LESSON ASSIGNMENT

LESSON 1
Reproductive Anatomy and Physiology.

TEXT ASSIGNMENT
Paragraphs 1-1 through 1-12.

LESSON OBJECTIVES
After completing this lesson, you should be able to:

1-1. Identify terms and definitions that are related to the female and male reproductive system.

1-2. Identify descriptive phrases concerning anatomical locations of the female reproductive system.

1-3. Match names of the female reproductive system to an anatomical drawing of the female.

1-4. Identify the functions of specific parts of the female reproductive system.

1-5. Identify steps in the process of oogenesis.

1-6. Select descriptive phrases concerning the influence of estrogen on the female body.

1-7. Select descriptive phrases concerning the influence of progesterone on the female body.

1-8. Identify physiological phenomenon, which occur during specific times of the menstrual cycle.

1-9. Select descriptive phrases describing the location/gross anatomy of the male reproductive anatomy.

1-10. Identify anatomical names and match the anatomical names with the correct parts of the male reproduction system.

1-11. Identify the functions of the male reproductive system.

1-12. Identify the steps describing the phases of spermatogenesis.
1-13. Identify parts of the sperm.

1-14. Identify the correct effects of testosterone.

**SUGGESTION**

After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.
LESSON 1

REPRODUCTIVE ANATOMY AND PHYSIOLOGY

Section I. THE FEMALE REPRODUCTIVE SYSTEM

1-1. GENERAL

The organs of the reproductive systems are concerned with the general process of reproduction, and each is adapted for specialized tasks. These organs are unique in that their functions are not necessary for the survival of each individual. Instead, their functions are vital to the continuation of the human species. In providing maternity gynecologic health care to women, you will find that it is vital to your career as a practical nurse and to the patient that you will require a greater depth and breadth of knowledge of the female anatomy and physiology than usual. The female reproductive system consists of internal organs and external organs. The internal organs are located in the pelvic cavity and are supported by the pelvic floor. The external organs are located from the lower margin of the pubis to the perineum. The appearance of the external genitals varies greatly from woman to woman, since age, heredity, race, and the number of children a woman has borne determine the size, shape, and color. See figure 1-1 for the female reproductive organs.

Figure 1-1. The female reproductive organs (sagittal section).
1-2. TERMS AND DEFINITIONS

These are only a few terms and definitions that will be used in this lesson. Other terms and definitions will be dispersed throughout the lesson.

a. **Broad Ligaments.** Two wing-like structures that extend from the lateral margins of the uterus to the pelvic walls and divide the pelvic cavity into an anterior and a posterior compartment.

b. **Corpus Luteum.** The yellow mass found in the graafian follicle after the ovum has been expelled.

c. **Estrogen.** The generic term for the female sex hormones. It is a steroid hormone produced primarily by the ovaries but also by the adrenal cortex.

d. **Fimbriae.** Fringes; especially the finger-like ends of the fallopian tube.

e. **Follicle.** A pouch like depression or cavity.

f. **Follicle Stimulating Hormone.** The follicle stimulating hormone (FSH) is a hormone produced by the anterior pituitary during the first half of the menstrual cycle. It stimulates development of the graafian follicle.

g. **Graafian Follicle.** A mature, fully developed ovarian cyst containing the ripe ovum.

h. **Hormone.** A chemical substance produced in an organ, which, being carried to an associated organ by the bloodstream excites in the latter organ, a functional activity.

i. **Lactation.** The production of milk by the mammary glands.

j. **Luteinizing Hormone.** A hormone produced by the anterior pituitary that stimulates ovulation and the development of the corpus luteum.

k. **Oocyte.** A developing egg in one of two stages.

l. **Ovum.** The female reproductive cell.

m. **Progesterone.** The pure hormone contained in the corpora lutea whose function is to prepare the endometrium for the reception and development of the fertilized ovum.

n. **Reproduction.** The process by which an offspring is formed.
1-3. INTERNAL FEMALE ORGANS

The internal organs of the female consists of the uterus, vagina, fallopian tubes, and the ovaries (see figures 1-1 and 1-2).

Figure 1-2. Anterior view of the uterus and related structures.

a. Uterus. The uterus is a hollow organ about the size and shape of a pear. It serves two important functions: it is the organ of menstruation and during pregnancy it receives the fertilized ovum, retains and nourishes it until it expels the fetus during labor.

(1) Location. The uterus is located between the urinary bladder and the rectum. It is suspended in the pelvis by broad ligaments.

(2) Divisions of the uterus. The uterus consists of the body or corpus, fundus, cervix, and the isthmus. The major portion of the uterus is called the body or corpus. The fundus is the superior, rounded region above the entrance of the fallopian tubes. The cervix is the narrow, inferior outlet that protrudes into the vagina. The isthmus is the slightly constricted portion that joins the corpus to the cervix.

(3) Walls of the uterus (see figure 1-3). The walls are thick and are composed of three layers: the endometrium, the myometrium, and the perimetrium. The endometrium is the inner layer or mucosa. A fertilized egg burrows into the endometrium (implantation) and resides there for the rest of its development. When the female is not pregnant, the endometrial lining sloughs off about every 28 days in response to changes in levels of hormones in the blood. This process is called menses. The myometrium is the smooth muscle component of the wall. These smooth muscle fibers are arranged in longitudinal, circular, and spiral patterns, and are interlaced with connective tissues. During the monthly female cycles and during pregnancy, these
layers undergo extensive changes. The perimetrium is a strong, serous membrane that coats the entire uterine corpus except the lower one fourth and anterior surface where the bladder is attached.

![Figure 1-3. Walls of the uterus.](image)

b. **Vagina**.

   (1) **Location**. The vagina is the thin walled muscular tube about 6 inches long leading from the uterus to the external genitalia. It is located between the bladder and the rectum.

   (2) **Function**. The vagina provides the passageway for childbirth and menstrual flow; it receives the penis and semen during sexual intercourse.

c. **Fallopian Tubes (Two)**.

   (1) **Location**. Each tube is about 4 inches long and extends medially from each ovary to empty into the superior region of the uterus.

   (2) **Function**. The fallopian tubes transport ovum from the ovaries to the uterus. There is no contact of fallopian tubes with the ovaries.

   (3) **Description**. The distal end of each fallopian tube is expanded and has finger-like projections called fimbriae, which partially surround each ovary. When an oocyte is expelled from the ovary, fimbriae create fluid currents that act to carry the oocyte into the fallopian tube. Oocyte is carried toward the uterus by combination of tube peristalsis and cilia, which propel the oocyte forward. The most desirable place for fertilization is the fallopian tube.
d. **Ovaries (2)** (see figure 1-4).

![Diagram of the human ovary](image)

**Figure 1-4. Human ovary.**

(1) **Functions.** The ovaries are for oogenesis—the production of eggs (female sex cells) and for hormone production (estrogen and progesterone).

(2) **Location and gross anatomy.** The ovaries are about the size and shape of almonds. They lie against the lateral walls of the pelvis, one on each side. They are enclosed and held in place by the broad ligament. There are compact like tissues on the ovaries, which are called ovarian follicles. The follicles are tiny sac-like structures that consist of an immature egg surrounded by one or more layers of follicle cells. As the developing egg begins to ripen or mature, follicle enlarges and develops a fluid filled central region. When the egg is matured, it is called a graafian follicle, and is ready to be ejected from the ovary.

(3) **Process of egg production—oogenesis (see figure 1-5).**

(a) The total supply of eggs that a female can release has been determined by the time she is born. The eggs are referred to as "oogonia" in the developing fetus. At the time the female is born, oogonia have divided into primary oocytes, which contain 46 chromosomes and are surrounded by a layer of follicle cells.

(b) Primary oocytes remain in the state of suspended animation through childhood until the female reaches puberty (ages 10 to 14 years). At puberty, the anterior pituitary gland secretes follicle-stimulating hormone (FSH), which stimulates a small number of primary follicles to mature each month.
(c) As a primary oocyte begins dividing, two different cells are produced, each containing 23 unpaired chromosomes. One of the cells is called a secondary oocyte and the other is called the first polar body. The secondary oocyte is the larger cell and is capable of being fertilized. The first polar body is very small, is nonfunctional, and incapable of being fertilized.

(d) By the time follicles have matured to the graafian follicle stage, they contain secondary oocytes and can be seen bulging from the surface of the ovary. Follicle development to this stage takes about 14 days. Ovulation (ejection of the mature egg from the ovary) occurs at this 14-day point in response to the luteinizing hormone (LH), which is released by the anterior pituitary gland.

(e) The follicle at the proper stage of maturity when the LH is secreted will rupture and release its oocyte into the peritoneal cavity. The motion of the fimbriae draws the oocyte into the fallopian tube. The luteinizing hormone also causes the ruptured follicle to change into a granular structure called corpus luteum, which secretes estrogen and progesterone.

(f) If the secondary oocyte is penetrated by a sperm, a secondary division occurs that produces another polar body and an ovum, which combines its 23
chromosomes with those of the sperm to form the fertilized egg, which contains 46 chromosomes.

(4) Process of hormone production by the ovaries.

(a) Estrogen is produced by the follicle cells, which are responsible for secondary sex characteristics and for the maintenance of these traits. These secondary sex characteristics include the enlargement of fallopian tubes, uterus, vagina, and external genitals; breast development; increased deposits of fat in hips and breasts; widening of the pelvis; and onset of menses or menstrual cycle.

(b) Progesterone is produced by the corpus luteum in presence of LH in the blood. It works with estrogen to produce a normal menstrual cycle. Progesterone is important during pregnancy and in preparing the breasts for milk production.

1-4. EXTERNAL FEMALE GENITALIA

The external organs of the female reproductive system include the mons pubis, labia majora, labia minora, vestibule, perineum, and the Bartholin’s glands. As a group, these structures that surround the openings of the urethra and vagina compose the vulva, from the Latin word meaning covering. See Figure 1-6.
a. **Mons Pubis.** This is the fatty rounded area overlying the symphysis pubis and covered with thick coarse hair.

b. **Labia Majora.** The labia majora run posteriorly from the mons pubis. They are the 2 elongated hair covered skin folds. They enclose and protect other external reproductive organs.

c. **Labia Minora.** The labia minora are 2 smaller folds enclosed by the labia majora. They protect the opening of the vagina and urethra.

d. **Vestibule.** The vestibule consists of the clitoris, urethral meatus, and the vaginal introitus.

   (1) The **clitoris** is a short erectile organ at the top of the vaginal vestibule whose function is sexual excitation.

   (2) The **urethral meatus** is the mouth or opening of the urethra. The urethra is a small tubular structure that drains urine from the bladder.

   (3) The **vaginal introitus** is the vaginal entrance.

e. **Perineum.** This is the skin covered muscular area between the vaginal opening (introitus) and the anus. It aids in constricting the urinary, vaginal, and anal opening. It also helps support the pelvic contents.

f. **Bartholin's Glands (Vulvovaginal or Vestibular Glands).** The Bartholin's glands lie on either side of the vaginal opening. They produce a mucoid substance, which provides lubrication for intercourse.

1-5. **BLOOD SUPPLY**

The blood supply is derived from the uterine and ovarian arteries that extend from the internal iliac arteries and the aorta. The increased demands of pregnancy necessitate a rich supply of blood to the uterus. New, larger blood vessels develop to accommodate the need of the growing uterus. The venous circulation is accomplished via the internal iliac and common iliac vein.

1-6. **FACTS ABOUT THE MENSTRUAL CYCLE**

Menstruation is the periodic discharge of blood, mucus, and epithelial cells from the uterus. It usually occurs at monthly intervals throughout the reproductive period, except during pregnancy and lactation, when it is usually suppressed.

a. The menstrual cycle is controlled by the cyclic activity of follicle stimulating hormone (FSH) and LH from the anterior pituitary and progesterone and estrogen from
the ovaries. In other words, FSH acts upon the ovary to stimulate the maturation of a follicle, and during this development, the follicular cells secrete increasing amounts of estrogen (see figure 1-7).

Figure 1-7. Menstrual cycle.

b. Hormonal interaction of the female cycle are as follows:

1. Days 1-5. This is known as the menses phase. A lack of signal from a fertilized egg influences the drop in estrogen and progesterone production. A drop in progesterone results in the sloughing off of the thick endometrial lining which is the menstrual flow. This occurs for 3 to 5 days.

2. Days 6-14. This is known as the proliferative phase. A drop in progesterone and estrogen stimulates the release of FSH from the anterior pituitary. FSH stimulates the maturation of an ovum with graafian follicle. Near the end of this phase, the release of LH increases causing a sudden burst like release of the ovum, which is known as ovulation.

3. Days 15-28. This is known as the secretory phase. High levels of LH cause the empty graafian follicle to develop into the corpus luteum. The corpus luteum releases progesterone, which increases the endometrial blood supply. Endometrial
glands secrete nutrients into the uterine cavity, helping to prepare the lining for the arrival of the fertilized egg. If the egg is fertilized, the embryo produces human chorionic gonadotropin (HCG). The human chorionic gonadotropin signals the corpus luteum to continue to supply progesterone to maintain the uterine lining. Continuous levels of progesterone prevent the release of FSH and ovulation ceases.

c. **Additional Information.**

(1) The length of the menstrual cycle is highly variable. It may be as short as 21 days or as long as 39 days.

(2) Only one interval is fairly constant in all females, the time from ovulation to the beginning of menses, which is almost always 14-15 days.

(3) The menstrual cycle usually ends when or before a woman reaches her fifties. This is known as menopause.

1-7. **OVULATION**

Ovulation is the release of an egg cell from a mature ovarian follicle (see figure 1-5 for ovulation). Ovulation is stimulated by hormones from the anterior pituitary gland, which apparently causes the mature follicle to swell rapidly and eventually rupture. When this happens, the follicular fluid, accompanied by the egg cell, oozes outward from the surface of the ovary and enters the peritoneal cavity. After it is expelled from the ovary, the egg cell and one or two layers of follicular cells surrounding it are usually propelled to the opening of a nearby uterine tube. If the cell is not fertilized by union of a sperm cell within a relatively short time, it will degenerate.

1-8. **MENOPAUSE**

As mentioned in paragraph 1-6c(3), menopause is the cessation of menstruation. This usually occurs in women between the ages of 45 and 50. Some women may reach menopause before the age of 45 and some after the age of 50. In common use, menopause generally means cessation of regular menstruation. Ovulation may occur sporadically or may cease abruptly. Periods may end suddenly, may become scanty or irregular, or may be intermittently heavy before ceasing altogether. Markedly diminished ovarian activity, that is, significantly decreased estrogen production and cessation of ovulation, causes menopause.

**Section II. THE MALE REPRODUCTIVE SYSTEM**

1-9. **GENERAL**

a. The male reproductive tract consists of external genitals and internal organs. These organs are located in the pelvic cavity (see figure 1-8). The male's reproductive system begins to develop in response to testosterone during early fetal life. Essentially
no testosterone is produced during childhood. Resumption of testosterone production at the onset of puberty stimulates growth and maturation of the male's reproductive structures and secondary sex characteristics. Testosterone is the male sex hormone secreted by the interstitial cells of the testes.

b. The primary function of the male's reproduction system is to produce male sex cells, which are called sperm cells. The primary organs of the male's reproduction system are the two testes in which the sperm cells are formed. The other structures are the duct system and the accessory glandular structure.

1-10. MALE REPRODUCTIVE ORGANS

a. Testes (2). The testes are two almond-shaped glands whose functions are for the production of sperm and testosterone. The testes are suspended in the scrotal sac outside the abdominopelvic cavity. It is believed that the testes lie outside the body cavity because they are very sensitive to heat and the higher temperature within the body is unfavorable to the production of sperm. Each testis is enclosed by a tough, white fibrous capsule called the tunica albuginea. Extension of the capsule divides it into a large number of lobes. Each lobe contains four tightly coiled seminiferous tubules (this is the location of actual sperm production). The seminiferous tubules empty sperm
into the testicular network where they travel to the epididymis. The epididymis is located outside of the testis (see figures 1-8 and 1-9).

Figure 1-9. Structure of the testes.

b. **Duct System.** The duct system is the passageway for the sperm to exit the body. It contains the epididymis and the vas deferens.

(1) **Epididymis.** The epididymis is a coiled tube about 20 inches long. It caps the superior part of the testis and runs down its posterior side. It forms the first part of the duct system and provides a temporary storage site for immature sperm. When the male is sexually stimulated, the walls of the epididymis contract to expel sperm into the next part of the duct system.

(2) **Vas deferens (ductus deferens).** The sperm continue their journey through the vas deferens. The vas deferens runs upwards from the epididymis through the inguinal canal into the pelvic cavity and arches over the bladder (see figure 1-8). It is enclosed with blood vessels and nerves in a connective tissue sheath, which is called a spermatic cord. The vas deferens empties into the ejaculatory duct that carries the sperm through the process to empty into the urethra.

c. **Accessory Glandular Structure.** The accessory glandular structure includes the seminal vesicles, prostate gland, Cowper's glands, and the penis.

(1) **Seminal vesicles.** The two seminal vesicles are pouches that store sperm. Sixty percent of fluid volume of semen (seminal fluid) is produced there. The secretion is rich in sugar (fructose), which nourishes and activates the sperm passing through the tract.
(2) **Prostate gland.** The prostate gland is a single gland about the size and shape of a chestnut. It encircles the upper area of the urethra just below the bladder. It secretes a milky alkaline fluid, which has the role in protecting the sperm against acid conditions of the vagina.

(3) **Cowper's glands.** The cowper's glands are tiny pea-sized glands inferior to the prostate. They form a thick, clear mucus, which drains into the urethra. The secretion is believed to serve primarily as a lubricant during sexual intercourse.

(4) **Penis.** The penis is a cylinder-shaped organ located externally on the mons pubis, immediately above the scrotum. It is made of erectile tissue with cavern-like spaces in it. At the time of sexual excitement, blood fills these spaces, changing the soft, limp penis to an enlarged, rigid, erect organ. The smooth cap of the penis is called the glans penis and is covered by a fold of loose skin that forms the headlock foreskin. Surgical removal of this foreskin, called circumcision, is frequently performed. The penis also serves as part of the urinary tract in the male.

1-11. **SPERMATOGENESIS (SPERM FORMATION)**

a. Spermatogenesis begins during puberty and continues throughout life.

b. Millions of sperm are produced in a 24-hour period. This occurs in the seminiferous tubules (see figure 1-10).

c. The process is begun by primitive stem cells, which are called spermatogonia and are found in the outer region of each tubules. Follicle stimulating hormone is secreted by the anterior pituitary beginning at puberty. Follicle stimulating hormone influences division of spermatogonia into primary spermatocytes.

![Figure 1-10. Spermatogenesis](image)

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d. Each spermatocyte undergoes meiosis and produces four spermatids. All of the male's body cells contain the same 23 pairs of chromosomes. The spermatid contains one chromosome of each of the 23 pairs. The same chromosome configuration occurs in the ovum. When the sperm and egg unite, the normal number of chromosomes is reestablished—46 chromosomes or 23 pairs.

e. The mature sperm contains three regions: the head, which contains deoxyribonucleic acid (DNA), the midpiece, and the tail (see figure 1-11).

![Figure 1-11. Structure of the sperm.](image)

f. The acrosome is anterior to the head of the mature sperm. It contains special enzymes, which help the sperm to penetrate the egg.
1-12. PROCESS OF TESTOSTERONE PRODUCTION

The interstitial cells, which lie between the seminiferous tubules, produce testosterone. These cells are activated during puberty by two hormones, FSH and LH, which is called interstitial cell stimulating hormone (ICSH). A rise in testosterone production in the young male stimulates his reproductive organs to develop to their adult size and causes secondary sex characteristics to appear. These characteristics are:

a. Deepening of the voice due to enlargement of the larynx.

b. Increased hair growth especially on the face, axillary, and pubic regions.

c. Enlargement of skeletal muscles.

d. Increase in skeletal size.
EXERCISES, LESSON 1

INSTRUCTIONS: Complete the following exercises by marking the lettered response that best answers the question, by completing the incomplete statement, or by writing the answer in the space(s) provided.

After you have completed all of these exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. List the female's internal reproductive organs.

   __________________________.  ___________________________.
   __________________________.  ___________________________.

2. The ____________ is suspended by broad ligaments and is located between the urinary bladder and the rectum.

3. The ____________ provides the passageway for childbirth and menstrual flow.

4. The female has ____ fallopian tubes.
   a. Two.
   b. Three.
   c. Four.

5. Which of the female reproductive organs has finger-like projections that partially surround each ovary?
   __________________________

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6. ______________ are for the production of oogenesis and hormones.

7. ______________ works with estrogen to produce a normal menstrual cycle.

8. Vaginal introitus is known as the _________________.

9. Days 6-14 of the hormonal interaction of the female cycle is known as the ________________ phase.

10. What is the name of the male's sex hormone?
    ________________.

11. What male reproductive organ is suspended in the scrotal sac outside of the abdominopelvic cavity?
    ________________

12. The ________________ caps the superior part of the testes and runs down its posterior side.

13. The male's accessory glandular structure includes:
    ________________.
    ________________.
    ________________.
    ________________.

14. The ________________ is anterior to the head of the mature sperm.

15. The male's interstitial cells are activated during puberty by two hormones, __________ and __________.
Special Instructions for Exercises 16 Through 32 (following page). Match the information in Column A with the appropriate word or term in Column B. Place the letter of the response in the blank space at the left of the number in Column A.

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
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<tbody>
<tr>
<td>16. Upon dividing 2 different cells are produced, each containing 23 chromosomes.</td>
<td>a. internal</td>
</tr>
<tr>
<td>17. Menopause.</td>
<td>b. walls of the uterus</td>
</tr>
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<td>18. Transport ovum from the ovaries to the uterus.</td>
<td>c. ovaries</td>
</tr>
<tr>
<td>19. Epididymis and vas deferens.</td>
<td>d. divisions of the uterus</td>
</tr>
<tr>
<td>20. Corpus, fundus, cervix, isthmus.</td>
<td>e. external female organs</td>
</tr>
<tr>
<td>21. Pouches that store sperm.</td>
<td>f. menstrual cycle</td>
</tr>
<tr>
<td>22. Ovaries, uterus, vagina, fallopian tubes.</td>
<td>g. fallopian tubes</td>
</tr>
<tr>
<td>the female cycle</td>
<td>h. primary oocyte</td>
</tr>
<tr>
<td>23. Cowper's glands, penis, prostate, seminal vesicles.</td>
<td>i. hormonal interaction of the female cycle</td>
</tr>
<tr>
<td>24. Tail, midpiece, head.</td>
<td>j. menstruation cessation</td>
</tr>
<tr>
<td>25. Mons pubis, vestibule, perineum, Bartholin's glands.</td>
<td>k. produces sperm and testosterone</td>
</tr>
<tr>
<td>26. Menses phase, proliferative phase, secretory phase.</td>
<td>l. male's duct system</td>
</tr>
<tr>
<td>27. Peritoneum, myometrium, endometrium.</td>
<td>m. vestibule</td>
</tr>
<tr>
<td>28. Millions of sperms produced in the seminiferous tubules.</td>
<td>n. accessory glandular structure</td>
</tr>
<tr>
<td>29. Controlled by the cyclic activity of FSH and LH.</td>
<td>o. seminal vesicles</td>
</tr>
<tr>
<td>30. Produces female sex eggs, estrogen, and progesterone.</td>
<td>p. spermatogenesis</td>
</tr>
<tr>
<td>31. Testes.</td>
<td>q. regions of a mature sperm</td>
</tr>
<tr>
<td>32. Clitoris, urethral meatus, vaginal introitus.</td>
<td></td>
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</tbody>
</table>

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33. Identify each of the parts indicated in the drawings of the female's reproductive system below.
34. Identify each of the parts indicated in the drawing of the male's reproductive system below.

Check Your Answers on Next Page
SOLUTIONS TO EXERCISES, LESSON 1

1. uterus.
   vagina.
   fallopian tubes.
   ovaries (para 1-3).

2. uterus (para 1-3a(1)).

3. vagina (para 1-3b(2)).

4. a (para 1-3c).

5. fallopian tubes (para 1-3c(3)).

6. Ovaries (para 1-3d(1)).

7. Progesterone (para 1-3d(4)(b)).

8. vaginal entrance (para 1-4d(3)).

9. proliferative (para 1-6b(2)).

10. testosterone (para 1-9).

11. testes (para 1-10a).

12. epididymis (para 1-10b(1)).

13. seminal vesicles.
    prostate gland.
    Cowper's gland.
    penis (para 1-10c).

14. acrosome (para 1-11f).

15. FSH and LH (para 1-12)

16. h (para 1-3d(3)(c)).

17. j (para 1-8).

18. g (para 1-3c(2)).

19. l (para 1-10b).
20. d (para 1-3a(2)).
21. o (para 1-10c(1)).
22. a (para 1-3).
23. n (para 1-10c).
24. q (para 1-11e).
25. e (para 1-4).
26. l (para 1-6b).
27. b (para 1-3a(3)).
29. f (para 1-6a).
30. c (para 1-3d(1)).
31. k (para 1-10a).
32. m (para 1-4d).
33. Solution for exercise #33 (female's reproductive organs).
34. Solution for exercise #34 (male's reproductive organs).