

Ask®

Brilliant Blood

Blood is the life-maintaining fluid that flows throughout the body's circulatory system. From transporting oxygen to forming clots, this issue of ASK magazine examines the many amazing functions of blood.

CONVERSATION QUESTION

What have scientists learned about blood?

TEACHING OBJECTIVES

- Students will learn how scientists became increasingly knowledgeable about blood and the circulatory system over time.
- Students will learn about the different oxygen carriers for blood.
- Students will learn why leeches are helpful to scientists and doctors.
- Students will compare and contrast ancient theories with modern ideas.
- Students will obtain information from a nonfiction article.
- Students will construct questions.
- Students will use a mathematical process to solve word problems.
- Students will make a model representing the components of blood.
- Students will examine homophones.



In addition to supplemental materials focused on core STEAM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

SELECTIONS

- **Life's Blood**
Expository Nonfiction, ~870L
- **Strange Blood**
Expository Nonfiction, ~860L
- **Lunching with Leeches**
Expository Nonfiction, ~970L

Ask® Teacher Guide: October 2024

Life's Blood

pp. 6–11, Expository Nonfiction

This article explores the earliest theories about the purpose of blood and how it circulates through the body. Students will witness how new technologies and continued research have updated these theories over time.



ENGAGE

Conversation Question: What have scientists learned about blood?

Distribute the article, “Life’s Blood,” and have students turn to the text box on the top of page 8. Read the four steps of this simple experiment aloud and have students recreate Harvey’s experiment. Discuss observations. Take students on a virtual field trip to view the “Body Worlds” exhibit (available online) which is referenced on page 9.

INTRODUCE VOCABULARY

Post the key words and discuss the meanings of the terms. Then display the following prompts and have students discuss responses with a partner.

- What things have **inspired** you to take action?
- How do viruses tend to **circulate** through a crowd?
- What situations have caused you to **blush**?

READ & DISCUSS

Reinforce comprehension of the concepts presented in the article by using the following questions to direct discussion.

1. Why were early doctors only able to guess what went on inside the human body?
2. How did Galen study blood and the insides of bodies?
3. Why were Galen’s views unquestioned for almost 1,500 years?
4. How was William Harvey able to map the blood flow through the heart and body?
5. What do the red blood cells in the body do? What do the white blood cells do?

SKILL FOCUS: Compare and Contrast

INSTRUCT: Review the text and guide students to express that the article was written to teach readers how accepted explanations change over time as new theories are validated. Distribute the graphic organizer, *Flesh and Blood*, and tell the class that they will work with a partner and use information directly from the text to complete the chart. Have students answer the question in the **THINK TANK** independently, using logical reasoning and details.

ASSESS: Reconvene and review the *Flesh and Blood* worksheet. Invite students to read their comparison paragraphs aloud.

EXTEND

Mathematics: An average resting pulse is 60–100 beats per minute. Demonstrate how to measure a pulse (p. 6) by pressing two fingers on the side of your neck, below your chin. Have students record their pulse on a piece of paper and then use the Read-Draw-Write process to calculate the following answers using that number:

- a) How many times would your heart beat in two minutes?
- b) How many times would your heart beat in five minutes?
- c) How many times would your heart beat in ten minutes?

RESOURCES

Compare and Contrast: *Flesh and Blood*

OBJECTIVES

- Students will learn how scientists became increasingly knowledgeable about blood and the circulatory system over time.
- Students will compare and contrast ancient theories with modern ideas.
- Students will use a mathematical process to solve word problems.

KEY VOCABULARY

- **inspired** (p. 7) motivated; exerted an influence on
- **circulates** (p. 9) moves without stopping
- **blushing** (p. 10) an automatic reddening of the face, usually from embarrassment

Flesh and Blood

Compare and Contrast: Use information from the article to compare and contrast the belief systems below.

Questions	Ancient Science	Modern Science
How does the heart beat?		
How is new blood made?		
Why is blood red?		
Why does blood circulate?		

THINK TANK: Choose one of the questions on the chart and compare the ancient and modern theories in paragraph form. Use the information recorded above and refer to the article. Include details and evidence that support the modern science explanation.

Strange Blood

pp. 12–15, Expository Nonfiction

One of blood's most important jobs is to deliver oxygen all around the body. Readers will learn how blood circulates, how blood can be different colors, and how it can perform amazing tricks.



RESOURCES

Obtain Information: Bloody Colorful

OBJECTIVES

- Students will learn about the different oxygen carriers for blood.
- Students will obtain information from a nonfiction article.
- Students will make a model representing the components of blood.

KEY VOCABULARY

- **tangly** (p. 12) a badly organized state in which things or parts are not kept separate from each other
- **plasma** (p. 13) the liquid, slightly yellow portion of blood
- **parasite** (p. 15) an animal or plant that survives on or within a host organism

ENGAGE

Conversation Question: What have scientists learned about blood?

Present the article, “Strange Blood,” and tell students that the heart pumps about 1.3 gallons of blood per minute. Get students motivated to learn more about the topic by filling a large container with water and setting a timer. Have students use a small cup to scoop water into another container as fast as they can for one minute. Pose the question, “Can you beat your heart?”

INTRODUCE VOCABULARY

Post the key terms and discuss the definitions. Then display the following questions and have students supply the correct answers.

1. Which items would **NOT** be **tangly**?
a) vines b) hair c) yarn d) bones
2. Which is **NOT** a function of **plasma**?
a) supplying energy b) transporting nutrients c) delivering hormones d) exchanging oxygen and carbon dioxide
3. Which are **NOT** an example of a **parasite**?
a) ticks b) seagulls c) mosquitos d) leeches

READ & DISCUSS

Post and discuss questions prior to reading. Have students read the article independently and answer the questions in full sentences.

1. What is the color of blood dependent on?
2. List two amazing things that the blood does.
3. Why can Cuvier beaked whales dive deeper and longer than any other mammal?
4. Why are scientists working hard to make artificial crab blood?

SKILL FOCUS: Obtain Information

INSTRUCT: Guide students to obtain information from the text, captions and photos in the article. Remind them that the article was written to teach readers how different oxygen carriers lead to different blood colors. Introduce the *Bloody Colorful* worksheet and instruct students to complete the chart and then answer the question in the **THINK TANK** independently.

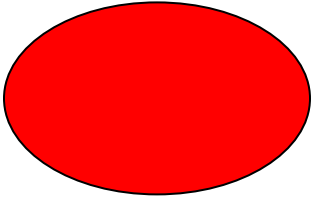
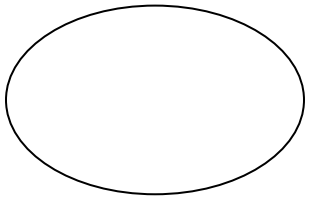
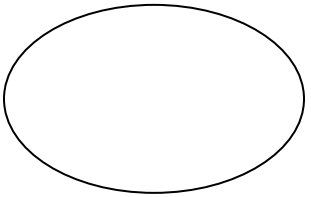
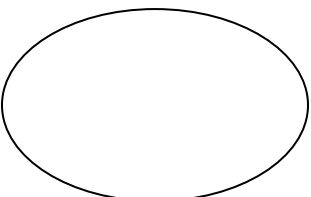
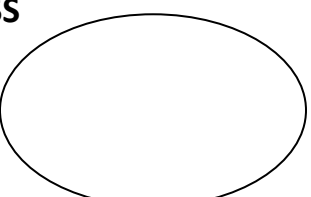
ASSESS: Review and discuss the answers on the chart. Collect to assess students’ ability to obtain information in the **THINK TANK** activity.

EXTEND

STEAM: Help students visualize the components of blood by making a liquid model. This can be done as a class in a bowl or by reusing empty water bottles to make individual models. The procedure is as follows: 1. Pour corn syrup, representing plasma into the bowl/bottle. 2. Add cinnamon candies (red hots) to represent the red blood cells. Red blood cells make up about 40% of the blood, so add plenty! 3. Add white lima beans to represent the white blood cells. White blood cells make up 1% of the blood so you don’t need many. 3. Add uncooked rice to represent the platelets. Again, about 1% of the blood. Observe and discuss.

Bloody Colorful

Obtain Information: Reread the article and study the various oxygen carriers of blood. Color the ovals and then complete the chart below.

Blood Color	Oxygen Carrier	Animal Example
RED 		
BLUE 		
VIOLET 		
GREEN 		
COLORLESS 		

THINK TANK: Why is the blue blood of horseshoe crabs especially important to humans? Answer the question in paragraph form on the back of this paper, citing evidence from the text.

Lunching with Leeches

pp. 24–28, Expository Nonfiction

Some creatures, like leeches, have a clever way to get a good meal full of protein without hunting—sucking blood! This article focuses on the practical application of leeches in both ancient and modern times.



RESOURCES

Construct Questions: Quiz Question Template

OBJECTIVES

- Students will learn why leeches are helpful to scientists and doctors.
- Students will construct questions.
- Students will examine homophones.

KEY VOCABULARY

- **hematophage** (p. 24) an animal that feeds on blood
- **dislodge** (p. 26) to force out of a secure position
- **hirudin** (p. 26) a substance extracted by leeches that prevents blood from clotting

ENGAGE

Conversation Question: What have scientists learned about blood?

Introduce the article and tell students that leeches can suck blood because they emit a substance that keeps the blood from clotting. Normally, platelets stick together to form a clot and then a scab. Have some bloody fun with the following activity: Make red Jell-O according to instructions and leave to cool until it is just starting to set. Gently drop some spoonfuls of Jell-O onto parchment paper in scab shapes. Add some crusted Wheaties cereal for texture and place in the refrigerator to set. Finished scabs will temporarily stick to arms and legs!

INTRODUCE VOCABULARY

Post and discuss the key vocabulary words and definitions. Have students write a simple sentence for each word that demonstrates an understanding of the term. Challenge students to write one super sentence using all three words. Draw attention to the words as they are revealed in the reading.

READ & DISCUSS

As a post-reading activity, lead a discussion based on the following questions.

1. What makes blood a nutritious and practical meal for some animals?
2. Why is it to the advantage of the blood sucker to be sneaky, not scary?
3. Where do leeches reside?
4. Why did doctors use leeches in the past?
5. What are the modern applications of leeches for modern doctors and scientists?

SKILL FOCUS: Construct Questions

INSTRUCT: Students will need to form five questions that can be answered from information in the article, or alternatively, the entire October issue. They will use the Quiz Question template to craft questions and answers. Next, they will cut out and place questions on the front of an index card and answers on the back. Creating questions promotes higher order thinking.

ASSESS: Cards can be used to study or turned into a quiz game by assembling players and providing a bell to ring in the answer. The tone should be fun and interactive.

EXTEND

Language Arts: Guide students to notice that the word, *leech*, has the long e sound generated by ee. However, its homophone, *leach*, meaning to draw from, uses ea. Have students make a list of homophones (two or more words having the same pronunciation but different meanings or spellings) that use ee and ea to represent the long e sound. Compare lists. Examples: *peek/peak; beet/beat; reed/read*.

Construct Questions

Quiz Question Template: Use for study or quiz game.

Front of Card

Back of Card

Question: <hr/> <hr/>	Answer: <hr/> Page: _____
Question: <hr/> <hr/>	Answer: <hr/> Page: _____
Question: <hr/> <hr/>	Answer: <hr/> Page: _____
Question: <hr/> <hr/>	Answer: <hr/> Page: _____
Question: <hr/> <hr/>	Answer: <hr/> Page: _____