
Ⓓ People in the United States eat cows.

4. What is a witchety grub?

Ⓐ a slang term for a great meal
Ⓑ a moth larva that is sometimes eaten in Australia
Ⓒ a worm that is sometimes eaten in Asia
Ⓓ a type of toasted almond

5. What is one probable reason why the Japanese like to eat octopus?

Ⓐ Japan is an island, and it is easy to get seafood.
Ⓑ Japan is a place where they can't get hamburgers.
Ⓒ In Japan, they serve octopus at restaurants.
Ⓓ The Japanese enjoy watching the faces of the Americans when someone eats octopus.

Vocabulary

Find each vocabulary word in the selection. The words and sentences around it will help you figure out its meaning.

Fill in the letter with the best definition of the underlined word.

1. Octopus is very <u>nutritious</u>.

Ⓐ sharp tasting
Ⓑ hard to find
Ⓒ neutral
Ⓓ healthful to eat

2. A zoo recently served <u>candied</u> bugs for children to taste.

Ⓐ coated in sugar
Ⓑ lit by candles
Ⓒ bad tasting
Ⓓ canned

3. Millions of people think insects are <u>delectable</u>.

Ⓐ very tasty
Ⓑ weak or feeble person
Ⓒ easily annoyed
Ⓓ supermarket food

4. When cooked in ashes, witchety grubs have an almond <u>flavor</u>.

Ⓐ flame
Ⓑ color
Ⓒ taste
Ⓓ feeling

5. The Aztec Indians had a special breed of <u>edible</u> dog.

Ⓐ incredible
Ⓑ peculiar
Ⓒ able to be eaten
Ⓓ gross

Name _____ Date _____

Word Work

Antonyms are words that have opposite meanings. For example, *good* and *bad* are antonyms.

Read the sentences and the words in the box. Write the word that means the opposite of the word in dark type.

ask disgusting cooked fancy before

1. delicious For some kids, cheese is just spoiled cow's milk, and that's _____.

2. plain You can find chocolate-covered ants in _____ food stores.

3. after You can eat fried grasshoppers for a snack _____ lunch.

4. raw In some parts of Asia, they like their crickets _____.

5. answer If you want to know more about edible bugs, _____ your local zoo.

A **contraction** is two words joined to make one. One or more letters have been left out. The apostrophe shows where the letters were left out.

Fill in the letter of the contraction that is formed by the underlined words.

6. Hiroshi <u>does not</u> want pizza for lunch.

Ⓐ don't Ⓒ won't
Ⓑ can't Ⓓ doesn't

7. <u>He will</u> be happier with a plate of raw fish.

Ⓐ He'll Ⓒ He's
Ⓑ He'd Ⓓ Here

8. <u>Who is</u> hungry? It's time for fried crickets.

Ⓐ Whose Ⓒ Who's
Ⓑ Who'd Ⓓ Who'll

9. <u>They are</u> going to serve us witchety grubs.

Ⓐ There Ⓒ Their
Ⓑ They're Ⓓ They've

10. <u>It has</u> been a long time since I had such delicious boiled worms.

Ⓐ It'd Ⓒ It's
Ⓑ It'll Ⓓ Isn't

Write Now

There are lots of unusual foods described in "Crunchy Critters." People in different countries follow some very different recipes when it's time to prepare a meal. Why not write a recipe of your own?

- Plan to write a recipe. It doesn't have to be serious, and it doesn't have to be edible! First, list the ingredients—the things that will go in your recipe. Be sure to tell how much of each ingredient you need. Then, write step-by-step instructions for putting the recipe together. Don't forget to give your recipe a name!
- Write your recipe. Remember it can be edible or inedible, silly or serious. Have fun!

The earliest kites were made more than 2,000 years ago. We do not know for sure where they came from or who invented them, but the general belief is that the first kite was invented in an eastern region of China called Shandong. As legend has it, a Chinese farmer tied a string to his hat to stop the wind blowing the hat away, and supposedly, the kite was born.

The first kites were made from bamboo frames and silk or paper for covering. There is even some evidence that huge wooden kites were built by Chinese emperors who wished them to be strong enough to carry the weight of a soldier in a time of war.

Kites were first described in around 1295 by the European explorer, Marco Polo. He wrote notes on how to build and fly them.

By the 16th century, kites were well-known and very popular because the kite had become a child's toy. Two centuries later, enthusiasm for this toy was lacking. At this time, scientists used the kite for recording temperatures. In Scotland in 1749, meteorologist Alexander Wilson attached a thermometer to it and sent is up into the sky. Wilson was responsible for the future use of kites in the weather service to record temperatures around the world.

23. When were the first kites made?

A) 1749
B) 1295
C) over 2000 years ago
D) in the 16th century

Answer: _____

Continue

24. The earliest kites were made of _____?

J) bamboo and silk
K) rice paper and sticks
L) sticks and leaves
M) tree branches and paper

Answer: _____

25. It is believed that a Chinese man was the first person to invent the kite. What was his profession?

J) inventor
K) teacher
L) weatherman
M) farmer

Answer: _____

26. Why did the Chinese emperors want the kites to be strong?

A) so that they would not break in high winds
B) to carry men in time of war
C) so that children would not be able to break them
D) to be able to make weather observations

Answer: _____

27. Who was responsible for the use of kites in weather services?

J) Marco Polo
K) a Chinese boy
L) the Chinese emperor
M) Alexander Wilson

Answer: _____

Continue

28. Marco Polo was one of the first people to_____?

A) use kites for weather services
B) write notes on how to build and fly kites
C) invent the first kite
D) study the use of kites in a time of war

Answer: _____

Continue

What are the traits of a dragon? They can be describe as having long, curving neck, nostrils that breathe fire, a tail with pointy spikes and some pretty scary teeth! Are dragons real? No, they are not. They are however, a very popular mythological creature that has remained well-known for generations. Cultures from the Americas to Europe to India and to China all have their own versions of dragon stories, called legends.

No one knows where or when the first dragon stories emerged but we can find evidence of them in the writing of the Ancient Greeks and Sumerians. Dragons were thought of as being very exotic creatures, sometimes very protective and often very dangerous. It was not until the spread of the Christian religion that dragons became associated with Satan and evil.

Perhaps the reason for the creation of the fierce looking dragon came from the huge dinosaur bones found hidden in the ground which no one could explain. These ancient people had no concept of dinosaurs and perhaps they were attempting to understand what these enormous skeletons were all about.

29. Dragons are mythological creatures, which means _____?

A) they are logical creatures
B) they are feared creatures
C) they are friendly creatures
D) they are imagined creatures

Answer: _____

Continue

30. What might the first dragon stories have been trying to explain?

J) Good and evil.
K) Dinosaur bones.
L) God like protector.
M) Religious differences.

Answer: _____

31. Dragons were first thought of as _____?

A) friendly and protective
B) exotic pets
C) protective but dangerous
D) associated with evil

Answer: _____

32. What caused dragons to become associated with evil?

J) the spread of Christianity
K) their dangerous nature
L) the first legends
M) the ancient myths

Answer: _____

Continue

Blinking is one of those involuntary movements we do without realizing it. It is an involuntary nerve action that happens without a person giving the blink command. A blink lasts about a tenth of a second and each time you blink, you are cleaning and moisturizing your eyeball which is very important for your eyesight. Blinking is something we do unconsciously; it is a protective reflex to take care of the eye and clear away any dust particles. When you blink, you spread tears, oils and mucus secretions across the surface of your eye and without these fluids, your eyes would completely dry out.

We also blink to avoid some dangerous elements like bright sunlight, objects coming close to our eyes or if we are suddenly startled. Scientists say that we blink less when we concentrate.

What is amazing is that we do not find ourselves in the pitch black every time we blink. Blinking happens every 2 to 10 seconds and that means about 20 times every minute so that would be a large period of time spent in blackness. Scientists tell us that our brains have a special skill for ignoring these momentary blackouts so your experience of the world is continuous.

33. Why do we not notice darkness when we blink?

A) Our brains have developed to ignore these blackouts.
B) They are too short to notice.
C) Our eyes never fully close.
D) We actually do notice the darkness.

Answer: _____

34. What does "involuntary" mean in the first sentence of the passage?

J) deliberate
K) uncontrolled
L) planned
M) conscious

Answer: _____

Continue

35. What would happen to the eye if we did not blink automatically?

A) it would never see darkness
B) it would need to squint
C) it would tear up
D) it would dry out

Answer: _____

36. When we concentrate, we blink _____?

J) more
K) less
L) the same
M) faster

Answer: _____

37. What phrase best describes the word "unconscious"?

A) without thinking
B) controlled thought
C) hibernating thought
D) malicious thought

Answer: _____

38. How often do we blink?

J) Every 2-10 seconds.
K) About 20 times every minute.
L) About 2-10 times every minute
M) Answers J and K are both correct.

Answer: _____

Continue