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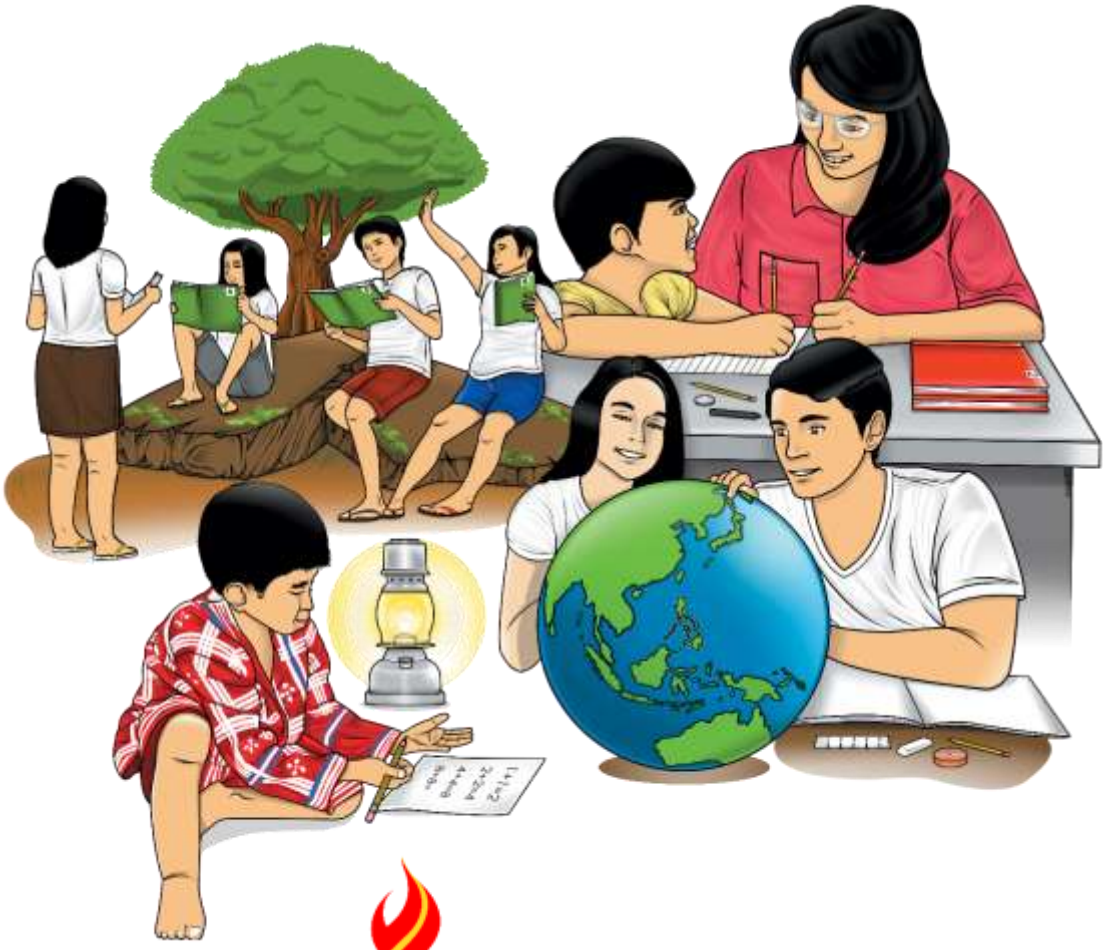
DEPARTMENT OF EDUCATION

Science

Quarter 3 – Module 1:

The Endocrine System: Glands and Their Hormones



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The Endocrine System: Glands and Their Hormones

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

Our body is composed of different systems working as a whole for it to function well, one of which is endocrine system. What are the glands that involved in endocrine system? What are the hormones being secreted by such glands? How endocrine system worked in relation to other body systems?

This module will help you to answer the above-mentioned questions. It has provided information and activities that will help you understand the endocrine system and the role of hormones involved in reproductive system.

After going through this module, you are expected to:

1. identify the major endocrine glands in the human body;
2. explain the role of hormones involved in the female and male reproductive systems **(S10LT-IIIb-34)**; and
3. explain the different disorders in the endocrine system.

Going through this module can be a meaningful learning experience. All you need to do is make use of your time and resources efficiently. To do this, here are some tips for you:

1. Take the pretest before reading the rest of the module.
2. Take time in reading and understanding the lesson. Follow instructions carefully. Do all activities diligently. This module is designed for independent or self-paced study. It is better to be slow but sure than to hurry and miss the concepts you are supposed to learn.
3. Use a separate sheet of paper for your answers in each activity or assessment. Do not forget to write your name. Label it properly.
4. Try to recall and connect the ideas about Biology that you had in the lower years. Use the concept discussed in the lesson to explain the results of activities or performance task. You may answer in English or a combination of your vernacular and English.
5. Be honest. When doing the activities, record only what you have really observed. Take the self-assessments after each activity, but do not turn to the Answer Key page unless you are done with the entire module.
6. Do not hesitate to ask. If you need to clarify something, approach or contact your teacher or any knowledgeable person available, to help you. You may also look into other references for further information. There is a list of references at the back part of this module.
7. Take the posttest prepared at the end of the module, so you can assess how much you have learned from this module.
8. You can check your answers in the activities, self-assessments, and posttest after you finished the entire module to know how much you have gained from the lesson and the activities.

What I Know

Directions: Read carefully each item. Write only the letter of the correct answer for each question. Use a separate sheet of paper for your answers.

1. What do you call the body system that contains a group of glands that releases hormones into the body?
   A. endocrine system
   B. nervous system
   C. reproductive system
   D. skeletal system

2. Which of the following is NOT TRUE about endocrine system?
   A. Endocrine system is composed of glands that secrete different types of hormones.
   B. Endocrine system secretes chemicals known as hormones into the bloodstream.
   C. Endocrine system is a collection of nerves that transmit signals to the different parts of the body.
   D. The endocrine hormones help control mood, growth and development, metabolism , and reproduction.

3. Which of the following is not an endocrine gland?
   A. adrenal gland
   B. pancreas
   C. penis
   D. pituitary

4. Which gland is located at the base of the brain?
   A. adrenal
   B. ovary
   C. pituitary
   D. thyroid

5. It is a gland that regulates blood sugar levels.
   A. ovaries
   B. pancreas
   C. pituitary
   D. thymus

6. What hormone is being secreted by the testes?
   A. testosterone
   B. estrogen
   C. insulin
   D. progesterone

7. Which of the following is NOT a function of the progesterone and estrogen secreted by the ovaries?
   A. developing secondary female sex characteristics
   B. regulating the menstrual cycle
   C. regulating blood sugar levels
   D. thickening the lining of the uterus

8. Which of the following organ is not part of the endocrine system?
   A. heart
   B. ovary
   C. testes
   D. thyroid gland

9. Which of the following is NOT A CORRECT pairing of the gland and its secretion?
   A. adrenal gland: adrenaline
   B. pancreas: insulin
   C. parathyroid gland: parathormone
   D. testes: progesterone

10. Which gland makes hormones that help you grow?
   A. adrenal
   B. thymus
   C. pituitary
   D. thyroid

11. Which gland is responsible for calcium regulation?
   A. pancreas
   B. parathyroid glands
   C. pineal gland
   D. thyroid gland

12. In times of emergency, what gland has an increased secretion?
   A. adrenal gland
   B. pancreas
   C. parathyroid gland
   D. testes

13. Which gland is responsible for flight or fight response?
   A. adrenal gland
   B. parathyroid gland
   C. pituitary gland
   D. thyroid gland

14. Which gland may enlarge due to an iodine deficiency?
   A. adrenal gland
   B. parathyroid gland
   C. pituitary gland
   D. thyroid gland

15. After consuming ice cream, which hormones would be expected to increase?
   A. glucagon
   B. insulin
   C. parathyroid hormone
   D. prolactin

Answer Key on page 15

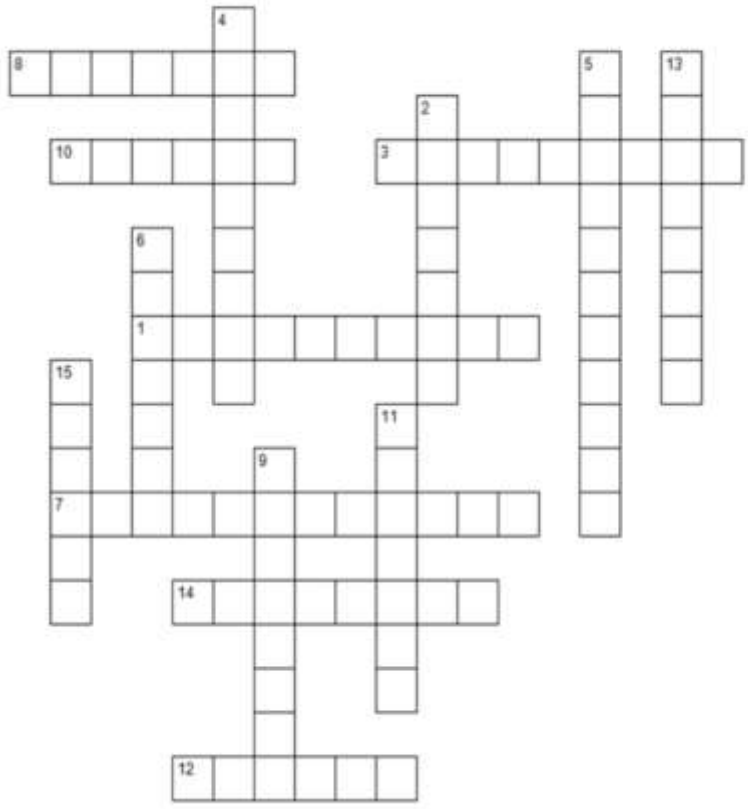
How did you find the pre-test? What was your score? If you got 15 items correctly, you may not take this module. But if your score is 14 and below, you must proceed with the module.

Have fun in learning about Endocrine System! God bless you!

Lesson 1 The Endocrine System: Glands and Their Hormones

What's In

Directions: Recall the different words about endocrine system during your lower years, this will help you understand the module as we go along. Given the crossword puzzle below, complete the boxes to get the correct answer and refer to the clues given. Use another sheet of paper for your answer.



Across

1. hormones secreted by adrenal
3. a system that contains glands
7. primary male sex hormones
8. gland that regulates body metabolism
10. gland that produces T cells
12. small, pea-shaped gland in the brain
14. chemicals secreted by endocrine

Down:

2. secreted by pancreas
4. also called the 'master gland'
5. gland that controls the calcium levels in the body
6. gland that produce female sex hormones
9. hormones secreted by the ovary
11. gland that regulates body metabolism
13. gland that secretes insulin and glucagon
15. gland that secretes male sex hormone

How many words do you remember well? You may refer back to these pages when you want to recall the definition of the listed terms.

What's New

The **endocrine system** is composed of glands that secrete different types of hormones that affect almost every cell, organ, and function of our body.

Let us do an activity about endocrine system so that you can familiarize yourself with its parts.

Directions: Identify the glands of the endocrine system. Choose your answer from the box below. Use separate sheet of paper for your answer.

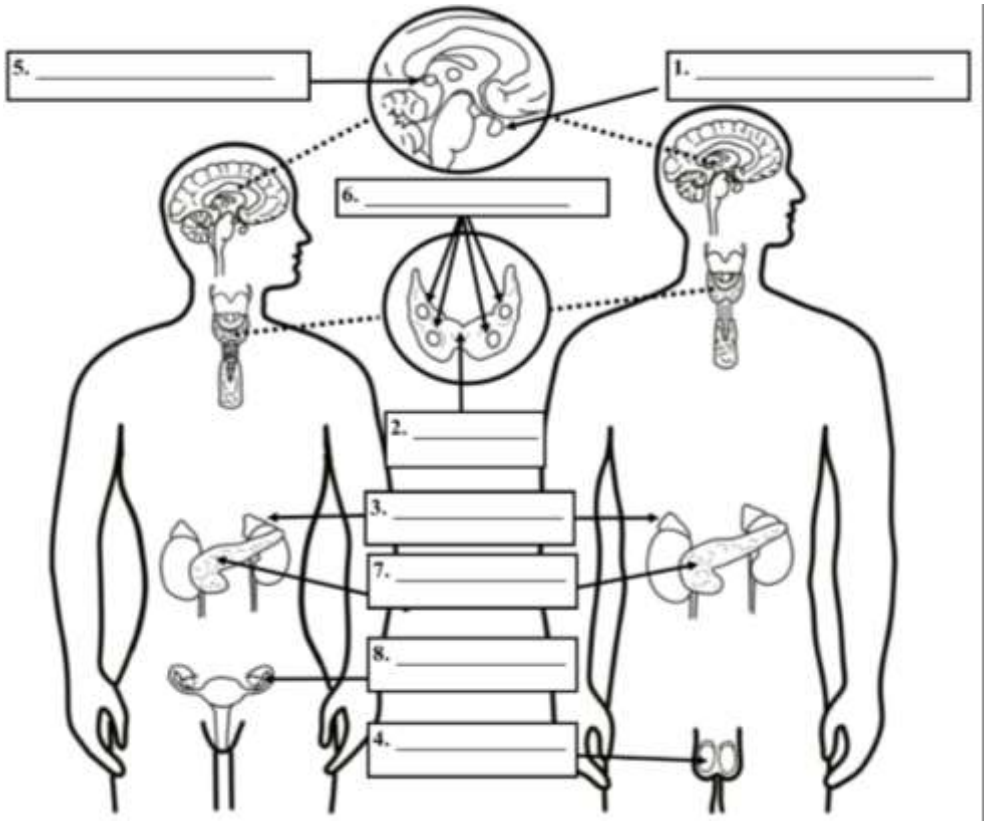


Figure 1. Label the Endocrine System
Illustrated by: Queenie Joy V. Alcantara

Ovary
Pineal gland
Adrenal gland
Pancreas
Testis
Pituitary gland
Parathyroid gland
Thyroid gland

Answer Key on page 15

What is It

The Endocrine System

The endocrine system is composed of different glands which secrete hormones that regulate metabolism, growth and development, mood, and reproduction. **Hormones** are organic substances released by the glands of the endocrine system directly into the bloodstream. Hormones are capable of changing the physiological and metabolic behaviors of their target cells to maintain homeostasis. The major endocrine glands in the body are the pituitary, thyroid, parathyroid, thymus, adrenal, pancreas, ovaries, and testes.

The table below shows the major endocrine glands in the body, with their respective functions, locations, and hormone secretions.

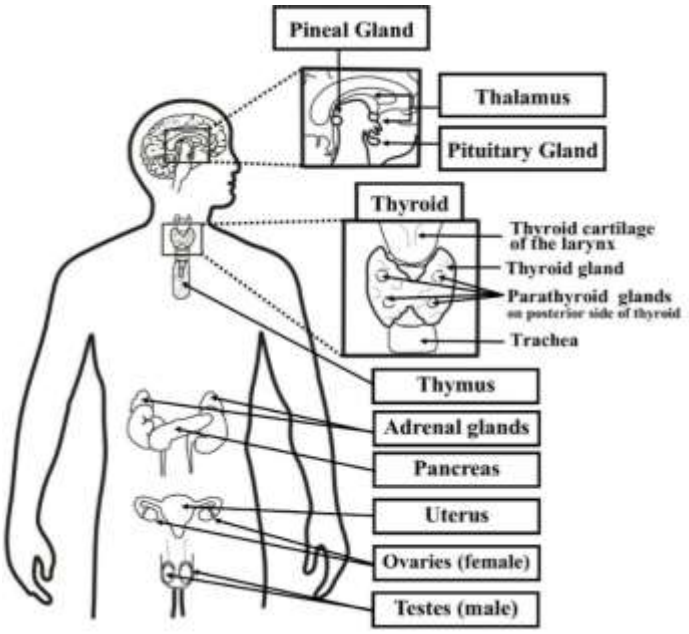


Figure 2. Endocrine System
Illustrated by: Queenie Joy V. Alcantara

Table 1. The Endocrine System: Glands and their Functions

Gland	***Function***	***Hormones***	***Location***
Pituitary	Produces hormones that stimulate growth, and controls the functions of other glands	Oxytocin Growth Hormones (GH) Prolactin (PRL) Luteinizing Hormone (LH) Follicle Stimulating Hormone (FSH) Adrenocorticotrophic hormone (ACTH) Antidiuretic hormone (AH)	At the base of the brain

		Thyroid Stimulating Hormone (TSH)	
Thyroid	Produces hormones that regulate body metabolism, and storage of calcium in bones	Thyroid hormone	In front of the neck and below the voice box
Parathyroid	Produces hormones that control the calcium levels in your body, and normalizes bone growth	Parathormone	In the neck
Thymus	Produces hormones that enable the body to produce T cells before puberty	Thymosin	In front of the heart
Adrenal	Produces hormones that affects metabolism, immune system and blood pressure, stress reaction	Adrenaline and others	On top of the kidneys
Pancreas	Produce hormones that regulate blood sugar levels	Insulin, Glucagon	Behind the stomach
Reproductive ***Testes (Males)** ***Ovaries (Females)**	Produces hormones that control maturation of sperm and development of the secondary male sexual characteristics; Produces hormones that influence development of the secondary female sexual characteristics, and maturation of the egg cells and ovulation	Testosterone Estrogen, Progesterone	Scrotum Pelvic area
Pineal	Produces a hormone that regulates the biological clock in some animals	Melatonin	In the brain

The Role of Hormones in Female and Male Reproductive Systems

A human being depends on reproduction for continued production of species. If humans stop to reproduce, the human species would become extinct. Reproduction is a normal process controlled by hormones. These hormones keep both the male and female reproductive systems to function properly. The pituitary gland controls the functions of both the testes and ovaries.

Into the male system, pituitary gland releases follicle stimulating hormone (FSH) and luteinizing hormone (LH). As the FSH enters the testes, it stimulates the Sertoli cells that are responsible for nourishing the sperm cells that the testes produce to facilitate the process of sperm production. Also, LH enters the testes to stimulate the interstitial cells called the Leydig cells to make and release testosterone into the testes and the blood. The hormone testosterone is responsible for the development of male secondary sexual characteristics and stimulates the process of sperm production in the testes.

In female reproductive system, the follicles produce estrogen that controls the growth and release of eggs from the ovaries. Together with it is another hormone known as progesterone which prepares uterus so that the fertilized egg can grow in it. Progesterone is also responsible for preventing muscle contraction of the uterus that can cause the egg to detach from the uterus. In addition, the hormone inhibin produced by follicle cells inhibit FSH (follicle stimulating hormone) production. FSH (Follicle Stimulating Hormone) and LH (luteinizing hormone) plays in the regulation of estrogen-progesterone levels. It affects the development of the follicles and maturation of the egg as well as the process of ovulation.
(https://courses.lumenlearning.com/boundless-biology/chapter/hormonal-control-of human-reproduction/)

Endocrine System Disorder

Hormonal imbalance will occur if the organs and hormones of your body do not produce the right amount of chemicals needed which in turn may lead to some dysfunctions. The following are some examples of endocrine disorders.

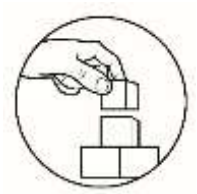
Osteoporosis is a disease that happens when the mineral density of the bone is reduced making it brittle and porous. Parathyroid hormone secretion is one of the possible causes of this disease.

Goiter is an abnormal enlargement of the thyroid gland. It results from the underproduction or overproduction of thyroid hormones.

Gigantism is a disorder that happens during childhood when there is abnormal increase in height associated with too much secretion of growth hormones.

Dwarfism is a condition wherein the production of growth hormones in the pituitary gland is insufficient resulting in short stature.

https://www.biologyonline.com/dictionary/dwarfism.)



What's More

Activity 1.1

Directions: Complete the table below by listing the gland and hormone in each described scenario.

	Gland	Hormones	Scenario
1.			Egg maturation
2.			Extra strength during fires
3.			Adam's apple becomes bigger
4.			Building up of the immune system By T-cell production
5.			Consumption of sugar-rich foods

Activity 1.2

Directions: The following statements are about endocrine system. Identify what is being asked by filling in the gaps with letters to complete the word at the end of every sentence.

1. This gland is located at the base of the brain and stimulates growth. **(P _ T _ I _ A _Y)**

2. This is a gland that secretes adrenaline hormone which affects the heart rate. **(A _ R _ N _ L)**

3. This refers to the group of glands that releases hormones into the body. **(E _ D _ C R _ N _ S _ S T _ M)**

4. These are the two hormones secreted by the ovaries. **(E _ T R O _ _ N)** and **(P _ O G _ S T _ R _ N E)**

5. It refers to the gland that regulates blood sugar level. **(P _ N _ R E _ S)**

Activity 1.3

Directions: Match the glands in column A with the hormone secreted in column B by writing the letter of your answer. Use a separate sheet of paper for your answers.

A	B
_____1. Pituitary	a. thymosin
_____2. Thyroid	b. insulin
_____3. Parathyroid	c. estrogen
_____4. Thymus	d. testosterone
_____5. Adrenal	e. melatonin
_____6. Pancreas	f. parathormone
_____7. Testes	g. adrenaline
_____8. Ovaries	h. thyroxin
	i. growth hormone

What I Have Learned

Great job! You are almost done with this module. Let us summarize what you have learned from the lesson and activities. Use a separate sheet of paper and write only your answer.

A. Complete the statements below. Choose your answer from the box.

Options (1-5):				
body	endocrine	glands	hormones	ovaries

The (1) _____ system consists of (2) _____ that secrete chemicals called (3) _____ that control various body processes. This control system usually brings about slow changes in the (4) _____ because hormones move through the circulatory system. The major glands in the body are the pituitary, thyroid, parathyroid, thymus, adrenal, pancreas, (5) _____ and testes.

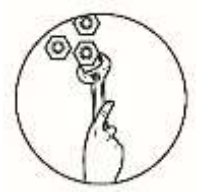
Options (6-10):

testes testosterone progesterone androgens

sperm ovaries

Reproductive glands of endocrine system release sex hormones to keep the male and female reproductive systems properly. The (6) _____ of male which lie in the scrotum, secretes hormones called (7) _____; the most important of which is testosterone. These hormones are secreted that affect many male characteristics such as development of the secondary sexual characteristics like the growth of hair in various body parts as well as (8) _____ production.

On the other hand, the (9) _____ of the female produce estrogen and (10) _____. These hormones cause the development of female sexual characteristics like breast enlargement and in the regulation and maintenance of menstruation and pregnancy, respectively.



What I Can Do

Activity: My glands, My responsibility!

Write a 200-word essay on how endocrine glands has helped you maintain a healthy life. The rubric is provided for your guide.

Category	4	3	2	1
Content	The essay cited 5 ways that the endocrine system helped to maintain a healthy life. Explanations were provided.	The essay cited 4 ways that the endocrine system helped to maintain a healthy life. Explanations were provided.	The essay cited 3 ways that the endocrine system helped to maintain a healthy life. Explanations were provided.	The essay cited 2 ways that the endocrine system helped to maintain a healthy life. Explanations were provided.
Grammar	There are no grammatical mistakes of the essay.	There are 1-5 grammatical mistake of the essay.	There are 6-10 grammatical mistake of the essay.	There are more than 10 grammatical

				mistakes of the essay.
Message	The message of the output is clear and compelling.	The output clearly shows some of the messages and is slightly compelling.	The output indirectly shows the message and is slightly compelling.	The output does not sufficiently show the message and is not compelling.
Timeliness	The output is submitted on or before the given due date.	The output is submitted one day after the given due date.	The output is submitted two days after the given due date.	The output is submitted three or more days after the given due date.

Assessment

Multiple Choice. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. What gland is being stimulated during exercise?
   A. adrenal
   B. parathyroid
   C. pituitary
   D. thyroid
2. Which of the following glands secrete a hormone that enables the body to produce T cells?
   A. adrenal
   B. parathyroid
   C. thymus
   D. thyroid
3. The organ that makes estrogen and progesterone is the _____.
   A. hypothalamus
   B. ovary
   C. pineal gland
   D. vagina
4. Which of the following glands produce hormones that controls the calcium levels the body?
   A. adrenal
   B. parathyroid
   C. pituitary
   D. thymus
5. Which of the following glands produce hormones that controls the heart rate and breathing in times of emergency?
   A. adrenal
   B. pancreas
   C. pituitary
   D. thyroid
6. The hormones secreted by pancreas are insulin and _____.
   A. adrenaline
   B. estrogen
   C. glucagon
   D. melatonin

7. When you are running to stay away from danger, what gland is being stimulated?
   A. adrenal
   B. pineal
   C. pituitary
   D. thyroid

8. It refers to the body's 'master gland' because it controls the activity of most other hormone-secreting glands.
   A. adrenal
   B. parathyroid
   C. pituitary
   D. thyroid

9. Which of the following is NOT TRUE about the function of the endocrine system?
   A. controls sexual reproduction
   B. collect sensory input from the body
   C. maintain homeostasis
   D. regulate growth

10. What gland is involved if a person's blood sugar level becomes unstable?
   A. adrenal
   B. pancreas
   C. parathyroid
   D. ovary

11. The nervous system uses electrical impulses to send messages through neurons while _____ uses hormones to send messages to the target cells through the bloodstream.
   A. circulatory system
   B. endocrine system
   C. nervous system
   D. reproductive system

12. What is the purpose of the thyroid gland?
   A. It releases insulin and glucagon to regulate sugar level.
   B. It releases thyroxin and insulin to stimulate growth.
   C. It releases thyroxin and calcitonin.
   D. It releases adrenaline to prepare the body for action.

13. What is osteoporosis?
   A. It is a condition characterized by imbalanced blood sugar.
   B. A disorder characterized by apparent lack of aging.
   C. A disorder characterized by impaired growth.
   D. A disorder in which bones become fragile and breakable.

14. What do you call a rare condition that causes abnormal growth in children due to the decrease in the production and secretion of growth hormones?
   A. diabetes
   B. dwarfism
   C. gigantism
   D. goiter

15. Which of the following shows a correct pairing of a dysfunction and the involved endocrine gland?
   A. diabetes: ovaries
   B. dwarfism: adrenal
   C. goiter: thyroid
   D. osteoporosis: pancreas

How was the Assessment? What was your score? Congratulations if you got 12 to 15 items correctly. If your score is below 12, you must review the parts of the lesson that you did not understand well. You may also ask your teacher/facilitator for further explanation on these parts.

Additional Activity

A. Directions: Answer the following questions. Write your answer on a separate sheet of paper.

1. What is endocrine system?
   _____
   _____
   _____

2. What are the functions of endocrine system? Write four (4) functions.
   _____
   _____
   _____

3. Write five (5) glands of the endocrine system and their functions.
   _____
   _____
   _____

B. Directions: Fill in the table by providing the name of the disease that can be caused by the over secretion or under secretion of hormones by the given glands. Doing simple research to accomplish this is advised.

	Glands	**Disorder**	**Description of the Disorder**
1.	Adrenal gland		
2.	Pituitary gland		
3.	Pancreas		
4.	Thyroid		
5.	Reproductive glands		

Answer Key

What I Know

1. A
2. C
3. C
4. C
5. B
6. A
7. C
8. A
9. D
10. C
11. B
12. A
13. A
14. D
15. B

What's In

1. Adrenaline
2. Insulin
3. Endocrine
4. Pituitary
5. Parathyroid
6. Ovaries
7. Testosterone
8. Thyroid
9. Estrogen
10. Thymus
11. Adrenal
12. Pineal
13. Pancreas
14. Hormones
15. Testes

What's New

1. Pituitary gland
2. Thyroid gland
3. Adrenal gland
4. Testes
5. Pineal gland
6. Parathyroid gland
7. Pancreas
8. Ovary

What's More (Activity 1.1)

	Gland	**Hormones**
1.	Ovary	Progesterone
2.	Adrenal	Adrenaline
3.	Testes	Testosterone
4.	Thymus	Thymosin
5.	Pancreas	Insulin

What's More (Activity 1.2)

1. Pituitary
2. Adrenal
3. Endocrine System
4. Estrogen, Progesterone
5. Pancreas

What's More (Activity 1.3)

1. I
2. H
3. F
4. A
5. G
6. B
7. D
8. C

What's I Have Learned

1. Endocrine
2. Glands
3. Hormones
4. Body
5. Ovaries
6. Testes
7. Androgen
8. Sperm
9. Ovaries
10. Progesterone

Assessment

1. D
2. C
3. B
4. B
5. A
6. C
7. A
8. C
9. B
10. B
11. B
12. C
13. D
14. B
15. C

Additional Activity

A. (Answer may vary)

1. The endocrine system is a collection of glands that produces hormones that regulate metabolism, growth and development.
2. Regulate body's growth
Makes hormones that control your moods
Sends hormones into your bloodstream
Helps control metabolism
3. Pituitary- produce hormones that stimulates growth
Thyroid- produce hormones that regulates body metabolism
Parathyroid- produce hormones that controls calcium levels in your body
Thymus- produce hormones that enables the body to produce certain antibodies
Adrenal- produce hormones that controls heart rate and breathing rate in times of emergency
Pancreas- produce hormones that regulates blood sugar levels

B. (Answer may vary)

	Glands	Disorder
1.	Adrenal gland	Addison's Disease
2.	Pituitary gland	Gigantism
3.	Pancreas	Pancreatic cancer
4.	Thyroid	Hypothyroidism
5.	Reproductive glands	Ovarian cancer

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