



Elementary Anatomy: Nervous, Respiratory, & Circulatory Systems



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Using This Teacher Guide

Features: The suggested weekly schedule enclosed has easy-to-manage lessons that guide the reading, worksheets, and all assessments. The pages of this guide are perforated and three-hole punched so materials are easy to tear out, hand out, grade, and store. Teachers are encouraged to adjust the schedule and materials needed in order to best work within their unique educational program.

Lesson Scheduling: Students are instructed to read the pages in their book and then complete the corresponding section provided by the teacher. Assessments that may include worksheets, activities, quizzes, and tests are given at regular intervals with space to record each grade. Space is provided on the weekly schedule for assignment dates, and flexibility in scheduling is encouraged. Teachers may adapt the scheduled days per each unique student situation. As the student completes each assignment, this can be marked with an “X” in the box.



Approximately 30 to 45 minutes per lesson, four days a week



Includes answer keys for worksheets and tests.



Worksheets for each section. Additional teaching material available as a download. <http://www.masterbooks.com/free-downloads>



Tests are included to help reinforce learning and provide assessment opportunities.



Designed for grades 4 to 6 in a one-year science course

Course Objectives: Students completing this course will

- ✓ Investigate the main areas and structures of the brain and what important role each plays in making the body function
- ✓ Evaluate awesome examples of God’s creativity in both the design and precision of human anatomy
- ✓ Review a timeline of important discoveries and innovators, as well as key anatomical terms and concepts
- ✓ Explore the human body’s respiratory system, focused on structures, function, diseases, and God’s efficient and effective designs
- ✓ Learn about the mechanics of the circulatory system, how it transports nutrients, blood, chemicals, and more to cells within the body
- ✓ Identify important innovations that help professionals understand the mechanisms of our lungs, sinus cavities, and diaphragm
- ✓ Demonstrate vital facts about why you sleep, what foods can superpower your brains functions, and how it controls the wondrous machine known as your body!

Course Description

This series delights in sharing the truth to children of how they are wonderfully made! Beyond the basics of how and why the body works as it does, it is important to share how the amazing and deliberate design of their bodies enables it to function as it should, just as God meant for it to. Utilizing three books from pediatrician and instructor Dr. Lainna Callentine, students will learn about the complex circulatory system, the electrifying nervous system, and the breathtaking respiratory system, with features that include instructional guidance on the eight areas of intelligence to help students of all learning styles. This includes designated levels and pacing suggestions, and it should be noted that all activities can be used at any level.

Additional organizational material can be downloaded from;
<http://www.masterbooks.com/free-downloads> .

You will find activities geared to the particular level of your student. Levels 1, 2, and 3 charts outline activities that pertain to the particular types of intelligences. Each of the activities and worksheets in this guide have been identified by the various learning styles. Many of these activities can be designated in multiple categories. Remember this is just a guide. The activities can be designated in other ways.

Optional Science Lab

Hands-on science kits are available with each unit. ***These lab kits are optional, and are not an integral part of completing the course.*** They are in no way mandatory to enjoy the “God’s Wondrous Machine” series. The kits include dissection specimens and materials to do several of the activities and are available from:

www.Sciexperience.com



Dr. Lainna Callentine, MEd, MD, is a physician, instructor, writer, speaker, and creator at Sciexperience, as well as volunteering her services at a clinic that serves the uninsured in the Chicago suburbs. She affirms the clinic’s motto from Galatians 5:13, “serving one another in love” and left formal medicine in the ER to homeschool her three children and pursue her passion in teaching.

First Semester Suggested Daily Schedule

Date	Day	Assignment	Due Date	✓	Grade
First Semester–First Quarter					
Week 1	Day 1	Read pages 7–9 of <i>Electrifying Nervous System</i> (ENS)			
	Day 2	Read pages 10–11 (ENS) • Complete Activity 1 pages 25–32; Practice sounding out the words and reviewing the vocabulary flash cards			
	Day 3	Read pages 12–13 (ENS) “Let’s Start at the Beginning”			
	Day 4	Read pages 14–15 • Complete Worksheet 1 pages 33–34			
	Day 5				
Week 2	Day 6	Read pages 16–19 (ENS) “Let’s Start at the Beginning,” continued • Complete Activity 2 page 35			
	Day 7	Complete Activity 3 page 36			
	Day 8	Complete Worksheets 2, 3, or 4 pages 37–42			
	Day 9	Complete Activity 4 page 43			
	Day 10				
Week 3	Day 11	Read pages 20–21 (ENS) • Complete Worksheet 5 page 44			
	Day 12	Complete Activity 5 page 45			
	Day 13	Read 22–23 (ENS) • Complete Worksheet 6 pages 47–48			
	Day 14	Complete Worksheet 7 and Activity 6 page 49–57			
	Day 15				
Week 4	Day 16	Review Pages 22 and 23 and Vocabulary Cards Complete Activity 7 or 8 pages 59–60			
	Day 17	Read Pages 24–27 (ENS) • Complete Worksheet 8 page 61			
	Day 18	Complete Worksheets 9, 10, or 11 pages 62–66			
	Day 19	Complete Activities 9, 10, 11, or 12 pages 67–72			
	Day 20				
Week 5	Day 21	Read pages 28–30 (ENS) Complete Worksheets 12, 13, or 14 page 73–76			
	Day 22	Complete Activity 13 or 14 pages 77–78			
	Day 23	Read pages 31–33 (ENS) Complete Worksheets 15 or 16 page 79–81			
	Day 24	Complete Activity 15 or 16 pages 82–83			
	Day 25				
Week 6	Day 26	Complete Activity 17 page 84			
	Day 27	Read pages 34–37 (ENS) • Complete Worksheet 17 page 85			
	Day 28	Complete Activity 18, 19, or 20 pages 86–88			
	Day 29	Review word flash cards from this section.			
	Day 30				

Division of the Teacher's Guide

This teacher guide is set up in three sections. Each contains material that corresponds with a specific book in the God's Wondrous Machine series. You will note three symbols on the sections of material that follow:



The Electrifying Nervous System

The brain symbol is a designation found on items pertaining to the nervous system.



The Breathtaking Respiratory System

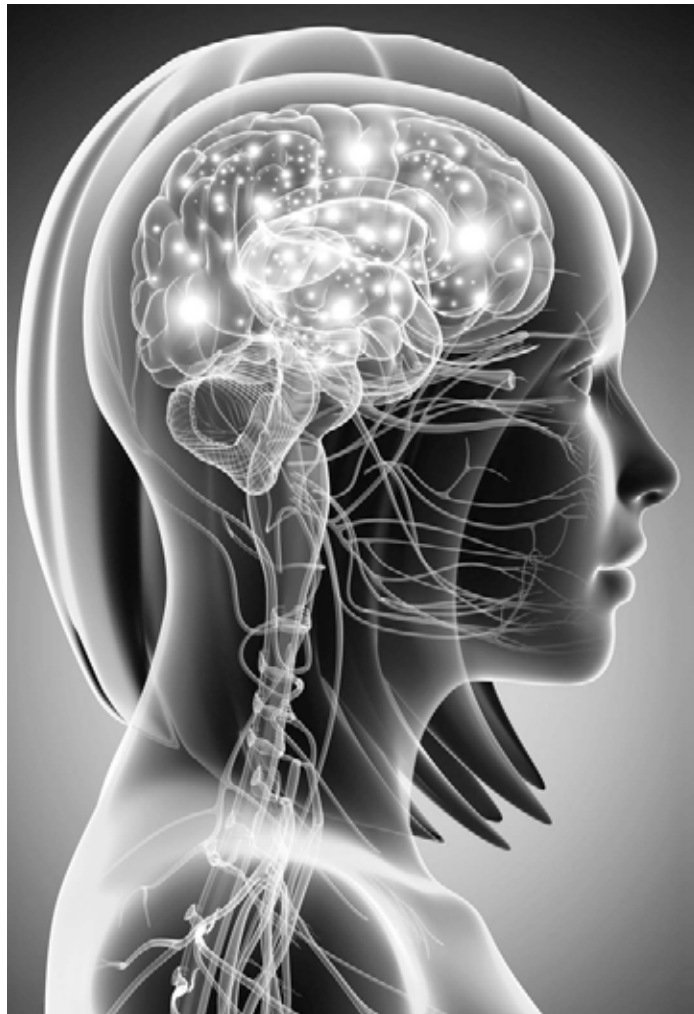
The respiratory symbol is a designation found on items pertaining to the respiratory system.



The Complex Circulatory System

The circulatory symbol is a designation found on items pertaining to the circulatory system.

If all the symbols are on a page (such as the reports and rubric section in the back), then the sheets can be used with any of the different units of material.



The Electrifying Nervous System

Activities and Worksheets



Just the Facts

Match the word with its related meaning:

- | | | |
|---------------|-------|---|
| A. Anatomy | _____ | Abnormal health consequences of disease |
| B. Physiology | _____ | Microscopic cell structure |
| C. Histology | _____ | Name and location of parts of the body |
| D. Pathology | _____ | How the body functions |

Quick questions:

1. How much does your brain weigh?
2. At what rate can your brain and nervous system send out signals to the body?
3. What basic function does your brain serve to do?
4. The Edwin Smith Surgical Papyrus was written by what ancient culture?
5. Who is also known as “The Father of Medicine”?
6. Who believed the brain was just a place to cool blood from the heart?



Back in Time

Choose one of the people from the historical timeline. Write a short story of how this discovery may have been made — and you can be as creative as you like. For example, imagine a situation that Hippocrates would have felt the need to develop the Hippocratic Oath. Or why the Edwin Smith Surgical Papyrus was written. Or what a day in an early apothecary may have been like.



How Did It Happen? Short Story Challenge

Imagine you are the assistant of one of the people listed on the timeline of brain-related discoveries or innovations. In 750 words or less, create a possible scenario that might have led to the discovery.

For example, you are Dr. Alice Hamilton's nurse and she is looking over a stack of patient records. When she realizes that the patients all have the same symptoms, she then tries to discover other things they have in common. (Hint! What kind of jobs do they have?)



The Breathtaking Respiratory System

Activities & Worksheets



Snot O' Matic

CAUTION: Using food coloring or dyes can stain hands and clothing. Protect surfaces as well. Be very careful and ask an adult for help when using it.

Materials:

Borax Laundry Booster
1 liter or quart soda bottle, clean
Measuring cup
Green or neon food coloring
Tap water
Tablespoon
White glue



Instructions:

1. Mix approximately $\frac{1}{8}$ cup of Borax with approximately $\frac{1}{2}$ liter of warm water in the bottle. Continue to shake the bottle until the borax is dissolved in the water.
2. Let the solution cool to room temperature.
3. Place 4 tablespoons of white glue in the cup.
4. Add drops of food coloring until the desired color is achieved. Stir well.
5. Measure 3 tablespoons of Borax solution from the pop bottle and add it to the glue mixture in the cup. Stir.



The Word of God

Look up Psalm 150:6, and write it below.

What does this passage mean to you?



Wind Bags

This experiment will measure how much air a person can exhale in one breath.

Materials:

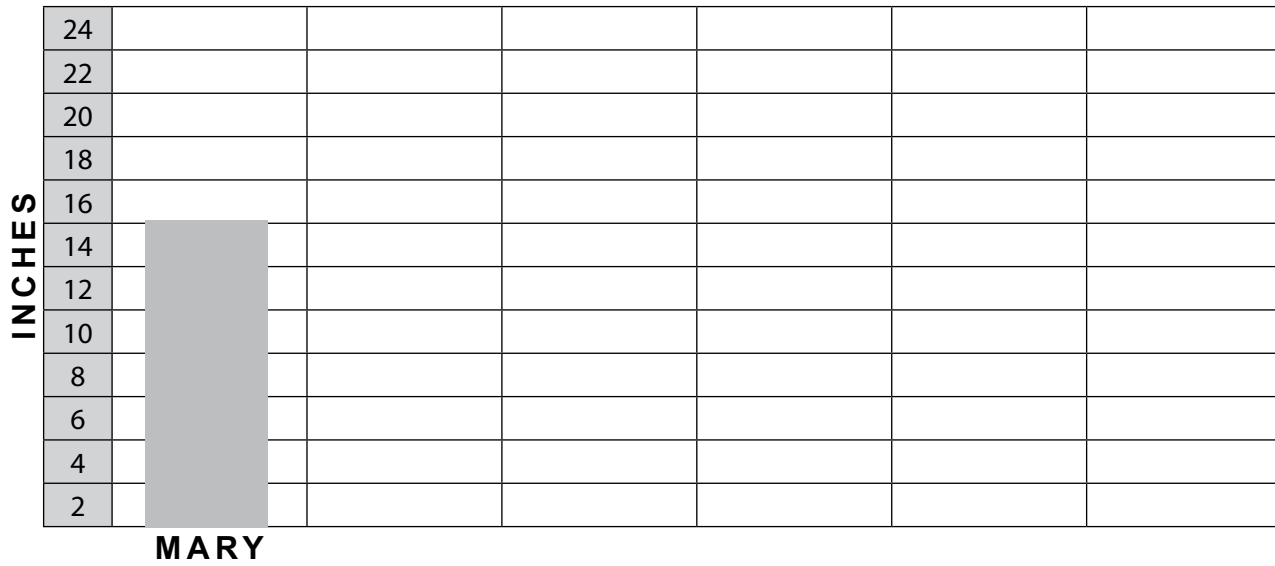
- Several large balloons (one for every one of your test subjects)
- One 2-foot length of yarn or other string
- A ruler
- Markers

Procedure:

1. Ask your test subject (a classmate or family member) to blow into a balloon with one continuous long breath. When the subject cannot blow any more, quickly pinch the neck of the balloon so that no air will escape.
2. Have your subject wrap the string around the widest area of the balloon. Measure the string with the ruler. The length of the string will be the circumference of the balloon (the distance around).
3. Using the graph on the next page, record your results.
4. Repeat the same procedure with several other subjects.



Wind Bag Graph:



(Example: Mary's balloon circumference was 15 inches)

Test Subjects

Question to Ponder:

Is there a difference in the circumference of the balloon based on the person's size, age, or gender?



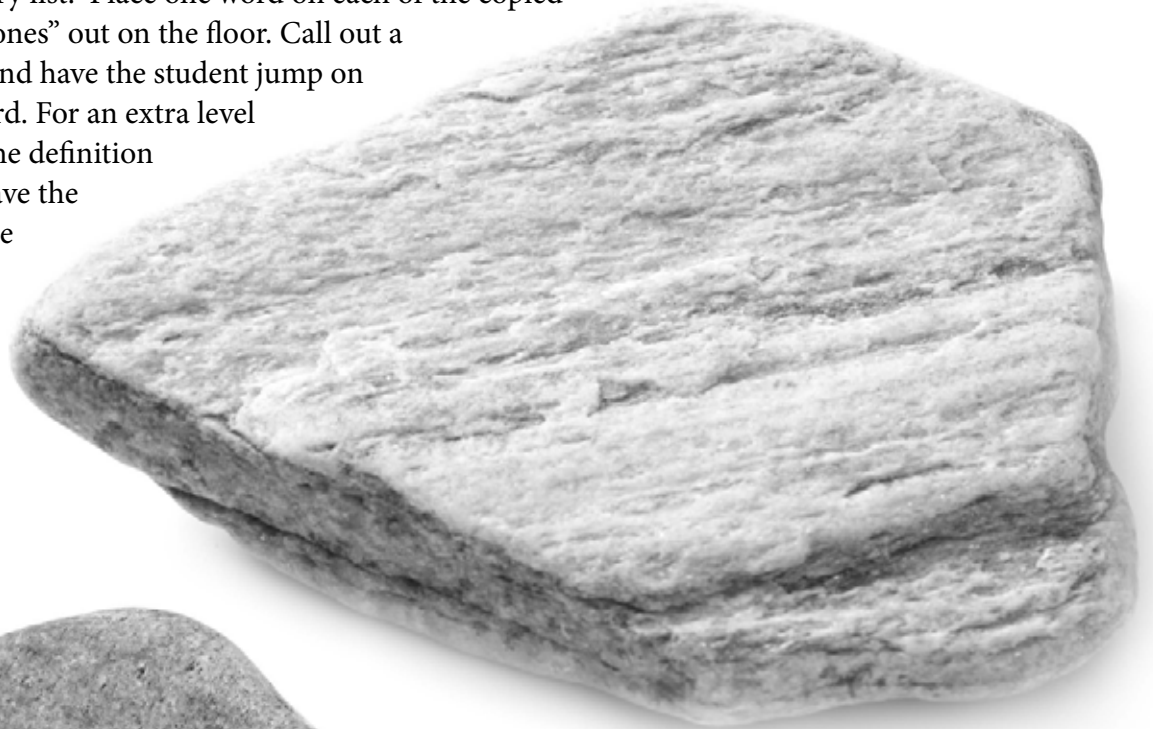
The Complex Circulatory System

Activities & Worksheets

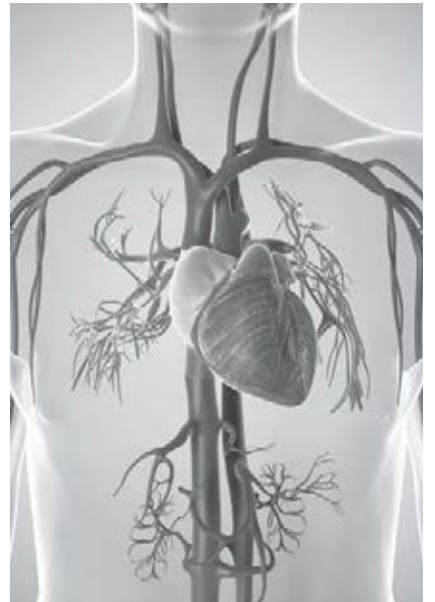


Cardiac Cobble Stones

Make several copies of the jumping cardiac cobble stones, as seen below. Cut the stones out and write out one of the selected words from the vocabulary list. Place one word on each of the copied stones. Lay the “stones” out on the floor. Call out a vocabulary word and have the student jump on the designated word. For an extra level of difficulty read the definition of the word and have the student jump to the designated word.







Exams



Fill in the blanks.

Word Bank		
fissures	frontal lobes	executive functions
plasticity	dermatomes	gyrus

- _____ are regions of the skin innervated by a particular nerve root.
- In the story about Phineas Gage, the tamping iron passed through his _____, which is responsible for _____.
- The _____ are rounded convolutions, folds, or ridges on the surface of the brain and _____ are the crevices on the surface of the brain.
- _____ is a neuroscience term that refers to the ability of the brain to be retrained and take over functions that are normally performed by another part of the brain.

Match the region of the brain with its functions.

- | | |
|-------------------------|---|
| 5. _____ Temporal lobe | A) Personality, judgment, abstract reasoning, social behavior |
| 6. _____ Parietal lobe | B) Visual cortex |
| 7. _____ Occipital lobe | C) Auditory and olfactory cortex, language comprehension |
| 8. _____ Frontal lobe | D) Primary sensory cortex and memory storage |

Points /10

Multiple Choice

- The neurons that have phagocytic properties and digest microorganism invaders and waste products produced by other neurons are called:
 - oligodendroglia
 - microglia
 - astroglia
 - neuroglia
- The _____ is composed of neurofiber tracks that allow the two hemispheres to communicate with each other.
 - gray matter
 - ependymal cells
 - pituitary
 - corpus callosum

11. The following structures are the main parts of a neuron EXCEPT:

- A. dendrites
- B. central cell body
- C. synapse
- D. axon
- E. myelin sheath

12. The following activities are functions of the gray matter EXCEPT:

- A. memory storage
- B. relay station
- C. processing
- D. conscious regulation of skeletal movement
- E. unconscious regulation of skeletal movement

True or False.

13. The synapse connects the brain stem to the spinal cord.

- A. True
- B. False

14. The central nervous system is composed of the brain and peripheral spinal nerves.

- A. True
- B. False

15. The neuron is the most fundamental unit of the nervous system.

- A. True
- B. False

16. The tentacle-like structures that extend from the cell body and reach out to other cells are called dendrites.

- A. True
- B. False

Points: /8

Short Answers

17. What is a reflex?

18. Why is the arbor vitae named after the Latin words for the “tree of life”?

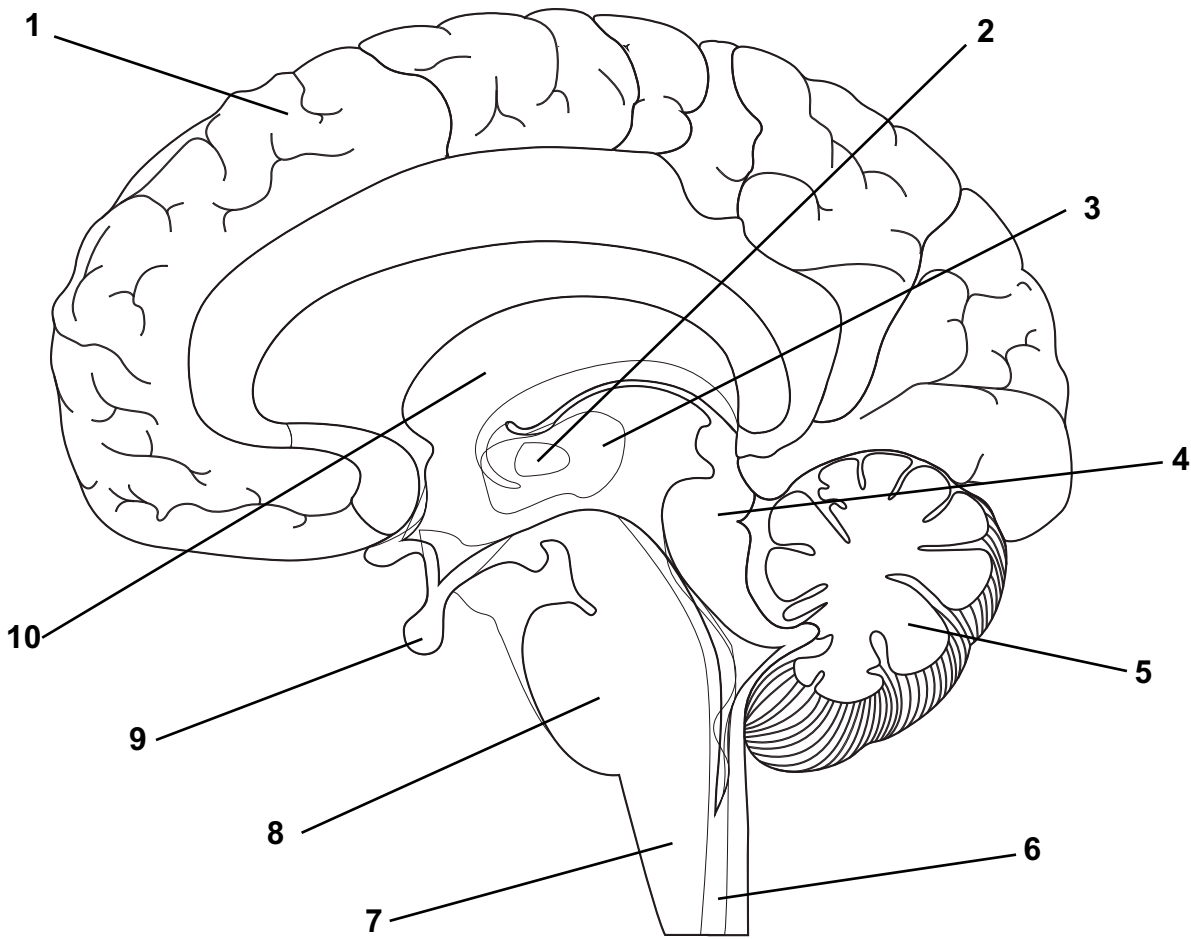
19. Explain the difference between the Broca and Wernicke’s areas.

Points: /15

Label the following diagram.

1. _____
2. _____
3. _____
4. _____
5. _____

6. _____
7. _____
8. _____
9. _____
10. _____



Points: /7

(Verbal-Linguistic)

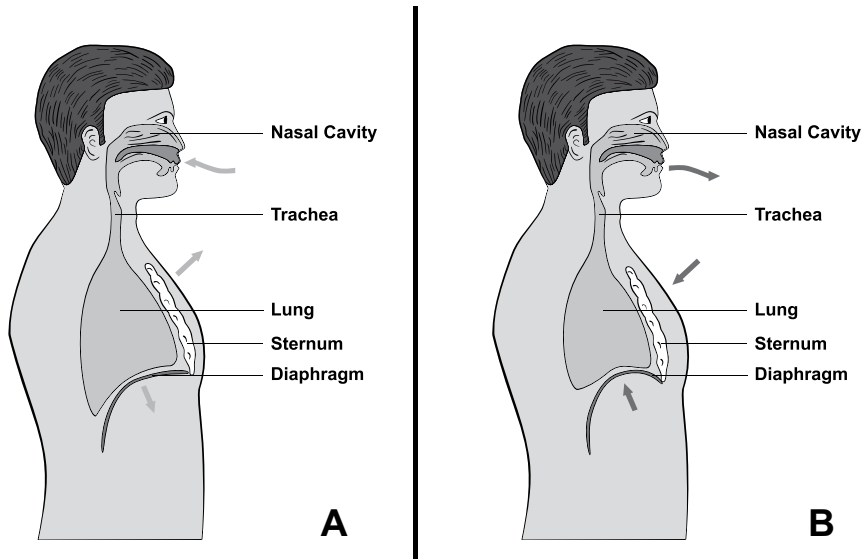


Section 1: Multiple Choice

Circle the answer that best completes the sentence. (1 point each)

1. The nose and the pharynx are a part of the
 - A. digestive system
 - B. circulatory system
 - C. upper respiratory tract
 - D. lower respiratory tract
 - E. nervous system
2. During respiration,
 - A. carbon dioxide is used and oxygen is produced.
 - B. oxygen is used and carbon dioxide is stored.
 - C. both oxygen and carbon dioxide are used.
 - D. oxygen is used and carbon dioxide is produced.
3. The vocal cords are located in the
 - A. larynx
 - B. trachea
 - C. esophagus
 - D. bronchi
4. In the lungs, gases are exchanged between the capillaries and the
 - A. bronchi.
 - B. trachea
 - C. alveoli
 - D. respiratory tree
5. Your voice is produced by the
 - A. sinuses
 - B. bronchi
 - C. larynx
 - D. pharynx

6. When a person takes a deep breath in, the air travels from
- the nares or mouth to the alveoli
 - the alveoli to the nares or mouth
 - the capillaries to the bronchi
 - the bronchi to the capillaries
7. The right lung has _____ lobes.
- 4
 - 3
 - 2
 - 1
8. What processes are shown in the diagrams A. and B.



- A is ventilation and B is cellular respiration
 - A is inhalation and B is exhalation
 - A is perspiration and B is expiration
 - A is absorption and B is radiation
9. The main control for respiration is located in
- the kidneys
 - the liver
 - the heart
 - the brain

10. The sensory network for smell located in the nasal cavity is called the
- A. smell nerves
 - B. odorants
 - C. bulb nerves
 - D. cribriform plate

Points: ____/10

Section 2: Fill in the Blank

Use the chart below to answer the following questions:

	Oxygen	Carbon Dioxide	Nitrogen	Water
Inhaled air	21%	0.04%	78%	1.25%
Exhaled air	16%	4.0%	78%	5.9%

11. Which substance is not utilized by the body? (1 point)
12. Give the evidence based on the chart information that led to your answer in question #1. (3 points)
13. Explain the difference between the inhaled and exhaled concentrations of carbon dioxide. (4 points)
14. Explain or draw the pathway that air takes through the respiratory system. (5 points)

Points: ____/13

15. How do mucus and cilia work as a team to remove dust that enters your nose? What does each do? (5 points)
16. Explain what happens to carbon dioxide in the blood when it flows through the capillaries in the alveoli? Draw a picture of the process. (5 points)

17. What is the function of surfactant in the lungs? Explain how this relates to babies that are born prematurely and the function of their lungs. (5 points)

Points: _____ / 15

Matching (1 point each)

18. _____ Vocal cords A. Short, hairlike, rhythmically beating extensions on the surface of some cells
19. _____ Bronchi B. The exchange of air between the lungs and the environment
20. _____ Cilia C. To breathe in
21. _____ Ventilation D. Slimy substance secreted by the body to protect the surfaces
22. _____ Epidemic E. A viral disease that causes damage to the cells of the brain stem and spinal cord
23. _____ Inhale F. Two folded pairs of membranes in the larynx
24. _____ Mucus G. The two branches of the trachea that extend into the lungs
25. _____ Polio H. Outbreak of a disease that spreads among people in an area
26. _____ Pandemic I. Episodes of airway obstruction with wheezing and shortness of breath
27. _____ Asthma J. Outbreak of a disease that spreads among people across a wide area, across continents

Fill in the blank from the word box below. (1 point each)

28-33. Air enters the nose and travels down to the _____, it meets up with the _____ (the location of the vocal cords). A cartilage “lid” called the _____ protects this delicate area and keeps food from entering the lungs. From here air enters the _____, which are branching passageways to the smallest passage called the _____. Gas exchange occurs in the _____.

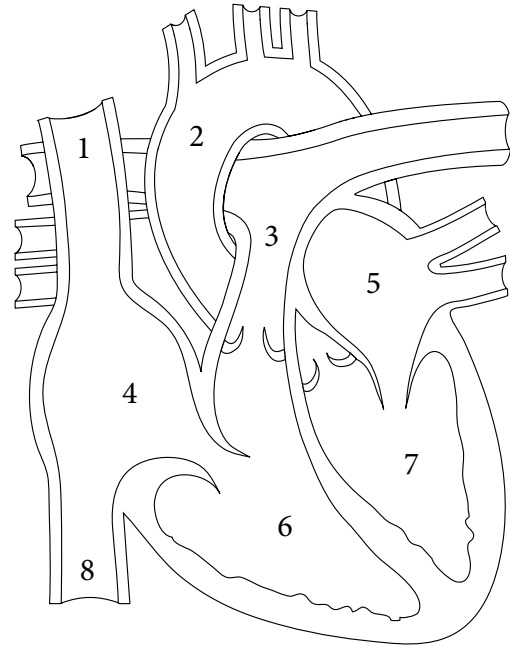
Word Box			
alveoli	larynx	cilia	bronchioles
pleura sac	mucus	epiglottis	nares
trachea	pharynx	sinuses	

Points - _____ / 16 points



Label the parts of the heart. Use the word bank below it. (2 pts each)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____



Word Box

- | | | | |
|--------------|--------------------|--------------------|-----------------|
| left atrium | aorta | superior vena cava | left ventricle |
| right atrium | inferior vena cava | pulmonary artery | right ventricle |

Points: _____ / 16

Multiple Choice

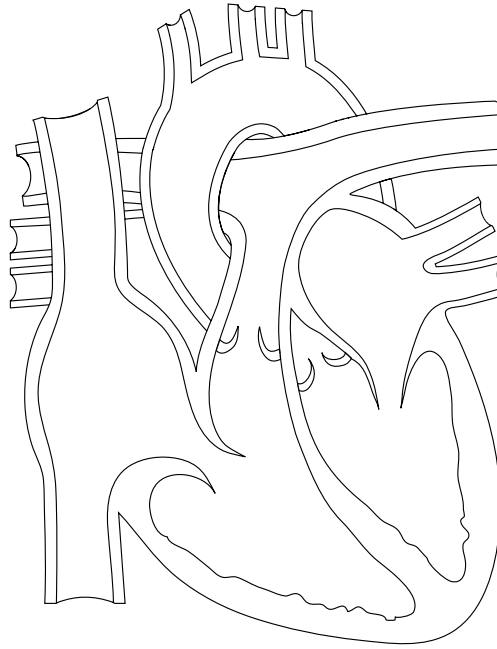
Write the letter of the correct answer on the line at the left.

- _____ 9. Which chamber of the heart pushes the blood with the greatest force?
- a. Right atrium
 - b. Right ventricle
 - c. Left atrium
 - d. Left ventricle
- _____ 10. Cells that help protect the body from disease are the
- a. Lymph cells
 - b. Red blood cells
 - c. White blood cells
 - d. Platelets

- _____ 11. Which chamber receives blood from the body?
- Right atrium
 - Right ventricle
 - Left atrium
 - Left ventricle
- _____ 12. The general pathway of blood in the body is
- Heart -> Lungs -> Heart -> Body
 - Heart -> Lungs -> Body -> Heart
 - Lungs ->Heart ->Lungs ->Body
 - Body -> Lungs -> Heart -> Body
- _____ 13. Blood leaves the heart through
- Arteries
 - Atria
 - Veins
 - Capillaries
- _____ 14. What prevents blood from flowing backward in veins?
- Chambers
 - Platelets
 - Red Blood Cells
 - Valves
- _____ 15. Blood cells are made in the
- The heart.
 - From plasma.
 - From lymph.
 - In the bones.

Points: _____ / 7

16. Trace the flow of blood through the heart. Use colored pencils. Use the colors red and blue depicting the flow of the oxygenated and deoxygenated blood. (4 pts)



Points: _____ / 4

True or False

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

_____ 17. White blood cells contain hemoglobin.

_____ 18. The capillaries are the smallest blood vessels in the body.

_____ 19. Platelets help the body to fight infection.

Points: _____ / 7



Answers

Elementary Anatomy Worksheet Answer Keys

The Electrifying Nervous System

Worksheet 1

D; C; A; B

1. 3 pounds for an adult
2. At over 320 feet per second
3. It is the control center of our bodies
4. Egypt
5. Hippocrates
6. Aristotle
7. lead
8. Andreas Vesalius
9. When people thought they could distinguish the traits of others by feeling the bumps on their heads
10. 1884

Worksheet 2, 3, and 4

Answers will vary according to the Bible version used.

Worksheet 5

Fill in the blanks:

1. computerized tomography, bone injuries, lung/chest problems, cancers
2. electroencephalogram, electrical activity, brain
3. magnetic resonance imaging, scanners, fields, waves
4. positron emission tomography, radioactive tracers, active

Worksheet 6

Fill in the blanks:

dendrites; axon; myelin sheath; neuron; Neuroglia

Matching:

3; 1; 4; 2

Name the parts of a neuron:

1. central cell body
2. dendrites
3. axon

Worksheet 7

Fill in the associated boxes. (Nervous System divided into 2 parts.)

- (1.) Central Nervous System > (a.) Brain
(b.) Spinal Cord
- (2.) Peripheral Nervous System > (a.) All the nerves that connect to the Brain and Spinal Cord

What are the four types of neurological cells?

1. Astroglia
2. Ependymal cells
3. Microglia
4. Oligodendroglia

Draw a cartoon:

1. Store grocer
2. Blanket or liner
3. Garbage collector
4. The protector

Activity 6

1700 BC - Edwin Smith papyrus

460-379 BC - Hippocrates

335 BC - Aristotle

170 BC - Galen

4 or 5 BC - Christ

AD 1543 - Andreas Vesalius

AD 1649 - Rene Descartes

AD 1717 - Anthony Van Leeuwenhoek

AD 1861 - Dr. Paul Broca

AD 1910 - Dr. Alice Hamilton

AD 1957 - Dr. Wilder Penfield

AD 1980 - Dr. Raymond Damadian

Worksheet 8

1. Corpus Callosum
2. Thalamus
3. Hypothalamus
4. Brain Stem
5. Pons
6. Medulla Oblongata
7. Pituitary

8. Spinal Cord
9. Cerebellum
10. Midbrain
11. Cerebral Cortex

Worksheet 9

Color and label the parts of the brain.

1. Cerebral Cortex
2. Thalamus
3. Hypothalamus
4. Midbrain
5. Cerebellum
6. Spinal cord
7. Medulla Oblongata
8. Pons
9. Pituitary
10. Corpus Collosum

Worksheet 10

Fill in the blanks:

cerebral hemispheres, cerebrum, gray matter, white matter, Corpus callosum

Matching:

2, 4, 1, 3

1. (Answers may vary.) The gray matter is the outer rim on the surface of the brain. The white matter lies deeper than the gray matter. It is the area in which neurological nerve tracts are housed. (See page 17.)
2. (Answers may vary.) The brain of a child has the ability to reorganize neural connections. If one part of the brain is injured, then other areas of the brain may be retrained to take over the functions of the damaged area.

Worksheet 11

1. Answers will vary — but be sure the student specifies the qualities or reasons why he or she feels he or she is either a right- or left-brained person.
2. A variety of answers would be acceptable, but they need to be focused on how conflict occurs — for example, a left-brained person uses facts while a right-brained person uses an imaginative explanation.
3. Be sure the student has read the verses and can articulate aspects of what they present. For

example, Matthew 18:15 speaks of working out conflict privately first and then gives additional steps to follow if the conflict is not resolved.

Worksheet 12

The drawings will vary per student — but they have to demonstrate or reflect a function. However, each needs to reflect that specific area of the cerebrum and what it controls.

Lobes	Function
Frontal Lobe	Personality, judgment, abstract reasoning, social behavior: location of the primary motor cortex, which controls movement
Parietal Lobe	Location of the primary sensory cortex — conscious perception of sensations, such as touch, pressure, vibration, pain, taste, and temperature; origination of memory storage and processing, as well as conscious and subconscious regulation of skeletal movement
Occipital Lobe	Visual cortex
Temporal Lobe	Auditory cortex, olfactory (smell) cortex, and language comprehension

Worksheet 13

Language Comprehension > Parietal Lobe
 Memory > Frontal Lobe
 Visual Cortex > Occipital Lobe
 Personality, Judgment > Frontal Lobe
 Listening Comprehension > Parietal Lobe
 Movement of Muscles > Parietal Lobe
 Coordinates Movements > Cerebellum

Worksheet 14

The diary entry should not be just written as a collection of facts — the exercise is designed to give the student an imaginative attempt to step back into history and be part of a big event and then share it from a personal perspective in a diary. So the tone should be personal, but there should be some additional details from the research that help make the scene described more realistic.

Worksheet 15

Biography answers:

The Electrifying Nervous System

1. Dermatomes
2. frontal lobe, executive functions
3. gyrus, fissures
4. Plasticity
5. C
6. D
7. B
8. A
9. B. microglia
10. D. corpus callosum
11. C. synapse
12. B. relay station
13. False
14. False
15. True
16. False
17. (Answers may vary) When our peripheral nervous system picks up sensory information, it sets our reflexes in action. Reflexes are involuntary responses to stimuli. For example, the withdrawal reflex, the act of withdrawing your foot when you step on a nail, is an example of a reflex.
18. (Answers may vary) It is the tree-like structure that occupies the cerebellum. It is composed of nerve fibers that bring sensory and motor impulses to the cerebellum.
19. Broca's Area is located on the left hemisphere in the temporal area, and it houses the motor speech region that provides the ability to form spoken words.
Wernicke's Area is the region of the brain that interprets what one hears and makes sense of spoken communication.

Label the diagram.

1. Cerebral Cortex
2. Thalamus
3. Hypothalamus
4. Midbrain
5. Cerebellum
6. Spinal cord

7. Medulla Oblongata
8. Pons
9. Pituitary
10. Corpus Collosum

The Breathtaking Respiratory System

1. C
2. D
3. A
4. C
5. C
6. A
7. B
8. B
9. D
10. D
11. Nitrogen
12. (Answers may vary slightly.) In comparing the exhaled and inhaled air, there is no change in the concentration of the nitrogen. Therefore, nitrogen is not utilized by the body.
13. (Answers may vary slightly.) Inhaled air contains 0.04% carbon dioxide and exhaled contains 4%. The body produces carbon dioxide as a waste product from its cellular activity. Therefore, more is expired from the body than is taken from the outside environment.
14. (Answers may vary.) Nares/mouth to pharynx to larynx to trachea to bronchi to bronchioles to alveoli
15. (Answers may vary.) The mucus is a thick lubricant that coats the surfaces of the respiratory tract. It is sticky. Dust bits come in contact with the mucus and the bits stick to the mucus.
Lying under the surface of the mucus, hairlike extensions from the cells called cilia are located. The cilia beat and move rhythmically in one direction to expel the mucus. The mucus flows off the surface and the dust bits can be coughed, spit, or sneezed out.
16. (Answers may vary.) Carbon dioxide diffuses

from the capillary into the alveoli to be excreted by the body. Carbon dioxide is a waste product produced by the body as a result of its chemical processes. The carbon dioxide is exchanged for oxygen.

17. (Answers may vary.) Surfactant helps decrease the tension of water on the surface of the alveoli and prevents the alveoli from collapsing. Premature babies may deliver prior to their ability to produce surfactant in their lungs. Without this surfactant, the premature may not be able to expand their lungs and could have difficulty with breathing.

18. F

19. G

20. A

21. B

22. H

23. C

24. D

25. E

26. J

27. I

28. larynx

29. pharynx

30. epiglottis

31. bronchi

32. bronchioles

33. alveoli

The Complex Circulatory System

1. Superior Vena Cava

2. Aorta

3. Pulmonary Artery

4. Right Atrium

5. Left Atrium

6. Right Ventricle

7. Left Ventricle

8. Inferior Vena Cava

9. D

10. C

11. A

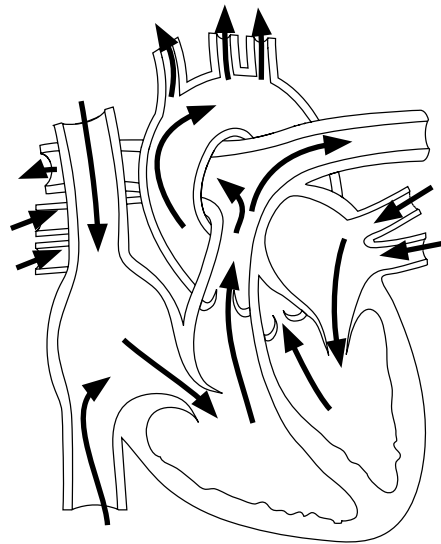
12. A

13. A

14. D

15. D

16.



17. False

Red blood cells contain hemoglobin.

18. True

19. False

White blood cells help to fight infection.

Final Test

1. Cilia

2. Neurons

3. Iron Lung

4. Epiglottis

5. Pleura Sac

6. Blood-Brain Barrier

7. Asthma

8. Nares

9. Arbor Vitae

10. Autonomic Nervous System

11. Astroglia

12. Temporal Lobe

13. Sinuses

14. White Matter

15. Upper Respiratory Tract

16. Dermatomes

17. Alveoli

18. Pons

19. Laryngitis

20. Medulla Oblongata

21. Nose, sinuses, pharynx, larynx

22. Trachea and lungs

23. Plasma, Buffy coat (white blood cells and platelets), Erythrocytes (red blood cells)
24. Must include three of the following (wording will vary per student): act as a delivery agent (delivers gases to cells), acts as a garbage collector (transports waste out of the cells and then to the kidneys for disposal), controls the heat in your body, controls the pH balance in your body, helps us form clots to protect against blood loss, and helps protect us against infection, bacteria, and disease.
25. Hematopoiesis
26. A person with blood type O is called a “universal” donor.
27. Nervous system – your brain
28. A. Cerebral Cortex
B. Thalamus
C. Hypothalamus
D. Midbrain
E. Cerebellum
F. Spinal cord
G. Medulla Oblongata
H. Pons
I. Pituitary
J. Corpus Collosum
29. A. Superior Vena Cava
B. Right Pulmonary Artery
C. Right Pulmonary Veins
D. Right Atrium
E. Tricuspid Valve
F. Inferior Vena Cava
G. Pulmonary Valve
H. Right Ventricle
I. Left Ventricle
J. Mitral Valve / Bicuspid
K. Left Atrium
L. Left Pulmonary Veins
M. Left Pulmonary Artery
N. Aortic Valve
O. Aorta
30. Answers will vary. Make sure sentences are complete and that the student is able to use specific information or examples of the complexity of the human body.