

Giving Credit Where Credit Is Due

Fill in the circle by the correct answer. Then answer questions 3, 4, and 5.

1. Which two words are antonyms?
 A originated, discovered
 B sensationaly, fantastically
 C effective, worthless
 D checking, halting
 2. Who first gave Ball credit for her discovery of how to treat leprosy with ethyl esters extracts of chaulmoogra oil?
 A Dr. Harry T. Hollmann
 B Alice Ball, M.S.
 C Dr. Arthur L. Dean
 D Professor Miles Jackson
 3. Why do you think Dr. Hollmann used the word “instructress”?
-
-

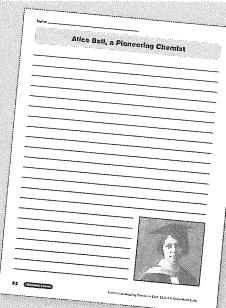
4. Does the author approve or disapprove of Dr. Hollmann’s mention of Alice Ball? Explain why you think so.
-
-

5. Reread paragraph 1. Restate the quotation in your own words.
-
-

Write About the Topic

Use the Writing Form to write about what you read.

Explain how the article is organized. Tell why you think the writer organized it this way.



Aristotle

Level 1

Words to Know list, Reading Selection, and Reading Comprehension questions

Aristotle's Life

Aristotle was born about 384 BC, just over 250 years ago in ancient Greece. He grew up during a period when the Greeks highly valued open辩论 and beliefs such as Polytheism, Democracy, and Plato. Many historians believe he was one of the greatest philosophers of all time.

Aristotle's father, Nicomachus, was a physician. He encouraged his young son to study science, especially biology. After his father passed away at 17 years old, Aristotle moved to Athens to attend the Academy of Platon. There he would receive great teacher Plato and many other leading scholars of the university. Aristotle studied all subjects, including mathematics, arithmetic, geometry, and logic. While there he learned many things that changed his life, including the four causes of why things happen—material, formal, efficient, and final—and how we can understand them better through logic and organized arguments.

In discussions at the school, one person would ask a question and another person would attempt to answer it.

The Student Becomes a Teacher

When Aristotle's father died, he returned to Macedonia to care for his son Alexander the Great. In 335 BC, Aristotle returned to Athens and established his own school, the Lyceum. He also taught at the "Peripatos," or the "Walking School." Aristotle's students often included Alexander's personal guards, as well as his large entourage, and citizens from surrounding towns.

Other Aristotle's work in his early days, living in Greece, included writing his treatise *History of Animals* for his son Alexander. He also wrote the *Treatise on the Generation of Animals*, which Aristotle referred to as his best biological work. He was also known as the "Theater of Nature." Aristotle was a leader in almost every field of study he pursued, including zoology, botany, and philosophy.

After his pilgrimage to India, Aristotle returned to Athens and established the Lyceum. He also established his own school, the Peripatos. Aristotle's work in his later years included writing his treatise *History of Animals* for his son Alexander, as well as his large entourage, and citizens from surrounding towns.

Aristotle died in 322 BC at the age of 62. He was buried in the city of Mende in Greece.

Sudden Death

Aristotle died at 62 years old, but not suddenly changed. His funeral page! Alexander the Great sent his personal physician Crates to help. Crates had been the personal physician of Aristotle's mentor, Plato, and had helped him to both recover from his illness and to build his own health. Aristotle died of natural causes, and Crates did what he could for his friend. He died then at a much older age than Aristotle.

64 Aristotle R Aristotle Reading Passage 18C

Aristotle R

Level 2

Words to Know list, Reading Selection, and Reading Comprehension questions

The "First Great" Biologist

Born in Greece in 384 BC (c. 400 years ago), Aristotle was famously called "the Father of Biology." While some people believe he is not to be confused with the famous Italian scientist Galileo today, for example, it was Aristotle who many believe to be the first great biologist.

He is believed to be the first to classify plants and animals into groups based on their physical similarities. For example, if two objects have long, give birth to their own young, have wings, give birth to their own young, etc., then they belong to the same group. After his classification of plants and animals, Aristotle began to group them with properties and while in a general sense this was a good idea, it had its flaws.

Aristotle's other extensive observations include the following: some fish have bones, and others do not; some birds have feathers, some do not; Aristotle's classification of animals is based on their behavior, and their cognitive abilities; a chick hatches from an egg with feathers, but a human emerges from an egg without feathers; that our brain's main function is to control our body; etc.

Aristotle collected specimens of specimens and made detailed drawings of them. He also dissected animals to see how they look, live, and move. He studied the organs of animals he collected in order to identify what they do and how they work. By doing this, Aristotle made many important discoveries. For example, he studied the heart to see how it functions and that people's thoughts originated in their heart. Aristotle's contributions to science and medicine have had a lasting impact on the way we view the natural world.

The First Biological Classification System

The system of classifying natural species may have been his most important contribution to biology, replaced by that of Linnaeus. His system involved classifying species into genera, and genera into species. This system, which was developed with great detail, has been used to classify all living things since. Aristotle's classification system of vertebrates and invertebrates broke down each animal into three groups: the genus, the species, and the family. For example, Aristotle's classification system put the elephant and the mouse in the same genus, because both are mammals. Aristotle's classification system was the first to group animals by common traits, such as having fur, bones, and offspring. Aristotle's classification system has been used for centuries. During the 12 years that Aristotle spent on his work on classifying species, he came across many new species. For example, Aristotle found a new species of lizard that he called a "lizard with a shell." Aristotle's classification system has been used for centuries, and is still used today. Aristotle's classification system is the basis for modern taxonomy. Aristotle's classification system is still used today.

Aristotle's Contributions to Science

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65 Aristotle R Aristotle Reading Passage 18C

Aristotle R

Level 3

Words to Know list, Reading Selection, and Reading Comprehension questions

An Encyclopedia of Learning

Aristotle's Deuterion was considered one of the greatest and most important encyclopedias produced by the ancient world. Aristotle's Deuterion was an encyclopedia of subjects, from metals and minerals to politics and government. It covered thousands of topics through entries that were all interconnected. For example, Aristotle believed that the sun was the center of the universe. This belief led him to conclude that the moon, stars, and planets revolved around the sun. Aristotle's Deuterion was the first scientific source to be developed by one person. Aristotle's Deuterion was the first scientific source to be developed by one person. Aristotle's Deuterion was the first scientific source to be developed by one person. Aristotle's Deuterion was the first scientific source to be developed by one person. Aristotle's Deuterion was the first scientific source to be developed by one person. Aristotle's Deuterion was the first scientific source to be developed by one person.

First Scientist

While Aristotle's Deuterion was the first scientific source to be developed by one person, he also made significant contributions to science. For example, he is believed to be the first to apply logic to scientific problems. In fact, he gave the first definition of science. Aristotle also believed that science is based on observation and experiment. Two ways to describe other people's beliefs are to say they are "theoretical" or "experimental." Aristotle's beliefs were "theoretical." He believed that science is based on observation and experiment. Two ways to describe other people's beliefs are to say they are "theoretical" or "experimental." Aristotle's beliefs were "theoretical." He believed that science is based on observation and experiment. Two ways to describe other people's beliefs are to say they are "theoretical" or "experimental." Aristotle's beliefs were "theoretical." He believed that science is based on observation and experiment. Two ways to describe other people's beliefs are to say they are "theoretical" or "experimental." Aristotle's beliefs were "theoretical." He believed that science is based on observation and experiment.

Posses and Causes of Aristotle's Influence

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Nature and Ideas

Nature also seems that Aristotle's influence on the world of science has been felt through the ages. For example, the concept of cause and effect, or cause and effect, is a concept that has been used in science for centuries. Aristotle's ideas have been used in many fields of science, including physics, chemistry, and biology. Aristotle's ideas have been used in many fields of science, including physics, chemistry, and biology. Aristotle's ideas have been used in many fields of science, including physics, chemistry, and biology. Aristotle's ideas have been used in many fields of science, including physics, chemistry, and biology. Aristotle's ideas have been used in many fields of science, including physics, chemistry, and biology. Aristotle's ideas have been used in many fields of science, including physics, chemistry, and biology. Aristotle's ideas have been used in many fields of science, including physics, chemistry, and biology. Aristotle's ideas have been used in many fields of science, including physics, chemistry, and biology.

66 Aristotle R Aristotle Reading Passage 18C

Aristotle R

Assemble the Unit

Reproduce and distribute one copy for each student:

- Visual Literacy page: Aristotle, "the Mind," page 61
- Level 1, 2, or 3 Reading Selection and Reading Comprehension page and the corresponding Words to Know list
- Graphic Organizer of your choosing, provided on pages 180–186
- Writing Form: Aristotle, Collector of Knowledge, page 62

Introduce the Topic

Read aloud and discuss the "Aristotle, 'the Mind'" text, chart, and images on the Visual Literacy page. Explain that Aristotle was one of many ancient Greek philosophers, scientists, and artists who made a strong impact on knowledge and culture worldwide. Some think he was the most influential ancient Greek thinker of all.

Read and Respond

Form leveled groups and review the Words to Know lists with each group of students. Instruct each group to read their selection individually, in pairs, or as a group. Have students complete the Reading Comprehension page for their selection.

Write About the Topic

Read aloud the leveled writing prompt for each group. Tell students to use the Graphic Organizer to plan their writing. Direct students to use their Writing Form to respond to their prompt.

Aristotle, "the Mind"

Aristotle was a Greek philosopher and scientist born in 384 BC in the city of Stageira. He gathered knowledge on an amazing variety of subjects, from marine biology to theater arts. He also spent time studying and writing about everything he studied. Below are examples for the students to use.

Illustrations

A statue of Aristotle, the scientist.
A statue of Aristotle and King Alexander the Great, who studied together.

Topics for Aristotle's Selected Readings and Write About

Scientists	Philosopher	Aristote
anatomy	ancient history	acupuncture
biology	chemistry	classification of plants
botany	chemistry (for Aristotle)	ethics
chemistry	chemistry (for Aristotle)	geography
environmental biology	classical literature	history
physics	classical literature of Aristotle	logic
time	classical literature of Aristotle	metaphysics
zoology	classification of living things	music

61

Visual Literacy

Aristotle, Collector of Knowledge

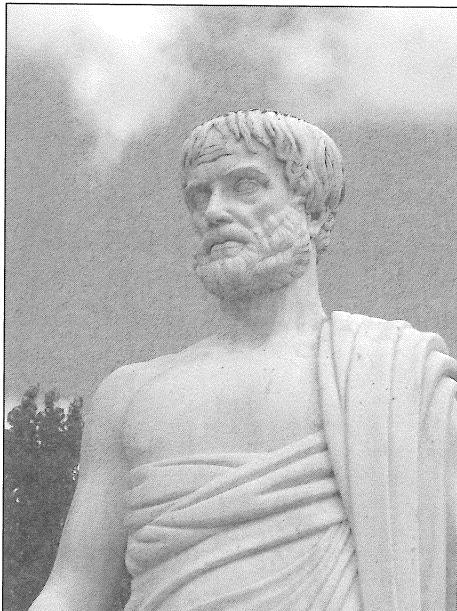
Name _____

62 Writing Form

Writing Form

Aristotle, “the Mind”

Aristotle was a Greek philosopher and scientist born in 384 BC in the city of Stagira, Greece. He gathered knowledge on an amazing variety of subjects, from marine biology to theater arts. He also gave well-considered opinions on just about everything he studied. Artists have depicted his image for thousands of years.



urbazon / Shutterstock.com



A statue of Aristotle, by sculptor Marinali, 18th century

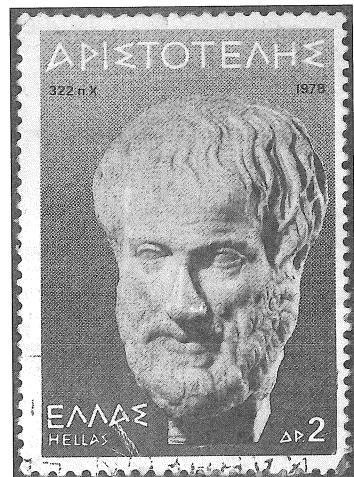
Aristotle and his pupil Alexander the Great, engraving, 1885

Topics that Aristotle Studied, Taught, and Wrote About

Scientific		Philosophical	Artistic
anatomy	astronomy/cosmology	argument	aesthetics (the study of beauty)
biology	chemistry/alchemy: the 5 elements (air, water, earth, fire, “quintessence”)	classification of governmental systems	drama/theater
botany	classification of living things	ethics	music
geology		human psychology	poetry
marine biology	“meteorology” (study of nonliving natural phenomena, such as the water cycle and natural disasters)	logic	rhetoric
physics		“the mean” (doing everything in moderation)	
time		metaphysics	
zoology		politics	

Name _____

Aristotle, Collector of Knowledge



Lefteris Papoulakis / Shutterstock.com

Words to Know

Aristotle's Life

Aristotle
revered
surpassed
philosopher
Academy
dialogues
Macedonia
peripatetic
orator
ailment

Aristotle ■■



Words to Know

The “First Great” Biologist

justifiably
elaborate
classification
cartilage
chambered
anatomies
embryo
assumptions
originated
dissected
ecology
migration
vertebrates
invertebrates

Aristotle ■■■

Words to Know

An Encyclopedia of Learning

systematizer
experimentation
crude
astute
deductions
cartilage
chambered
anatomies
assumptions
originated
impeded
anticipated

Aristotle ■■■■

Aristotle's Life

Aristotle was born about 2,400 years ago in Stagira, a city in ancient Greece. He was born during a period when the Greeks highly revered great thinkers and teachers such as Pythagoras, Socrates, Democritus, and Plato. Many historians believe that Aristotle surpassed all of these brilliant men.

Aristotle's father, Nicomachus, was a king's physician. He encouraged his young son to study the natural sciences—especially biology. After his parents died, Aristotle, then 17 years old, traveled to Athens to study with the philosopher Plato at his Academy. Plato was already famous for his great intellect. Schools like Plato's were different from today's universities. Instructors and students challenged one another in discussions that were more like debates, or organized arguments. In discussions called dialogues, one person would ask a question and another person would attempt to answer it.

The Student Becomes a Teacher

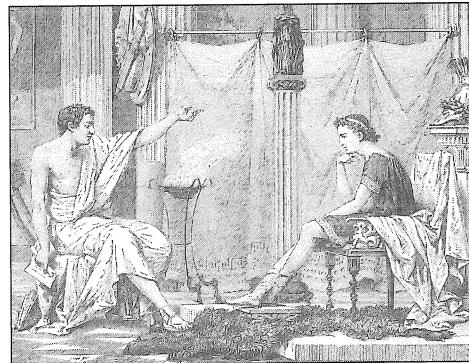
Aristotle soon graduated from student to teacher. He remained at Plato's Academy for 20 years. Plato called Aristotle "the Mind." He died when Aristotle was 37 years old. Aristotle then left the Academy, probably because Plato's nephew had taken over the school.

When Aristotle was in his early 40s, King Phillip of Macedonia (a Greek state) hired him to teach his son Alexander, who was then 13. Aristotle tutored the boy until Alexander grew up and became king himself. Under his rule, Macedonia controlled all of Greece, as well as a huge empire that included Egypt and the lands that make up today's Iran, Iraq, Israel, Jordan, and Syria.

After his pupil became king, Aristotle returned to Athens and established his own school, the Lyceum. It was also known as the "peripatetic" school because as Aristotle talked with his students, he strolled along with them under a covered walkway called a "peripatos." During the 12 years that followed, Aristotle wrote on an astounding variety of topics, from marine biology, geology, and astronomy to human psychology, poetry, and drama. The Roman orator Cicero said that "if Plato's prose was silver, Aristotle's was a flowing river of gold."

Sudden Disfavor and Death

When Aristotle was 61 years old, his life suddenly changed. His former pupil Alexander the Great died. Many Greeks, especially Athenians, had always resented the fact that, under Alexander, Macedonia controlled all of Greece. Because of Aristotle's friendship with Alexander, Athenians began to look on the honored man as an enemy. Fearing for his life, Aristotle fled to a northern island where he owned land. He died there of a stomach ailment at age 62.



**Aristotle teaching his
pupil Alexander**

Aristotle's Life

Fill in the circle by the correct answer. Then answer questions 3, 4, and 5.

1. Which two words are antonyms?

- A revered, despised
- B philosopher, thinker
- C dialogues, conversations
- D ailment, illness

2. Paragraph 3 implies that Aristotle _____.

- A took over the Academy after Plato died
- B did not want to work under Plato's nephew
- C had always wanted to be a teacher
- D was a teacher, not a student, at Plato's Academy

3. If Aristotle had not tutored Alexander, how might Aristotle's life have been different?
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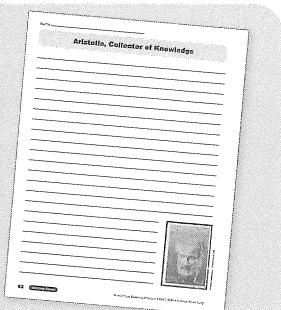
4. In your opinion, what was the most amazing aspect of Aristotle's life?
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-

5. Reread the quotation in paragraph 5. What inference can you make about the difference between Plato's and Aristotle's writing?
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Write About the Topic

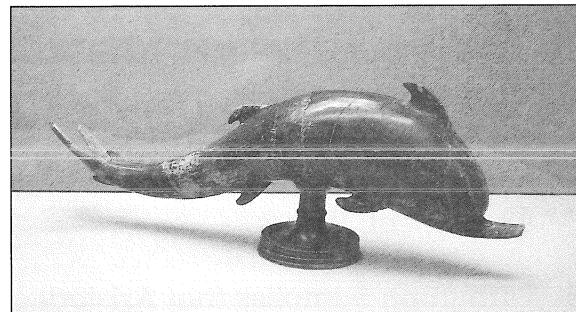
Use the Writing Form to write about what you read.

Was Aristotle born a great thinker, did his life events shape him into one, or are both true? Give evidence to support your answer.



The “First Great” Biologist

Born in Greece in 384 BC (2,400 years ago!), Aristotle is justifiably called “the father of biology.” While some of his discoveries turned out to be mistaken, many of them are still considered factual today. For example, it was Aristotle who first wrote that dolphins are not fish—through close observation, he had figured out that they have lungs, give birth to their babies (rather than laying eggs), and that mother dolphins feed milk to their young. In his elaborate classification system of living things—the first in history—he grouped dolphins with porpoises and whales in a genus he called “Cetacea.”



Ancient Greek art showing a dolphin

Aristotle’s other accurate observations include the following: some fish have bones, and others have cartilage; cows have four-chambered stomachs; birds and reptiles have similar anatomies; and a chick embryo has a beating heart. Aristotle’s mistaken assumptions include some about human anatomy; for example, he believed that people’s thoughts originated in their hearts, and that the brain’s main function was to cool down the heart.

Aristotle collected thousands of specimens and made thousands of written observations on animals and plants. He dissected many of the animals he collected in order to identify their parts and figure out how their bodies functioned. Besides animals’ anatomy, he studied their prebirth development, their behavior, and their ecology (interactions with their habitats); he also collected information on the geographic distribution of animals (which creatures live where). Aristotle figured out significant facts about animal reproduction, migration, predators and prey, and extinction due to harmful conditions in environments.

The First Biological Classification System

Aristotle’s system of grouping animal species may have been his most important contribution to biological science. In fact, scholars used his system for over 2,000 years. It was finally replaced by that of Swedish scientist Carolus Linnaeus in 1758. Aristotle identified two groups of animals: those with (red) blood and those without. His two groups approximately match the modern classification system of vertebrates and invertebrates. Next, Aristotle broke down each of his two groups into genera. His six genera of animals with blood (vertebrates) were fishes, reptiles and amphibians, birds, sea mammals, land animals, and humans. Science historian George Sarton wrote that Aristotle possessed “biologic genius. He was not only the first great one in his field... but he remained the greatest for two thousand years.”

The “First Great” Biologist

Fill in the circle by the correct answer. Then answer questions 3, 4, and 5.

1. Which two words are antonyms?
 - (A) justifiably, defensibly
 - (B) assumptions, theories
 - (C) originated, derived
 - (D) vertebrate, invertebrate

 2. Based on paragraph 3, the word “dissected” means to _____.
 - (A) discover
 - (B) look at closely
 - (C) cut into separate parts
 - (D) put into a jar

 3. What is the writer’s opinion of Aristotle? Give evidence for your answer.
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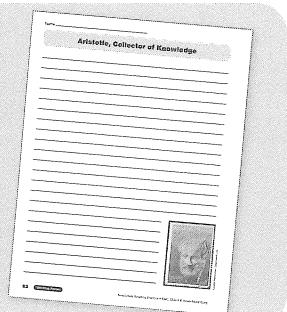
4. In paragraph 1, what does the phrase “is justifiably called” mean?
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-

5. In the last paragraph, why does the writer mention vertebrates and invertebrates?
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Write About the Topic

Use the Writing Form to write about what you read.

Explain why scholars continued to use Aristotle’s classification system until 1758. Give evidence to support your reasoning.



An Encyclopedia of Learning

Author Robert Downs wrote that “Aristotle was unquestionably the greatest collector and systematizer of knowledge produced by the ancient world...His works are an encyclopedia of...learning...” Born in 384 BC in ancient Greece, Aristotle not only gathered knowledge on an amazing variety of subjects, from marine biology to theater arts, he also discovered thousands of facts (though some turned out to be less factual than others).

The First Scientist’s Scientific Procedure

Some historians call Aristotle the first scientist because he developed his own procedure for scientific research. Step One in his method was to accurately identify the subject to be studied, as well as the specific problem he wished to solve. Step Two was to describe other people’s solutions to the problem. In Step Three, he gave his reasons for doubting the solutions others had put forward. Step Four was to state his own solution. Also in Step Four, he gave his evidence and reasons for believing that his solution was correct. For Step Five, Aristotle would prove that other people’s solutions were incorrect.

Pros and Cons of Aristotle’s Influence

Author Don Nardo wrote: “...while Aristotle stressed the importance of evidence, he failed to appreciate that experimentation is almost always the best method of finding it...Yet...when he conducted crude experiments, Aristotle made astute and largely correct deductions.” For example, it was Aristotle who first wrote that dolphins are not fish—through close observation, he had figured out that they have lungs, give birth to their babies (rather than laying eggs), and that mother dolphins feed milk to their young.

His other accurate observations include the following: some fish have bones, and others have cartilage; cows have four-chambered stomachs; and birds and reptiles have similar anatomies. Aristotle’s mistaken assumptions include some about human anatomy; for example, he believed that people’s thoughts originated in their hearts, and that the brain’s main function was to cool down the heart.

Nardo also wrote that “Aristotle’s influence on the future growth of knowledge was both negative and positive...” For example, Aristotle believed that the planets orbited Earth, not the sun. Because they believed in the ancient Greek teacher’s wisdom, later scholars’ progress in astronomy was “impeded” by “their almost blind acceptance.” However, Nardo added that many of Aristotle’s ideas “brilliantly anticipated modern discoveries.”

