

Grade 4 Science

Unit 6: Human Respiration and Circulation

8 lessons and a unit quiz. Use this pack with the **Human Respiration and Circulation Student Reader** (print it, or download it once from the course) to teach the whole unit without the internet.

What is in this pack

- A lesson plan for each chapter: the Big Question, words to know, which pages to read, questions to talk over and the activity pages.
- The unit quiz, ready to print.
- Answers for the teacher at the back: every discussion question and the quiz key.

This course is based on an original work of the Core Knowledge® Foundation (www.coreknowledge.org) made available through licensing under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. This does not in any way imply that the Core Knowledge Foundation endorses this work. PGAMO added the lesson pages, study packs and quizzes layout, and shares them under the same license. License: CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>).

Lesson schedule

Two or three lessons a week, about 30 minutes each. Tick each one off as you go.

	Lesson	Reader pages	Activity pages
☐	Lesson 1: Rest and Run	PDF pages 7-8	AP 1.1
☐	Lesson 2: Respiration	PDF pages 9-14	AP 2.1
☐	Lesson 3: A Closer Look at Lungs and Breathing	PDF pages 15-20	AP 3.1
☐	Lesson 4: Circulation	PDF pages 21-26	—
☐	Lesson 5: A Closer Look at the Heart	PDF pages 27-30	AP 5.1
☐	Lesson 6: A Closer Look at Blood	PDF pages 31-34	AP 6.1
☐	Lesson 7: Wellness of the Heart and Lungs	PDF pages 35-40	AP 7.1
☐	Lesson 8: Helpful Technology	PDF pages 41-46	AP 8.1
☐	Unit review and assessment	—	—
☐	Words quiz	—	—

Page numbers are the PDF page numbers of the Student Reader file, so they match what your PDF reader shows.

Lesson 1: Rest and Run

THE BIG QUESTION

What happens to your breathing and heartbeat when you run?

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 19–23: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 1: “Rest and Run”: PDF pages 7–8. Look at the pictures and maps together.

Talk it over

1. How do you feel after running as fast as you can?
2. What body parts are used for breathing?
3. What does my heart do for my body?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What happens to your breathing and heartbeat when you run?

Activity pages

- Activity Page 1.1: Investigating Changes in Breathing and Heartbeats — Teacher Guide PDF page 59

Lesson 2: Respiration

THE BIG QUESTION

What is respiration?

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 24–28: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 2: “Respiration”: PDF pages 9–14. Look at the pictures and maps together.

Talk it over

1. How does this affect the other parts of the model?
2. What did you feel when you exhaled?
3. About what fraction of air is oxygen?
4. Why is it a healthy practice to use a tissue when you sneeze or cough?
5. Which part is related to the diaphragm?
6. Which structure in the respiratory system is the most important one?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What is respiration?

Activity pages

- Activity Page 2.1: Structures of the Respiratory System — Teacher Guide PDF page 60

Lesson 3: A Closer Look at Lungs and Breathing

THE BIG QUESTION

What are the parts inside lungs, and how do they work?

Words to know

- **alveolus** — a tiny air sac inside the lung that moves gases into and out of the body's blood
- **bronchial tube** — the tube connecting the trachea to the lungs
- **bronchiole** — the branching tubes in the lungs which connect the main bronchial tubes to the alveoli
- **pollutant** — an artificial or natural substance that contaminates air, water, or soil

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 29–33: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 3: “A Closer Look at Lungs and Breathing”: PDF pages 15–20. Look at the pictures and maps together.

Talk it over

1. What spelling rule do they follow?
2. Where is gas exchanged between the blood and the lungs?
3. What would you expect to find if you counted your resting breaths per minute in different kinds of weather?
4. How did you collect data on air quality, and what did you find out by comparing data?
5. How would air with pollutants in it affect a runner?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What are the parts inside lungs, and how do they work?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 3.1: Investigating Air Quality — Teacher Guide PDF page 61

Lesson 4: Circulation

THE BIG QUESTION

What is circulation?

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 34–38: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 4: “Circulation”: PDF pages 21–26. Look at the pictures and maps together.

Talk it over

1. What are some substances in blood?
2. How do these balloons model blood pressure?
3. What does comparing the two balloons model about blood pressure?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What is circulation?

Lesson 5: A Closer Look at the Heart

THE BIG QUESTION

What are the parts that make up the heart, and how do they work?

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 39–43: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 5: “A Closer Look at the Heart”: PDF pages 27–30. Look at the pictures and maps together.

Talk it over

1. Why are the right atrium and right ventricle on the left side of the illustration?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What are the parts that make up the heart, and how do they work?

Activity pages

- Activity Page 5.1: The Heart Is a Puzzle — Teacher Guide PDF page 62

Lesson 6: A Closer Look at Blood

THE BIG QUESTION

What are the parts that make up blood, and how do they work?

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 44–47: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 6: “A Closer Look at Blood”: PDF pages 31–34. Look at the pictures and maps together.

Talk it over

1. How did you decide to represent the parts of blood that are less than 1/100?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What are the parts that make up blood, and how do they work?

Activity pages

- Activity Page 6.1: Draw a Visual Fraction Model of Blood — Teacher Guide PDF page 63

Lesson 7: Wellness of the Heart and Lungs

THE BIG QUESTION

How can we maintain healthy respiratory and circulatory systems?

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 48–52: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 7: “Wellness of the Heart and Lungs”: PDF pages 35–40. Look at the pictures and maps together.

Talk it over

1. managing stress with the help of friends and family Formative Assessment AP 7.1 46
Review students' data collection and responses to questions on How Clean Is the Air You Breathe?
2. Where indoors might be the most and least particles?
3. What do these cities have in common in their relationship to water on Earth?
4. How could living near a large body of water affect the ways people live?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How can we maintain healthy respiratory and circulatory systems?

Activity pages

- Activity Page 7.1: How Clean Is the Air You Breathe? — Teacher Guide PDF page 64

Lesson 8: Helpful Technology

THE BIG QUESTION

How can science and technology help the respiratory and circulatory systems?

Words to know

- **inherited** — to receive from one's parents
- **technology** — the use of science in solving problems

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 53-57: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 8: "Helpful Technology": PDF pages 41-46. Look at the pictures and maps together.

Talk it over

1. How is getting more oxygen helpful to people who need it?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How can science and technology help the respiratory and circulatory systems?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 8.1: A Better Mask — Teacher Guide PDF page 65

UNIT REVIEW

Unit review and assessment

- Activity page answer key (for the teacher): Teacher Guide PDF pages 66–66

WORDS QUIZ

Human Respiration and Circulation

Name: _____ Date: _____

Circle the letter of the best answer.

1. Which word means “to give or take one thing in return for another”?
 - a) plasma
 - b) bronchiole
 - c) inherited
 - d) exchange
2. Which word means “the upper chamber in the heart from which blood moves to the ventricle”?
 - a) circulation
 - b) atrium
 - c) plasma
 - d) capillary
3. Which word means “the use of science in solving problems”?
 - a) plasma
 - b) technology
 - c) bronchial tube
 - d) involuntary
4. Which word means “a structure in the body that opens and closes, allowing the passage of materials”?
 - a) valve
 - b) blood vessel
 - c) pollutant
 - d) rate
5. Which word means “a blood vessel that carries blood low in oxygen from the capillaries to the heart”?
 - a) voluntary
 - b) trachea
 - c) function
 - d) vein
6. Which word means “a very small branching blood vessel”?
 - a) alveolus
 - b) platelet
 - c) heart
 - d) capillary

- 7.** Which word means “an activity that requires physical effort, done to improve health”?
- a) health
 - b) pressure
 - c) oxygen
 - d) exercise
- 8.** Which word means “the tube connecting the larynx to the bronchial tubes”?
- a) heartbeat
 - b) trachea
 - c) alveolus
 - d) aorta
- 9.** Which word means “a body part made up of related tissues that performs a specific function”?
- a) blood
 - b) transfusion
 - c) organ
 - d) voluntary
- 10.** Which word means “to receive from one’s parents”?
- a) exercise
 - b) inherited
 - c) bronchiole
 - d) involuntary
- 11.** Which word means “a tube in the body that serve as pathways for blood flow”?
- a) oxygen
 - b) respiratory system
 - c) artery
 - d) transport
- 12.** Which word means “relating to the heart and blood vessels ced words and phrases are the unit that you should model for or use in isolated drill or memorization”?
- a) aorta
 - b) respiratory system
 - c) technology
 - d) cardiovascular

Answers

Lesson 1: Rest and Run

1. **How do you feel after running as fast as you can?**
Sweaty, out of breath, tired Ask: If the heartbeat is faster while running, how does that affect the blood?
2. **What body parts are used for breathing?**
What does breathing do for my body?
3. **What does my heart do for my body?**
What does my body need when I run?

Lesson 2: Respiration

1. **How does this affect the other parts of the model?**
Pulling down makes the balloon inside the bottle fill with air, and releasing it makes the air move out of the balloon. SUPPORT—If models are not working as expected, troubleshoot by checking that the modeling dough has sealed the hole in the bottle top and the balloon is attached to the straw tightly but is not collapsing the straw.
2. **What did you feel when you exhaled?**
Air coming out of my mouth
3. **About what fraction of air is oxygen?**
About one-fourth or one-fifth Ask: How does the amount of carbon dioxide and other gases in air compare to the amount of oxygen?
4. **Why is it a healthy practice to use a tissue when you sneeze or cough?**
Because a tissue can catch the germs so that they are not spread to other people
5. **Which part is related to the diaphragm?**
Answer: The whole balloon hanging inside the bottle represents a lung. The cut balloon on the bottom of the bottle represents the diaphragm.
6. **Which structure in the respiratory system is the most important one?**
Answers will vary, but students should note that all the parts are necessary for the respiratory system to work properly.

Lesson 3: A Closer Look at Lungs and Breathing

1. **What spelling rule do they follow?**
Alveolus is singular, and alveoli is plural. They follow the rule for some words ending in -us.
2. **Where is gas exchanged between the blood and the lungs?**
Where the blood vessels touch the walls of the alveoli
3. **What would you expect to find if you counted your resting breaths per minute in different kinds of weather?**
We might find that the numbers go up or down, depending how hot or cold and dry or humid it is.

4. **How did you collect data on air quality, and what did you find out by comparing data?**

We collected data by putting paper plates in four locations and comparing the amount of particles stuck on the plates in the four locations. We found out that the outdoor locations have more particles in the air than indoor locations.

5. **How would air with pollutants in it affect a runner?**

The runner would have trouble breathing because they would also be breathing the pollution in and their body would have to remove the pollutants as they run, like coughing up small particles. Point out to students that the next chapter in this unit will make it clearer where oxygen from the lungs goes once it moves into the blood.

Formative Assessment

Lesson 4: Circulation

1. **What are some substances in blood?**

Oxygen, carbon dioxide, sugar Explain that while some of these substances are picked up from the lungs, others come from the food they eat or other organs in their body.

2. **How do these balloons model blood pressure?**

The balloons are stretchy like the sides of blood vessels, and the air presses on the inside of the balloon, like blood presses against the insides of blood vessels. LESSON 4 | CIRCULATION

3. **What does comparing the two balloons model about blood pressure?**

One balloon shows a lower blood pressure, and the other balloon shows a higher blood pressure.

Lesson 5: A Closer Look at the Heart

1. **Why are the right atrium and right ventricle on the left side of the illustration?**

Because those chambers are on the person's right side when they are thinking about their own heart

Lesson 6: A Closer Look at Blood

1. **How did you decide to represent the parts of blood that are less than 1/100?**

By splitting one of the 100 squares into two halves

Lesson 7: Wellness of the Heart and Lungs

1. **managing stress with the help of friends and family Formative Assessment AP 7.1 46 Review students' data collection and responses to questions on How Clean Is the Air You Breathe?**

AP 7.1

2. **Where indoors might be the most and least particles?**

The most—in the kitchen; the least—in the nurse's office Ask: Where outdoors might be the most and least particles?

3. **What do these cities have in common in their relationship to water on Earth?**

They are all near the ocean or a large sea.

4. **How could living near a large body of water affect the ways people live?**

It could mean that the people here enjoy walking on the beach in the sunshine, swimming, boating, and fishing. It could also mean they can eat seafoods most of the year. Page 32

Lesson 8: Helpful Technology

1. **How is getting more oxygen helpful to people who need it?**

It makes it easier for the lungs to supply enough oxygen to the blood so that all the cells in the body can get enough. Pages 39–40

Unit quiz key

1. d 2. b 3. b 4. a 5. d 6. d 7. d 8. b 9. c 10. b 11. c 12. d