TEACHER GUIDE

9th–12th Grade

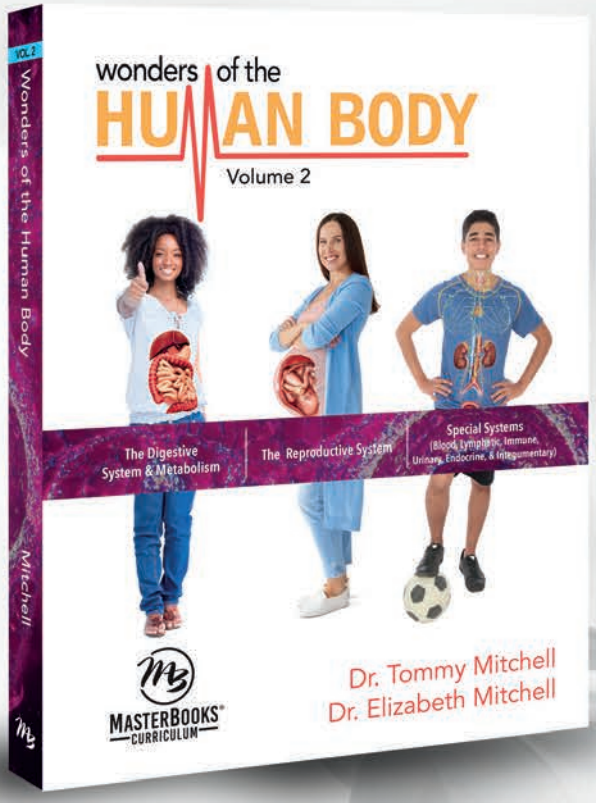
Includes Student Worksheets

Science

- Weekly Lesson Schedule
- Worksheets
- Quizzes & Tests
- Answer Keys

INTRODUCTION TO ANATOMY & PHYSIOLOGY 2

The Digestive System & Metabolism, Reproductive System, & Special Systems



wonders of the HUMAN BODY

MASTERBOOKS® CURRICULUM

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Introduction to Anatomy & Physiology 2 Revised

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Authors of Wonders of the Human Body: Volume 2:
Tommy and Elizabeth Mitchell met and married at Vanderbilt University School of Medicine, where they earned medical degrees in 1984. Both went on to complete residency training at Vanderbilt University affiliated hospitals. Dr. Tommy Mitchell became Board Certified in Internal Medicine and was elected a Fellow of the American College of Physicians. Dr. Elizabeth Mitchell became Board Certified in Obstetrics and Gynecology and a Fellow of the American College of Obstetricians and Gynecologists. Dr. Elizabeth Mitchell retired from medical practice in 1995 to devote herself more fully to the needs of their three children. Later, as a writer for Answers in Genesis, she authored the long-running weekly "News to Note" series, as well as in-depth web articles, and has been a contributing author for many of AiG's publications. In 2006, Dr. Tommy Mitchell withdrew from medical practice to join Answers in Genesis as a full-time speaker and writer. He passed into the presence of the Lord on September 17, 2019.

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Table of Contents

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.

Fearfully and Wonderfully Made! Continue the exploration of the human body from a creation perspective in this subsequent Anatomy & Physiology course. Students will learn how amazing their bodies are — from the simplest parts to some of its most complex functions. Covering the digestive system, metabolism, the reproductive system, and special systems, this course takes an in-depth look at how these systems work and how our bodies cannot possibly be an accident! Through worksheets, quizzes, and tests, students will solidify their knowledge of the human body, created by the one and only Master Designer.

	**Approximately 30 to 45 minutes per lesson, five days a week**
	**Includes answer keys for worksheets, quizzes, and tests**
	**Worksheets for each section**
	**Quizzes and tests are included to help reinforce learning and provide assessment opportunities**
	**Designed for grades 9 to 12 in a one-year course to earn 1 science credit**

Course Objectives: Students completing this course will

- Identify dietary needs
- Investigate the properties of amino acids
- Explore the anatomy of the stomach
- Discover the process of digestion
- Learn about nutrition and metabolism
- Understand the basic genetics of the human body
- Distinguish the male and female reproductive systems
- Discover the function of blood
- Understand the purpose of the immune system

Course Description

The introduction to anatomy and physiology continues as students are given a deeper understanding of God's wonderful design of their bodies. How does the cereal you had for breakfast become energy? Or the popcorn you had at the ballgame? How does the chicken you had for supper provide the amino acids the body needs to build proteins? How does the human body form so wondrously in a mother's womb? How does the blood ceaselessly transport oxygen and nutrients throughout the body? These questions and more are answered as we look into the wonders of God's awesome creation. But as with all things in our fallen cursed world, things do go wrong. We will also explore the problems that occur when our bodies are damaged by disease or injury. When you see the incredible complexity of you, you will realize that our bodies cannot be the result of chemical accidents occurring over millions of years. The human body is the greatest creation of an all-knowing Master Designer!

Note for Grading: All quizzes and tests are worth 100 points total. The unit 2 and 3 worksheets do include a component where students draw and label various diagrams from the book. You may grade these on both a content basis and an artistic basis.

First Semester Suggested Daily Schedule

Date	Day	Assignment	Due Date	✓	Grade
First Semester-First Quarter					
Week 1	Day 1	Read Introduction and Overview • Pages 6–9 • *Wonders of the Human Body Vol. 2* (WHBV2) Read Introduction with focus on course objectives • Pages 4–5 • Teacher Guide (TG)			
	Day 2	Read Pages 10–12 • (WHBV2)			
	Day 3	Read Pages 13–15 • (WHBV2)			
	Day 4	Worksheet 1 • Pages 17–18 • (TG)			
	Day 5	Read Pages 16–18 (to The Tongue) • (WHBV2)			
Week 2	Day 6	Read Pages 18–20 (from The Tongue) • (WHBV2)			
	Day 7	Worksheet 2 • Pages 19–20 • (TG)			
	Day 8	Read Pages 21–22 (to final full paragraph) • (WHBV2)			
	Day 9	Read Pages 22–25 (from final full paragraph) • (WHBV2)			
	Day 10	Worksheet 3 • Pages 21–22 • (TG)			
Week 3	Day 11	Read Pages 26–27 (to Saliva) • (WHBV2)			
	Day 12	Read Pages 27–29 (from Saliva) • (WHBV2)			
	Day 13	Worksheet 4 • Pages 23–24 • (TG)			
	Day 14	Read Pages 30–33 • (WHBV2)			
	Day 15	Read Pages 34–36 (to The Stomach) • (WHBV2)			
Week 4	Day 16	Worksheet 5 • Pages 25–26 • (TG)			
	Day 17	Read Pages 36–39 (from The Stomach) • (WHBV2)			
	Day 18	Read Pages 40–41 • (WHBV2)			
	Day 19	Worksheet 6 • Pages 27–28 • (TG)			
	Day 20	Read Pages 42–45 (to And Now…) • (WHBV2)			
Week 5	Day 21	Read Pages 45–46 (from And Now…) • (WHBV2)			
	Day 22	Worksheet 7 • Pages 29–30 • (TG)			
	Day 23	Read Pages 47–48 (to Miscroscopic Anatomy) • (WHBV2)			
	Day 24	Read Pages 49–50 (from Microscopic Anatomy) • (WHBV2)			
	Day 25	Worksheet 8 • Pages 31–32 • (TG)			
Week 6	Day 26	Read Pages 51–53 (to Blood Supply of the Liver) • (WHBV2)			
	Day 27	Read Pages 53–56 (from Blood Supply of the Liver to Functions of the Liver) • (WHBV2)			
	Day 28	Worksheet 9 • Pages 33–34 • (TG)			
	Day 29	Read Pages 56–59 (from Functions of the Liver) • (WHBV2)			
	Day 30	Read Pages 60–63 (to Blood Supply of the Small Intestine) • (WHBV2)			
Week 7	Day 31	Worksheet 10 • Pages 35–36 • (TG)			
	Day 32	Study Day			
	Day 33	**Unit 1: Quiz 1** • Pages 133–134 • (TG)			
	Day 34	Read Pages 63–65 (from Blood Supply of the Small Intestine) • (WHBV2)			
	Day 35	Read Pages 66–67 • (WHBV2)			

Date	Day	Assignment	Due Date	✓	Grade
Week 8	Day 36	Worksheet 11 • Pages 37–38 • (TG)			
	Day 37	Read Pages 68–69 • (WHBV2)			
	Day 38	Read Pages 70–71 • (WHBV2)			
	Day 39	Worksheet 12 • Pages 39–40 • (TG)			
	Day 40	Read Pages 72–75 • (WHBV2)			
Week 9	Day 41	Read Page 76 • (WHBV2)			
	Day 42	Worksheet 13 • Pages 41–42 • (TG)			
	Day 43	Read Pages 77–78 • (WHBV2)			
	Day 44	Read Pages 79–81 (to Digestion of Proteins) • (WHBV2)			
	Day 45	Worksheet 14 • Pages 43–44 • (TG)			
First Semester-Second Quarter					
Week 1	Day 46	Read Pages 81–83 (from Digestion of Proteins to Lipids) • (WHBV2)			
	Day 47	Read Pages 83–85 (from Lipids) • (WHBV2)			
	Day 48	Worksheet 15 • Pages 45–46 • (TG)			
	Day 49	Read Pages 86–87 • (WHBV2)			
	Day 50	Read Pages 88–89 • (WHBV2)			
Week 2	Day 51	Worksheet 16 • Pages 47–48 • (TG)			
	Day 52	Read Pages 90–91 (to Water) • (WHBV2)			
	Day 53	Read Pages 91–93 (from Water to Fiber) • (WHBV2)			
	Day 54	Worksheet 17 • Pages 49–50 • (TG)			
	Day 55	Read Pages 93–96 (from Fiber) • (WHBV2)			
Week 3	Day 56	Read Pages 97–100 • (WHBV2)			
	Day 57	Worksheet 18 • Pages 51–52 • (TG)			
	Day 58	Read Pages 101–108 • (WHBV2)			
	Day 59	Worksheet 19 • Pages 53–54 • (TG)			
	Day 60	Study Day			
Week 4	Day 61	**Unit 1: Quiz 2** • Pages 135–136 • (TG)			
	Day 62	Study Day			
	Day 63	**Test 1** • Pages 145–146 • (TG)			
	Day 64	Read Pages 110–113 • (WHBV2)			
	Day 65	Read Pages 114–116 • (WHBV2)			
Week 5	Day 66	Worksheet 20 • Pages 57–58 • (TG)			
	Day 67	Read Pages 117–119 • (WHBV2)			
	Day 68	Read Pages 120–121 • (WHBV2)			
	Day 69	Worksheet 21 • Pages 59–60 • (TG)			
	Day 70	Read Pages 122–123 • (WHBV2)			
Week 6	Day 71	Read Pages 124–127 (to Sex Linked Inheritance) • (WHBV2)			
	Day 72	Worksheet 22 • Pages 61–62 • (TG)			
	Day 73	Read Pages 127–129 (from Sex Linked Inheritance) • (WHBV2)			
	Day 74	Read Pages 130–133 (to last paragraph on page) • (WHBV2)			
	Day 75	Worksheet 23 • Pages 63–64 • (TG)			

Date	Day	Assignment	Due Date	✓	Grade
Week 7	Day 76	Read Pages 133–138 (from last paragraph on page) • (WHBV2)			
	Day 77	Read Page 139 • (WHBV2)			
	Day 78	Worksheet 24 • Pages 65–66 • (TG)			
	Day 79	Read Pages 140–142 • (WHBV2)			
	Day 80	Read Pages 143–144 • (WHBV2)			
Week 8	Day 81	Worksheet 25 • Pages 67–68 • (TG)			
	Day 82	Read Pages 145–147 • (WHBV2)			
	Day 83	Read Pages 148–150 (to Fertilization) • (WHBV2)			
	Day 84	Worksheet 26 • Pages 69–70 • (TG)			
	Day 85	Read Pages 150–154 (from Fertilization to Destination Uterus) • (WHBV2)			
Week 9	Day 86	Read Pages 154–156 (from Destination Uterus) • (WHBV2)			
	Day 87	Worksheet 27 • Pages 71–72 • (TG)			
	Day 88	Study Day			
	Day 89	**Unit 2: Quiz 1** • Pages 137–138 • (TG)			
	Day 90	Read Pages 157–159 (to What about Twins?) • (WHBV2)			
		Mid-Term Grade			

Second Semester Suggested Daily Schedule

Date	Day	Assignment	Due Date	✓	Grade
		Second Semester-Third Quarter			
Week 1	Day 91	Read Pages 159–161 (from What about Twins?) • (WHBV2)			
	Day 92	Worksheet 28 • Pages 73–74 • (TG)			
	Day 93	Read Pages 162–166 (to Amniotic Fluid) • (WHBV2)			
	Day 94	Read Pages 166–169 (from Amniotic Fluid) • (WHBV2)			
	Day 95	Worksheet 29 • Pages 75–76 • (TG)			
Week 2	Day 96	Read Pages 170–174 • (WHBV2)			
	Day 97	Worksheet 30 • Pages 77–78 • (TG)			
	Day 98	Read Pages 175–178 (to Using Ultrasound) • (WHBV2)			
	Day 99	Read Pages 178–181 (from Using Ultrasound) • (WHBV2)			
	Day 100	Worksheet 31 • Pages 79–80 • (TG)			
Week 3	Day 101	Read Pages 182–186 (to Respiratory System) • (WHBV2)			
	Day 102	Read Pages 186–187 (from Respiratory System) • (WHBV2)			
	Day 103	Worksheet 32 • Pages 81–82 • (TG)			
	Day 104	Read Pages 188–189 • (WHBV2)			
	Day 105	Read Pages 190–193 • (WHBV2)			
Week 4	Day 106	Worksheet 33 • Pages 83–84 • (TG)			
	Day 107	Read Pages 194–196 • (WHBV2)			
	Day 108	Read Pages 197–199 • (WHBV2)			
	Day 109	Worksheet 34 • Pages 85–86 • (TG)			
	Day 110	Read Pages 200–201 • (WHBV2)			
Week 5	Day 111	Read Pages 202–203 • (WHBV2)			
	Day 112	Worksheet 35 • Pages 87–88 • (TG)			
	Day 113	Study Day			
	Day 114	**Unit 2: Quiz 2** • Pages 139–140 • (TG)			
	Day 115	Study Day			
Week 6	Day 116	**Test 2** • Pages 147–148 • (TG)			
	Day 117	Read Pages 206–209 (to Blood Components) • (WHBV2)			
	Day 118	Read Pages 209–211 (from Blood Components) • (WHBV2)			
	Day 119	Worksheet 36 • Pages 91–92 • (TG)			
	Day 120	Read Pages 212–215 • (WHBV2)			
Week 7	Day 121	Read Pages 216–219 • (WHBV2)			
	Day 122	Worksheet 37 • Pages 93–94 • (TG)			
	Day 123	Read Pages 220–224 • (WHBV2)			
	Day 124	Read Pages 225–226 • (WHBV2)			
	Day 125	Worksheet 38 • Pages 95–96 • (TG)			

Date	Day	Assignment	Due Date	✓	Grade
Week 8	Day 126	Read Pages 227–229 • (WHBV2)			
	Day 127	Read Pages 230–233 • (WHBV2)			
	Day 128	Worksheet 39 • Pages 97–98 • (TG)			
	Day 129	Read Pages 234–237 • (WHBV2)			
	Day 130	Read Pages 238–240 • (WHBV2)			
Week 9	Day 131	Worksheet 40 • Pages 99–100 • (TG)			
	Day 132	Read Pages 241–243 • (WHBV2)			
	Day 133	Read Pages 244–248 (to Humoral Immunity) • (WHBV2)			
	Day 134	Worksheet 41 • Pages 101–102 • (TG)			
	Day 135	Read Pages 248–254 (from Humoral Immunity to Immunologic Memory) • (WHBV2)			
Second Semester-Fourth Quarter					
Week 1	Day 136	Read Pages 254–259 (from Immunologic Memory) • (WHBV2)			
	Day 137	Worksheet 42 • Pages 103–104 • (TG)			
	Day 138	Read Pages 260–263 • (WHBV2)			
	Day 139	Read Pages 264–267 (to Bigger on the Inside) • (WHBV2)			
	Day 140	Worksheet 43 • Pages 105–106 • (TG)			
Week 2	Day 141	Read Pages 267–270 (from Bigger on the Inside) • (WHBV2)			
	Day 142	Read Pages 271–274 • (WHBV2)			
	Day 143	Worksheet 44 • Pages 107–108 • (TG)			
	Day 144	Read Pages 275–279 • (WHBV2)			
	Day 145	Read Pages 280–281 • (WHBV2)			
Week 3	Day 146	Worksheet 45 • Pages 109–110 • (TG)			
	Day 147	Study Day			
	Day 148	**Unit 3: Quiz 1** • Pages 141–142 • (TG)			
	Day 149	Read Pages 282–284 • (WHBV2)			
	Day 150	Read Pages 285–289 • (WHBV2)			
Week 4	Day 151	Worksheet 46 • Pages 111–112 • (TG)			
	Day 152	Read Pages 290–292 (to Where Do Hormones Come From?) • (WHBV2)			
	Day 153	Read Pages 292–297 (from Where Do Hormones Come From?) • (WHBV2)			
	Day 154	Worksheet 47 • Pages 113–114 • (TG)			
	Day 155	Read Pages 298–301 • (WHBV2)			
Week 5	Day 156	Read Pages 302–304 • (WHBV2)			
	Day 157	Worksheet 48 • Pages 115–116 • (TG)			
	Day 158	Read Pages 305–307 • (WHBV2)			
	Day 159	Read Pages 308–310 • (WHBV2)			
	Day 160	Worksheet 49 • Pages 117–118 • (TG)			

Date	Day	Assignment	Due Date	✓	Grade
Week 6	Day 161	Read Pages 311–315 • (WHBV2)			
	Day 162	Read Pages 316–319 • (WHBV2)			
	Day 163	Worksheet 50 • Pages 119–120 • (TG)			
	Day 164	Read Pages 320–324 • (WHBV2)			
	Day 165	Read Pages 325–327 • (WHBV2)			
Week 7	Day 166	Worksheet 51 • Pages 121–122 • (TG)			
	Day 167	Read Pages 328–330 • (WHBV2)			
	Day 168	Read Pages 331–335 • (WHBV2)			
	Day 169	Worksheet 52 • Pages 123–124 • (TG)			
	Day 170	Read Pages 336–339 (to Burns) • (WHBV2)			
Week 8	Day 171	Read Pages 339–342 (from Burns) • (WHBV2)			
	Day 172	Worksheet 53 • Pages 125–126 • (TG)			
	Day 173	Read Pages 343–347 • (WHBV2)			
	Day 174	Read Pages 348–351 • (WHBV2)			
	Day 175	Worksheet 54 • Pages 127–128 • (TG)			
Week 9	Day 176	Study Day to Finish Assignments			
	Day 177	Study Day			
	Day 178	**Unit 3: Quiz 2** • Pages 143–144 • (TG)			
	Day 179	Worksheet 55 (Optional) • Pages 129–130 • (TG) Study Day			
	Day 180	**Test 3** • Pages 149–150 • (TG)			
		Final Grade			

Unit 1 Worksheets:

Digestive System & Metabolism

Words to Know — Define the Following:

1. Digestion: _____

2. Alimentary canal: _____

3. The accessory digestive organs: _____

4. Mechanical digestion: _____

5. Chemical digestion: _____

6. Absorption: _____

7. Elimination: _____

8. Serosa: _____

9. Peritoneum: _____

10. Bolus: _____

Fill in the Blank

1. The first function of the digestive system is called _____.

2. _____ is when food is moved along the length of the GI tract.

3. The indigestible material eliminated from the body is called _____ and leaves the body through the anus.

4. The food you chew up and swallow enters the _____, where it is processed and moved along from section to section.

5. The innermost tissue layer in the GI tract wall is called the _____.

6. The dense connective tissue of the _____ supports the overlying mucosa as it expands to accommodate food to be digested and shrinks back when digestion is completed.

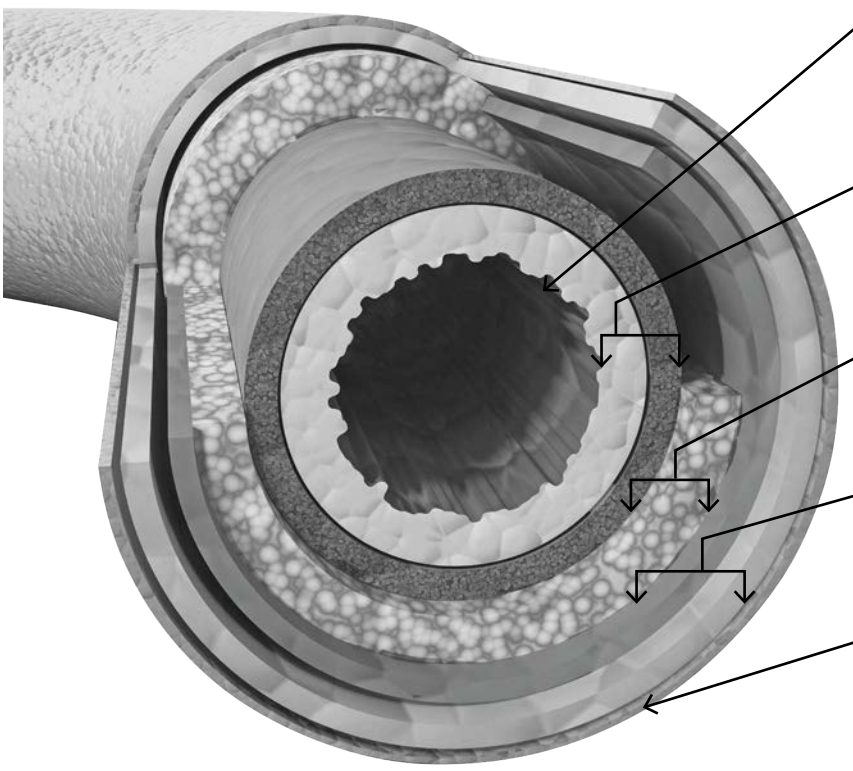
7. _____ help secure organs to the body wall and hold them in the proper position so that they won't twist while also suspending them to allow them room to expand and to slide along other organs.

8. _____ is a condition resulting from an acute inflammation of the peritoneum.

9. Symptoms of peritonitis include _____ pain and fever.

10. The GI tract has its own nervous system, called the _____ nervous system.

Complete the Chart — Tissue Layers of the GI Tract



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

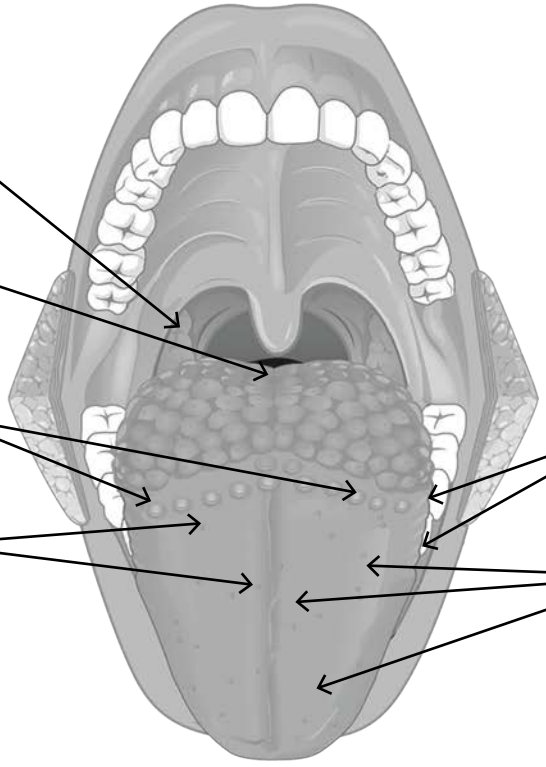
Words to Know — Define the Following:

1. Hard palate: _____
2. Soft palate: _____
3. Papillae: _____
4. Tooth's neck: _____
5. Gingiva: _____

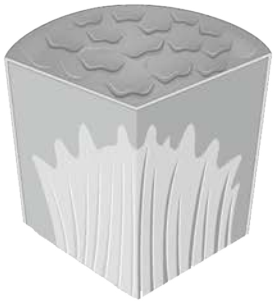
Fill in the Blank

1. The _____ are covered by skin on the outside but by mucous membrane on the inside of the mouth.
2. The lips, containing _____ muscle, are under voluntary control.
3. The superior (upper) boundary of the mouth is formed by the hard and soft palates, which is called the "_____" of the mouth.
4. The _____ is composed of two sets of skeletal muscles.
5. The tongue's extrinsic muscles are attached to the _____ bone.
6. _____ buds are found in fungiform, foliate, and circumvallate papillae.
7. The more thoroughly food is chewed, the better for your _____.
8. Each tooth has three major regions: the crown, the neck, and the _____.
9. _____ is the hardest substance in the body, and it is very durable.
10. _____ makes up the majority of the volume of a tooth.

Complete the Chart — The Tongue



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



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

Words to Know — Define the Following:

1. Periodontal ligament: _____
   _____
   _____
2. Cavities: _____
   _____
3. Saliva: _____
   _____
4. Tooth decay: _____
   _____
   _____
5. Plaque: _____
   _____
6. Gingivitis: _____
   _____

Fill in the Blank

1. In the _____ cavity is found nerves and blood vessels.

2. Both enamel and cementum contain _____, which is incorporated into their calcium-containing structures.

3. Fluoride is present in varying amounts in ordinary _____, in tea leaves, and in some foods, such as raisins and potatoes.

4. Unprotected by _____, tooth decay can become severe.

5. God designed your tooth enamel to _____ itself by incorporating minerals dissolved in your saliva.

6. The _____ produced by bacteria not only dissolve the minerals in your tooth enamel but also make it hard for teeth to recapture the lost minerals.

7. Ancient Egyptians and Babylonians — like the ones talked about in the Bible — cleaned their teeth by chewing on the frayed ends of _____.

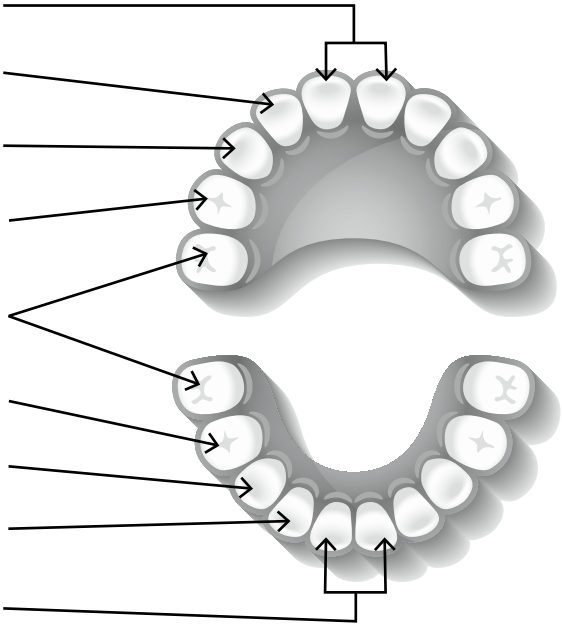
8. The ancient Egyptians developed the oldest known recipe for toothpaste, containing dried iris flower, mint, salt, and _____.

9. There is some evidence that poor oral hygiene can lead to _____ disease.

10. Baby teeth or milk teeth are already present in a baby's _____ at birth, hidden deep beneath the gums.

Complete the Chart — Dentition: The Arrangement of the Primary Teeth

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



Words to Know — Define the Following:

1. Gland: _____

   _____

2. Endocrine gland: _____

   _____

   _____

3. Exocrine gland: _____

   _____

4. Parotitis: _____

   _____

5. Submandibular glands: _____

   _____

   _____

6. Saliva: _____

   _____

7. Amylase: _____

   _____

8. Xerostomia: _____

   _____

   _____

Fill in the Blank

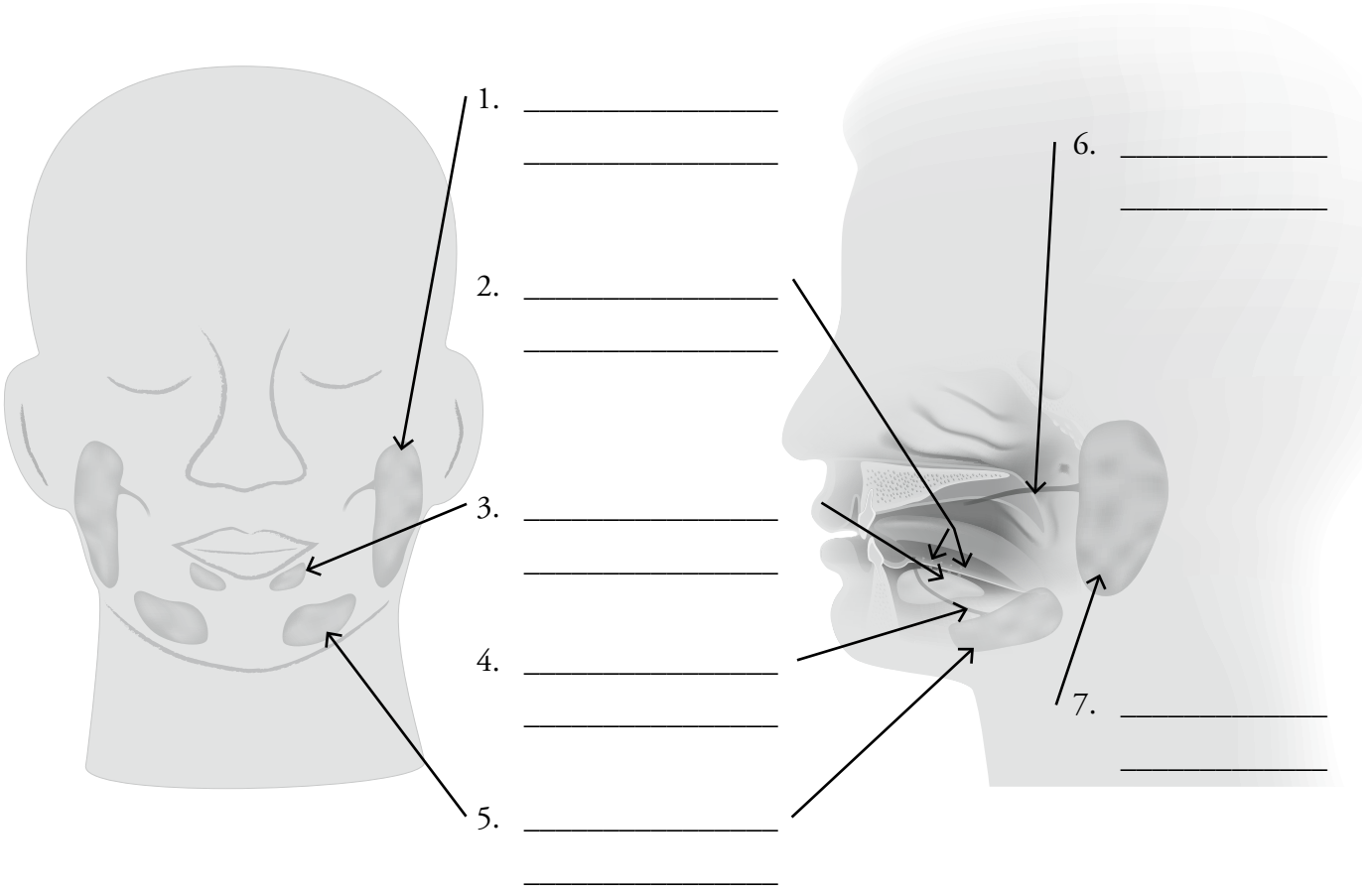
1. There are _____ permanent teeth, and the buds of these teeth are present long before birth.
2. The largest of the salivary glands are the _____ glands.
3. The most common cause of parotitis is a particular viral infection called _____.
4. The _____ of our saliva start the digestive process for some of the foods we eat.
5. Saliva moistens food and this helps keep the food in a small lump, often called a "_____."
6. If not removed, plaque calcifies and hardens into _____.
7. As food is chewed, movement of the tongue, cheeks, and jaw muscles stimulates _____.

8. Inhibition of the salivary glands can occur by means of the _____ nervous system.

9. Saliva production can often be stimulated by the mere sight or smell (or even thought) of _____.

10. Chronic bad breath (_____) is associated with inadequate saliva production.

Complete the Chart — Salivary Glands



Words to Know — Define the Following:

1. Mastication: _____
2. Pharynx: _____
3. Nasopharynx: _____
4. Oropharynx: _____
5. Laryngopharynx: _____
6. Esophagus: _____
7. Sphincter: _____
8. Adventitia: _____
9. Aspiration: _____
10. Peristalsis: _____

Fill in the Blank

1. The closing of the jaw is primarily due to the actions of the powerful _____ muscle.
2. When sufficiently chewed, the bolus of food is pushed to the rear of the mouth in preparation for _____.

3. To reach the abdominal cavity, the esophagus must pass through an opening in the diaphragm known as the esophageal _____.

4. Connective tissue and blood vessels are located in the _____ along with glands that secrete mucous.

5. The upper portion of the esophagus is supplied with blood by the inferior thyroid _____.

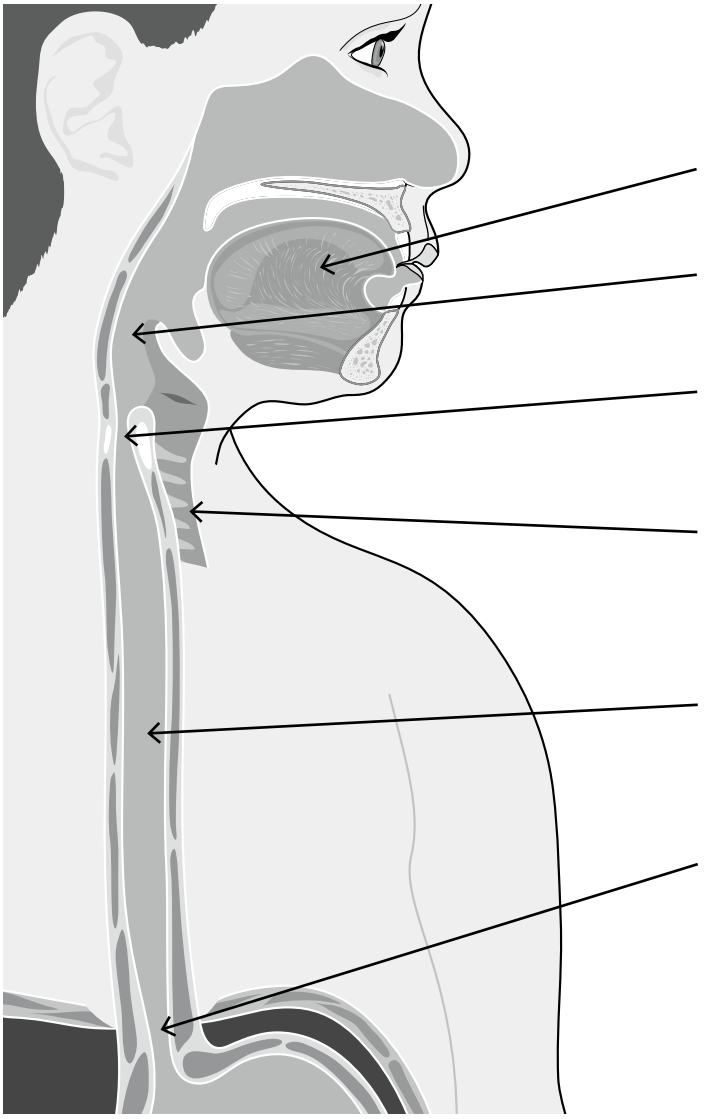
6. Risk factors for gastroesophageal _____ disease include smoking, alcohol, diabetes, and obesity.

7. Saliva helps bind the bits of ground food into a mass called a _____.

8. When a food bolus enters the pharynx, the soft palate raises up, making a _____ between the nasal cavity and the pharynx.

9. This muscle movement along the esophagus has been described as being like a "_____."

Complete the Chart — The Esophagus



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

Words to Know — Define the Following:

1. Greater curvature: _____
2. Stomach: _____
3. Omentum: _____
4. Gastric pits: _____
5. Parietal cell: _____
6. Chief cells: _____
7. Gastrin: _____
8. Intrinsic factor: _____

Fill in the Blank

1. Not only does the stomach secrete acid, it churns and mixes food to aid in _____.
2. When empty, the stomach lining looks wrinkled, having lots of folds, which are called _____.
3. The emptying of the stomach into the _____ intestine is controlled by the pyloric sphincter.
4. The mucosal layer of the stomach has, at its surface, a layer of special epithelial cells called _____ cells.
5. The mucus made by all those mucous cells protects the stomach lining from the corrosive effects of the very powerful _____ in the stomach.
6. A mucous layer contains a large amount of bicarbonate — a chemical found in _____ soda — which neutralizes the acid near the stomach lining.

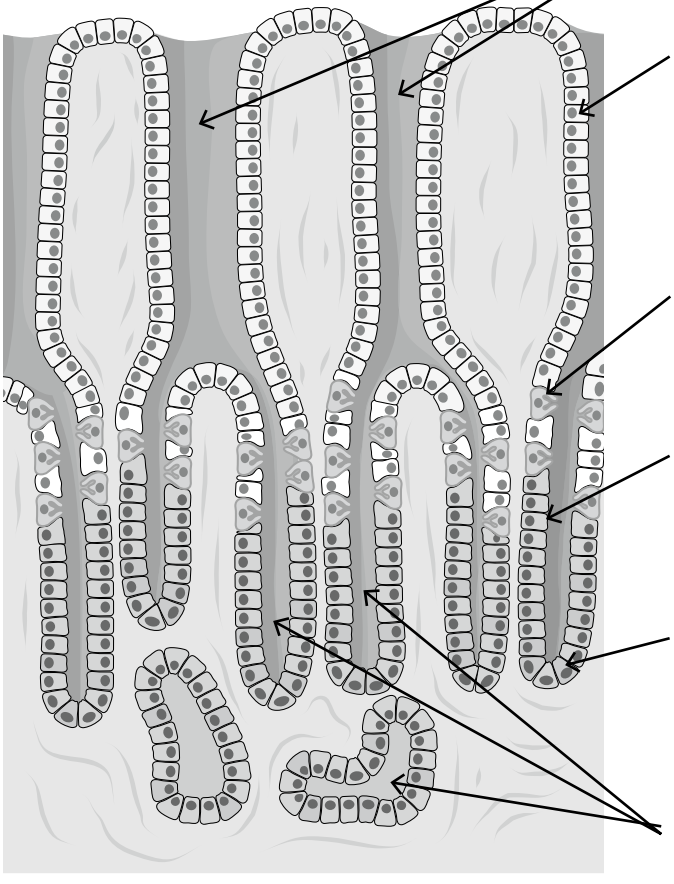
7. Pepsinogen is _____ when produced in the chief cells and has no activity until it is secreted into the stomach.

8. If pepsinogen were an _____ enzyme, it would begin to break down proteins right away, even before being secreted into the stomach, and the proteins it would attack would be the proteins in the chief cells that produce it.

9. The chief cells also produce _____, which help break down fats in our food.

10. As food enters the stomach, the walls of the stomach are _____.

Complete the Chart — The Stomach Lining



1. _____
_____

2. _____
_____

3. _____
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4. _____
_____
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_____

5. _____
_____
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6. _____
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_____
_____
_____

7. _____
_____

Words to Know — Define the Following:

1. Anemia: _____

2. Pernicious anemia: _____

3. Vomiting: _____

4. Peptic ulcer disease (PUD): _____

5. Treatment of PUD: _____

6. Pancreas: _____

7. Burping: _____

8. Gastric belch: _____

Fill in the Blank

1. _____ of pernicious anemia may include varying degrees of fatigue, shortness of breath with exertion, and pale skin.

2. As you might guess from the name pernicious, this sort of anemia can be very _____ if untreated.

3. When stimulated, this G cell produces a hormone called _____.

4. When _____ material is detected in the duodenum, stomach acid production is reduced.

5. Food generally remains in the stomach between two and _____ hours.

6. Vomiting results from sudden, forceful contraction of the muscles of the abdomen and the _____.

7. Emesis can result from illness, food _____, an adverse reaction to some kinds of medications, chemotherapy, radiation therapy, severe stress, motion sickness, or pregnancy, among other things.

8. Ongoing vomiting, besides being utterly miserable, can cause _____, which might require intravenous fluids.

9. Non-steroidal anti-inflammatory medication (NSAIDs) have the unfortunate side effect of damaging the lining of the stomach and duodenum, leading to irritation and _____.

10. Roughly 70 percent of people with PUD have stomach irritation due to H. _____.

11. The _____ activity of the stomach helps mix and grind the food as digestion continues.

12. The pancreas functions in the digestive system as an _____ gland — this is a gland that works by secreting its product into a duct.

13. The pancreas also functions as an _____ gland, a gland that secretes its products directly into the bloodstream.

14. The body of the pancreas extends laterally from the head, and it tapers into a _____.

15. We swallow _____ in small amounts as we eat, drink, and swallow the saliva in our mouths to avoid drooling.

16. When a bubble of air puts pressure on the upper part of the stomach, it triggers a reflex through the vagus nerve causing the sphincter between the esophagus and stomach to _____.

17. In a _____ belch, the air ultimately forced across the pharynx does not come up from the stomach, but is instead forcibly drawn into the upper esophagus.

Quizzes and Tests Section

for Use with

Introduction to Anatomy & Physiology 2

Match the words/phrases and their definitions. (5 points each)

Ampulla	Digestion	Omentum
Amylase	Esophagus	Soft palate
Anemia	Gingivitis	
Bile	Metabolism	

1. _____ Found in saliva; causes the breakdown of starch in our food into sugars
2. _____ Moves during swallowing to seal off the nasal passage while food moves from the mouth into the esophagus
3. _____ A yellow-green liquid produced in the liver; made up of water, bile salts, fats, and bilirubin
4. _____ As plaque builds up, it can cause this inflammation of the gums
5. _____ Refers to all the chemical transformations that happen in our cells, both those that break down biomolecules and those that manufacture them
6. _____ Latin for "flask"; it is a sac-like enlargement of a tubular structure
7. _____ The process by which the food we take in is converted to substances needed by our bodies
8. _____ A condition in which either the quantity or quality of a person's red blood cells is poor
9. _____ Latin word for "apron"; a double fold of peritoneal membrane
10. _____ A muscular tube that connects the pharynx to the stomach

Fill in the blank with the correct answer. (5 points each)

bolus	enamel	hormones	ingestion	parotid
dehydration	gallbladder	inactive	liver	remineralize

1. The first function of the digestive system is called _____.
2. The largest of the salivary glands are the _____ glands.
3. Pepsinogen is _____ when produced in the chief cells and has no activity until it is secreted into the stomach.
4. God designed your tooth enamel to _____ itself by incorporating minerals dissolved in your saliva.
5. Cholesterol is a kind of fat molecule your body's cells use to make many _____.
6. Bile is stored in the _____ until needed.
7. The _____ is the hardest substance in the body, and it is very durable.
8. In the right upper quadrant of the abdomen is found the largest organ in the digestive system, the _____.
9. Ongoing vomiting, besides being utterly miserable, can cause _____, which might require intravenous fluids.
10. Saliva helps bind the bits of ground food into a mass called a _____.

Match the words/phrases and their definitions. (5 points each)

Antigen Hormones Melanin Nociceptors Sphincter
Hemostasis Macrocytes Merocrine Pituitary Virus

1. _____ the "master gland," so called because it controls many other glands
2. _____ infectious agent that can only replicate inside a living cell; consists of nucleic acid (DNA or RNA) surrounded by a protective coat on which are receptors able to bind to particular sites on host cells
3. _____ enlarged red blood cells, seen in megaloblastic anemia
4. _____ the main pigment that produces skin color
5. _____ gland whose cells exude their product by exocytosis; for example, sweat and salivary glands
6. _____ molecules that act as messengers, helping control and coordinate a variety of cellular activities in the body
7. _____ the process of stopping bleeding
8. _____ a circular muscle designed to squeeze a tube closed
9. _____ pain receptors that detect noxious stimuli
10. _____ substance that triggers an immune response

Fill in the blank with the correct answer. (5 points each)

autoimmune	circulate	gland	nitrogen	stress
cells	dopamine	microbiome	parasitic	urinary

1. While hypothalamic releasing hormone can promote prolactin secretion, most of the time prolactin secretion is mediated through the inhibitory effects of the _____.

2. Bones are busy places where _____ called osteoclasts and osteoblasts constantly break down and rebuild bone.

3. Eosinophils play a major role in defense against _____ infections.

4. When the hypothalamus detects _____, it signals the anterior pituitary with corticotropin releasing hormone.

5. Skin is home to more than a trillion cells in the body's _____.

6. Sometimes the immune system begins attacking tissues that should be recognized as "self," and these are called _____ diseases.

7. The most common cause of _____ tract obstruction in males is called posterior urethral valves.

8. The coiled sweat-producing part of each _____ is called the acinus.

9. Blood urea _____ — a laboratory measurement of urea in blood — is one way to assess kidney function.

10. Neutrophils are the most common leukocytes and the most abundant phagocytes, and they _____ in blood.

Answer Keys

for Use with

Introduction to Anatomy & Physiology 2

Worksheet 1

Words to Know: Define the Following:

1. **Digestion:** the process by which the food we take in is converted to substances needed by our bodies
2. **Alimentary canal:** long tube that extends from the mouth to the anus; gastrointestinal tract
3. **The accessory digestive organs:** the teeth, tongue, salivary glands, liver, gallbladder, and pancreas
4. **Mechanical digestion:** the physical breaking down of food into smaller pieces
5. **Chemical digestion:** when various digestive enzymes break food down into its more basic components
6. **Absorption:** the breakdown products of chemical digestion move into the cells that line the lumen of the GI tract
7. **Elimination:** indigestible material and other substances are removed as they reach the end of the GI tract
8. **Serosa:** the outermost of the layers of the GI tract; helps provide support for the organs of the GI tract
9. **Peritoneum:** double-layered serous membrane that lines the abdominopelvic cavity; covers, at least partially, most of the organs in the abdomen
10. **Bolus:** a rounded ball of chewed food

Fill in the Blank

1. ingestion
2. Propulsion
3. feces
4. lumen
5. mucosa
6. submucosa
7. Mesenteries
8. Peritonitis
9. abdominal
10. enteric

Complete the Chart — Tissue Layers of the GI Tract

1. Lumen
2. Mucosa
3. Submucosa
4. Muscularis externa
5. Serosa

Worksheet 2

Words to Know: Define the Following:

1. **Hard palate:** bony structure covered by a mucous membrane; separates the oral cavity from the nasal cavity
2. **Soft palate:** moves during swallowing to seal off the nasal passage while food moves from the mouth into the esophagus
3. **Papillae:** the many little bumps on the surface of the tongue
4. **Tooth's neck:** the part of the tooth connecting the crown and the root
5. **Gingiva:** mucous membrane-covered connective tissue; the gums

Fill in the Blank

1. lips
2. skeletal
3. roof
4. tongue
5. hyoid
6. Taste
7. digestion
8. root
9. Enamel
10. Dentin

Complete the Chart — The Tongue

1. Palatine tonsil
2. Lingual tonsil

3. Circumvallate papillae
4. Fungiform papillae
5. Foliate papillae
6. Filiform papillae
7. Circumvallate papillae
8. Fungiform papillae
9. Foliate papillae
10. Filiform papillae

Worksheet 3

Words to Know: Define the Following:

1. **Periodontal ligament:** each tooth is secured in its socket by this complex and highly organized collection of connective tissue fibers
2. **Cavities:** holes in your tooth enamel
3. **Saliva:** produced by several glands in the mouth; neutralizes acids
4. **Tooth decay:** also known as dental caries; the result of the breaking down of the hard tissues of the tooth, primarily the enamel and the dentin
5. **Plaque:** made up of bits of food and other debris; bacteria love to live in it
6. **Gingivitis:** as plaque builds up, it can cause this inflammation of the gums

Fill in the Blank

1. pulp
2. fluoride
3. rainwater
4. enamel
5. remineralize
6. acids
7. twigs
8. pepper
9. heart
10. jaw

Complete the Chart — Dentition: The Arrangement of the Primary Teeth

1. Central incisors
2. Lateral incisors
3. Canine (cuspid)
4. First molar
5. Second molar
6. First molar
7. Canine (cuspid)
8. Lateral incisors
9. Central incisors

Worksheet 4

Words to Know: Define the Following:

1. **Gland:** an organ that produces a useful chemical substance
2. **Endocrine gland:** secretes its products directly into the bloodstream to be carried throughout the body
3. **Exocrine gland:** secretes its product by means of a duct (a small tube)
4. **Parotitis:** the inflammation of one or both of the parotid glands
5. **Submandibular glands:** empty into the mouth via the submandibular ducts; about 70 percent of saliva is produced by these glands
6. **Saliva:** a watery substance produced by the salivary glands
7. **Amylase:** found in saliva; causes the breakdown of starch in our food into sugars
8. **Xerostomia:** also known as "dry mouth syndrome"; often the direct result of an abnormally low production of saliva

Fill in the Blank

1. 32
2. parotid
3. mumps
4. enzymes
5. bolus
6. tartar
7. mechanoreceptors
8. sympathetic
9. food
10. halitosis

Complete the Chart — Salivary Glands

1. Parotid gland
2. Sublingual ducts
3. Sublingual gland
4. Submandibular duct
5. Submandibular gland
6. Parotid duct
7. Parotid gland

Worksheet 5

Words to Know: Define the Following:

1. **Mastication:** a fancy way of saying chewing; this is where mechanical digestion begins
2. **Pharynx:** a funnel-shaped tube that extends down to the level of the larynx and the esophagus; the tube that carries food and drink to your stomach
3. **Nasopharynx:** the superior portion of the larynx; extends from the rear of the nasal cavity and ends at the level of the soft palate
4. **Oropharynx:** the portion from the soft palate down to the level of the hyoid bone
5. **Laryngopharynx:** begins where the oropharynx ends, at the level of the hyoid bone; extends down to the opening of the esophagus
6. **Esophagus:** a muscular tube that connects the pharynx to the stomach
7. **Sphincter:** a ring of muscle that guards the opening at the end of a tube
8. **Adventitia:** the outer layer of the esophagus; a thin layer of connective tissue
9. **Aspiration:** when food enters the airway
10. **Peristalsis:** a series of coordinated movements of the muscles along the length of a tube, like the esophagus; the sequence of contraction and relaxation is what moves the swallowed material down the esophagus and into the stomach

Fill in the Blank

1. masseter
2. swallowing
3. hiatus
4. submucosa
5. artery
6. reflux
7. bolus
8. seal
9. wave

Complete the Chart — The Esophagus

1. Tongue
2. Pharynx
3. Upper esophageal sphincter
4. Trachea
5. Esophagus
6. Lower esophageal sphincter

Worksheet 6

Words to Know: Define the Following:

1. **Greater curvature:** the lateral aspect of the stomach
2. **Stomach:** composed of four main regions, which are the cardia, the fundus, the body, and the pyloris
3. **Omentum:** Latin word for "apron"; a double fold of peritoneal membrane
4. **Gastric pits:** an examination of the stomach lining reveals thousands of these small pits that extend down into the mucosal layer
5. **Parietal cell:** found along the walls of the gastric gland, parietal cells secrete hydrochloric acid, which begins breaking down food
6. **Chief cells:** found in the lower regions of gastric glands; produce a substance called pepsinogen
7. **Gastrin:** a hormone that aids in stimulating acid production in the stomach
8. **Intrinsic factor:** a special type of protein made by parietal cells

Fill in the Blank

1. digestion
2. rugae
3. small
4. mucous