Walk the Plank!

W.M. Akers

Walking the plank is not a fun thing to do. Here's how it works. A pirate sticks a long piece of wood off the side of his ship and makes you stand at one end. He puts his sword at your back and bellows, "Walllllk the plank!" You walk across the plank toward the water. When you run out of plank, you fall in the water. Probably there are sharks down there. The ship sails away, and that's the end of you.

The thing is, pirates never really made anyone walk the plank. This may surprise you, since it's in a lot of movies and TV shows. It's a nasty thing to do, and pirates were pretty nasty, so it *seems* like something they would do. But in fact walking the plank was imagined by Robert Louis Stevenson, a 19th century novelist, whose most famous book is *Treasure Island*. A fictional pirate like Long John Silver might make you walk the plank, but a real-life pirate never would.

That is what was going through Tommy's mind as he stood on the end of the plank staring out at his doom. His best friend Jack stood behind him. Tommy felt the point of Jack's wooden sword digging into his back.

"I said, walllllk the plank!" shouted Jack.

"The thing is," said Tommy, "pirates never really made people walk the plank. That was invented by Robert Louis Stevenson, who—"

"I'm a pirate! Do you think I care about books?"

They were standing on the edge of Jack's tree house, which had a lot of uses. Sometimes it was a submarine. Sometimes it was a spaceship. Sometimes it was just a tree house. That afternoon, it was serving as a pirate ship. They had been pirates all afternoon, and everything was going fine until Tommy made the mistake of criticizing his captain. Jack was always the captain, since this was his tree house. And Captain Jack's number one rule was that the crew must never question his orders.

So when the Captain ordered his first mate to hand over three chocolate chip cookies, Tommy was supposed to do so without complaint. But chocolate chip cookies were his favorite. He'd suffered through a whole boring bologna sandwich to get to them, and now that he was finished, Jack wanted to take them away. Tommy didn't care who was the captain. He stuffed all three cookies into his mouth and chewed as fast as he could. And so Captain Jack sentenced him to walk the plank.

"I'm getting tired of waiting, Mister Tommy. Walllllk the plank!"

Tommy looked at the ground. They had jumped out of the tree house tons of times, but it was easy when you had a running start. It would be harder to just walk into thin air. He could see why Robert Louis Stevenson thought this would be a scary thing. There was no way out. Unless…what would a pirate do?

Tommy didn't hesitate. He spun around as fast as he could and kicked his leg into the air. Jack's sword went flying, and before Jack knew what had happened, Tommy leapt onto the sword. He popped up and pointed it at Jack's back.

"Yaaargh!"

"What are you doing?" whined Jack.

"This is a mutiny! I'm the captain now. And I say that you have to walllllk the plank!"

Name: _____ Date: _____

1. What were Jack and Tommy pretending the tree house was?

A an island
B a spaceship
C a submarine
D a pirate ship

2. What is the main conflict in this story?

A Jack wants to eat all the cookies, but Tommy wants to share them.
B Jack wants Tommy to walk the plank, but Tommy does not want to.
C Tommy wants Jack to let him be Captain, but Jack does not want to.
D Tommy wants to stop pretending to be pirates, but Jack does not want to.

3. Read these sentences from the text.

"So when the Captain ordered his first mate to hand over three chocolate chip cookies, Tommy was supposed to do so without complaint. But chocolate chip cookies were his favorite. He'd suffered through a whole boring bologna sandwich to get to them, and now that he was finished, Jack wanted to take them away. Tommy didn't care who was the captain. He stuffed all three cookies into his mouth and chewed as fast as he could."

Based on this evidence, what conclusion can you draw about how Tommy felt?

A Tommy felt neutral and did not mind that Captain Jack wanted the cookies.
B Tommy felt a little sad, but thought Captain Jack was being fair.
C Tommy felt annoyed and thought Captain Jack's order was unfair.
D Tommy felt calm, but thought Captain Jack's order was unfair.

4. Tommy is afraid to walk the plank. What evidence from the text best supports this conclusion?

A "You walk across the plank toward the water. When you run out of plank, you fall in the water."
B "A fictional pirate like Long John Silver might make you walk the plank, but a real-life pirate never would."
C "[Tommy] could see why Robert Louis Stevenson thought [walking the plank] would be a scary thing."
D "Tommy didn't hesitate. He spun around as fast as he could and kicked his leg into the air."

5. What is the main idea of this story?

A While pretending they are pirates, Jack orders Tommy to walk the plank, but Tommy finds a way out.
B While playing pirates, Jack orders Tommy to give him three chocolate chip cookies.
C Although walking the plank is common in movies and TV shows, real pirates would not make someone walk the plank.
D Jack and Tommy enjoy playing pretend in Jack's tree house.

6. Read these sentences from the text.

"So when the Captain ordered his first mate to hand over three chocolate chip cookies, Tommy was supposed to do so without complaint. But chocolate chip cookies were his favorite. He'd suffered through a whole boring bologna sandwich to get to them, and now that he was finished, Jack wanted to take them away. Tommy didn't care who was the captain. He stuffed all three cookies into his mouth and chewed as fast as he could. And so Captain Jack sentenced him to walk the plank.

"'I'm getting tired of waiting, Mister Tommy. Walllllk the plank!'"

As used in this context, what does the word "sentence" mean?

A a kind suggestion
B a complete unit in language
C to order a punishment
D to help or assist

7. Choose the answer that best completes the sentence.

Jack was always the captain _____ this was his tree house.

A however
B therefore
C although
D because

8. What did Tommy do that caused Captain Jack to sentence him to walk the plank?

9. How does Tommy avoid walking the plank?

10. Explain why Tommy decides to become the captain and order Jack to walk the plank. Support your answer with evidence from the text.

Building a Better Natural History Museum

If you could put the history of the world in one building, how would you do it? That is the question posed to curators and scientists at the Smithsonian Institution National Museum of Natural History. One of the world's leading museums, the collections of the National Museum of Natural History are always changing.

The Smithsonian Institution, created in 1846, is the world's largest group of research institutions, museums, and collections. The Institution is the legacy of a British scientist named James Smithson. At the time of his death in 1829, he bequeathed his fortune to the United States under the directive that it be used to establish a research foundation. However, Congress only learned of the donation in 1835, after the estate had initially gone to Smithson's nephew. When his nephew died childless, control of the fortune was rightfully put in the hands of the government. The bequest represented an extraordinary sum of money, approximately $500,000 at the time. President Andrew Jackson sent an American diplomat to England to collect the money, who eventually brought back 105 sacks containing 104,960 gold sovereigns.

Even with all of the money, Congress had trouble getting the project off the ground. Among the points of contention was how to follow Smithson's directive. Smithson had described the institution he envisioned as a place designed "for the increase and diffusion of knowledge." What he meant by that exactly was considered open to debate. And the United States was still a young nation in the mid-19th century, so there were not many museums that had been established. Therefore, very few museums could even act as models for success.

Charles Willson Peale's popular "Cabinet of Curiosities" ("cabinet" really meant "room" in this usage), which had been open for more than forty years, in Philadelphia provided a bit of a blueprint. Peale was a painter and a "naturalist," or a person who studies "natural history." He put together a large collection of botanical, biological, and archaeological specimens for display. His collection eventually became known more formally as the Philadelphia Museum.

After Peale's death in 1827, the collection was split up and sold. P. T. Barnum, the legendary circus impresario, acquired a portion of it. Barnum took some of the so-called "static curiosities" that Peale displayed and supplemented them with live attractions. His "P. T. Barnum's Grand Traveling Museum, Menagerie, Caravan and Hippodrome" was a kind of traveling cabinet of curiosities.

Both Peale and Barnum's collections were, according to historians, legitimate attempts to document the wonders of the natural world. Fossils, animals preserved by taxidermy, mastodon bones, and wax castings of human deformities were all on display. The question of

whether these types of collections were of educational or entertainment value was a matter of debate. In this light, determining what exactly the Smithsonian Institution would be, look like, and provide was still a pressing question for Congress.

What Is Natural History?

Like Charles Willson Peale, Smithson was a naturalist. He was also formally trained in chemistry and mineralogy, and possessed a wide range of interests. His areas of research included the science of human tears and the chemistry of brass and snake venom.

During Peale's time, the sciences had not become as specialized as they are today. "Natural history" was the term that meant the study of the organisms of the entire world. As a field of intellectual inquiry, it has been around for centuries.

The Greek philosopher Aristotle worked on natural history topics that would now fall into the fields of geology, biology, and medicine.

Throughout the Scientific Revolution, which began as early as the 16th Century, prominent natural historians were dedicated to systematizing and classifying plant and animal families.

John Ray, a clergyman, was one of the leading natural historians of the 17th century. He wrote important treatises on the topics of biology, zoology, and botany. His work paved the way for the modern study of taxonomy.

Similarly, Charles Darwin considered himself a naturalist. The avid beetle collector and founder of the field of evolutionary studies observed plant and animal physiology over time. Thus, he added a linear element to the study of the natural world.

In the 20th century, the definition of natural history only broadened. It expanded to include new knowledge of ecology and ecosystem dynamics. The emphasis now is on the study of individuals and their interaction with the environment.

Contemporary authors H. W. Greene and J. B. Losos have written on the topics of systematics—the study of biological relationships of organisms for the purpose of classification—as well as natural history and conservation. They describe natural history as a field of inquiry that "focuses on where organisms are and what they do in their environment, including interactions with other organisms. It encompasses changes in internal states insofar as they pertain to what organisms do."

Other scientists emphasize the impact of evolutionary history in their definition of natural history. This is the idea that the effect of large-scale changes in the past, both within

the genetic history of a species and the climatic history of the environment, can explain behaviors, functions, and traits of an individual organism.

The Bartholomew Award is a prize given to young biologists. The award's namesake, George A. Bartholomew, worked as an integrative biologist. He described his job this way:

> A student of natural history, or a naturalist, studies the world by observing plants and animals directly. Because organisms are functionally inseparable from the environment in which they live, and because their structure and function cannot be adequately interpreted without knowing some of their evolutionary history, the study of natural history embraces the study of fossils as well as physiographic and other aspects of the physical environment.

Wildlife biologist S. G. Herman echoes this idea. He describes natural history as "the field of the scientific study of plants and animals in their natural environments. It is concerned with levels of organization from the individual organism to the ecosystem, and it stresses identification, life history, distribution, abundance, and inter-relationships. It often and appropriately includes an aesthetic component."

Few scientists working today call themselves natural historians. The term "natural history" is applied and tested more as a curatorial concept than a field heading. Organization, identification, history, and interaction—these are the thematic contexts that structure exhibits at natural history museums. At natural history museums around the world, you will find exhibits on subjects ranging from geology to paleontology to biology to botany to astronomy. Many also add exhibits on cultural topics such as anthropology and history.

The National Museum of Natural History

Congress eventually decided to hire a scientist named Joseph Henry to build and direct the collections of the Smithsonian. The institute quickly developed its research collections and specimen holdings, mostly from United States military and exploratory operations. What started as one collection has grown into an organization of 19 museums and galleries. Most of these are in Washington D.C., on the National Mall.

The National Museum of Natural History, as it is known today, is in many ways the lynchpin of the Smithsonian Institution. Founded in 1846, it was first called the United States National Museum and was housed in what was at the time considered a very large building.

The research collections kept growing. Congress approved the construction of the Natural History Building in 1902.

As of the summer of 2013 at the National Museum of Natural History, visitors can find exhibits on the following topics: the genome, ancient Egypt, marine paleogeology, gemology, physical anthropology, marine biology, and agricultural chemistry. Each of these exhibits is vetted by a world-class team of researchers and curators. The goal is to piece together a comprehensive look at the natural processes that have shaped the story of the earth and the organisms that inhabit it.

Name: _____ **Date:** _____

1. Who was James Smithson?

A) an American diplomat who visited England to collect sacks of gold sovereigns
B) a naturalist whose collection became known as the Philadelphia Museum
C) a British scientist who left his fortune to the United States
D) a leading natural historian of the 17th century who paved the way for modern taxonomy

2. Congress hired the scientist Joseph Henry as a solution to what problem?

A) Congress needed more money to build the Smithsonian collection.
B) The Smithsonian needed an exhibit about physical anthropology.
C) Congress had trouble getting the Smithsonian project off the ground.
D) The National Museum needed a new building to house its growing research collections.

3. Read this sentence from the text.
"Congress fulfilled Smithson's request to create an institution 'for the increase and diffusion of knowledge.'"

What evidence from the text supports this conclusion?

A) The Bartholomew Award is a prize given to young biologists.
B) Charles Darwin observed plant and animal physiology over time and founded the field of evolutionary studies.
C) Natural history exhibits around the world involve themes of organization, identification, history, and interaction.
D) The Smithsonian Institution is the world's largest group of research institutions, museums, and collections.

4. How has the study of natural history changed over time?

A) Natural history has grown to include more topics over time.
B) Natural history has become one of the most popular terms among scientists.
C) Natural history has narrowed to focus mostly on ecology and ecosystem dynamics.
D) Natural history has narrowed to focus mostly on evolution.

5. What is the main idea of this text?

A) The Smithsonian Institution includes 19 museums and galleries, most of which are in Washington D.C.
B) The Smithsonian's National Museum of Natural History contains exhibits on a wide variety of topics about the earth and its many organisms.
C) The National Museum of Natural History was founded in 1846 and was housed in a very large building.
D) Natural history owes much to the work of scientists like John Ray, Charles Darwin, H.W. Green, and George A. Bartholomew.

6. Read these sentences from the text.
"Visitors can find exhibits on the following topics: the genome, ancient Egypt, marine paleogeology, gemology, physical anthropology, marine biology, and agricultural chemistry. Each of these exhibits is vetted by a world-class team of researchers and curators."

As used in the text, what does the word "vetted" mean?

A) purchased
B) denied
C) inspected
D) confused

7. Choose the answer that best completes the sentence.
_____ Joseph Henry was hired to direct the Smithsonian, its collections grew quickly from United States military and exploratory operations.

A) Following
B) After
C) Namely
D) Although

8. Describe Charles Wilson Peale's "Cabinet of Curiosities." Include at least two details from the text in your description.

9. Describe P. T. Barnum's "Grand Traveling Museum, Menagerie, Caravan and Hippodrome." Include at least two details from the text in your description.

10. The collections of Charles Willson Peale and P. T. Barnum were two possible models for the Smithsonian Institution.
Which of these models did the Smithsonian follow more closely?

Wonderful World of Wasps

This text is provided courtesy of OLogy, the American Museum of Natural History's website for kids.

Wasps may not be as big as lions or bears, but these insects are among the most successful predators on Earth! Different wasp species have different ways of preying on other animals. Some wasps, called parasitoids, lay their eggs in the bodies of live insects (hosts). As a larva grows, it feeds on the host from the inside out! But humans have little to fear. Wasps are uninterested in people unless their nests are threatened. In fact, wasps prey on many of the insect pests that destroy crops, so they are ultimately beneficial to humans.

With more than 100,000 species, there's a lot to learn about wasps. They fall into two main categories:

- **Social wasps** build nests and live in colonies of up to thousands of individuals. Hornets and yellow jackets are social wasps.
- **Solitary wasps** don't live in large nests with other wasps, but live alone. Some build small nests in the ground or in natural crevices. Others get their nests from other insects. Parasitoid wasps lay their eggs in the bodies of "host" insects, while cleptoparasitic wasps steal insect nests to use as their own.

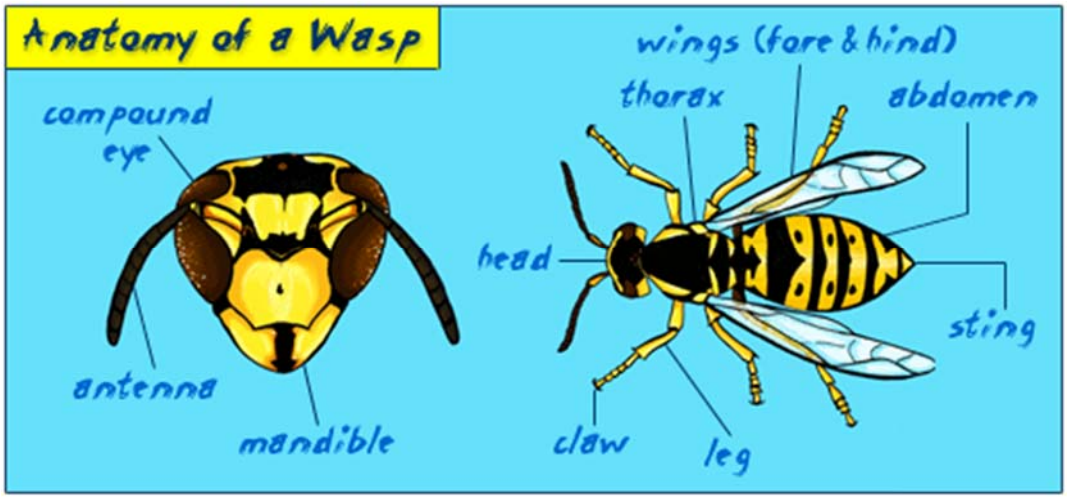


Illustration Credit: Carly Tribull

What's the Big Idea about Marine Biology? Life in the Ocean

This text is provided courtesy of OLogy, the American Museum of Natural History's website for kids.

Illustration Credit: Eric Hamilton (top); Sean Murtha (bottom)

It All Started in the Ocean

Our planet is made up of five great oceans — the Atlantic, the Pacific, the Indian, the Arctic, and the Southern. They're all linked together, creating a huge body of salt water called the World Ocean that surrounds the continents and islands and covers about two-thirds of the earth's surface.

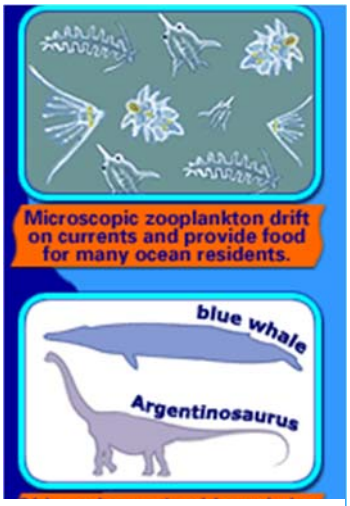


Illustration Credit: Sean Murtha (top); Eric Hamilton (bottom)

Scientists know — from studying tiny fossils — that life on Earth probably started in the oceans nearly 4 billion years ago. For most of Earth's history, life stayed and thrived in the oceans. About 500 million years ago, some living things, like our ancestors, moved out of the water and on to land, but most life stayed in the oceans.

Underwater Wonders

Life in the oceans is much more diverse than life on land; oceans have many more different kinds of organisms. They are full of the biggest, smallest, fastest, weirdest, coolest, and spookiest stuff: whales, phytoplankton, jellyfish, sponges, sea dragons, marlins, giant squid, hatchet fish, seaweed, starfish, sea cucumbers, manatees, coelacanths, and stingrays, to name a few.

Photo Credit: courtesy of California Academy of Sciences, Gerald and Buff Corsi (top); courtesy of AMNH Department of Library Services (bottom)

Just How Do You Live in Water?

Sea organisms need special adaptations for life in water because:

- There's a lot less dissolved oxygen in water.
- Food gets scarce once you leave the continental shelves.
- As you go deeper, pressure increases.
- Water is denser and more viscous than air. It supports weight better, but it's more difficult to move through because it's stiffer.
- As light travels downwards in water, different colors (wavelengths) are absorbed at different depths. Below 2,000 feet, the ocean is completely dark.

What's the Big Idea about Marine Biology? Creatures and Ecosystems in the Ocean

This text is provided courtesy of OLogy, the American Museum of Natural History's website for kids.

There Are So Many Ways to Live in the Sea

Forests and prairies are examples of ecosystems on land. An ecosystem is a community of living things. Members survive by interacting with each other and with their environment. At first glance, the ocean seems like one big ecosystem.

Photo Credit: courtesy of NOAA, Heather Dine (top); courtesy of Florida Department of Environmental Protection (bottom)

Look below the surface and you'll see that there are lots of different kinds of ocean ecosystems — more than on land — all teeming with life. Ocean ecosystems depend on each other for survival.

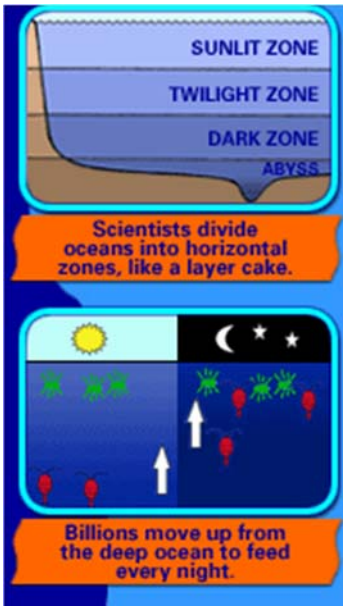


Illustration Credit: Eric Hamilton (top); courtesy of Debbie Steinberg, Virginia Institute of Marine Science (bottom)

Ocean Layer Cake

In the ocean you see a much greater variety of creatures if you move up or down than by moving from side to side.

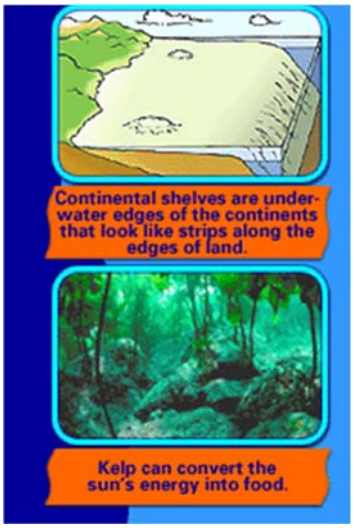
The sunlit zone, near the top, is rich in life. Algae bloom here, providing huge quantities of food for the animals that live here, and for the billions of deep-sea animals that rise to feed here every night and then return to the deep at dawn. This vertical migration is the largest mass movement of life on Earth. And it happens every night!

As you dive deeper, to the colder, darker twilight zone, there's less life. Zooplankton and sea snow provide most of the food for the animals that live here.

Way down deep is the icy-cold dark zone, where signs of life are rare. The pressure of the water would crush a human. It's pitch-black here because no sunlight penetrates. The only light is provided by bioluminescence — glowing lights on animals' bodies.

Life on the Edge

Ecosystems such as coral reefs, mangroves, kelp forests, and estuaries are found along the continental shelves. Eighty percent of all sea life lives here. Why? Because shallow water and closeness to land provide the conditions needed to support large quantities of life: food, light, and shelter. Algae, like kelp and phytoplankton, contain green, brown, and red pigments that enable them to convert the sun's energy into food.



Credit: Eric Hamilton (top illustration); courtesy of Ian Skipworth (bottom photo)

Social Wasp Undercover

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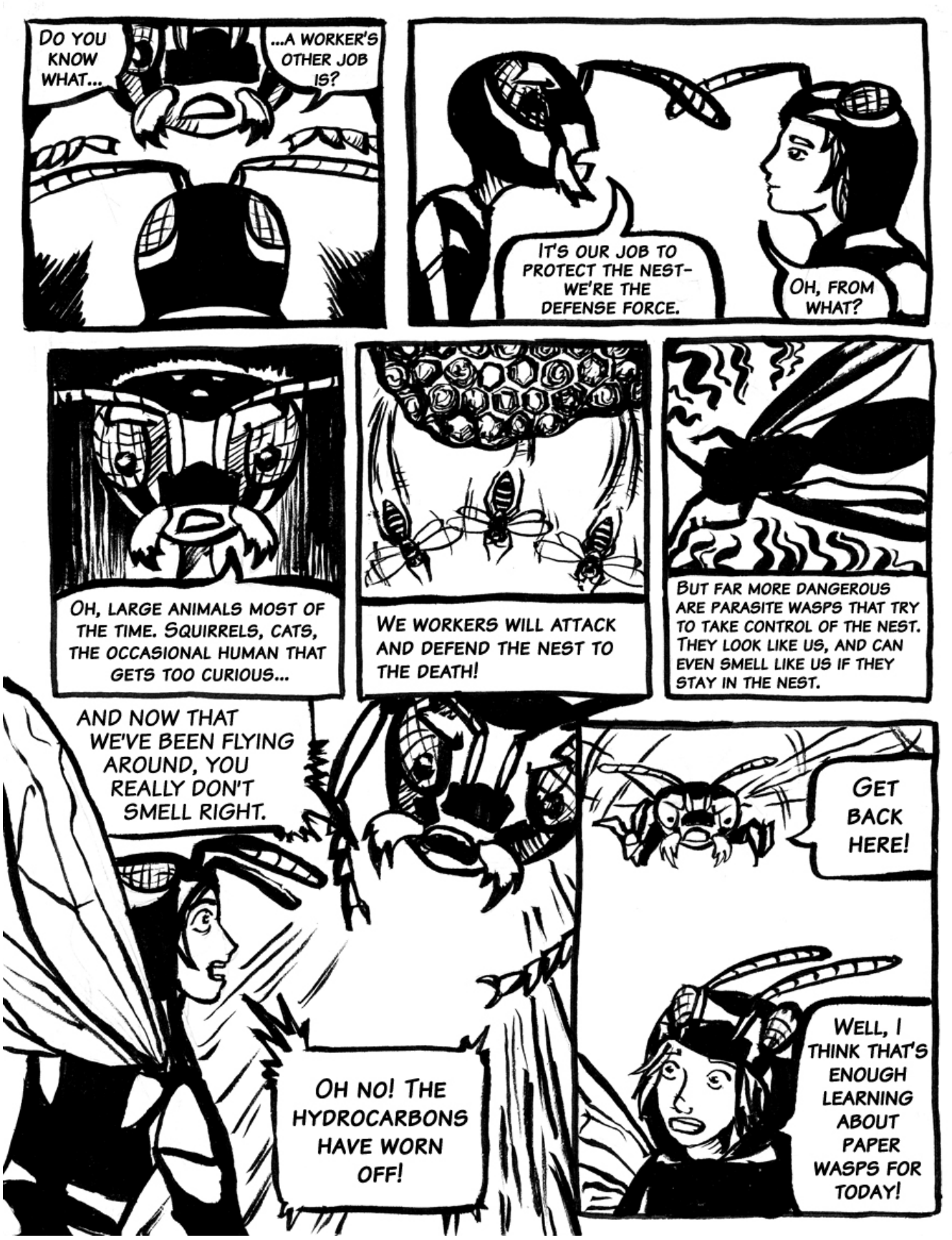
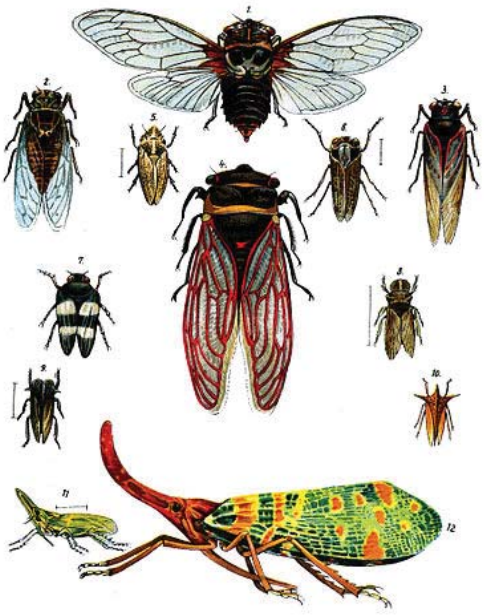
Illustrations by Carly Tribull



Cicadas: No Ordinary Bugs

By ReadWorks



1. Eichenzikade (Cicada plebeja). 2. Mannazikade (Cicada orni).
3. Siebzehnjährige Zikade (Cicada septemdecim). 4. Prachtzikade (Cicada speciosa).
5. Weidenschaumzikade (Aphrophora salicis). 6. Minierzikade (Cixius nervosus).
7. Gebänderte Stirnzikade (Cercopis bivittata). 8. Ohrzikade (Ledra aurita).
9. Dornzirpe (Centrotus cornutus). 10. Langhornzikade (Triquetra grossa).
11. Europäischer Laternenträger (Dictyophora europaea).
12. Chinesischer Laternenträger (Fulgora candelaria).

Cicadas are not ordinary bugs. They live in groups known as broods, which are like families. Every brood has a different cycle and stays in the same area for life.

Cicada broods are found all over the world. Each one is assigned a roman numeral. Depending on their broods, cicadas have different life cycles. In the United States, there are 15 different broods. Most of them are on a 17-year cycle. However, three have a 13-year cycle.

Most of their lives are spent deep underground. Once they are almost fully grown, cicadas crawl up to the earth's surface and emerge above ground to mate. After hurriedly mating and laying eggs for the next generation, they die soon thereafter.

With their large, red, fiery eyes, cicadas might look scary. Yet they are harmless. They can't sting or bite. Like all insects, they have three body parts: the head, thorax, and abdomen. They have short, bristly antennae. Their bodies are generally dark-colored. Sometimes their clear wings have orange veins. Adult cicadas grow to about one to two inches long and have six jointed legs. They are some of the noisiest creatures on earth.

The reason that cicadas are so noisy is the male bugs call out to the females to attract a mate. It's a competition where each male tries to call louder than other males. When a whole brood sings at the same time, the large chorus can sound like a roar.

Female cicadas stay busy laying their eggs in trees. A single Brood II female can produce as many as 600 eggs. Once the eggs drop to the ground, young cicadas, known as nymphs, are born. Soon after, the baby nymphs travel within the earth for nourishment. They dig as far as two feet deep and stay underground until they are almost mature enough to mate.

Brood II and Brood X cicadas keep growing beneath the earth until the spring of their 17th year. Then they start to crawl back to the surface. To prepare for their return above ground, the nymphs build small cones, like tunnels, that stick above the soil. Soon after they reach the surface, the nymphs shed their skins to grow larger. This process is called molting, and it transforms the nymphs into adults, ready to mate. But shortly after reproducing, they die. Their young dig into the earth, only to emerge in another 17 years. So the cycle repeats again and again.

In 1970, cicadas from Brood X invaded Princeton, New Jersey. When the famous songwriter Bob Dylan was awarded a special degree at Princeton University, the bugs were so noisy the musician wrote a song about them. Since he thought he was hearing locusts, he called the song “Day of the Locusts.” Here are some of the words to the song:

As I stepped to the stage to pick up my degree
And the locusts sang off in the distance
Yeah the locusts sang such a sweet melody

One of the last appearances of Brood X was during 1987 in Princeton. Then they emerged again in 2004. Brood X is found in American states, including Illinois, Michigan, New York, and Georgia. Cicadas have "a tendency to be homebodies and do not travel far beyond the region in which they come out,” said Princeton ecology professor Henry Horn.

Most cicadas on the east coast of the United States belong to Brood II. They live in an area that stretches from Connecticut in the North down to North Carolina in the South. Brood II last appeared in 2013. In northern states such as New Jersey, this happens around early June when the temperature warms up to about 64 degrees. Once the nymphs crawl out above ground, they find a leaf on which to perch. Then they transform and turn into winged adults capable of flying around and reproducing.

Name: _____ **Date:** _____

1. Where do cicadas spend most of their lives?

A) in trees
B) on the ground
C) underground
D) in bushes

2. Which of the following shows the correct sequence of events in the lives of Brood II cicadas as described in the passage?

A) Next generation hatches; young cicadas emerge from underground; adults mate and lay eggs; nymphs transform into winged adults; adults die.
B) Nymphs make their way to the surface of the earth; nymphs transform into winged adults; adults mate and lay eggs; adults die.
C) Nymphs transform into winged adults; adults mate and lay eggs; next generation hatches; young cicadas emerge from underground; adults die.
D) Adults die; next generation hatches; adults mate and lay eggs; young cicadas emerge from underground; nymphs transform into winged adults.

3. Read the following sentences from the text:
"The reason that cicadas are so noisy is the male bugs call out to the females to attract a mate. It's a competition where each male tries to call louder than other males."

What can be concluded about female cicadas based on this information?

A) Female cicadas choose mates that have the loudest call.
B) Female cicadas are louder than male cicadas.
C) Female cicadas choose mates that have the largest abdomen.
D) Female cicadas choose mates that prove themselves to be the strongest.

4. Which of the following conclusions about cicada broods is supported by the passage?

A) All cicada broods emerge from the ground at the same time.
B) We cannot accurately predict when a cicada brood will emerge.
C) Broods on a 13-year cycle are larger than broods on a 17-year cycle.
D) Different broods on 17-year cycles can emerge at different times.

5. What is this passage mostly about?

A) cicada broods around the world
B) how cicadas help plant life
C) the life cycle of cicadas
D) Bob Dylan's "Day of the Locusts"

6. Read the following sentences:
"Most of their lives are spent deep underground. Once they are almost fully grown, cicadas crawl up to the earth's surface and **emerge** above ground to mate. After hurriedly mating and laying eggs for the next generation, they die soon thereafter.."

What does "**emerge**" mean?

A) grow bigger
B) transform
C) hide under
D) come out

7. Choose the answer that best completes the sentence below.
Male cicadas call out to female cicadas to attract a mate, and each male tries to call louder than the next. _____, a brood of cicadas can be extremely noisy.

A) As a result
B) Although
C) For example
D) Previously

8. How long is the life cycle of Brood X?

9. Describe the life cycle of a Brood X cicada.

10. Based on the text, explain why cicadas spend most of their lives underground. Use information from the text to support your answer.

Spinning Thunderstorms

This article is provided courtesy of the American Museum of Natural History.

On a spring night in 2007, disaster struck a small town in Kansas called Greensburg. Shortly before 10 p.m., a siren went off. A mile-wide tornado was approaching Greensburg. And it wasn't just any tornado. It was a category EF5, the most powerful kind there is.

Its winds were estimated to be more than 200 miles per hour. In less than ten minutes, the town was destroyed and ten people lost their lives.

When the fury had passed, people clambered through the rubble. Cars and trucks had been thrown about. Homes were crushed, or simply ripped from the ground. "I'm in downtown Greensburg. There's really nothing left," said one resident.

Credit: FEMA Photo by Michael Raphael
The tornado destroyed much of the town. Many residents needed temporary housing.

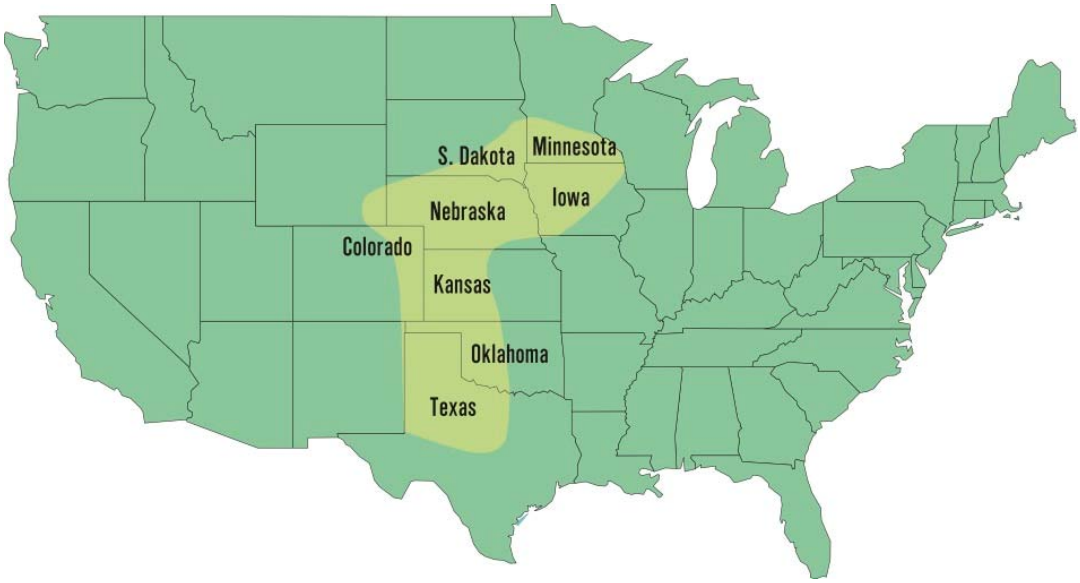
How do tornadoes form?

A tornado is a swirling, funnel-shaped column of wind that gets its start from a thunderstorm. Thunderclouds form when warm, wet air collides with cool, dry air. Then, strong winds form into a wide tube of spinning air. When the tube touches the ground, it becomes a tornado.

Credit: NOAA
A tornado is a swirling, funnel-shaped column of wind. It stretches from a thunderstorm cloud down to the ground. A tornado gets its start when strong winds at high altitudes set a thunderstorm's winds rotating.

Credit: The Field Museum
The 200-plus-mph winds of a tornado can bend a stop sign.

Kansans are used to tornadoes. The people of Greensburg live smack in the middle of "Tornado Alley," an area that spans eight states in the Central United states. This region is a perfect thunderstorm factory. It has just what storms need to get started: cool, dry air from the Arctic mixing with warm, humid air from the Gulf of Mexico. Above the flat Great Plains, far from mountains and coastal weather, thunderstorms can form undisturbed. These conditions spawn more than 600 tornadoes, on average, in "Tornado Alley" every year.

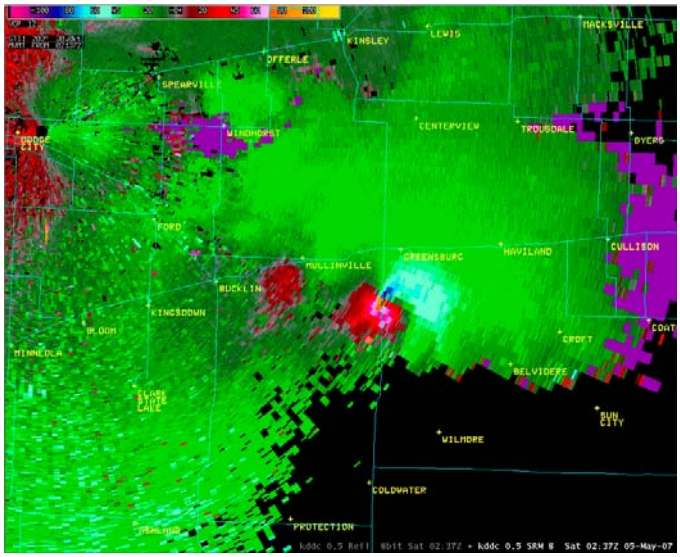


Credit: The Field Museum
More than 75% of all tornadoes in the world take place in "Tornado Alley."

How do scientists predict dangerous storms?

Meteorologists are scientists who study and forecast weather. They use a technology called radar to track storms. Weather radar works by detecting the precipitation (rain, snow, or hail) in approaching storms. The radar unit sends out a radio wave towards the storm. The radio wave bounces off the raindrops, hail or snow that is in the storm, and then returns to the radar unit. The amount of time it takes for the wave to return tells meteorologists how far away the storm is. Most radar units send out about 1,000 radio waves per second. This gives them detailed, up-to-the-minute information about the storm.

Using radar, forecasters can track the formation and path of severe storms like tornadoes. When a tornado takes shape, its winds blow raindrops in a circular pattern. When scientists see that pattern on a radar screen, they know that a tornado is developing. Although tornadoes have fast swirling winds, tornadoes themselves move relatively slowly across the land (18-30 miles per hour). So scientists can make reasonable forecasts about where they are headed. A system of tornado watches and warnings are used to alert the public to danger. A tornado "watch" means thunderstorm conditions exist that could spawn tornadoes. A "warning" means a tornado has touched down and been spotted.



Credit: NOAA
Doppler radar map shows the tornado shortly before it leveled most of Greensburg, Kansas.

This system saved many lives in Greensburg. After the tornado sirens shrieked, people had 20 minutes to escape to their basements and storm shelters before the tornado destroyed their town.

Name: _____ Date: _____

1. What happened to the town of Greensburg in 2007?

A It was destroyed by a fire.
B It was destroyed by a tornado.
C It was destroyed by a hurricane.
D It was destroyed by an earthquake.

2. What does this article explain?

A how scientists use radar to track storms
B how the town of Greensburg was rebuilt
C how the system of tornado watches and warnings developed
D how cool, dry air moves from the Arctic to the middle of the United States

3. Read this sentence from the article: "Kansans are used to tornadoes."

What evidence in the article supports this statement?

A The tornado that destroyed Greensburg was a mile wide and had winds that were moving faster than 200 miles an hour.
B A tornado came through Greensburg and destroyed the town 20 minutes after tornado sirens went off.
C Kansans live in an area of the United States where a lot of tornadoes happen.
D "Tornado Alley" has cool, dry air from the Arctic that mixes with warm, wet air from the Gulf of Mexico.

4. What might be a reason why scientists track tornadoes?

A to encourage more people to use radar technology
B to warn people against living in "Tornado Alley"
C to lower the number of tornadoes that happen every year
D to gather information that is used to warn people that a tornado is approaching

5. What is the main idea of this article?

A Tornadoes are dangerous spinning storms, but storm tracking and a system of watches and warnings can lessen their danger.
B "Tornado Alley" is an area in the middle of the United States where cool, dry air mixes with warm, wet air.
C The tornado that struck Greensburg threw cars and trucks through the air, pulled homes out of the ground, and killed 10 people.
D Radio waves give scientists information about approaching storms by traveling from a radar unit toward a storm and then returning to the radar unit.

6. Why might the author use headings such as “How do tornadoes form?” and “How do scientists predict dangerous storms?”

A to make readers think more deeply about the effects of tornadoes
B to suggest that there is still a lot to be learned about tornadoes
C to provide information about the pictures included with the article
D to help organize the information in the article

7. Select the word that best completes the sentence.

A tornado warning saved many lives in Greensburg _____ the town itself was destroyed.

A after
B although
C because
D for example

8. What is a tornado?

_____

_____

_____

_____

9. Explain how radar could be used to track a tornado. Support your answer with evidence from the article.

_____

_____

_____

_____

10. Could using radar to track a tornado help save lives? Explain why or why not, using evidence from the article.

_____

_____

_____

_____

Honey to the Bee

Bees are flying insects that feed on nectar and pollen. They are usually yellow and black and covered in fuzzy hair that makes collecting pollen easier. A bee's body is similar to that of other insects—for instance, an ant—with three major sections: the head, the middle section called the thorax, and the last section called the abdomen. The head of a bee has five eyes for seeing and two antennae for touching and smelling. Two sets of wings and three sets of legs can be found on a bee's thorax. Depending on the type of bee, the last set of legs might have little sacs that store the pollen that the bee has collected from flowers. Many types of bees have stingers. The bee stinger is the most feared part of a bee, and for good reason. Filled with poison, the stinger is a bee's protection from danger. The stingers are around 12 millimeters long. There are over 20,000 known bee species in the world. The best known is probably the honeybee.

Honeybees live in beehives, which have a distinct order that helps things run smoothly. At the bottom of the totem pole are the workers. Workers are young female bees. Some of their main duties include going out to find food (nectar and pollen), building the hive, and keeping it clean. Honeybees will travel up to eight miles if necessary to find nectar and pollen to bring back to the hive. Worker bees are actually the only bees that ever do any stinging. When this does happen, it is usually because they are trying to protect their hive from harm. A bee rarely stings when it is away from the hive, but it might sting if it senses danger. The lifespan of a worker bee is anywhere from 4 to 9 months.

The queen honeybee is the biggest bee in the hive. There is usually only one per hive, and her job is to grow the family by laying eggs that will become the next generation of honeybees. She lays over a thousand eggs per day and can live anywhere from 3 to 5 years. When the time

comes for a new queen to take over, some larvae are placed in special chambers to grow queen bees. After they hatch, they are fattened up with royal jelly, a nutritious substance that worker bees secrete. It usually takes about two weeks for a newly hatched female bee to grow into a queen bee. The first female bee to become a queen bee kills the other potential queen bees.

Male honeybees are called drones. They don't have stingers, and they don't collect nectar or pollen. Their only purpose is to mate with the queen. Several hundred drones can live in a hive at one time. As the winter months approach, the males are kicked out of the hive in order to make it easier for the queen and her workers to survive. Food needs to be saved as there are fewer flowers to collect pollen and nectar from. Less food means the drones are the first ones to go!

Name: _____ Date: _____

1. What is a bee?

A an insect that lives near water and eats fish
B a red-and-black insect that lives under the ground
C a flying insect that collects nectar and pollen
D a crawling insect with two sets of legs and no wings

2. What does this passage describe?

A wings, legs, mouths, and trees
B totem poles and winter weather
C different honeybees in a beehive
D poison and measurement

3. Different bees in a hive have different duties.

What evidence from the passage supports this statement?

A Worker bees gather food; the queen bee lays eggs.
B Bee stingers are about 12 millimeters long.
C Bees have two sets of wings and three sets of legs.
D The honeybee is probably the best known bee species.

4. Which bees are probably the least important bees in a beehive?

A worker bees
B the queen bee
C female bees
D drones

5. What is this passage mainly about?

A the lives of bees
B the bodies of bees
C different types of insects
D antennae and wings

6. Read the following sentences: "There are over 20,000 known bee **species** in the world. The best known is probably the honeybee."

What does the word "**species**" most nearly mean in the sentences above?

A colors or shades
B orders or levels
C kinds or types
D duties or jobs

7. Choose the answer that best completes the sentence below.

There is less food available for the honeybees in the hive during the winter; _____, the drones are kicked out.

A never
B even though
C including
D consequently

8. What does a bee look like, according to the text?

_____

_____

_____

_____

9. What are the main duties of worker bees?

_____

_____

_____

_____

10. Drones are the first bees to be kicked out of a beehive as the winter months approach. Why might this be? Make sure to consider the role of the drone in the beehive. Use evidence from the text to support your answer.

_____

_____

_____

_____

Adventure on a Hot Air Balloon

The wind is starting to blow stronger, and when you're riding in a basket under a hot air balloon, just 400 feet above ground, that's not necessarily a good thing. Keith Rodriguez looks to the horizon and squints. He had planned to take off from Scioto Downs, a horse racetrack south of Columbus, Ohio, fly a few miles north, and land his balloon in a barren cornfield next to his pickup truck.

Then the wind changed. Instead of a light breeze from the south, now Rodriguez's bright red balloon is getting hit by stronger, colder winds headed west. He has plenty of propane fuel in his tank—he probably could ride the wind halfway to Pennsylvania. But that would be dangerous. Rodriguez's choice of landing sites just became very limited. As the balloon switches direction and floats east, everything below becomes a wide carpet of suburban sprawl—big-box stores, major highways, and strip malls. Beyond the stores lie forests.

The only factor in Rodriguez's favor is that it's early, just after 7 a.m. The highways are filling up with people driving to work, but otherwise the morning is quiet and still.

"Oh boy," Rodriguez thinks. "If I don't land, like now, this could get bad."

The balloon has no propeller or engine, so Rodriguez can't change direction on his own—he's entirely dependent on the wind. The only thing he controls is altitude. He does this by changing the properties of two invisible gases: air and propane. Sitting on the floor of the wicker gondola are three tanks of propane, compressed to its liquid form. The tanks are connected via black rubber hoses to two burners overhead. Each burner is nearly as big as Rodriguez's head.

Rodriguez turns a knob on one side of the burners. This releases propane from a tank into the heating coil, where it is ignited by a pilot light. This heats the propane from a liquid into a gas. The gas catches fire, and flames leap two feet high into the balloon.

The balloon rises. Rodriguez has a plan in mind. The flame heats the air inside the nylon balloon. This works on a simple principle: hot air is lighter than cold air. One cubic foot of air

weighs about an ounce. If you heat that air by 100 degrees, its weight drops by about 7 grams. So every foot of heated air inside Rodriguez's balloon can lift about 7 grams. Just by himself, Rodriguez weighs 170 pounds, which equals 77,110 grams. That means he needs about 11,015 cubic feet of hot air just to raise his own body off the ground. This is why hot air balloons are so big—they must trap tremendous amounts of heated air. Rodriguez's balloon is a common size, trapping about 100,000 square feet of air. The balloon is 90 feet tall and 65 feet wide.

As Rodriguez gives his short burst of flame, the air inside swirls in complicated, invisible patterns. Little of it escapes out the hole in the bottom—instead, it cools off gradually by coming into contact with the surrounding air outside the balloon's thin nylon wall. As this happens, the balloon gradually sinks. To drop altitude more quickly, Rodriguez can pull a cord attached to a parachute valve at the very top of the balloon. Since the hottest air sits at the top, this releases the balloon's most buoyant air and increases the speed of descent.

Rodriguez gives the cord a short pull, and the gondola drops.

"I don't have an altimeter, and I can't really see anything happening inside the balloon," Rodriguez thinks. "I have to pilot by feel."

Pushed by the wind, the balloon is flying quickly now. It's floating over the back wall of a Wal-Mart when Rodriguez grabs hold of the parachute valve cord and gives it a long, hard tug. The balloon drops. Quickly. The hot air balloon is sinking, but still flying forward.

It looks as though it's about to slam into the edge of Wal-Mart's roof but it sails over it, with only about 15 feet to spare. Still, Rodriguez does not let go of the cord. He drops and drops, right between the light poles of the nearly empty parking lot. Just a few feet above the ground, Rodriguez releases the parachute cord, turns the knob above his head and fires both burners. The steep descent slows. The gondola touches lightly against the asphalt, and then drags to a stop. There are only two people in the parking lot, standing near the entrance to the store. They look toward the balloon, their eyes and mouths open wide in shock.

"That was a little closer than I expected," Rodriguez says to himself, laughing. "I really needed to land quick."

Name: _____ **Date:** _____

1. What makes landing the hot air balloon a challenge?

A) the gondola
B) the wind
C) the parking lot
D) the time of day

2. What problem does Keith Rodriguez solve?

A) how to fly from Ohio to Pennsylvania in his hot air balloon
B) how to increase the altitude of his hot air balloon
C) how to safely land his hot air balloon
D) how to change direction on his own in his hot air balloon

3. A hot air balloon floats because the air inside the balloon is warmer than the air outside of it. What information from the story supports this statement?

A) Hot air is lighter than cold air.
B) One cubic foot of air weighs about an ounce.
C) The air inside the balloon swirls in complicated, invisible patterns.
D) The hot air balloon is sinking, but still flying forward.

4. Based on information in the passage, what would make a good landing area for a hot air balloon?

A) a large, open space with no buildings
B) a large space with lots of tall buildings
C) a small, narrow space near a highway
D) a small space, such as the roof of a building

5. What is this story mainly about?

A) a hot air balloon that scares lots of people when it lands in a parking lot
B) a hot air balloon that does not work properly
C) a person who gets stuck up in the air and does not know what to do
D) a person trying to land a hot air balloon in difficult conditions

6. Read the following sentences: "To drop **altitude** more quickly, Rodriguez can pull a cord attached to a parachute valve at the very top of the balloon. Since the hottest air sits at the top, this releases the balloon's most buoyant air and increases the speed of descent."
What does the word **altitude** mean in the sentence above?

A) length
B) width
C) height
D) volume

7. Choose the answer that best completes the sentence below.
Keith Rodriguez was planning to land in a cornfield; _____, he changes his mind because of the wind.

A) previously
B) however
C) as a result
D) for example

8. What effect does pulling the cord attached to the parachute valve have on Rodriguez's balloon?

9. Based on what the story explains about air temperature, why does pulling the cord have this effect?

10. Keith Rodriguez makes a successful but dangerous landing in a parking lot. Based on information in the story about his location, the weather, and how hot air balloons work, explain whether his decision to land in the parking lot was or was not a good idea. Please use evidence from the passage.