1. Male Reproductive System

a. Label the figure by placing the numbers of the structures by the correct labels.

- **Bulbourethral gland**: 12
- **Prostate gland**: 11
- **Corpus cavernosum**: 4
- **Corpus spongiosum**: 5
- **Ejaculatory duct**: 10
- **Epididymis**: 13
- **Glans penis**: 7
- **Penis**: 6
- **Prepuce**: 8
- **Scrotum**: 15
- **Seminal vesicle**: 9
- **Testis**: 14
- **Urethra**: 3
- **Urinary bladder**: 1
- **Vas deferens**: 2

b. Trace the path of sperm cells from a testis to the outside by placing the numbers of the ducts in the spaces below.

1) Ejaculatory duct
2) Epididymis
3) Urethra
4) Vas deferens

Testis → 2 → 4 → 1 → 3 → outside.
c. Write the terms that match the statements in the spaces at the right.

1) Male gonads, or sex glands. ____________________________________________
   Testis

2) Tubules producing sperm cells. ____________________________________________
   Seminiferous tubules

3) Cells producing testosterone. ____________________________________________
   Interstitial cells

4) Process of sperm formation. ____________________________________________
   Spermatogenesis

5) Number of chromosomes in spermatogonia and primary spermatocytes. ____________________________________________
   46

6) Type of cell division forming primary spermatocytes. ____________________________________________
   Mitosis

7) Type of cell division forming spermatids from primary spermatocytes. ____________________________________________
   Meiosis

8) Number of chromosomes in each spermatid. ____________________________________________
   23

9) Cell formed from each spermatid. ____________________________________________
   Sperm

10) Location of nucleus in a sperm cell. ____________________________________________
    In the head

11) Provides motility for a sperm cell. ____________________________________________
    Flagellum

12) Tubule where sperm cells mature. ____________________________________________
    Epididymis

13) Secrete fluid, neutralizing acidity of urethra prior to ejaculation. ____________________________________________
    Bulbourethral glands

14) Secrete fluid containing fructose. ____________________________________________
    Seminal vesicles

15) Secretes fluid, activating swimming movements of sperm cells. ____________________________________________
    Prostate gland

16) Mixture of glandular secretions and sperm cells. ____________________________________________
    Semen

17) Contains testes outside the body. ____________________________________________
    Scrotum

18) Approximate temperature of testes required for production of viable sperm. ____________________________________________
    95.6° F

19) Male copulatory organ inserted into vagina during sexual intercourse. ____________________________________________
    Penis

20) Erectile tissue in penis surrounding urethra. ____________________________________________
    Corpus spongiosum

21) Two dorsal columns of erectile tissue in penis. ____________________________________________
    Corpora cavernosa

22) Sheath of skin covering the glans penis. ____________________________________________
    Prepuce

2. Male Sexual Response

Write the words that complete the sentences in the spaces at the right.

Sexual stimulation causes ____1____ nerve impulses to ____2____ the arterioles and ____3____ the venules serving the erectile tissue in the penis. Engorgement of the erectile tissue results in ____4____ of the penis. At the same time, the ____5____ glands secrete an alkaline fluid that neutralizes the ____6____ of the urethra. Continued sexual stimulation results in ____7____, which is characterized by a sensation of sexual pleasure and ____8____, the forcing of ____9____ out the urethra.

1) Parasympathetic

2) Dilate

3) Constrict

4) Erection

5) Bulbourethral

6) Acidity

7) Orgasm

8) Ejaculation

9) Semen
3. Hormonal Control of Reproduction in Males

a. Write the terms that match the statements in the spaces at the right.

1) The male sex hormone. ____________________________________________
  Testosterone

2) Secretes gonadotropin-releasing hormone. ____________________________________________
  Hypothalamus

3) Releases FSH and LH. ____________________________________________
  Anterior pituitary

4) Hormone stimulating testosterone secretion by testes. ____________________________________________
  LH (ICSH)

5) Two hormones that act together to stimulate spermatogenesis. ______________________________
  FSH; testosterone

6) Stimulates maturation of male sex organs. ____________________________________________
  Testosterone

7) Stimulates development and maintenance of secondary sexual characteristics. ____________________________________________
  Adrenal cortex

8) Produces androgens in male fetus. ____________________________________________
  Testosterone

9) Hormone whose first secretion triggers onset of puberty. ____________________________________________
  GnRH

10) Hormone stimulating release of FSH and LH. ____________________________________________

b. Record the numbers of the male secondary sexual characteristics listed in the space provided.

1) Maturation of the testes. 6) Increased metabolic rate. ______________________________
  2) Enlargement of the larynx. 7) Increased muscle development. ________________
  3) Broad shoulders. 8) Increased RBC production. ________________
  4) Growth of body hair. 9) Maturation of the penis. ________________
  5) Production of sperm cells. 10) Deepening of the voice. ________________

  2, 3, 4, 6, 7, 8, 10

c. Write the words that complete the sentences in the spaces at the right.

The production of testosterone by ___1___ in the testes is regulated by a ___2___ feedback system. When the level of testosterone in the blood declines, secretion of ___3___ by the hypothalamus is ___4___ , causing an ___5___ in the release of ___6___ from the anterior pituitary, which, in turn, ___7___ testosterone production. As the level of testosterone increases, it inhibits ___8___ production, which decreases the release of ___9___ , resulting in a ___10___ in testosterone production. _______________________

  1) Seminiferous tubules
  2) Negative
  3) GnRH
  4) Increased
  5) Increase
  6) LH (ICSH)
  7) Increases
  8) GnRH
  9) LH (ICSH)
  10) Decrease
4. Female Reproductive System

a. Label the figure by placing the numbers of the structures by the correct labels.

- 12 Anus
- 10 Cervix
- 6 Clitoris
- 9 Fimbriae
- 8 Labium major
- 7 Labium minor
- 2 Ovary
- 5 Urethra
- 4 Urinary bladder
- 1 Uterine tube
- 3 Uterus
- 11 Vagina

b. Write the terms that match the statements in the spaces at the right.

1) Produces female sex cells. ________________________________________________________________________
   - Ovaries

2) Receives penis in sexual intercourse. ________________________________________________________________________
   - Vagina

3) Holds embryo/fetus during pregnancy. ________________________________________________________________________
   - Uterus

4) Carries secondary oocyte toward uterus. ________________________________________________________________________
   - Uterine tube

5) Narrow space between labia minora. ________________________________________________________________________
   - Vestibule

6) Birth canal during childbirth. ________________________________________________________________________
   - Vagina
c. Write the words that complete the sentences in the spaces at the right.

During fetal development, ____1___ cell divi-
sion of germinal epithelial cells forms millions
of ____2___, but most of them degenerate. Sur-
vivors become ____3___ oocytes containing
____4___ chromosomes. Single layers of follicu-
lar cells envelop each oocyte forming ____5___
follicles, but most of them degenerate; the sur-
vivors become ____6___ follicles. After puberty,
usually ____7___ dominant follicle develops
each month, and its oocyte undergoes the first
____8___ division, producing a ____9___ oocyte
and a first ____10___ . Both of these cells con-
tain ____11___ chromosomes. Continued
growth results in rupture of the follicle at
____12___, and the released oocyte enters a
____13___ tube. If the secondary oocyte is pene-
trated by a ____14___ , the second ____15___ di-
vision forms an ____16___ and a second
____17___ , each with ____18___ chromo-
somes.

1) Mitotic
2) Oogonia
3) Primary
4) 46
5) Primordial
6) Primary
7) One
8) Meiotic
9) Secondary
10) Polar body
11) 23
12) Ovulation
13) Uterine tube
14) Sperm
15) Meiotic
16) Ovum
17) Polar body
18) 23

d. Write the terms that match the statements in the spaces at the right.

1) Inner lining of the uterus.
2) Moves an oocyte through a uterine tube.
3) Type of muscle in uterine wall.
4) Collective term for the external female
   reproductive organs.
5) Nodule of erectile tissue corresponding to the
   penis in males.
6) Portion of uterus projecting into vagina.

Endometrium
Cilia
Smooth
Vulva
Clitoris
Cervix

Vaginal mucosa and breasts
Clitoris
Vestibular
Orgasm
Uterus
Uterine
5. Hormonal Control of Reproduction in Females

a. Match the hormones listed with the following statements.

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrogen</td>
<td>1) Secreted by the follicular cells.</td>
</tr>
<tr>
<td></td>
<td>2) Stimulates maturation of female sex organs.</td>
</tr>
<tr>
<td></td>
<td>3) Maintains uterine lining in pregnancy.</td>
</tr>
<tr>
<td></td>
<td>4) Develops female secondary sexual characteristics.</td>
</tr>
<tr>
<td></td>
<td>5) Secreted by corpus luteum.</td>
</tr>
<tr>
<td></td>
<td>6) Secreted by the hypothalamus.</td>
</tr>
<tr>
<td></td>
<td>7) Stimulates development and function of corpus luteum.</td>
</tr>
<tr>
<td>FSH</td>
<td>8) First secretion starts onset of puberty.</td>
</tr>
<tr>
<td>LH</td>
<td>9) Stimulates development of ovarian follicles.</td>
</tr>
<tr>
<td></td>
<td>10) Prepare endometrium for pregnancy.</td>
</tr>
<tr>
<td></td>
<td>11) High concentrations inhibit GnRH secretion.</td>
</tr>
<tr>
<td></td>
<td>12) Promotes thickening of endometrium.</td>
</tr>
<tr>
<td></td>
<td>13) Promotes formation of blood vessels in endometrium.</td>
</tr>
<tr>
<td>GnRH</td>
<td></td>
</tr>
<tr>
<td>LH</td>
<td></td>
</tr>
</tbody>
</table>

b. Write the words that complete the sentences in the spaces at the right.

Between puberty and ____1____, a woman experiences one reproductive cycle per month consisting of an ovarian cycle and a ____2____ cycle. These cycles are controlled by ____3____ and average about ____4____ days in length. A cycle is started by the secretion of ____5____ by the hypothalamus, which activates the release of ____6____ and ____7____ by the anterior pituitary. FSH stimulates the development of a primary ____8____ and the secretion of ____9____ by the follicular cells. ____10____ promotes the thickening of the endometrium. The increasing estrogen production triggers a sharp increase in ____11____ secretion and a lesser increase in FSH production, leading to ____12____ on day 14. Under stimulation by LH, the follicle remnants become a ____13____ that secretes a high level of ____14____ and estrogen, which together prepare the ____15____ of the uterus to receive an early embryo. The high level of ____16____ inhibits secretion of GnRH, preventing development of additional ovarian follicles. If pregnancy does not occur, the corpus luteum degenerates and the levels of estrogen and ____17____ rapidly decline, resulting in breakdown of the endometrium leading to ____18____ and secretion of GnRH starting a new reproductive cycle.

1) **Menopause**
2) **Menstrual**
3) **Hormones**
4) **28**
5) **GnRH**
6) **FSH**
7) **LH**
8) **Follicle**
9) **Estrogen**
10) **Estrogen**
11) **LH**
12) **Ovulation**
13) **Corpus luteum**
14) **Progesterone**
15) **Endometrium**
16) **Progesterone**
17) **Progesterone**
18) **Menstruation**

**Progesterone**

**Estrogen**

**Estrogen, progesterone**

**GnRH**

**LH**

**GnRH and FSH**

**FSH**
6. Mammary Glands

Indicate whether each statement is true (T) or false (F).

___ T____ Mammary glands are specialized for milk production.
___ F____ Breasts contain connective tissue but little fat.
___ T____ Alveolar glands occur in lobes of mammary glands.
___ T____ Estrogen stimulates the development of mammary glands.
___ T____ A pigmented areola surrounds a protruding nipple.
___ T____ Mammary glands are present, but nonfunctional, in males.
___ F____ Breasts are formed internal to the pectoralis muscles.

7. Birth Control

Indicate whether each statement is true (T) or false (F).

___ T____ Contraceptives are designed to prevent union of sperm and egg.
___ F____ Contraceptives and birth control are synonymous.
___ T____ Spermicides act by killing the sperm cells.
___ T____ Progesterone in the “pill” inhibits GnRH secretion.
___ T____ Spermicides are usually used with barrier methods.
___ F____ It is impossible to catch STDs when using a condom.
___ T____ Diaphragms and cervical caps are about equally effective.
___ T____ The rhythm method relies on knowing when ovulation occurs.
___ T____ A condom is a barrier contraceptive.
___ F____ Pregnancy is not possible when using a condom.
___ F____ The “pill” is the most effective contraceptive.
___ F____ There are no undesirable side effects of the “pill.”
___ T____ An IUD prevents implantation of an embryo.
___ F____ Induced abortion is a contraceptive procedure.
___ F____ A tubal ligation prevents ovulation.
___ T____ Diaphragms and cervical caps are barrier contraceptives.
___ T____ A vasectomy prevents the ejaculation of sperm.
___ T____ Use of an IUD may cause pelvic inflammatory disease.
___ T____ Withdrawal is less effective than a condom.
___ T____ Undesirable side effects may result from induced abortion.

8. Disorders of the Reproductive Systems

Write the disorders that match the statements in the spaces provided.

Male Disorders

1) Inability to maintain an erection. _________________________ Impotence
2) Common reproductive cancer in males. ________________ Prostate
3) Inflammation of the prostate glands. ________________ Prostatitis
4) Inability to produce sufficient viable sperm. ___________ Infertility
5) Causes constriction of urethra in about one-third of older males. _________________________ Enlarged prostate
Female Disorders

1) Physical pain during menstruation.
2) Growth of endometrial tissue outside the uterus.
3) Absence of menstruation without pregnancy.
4) Associated with highly absorbent tampons.
5) Inability to become pregnant.
6) Infection in reproductive organs and/or pelvic cavity.
7) Physical and emotional distress just prior to menstruation.
8) Caused by toxin formed by \textit{S. aureus}.

Sexually Transmitted Diseases

1) Results from infection with herpes simplex virus type 2.
2) Fatal disease resulting from HIV infection.
3) Two bacterial diseases that may lead to sterility in females.
4) Characterized by chancre in first stage.
5) Caused by human papillomavirus (HPV).
6) Bacterial diseases curable with antibiotics.
7) Viral diseases for which there are no cures.

9. Clinical Applications

a. Failure of the testes to descend into the scrotum (cryptorchidism) causes sterility in males. Explain why. \textit{Normal body temperature prevents the development of viable sperm. A lower temperature, about 95.6°F., is required for production of viable sperm.}

b. Secondary amenorrhea in female athletes results from strenuous activity, which blocks the hypothalamic regulation of reproduction. How does this stop the reproductive cycles? \textit{When the production of GnRH by the hypothalamus is curtailed, ovarian and menstrual cycles cease.}

Women with amenorrhea produce little, if any, estrogen, which causes osteoporosis (bone loss). Why are such women deficient in estrogen? \textit{When GnRH is not produced by the hypothalamus, FSH is not secreted by the anterior pituitary. Without stimulation by FSH, follicular cells do not secrete estrogen.}

c. Without effective treatment, a bacterial sexually transmitted disease usually leads to pelvic inflammatory disease (PID) in females. How does this happen? \textit{Bacteria migrate up the uterine tubes and infect pelvic tissues.}