

## Study Guide Answer Key

chapter

3

**Learning Activities**

1. b, g, a, c, d, f, e
2. a. 4  
b. 22, x, y
3. a. 1  
b. 22, x
4. a. 24  
b. 5
5. a. boy  
b. girl  
c. The woman does not have a direct genetic influence over the gender of the baby because she only contributes an X chromosome. However, the pH (acidity or alkalinity) of her reproductive tract and her estrogen levels may affect the survival of the X-bearing and Y-bearing sperm differently and their speed of movement through her cervix and fallopian tubes.
6. a. fallopian tube  
b. upper, posterior
7. a, i, d, b, h, f, g, c, e, j
8. 1,000
9. a. Maintains an even temperature  
b. prevents adherence of the amniotic sac to the fetal skin  
c. allows symmetrical growth  
d. allows buoyancy and fetal movement  
e. cushions the fetus and umbilical cord from injury
10. yolk sac, liver, spleen, bone marrow
11. a. fetal respiration  
b. fetal nutrition  
c. fetal excretion  
d. endocrine gland
12. a. i. Maintains uterine lining  
ii. Reduces uterine contractions  
iii. Prepares milk-producing tissue of breasts for lactation  
iv. Stimulates testes of the male to produce testosterone needed for development of the male reproductive tract  
b. i. Stimulates uterine growth  
ii. Increases blood flow to uterine vessels  
iii. Stimulates ducts of breasts to prepare for lactation  
iv. Causes changes in skin pigmentation  
v. Vascular changes in the skin and the mucous membranes of the nose and mouth  
vi. Increases salivation  
c. Persistence of the corpus luteum so it secretes estrogen and progesterone  
d. Decreases maternal insulin sensitivity and utilization of glucose so that more glucose is available for fetal growth
13. See Figure 3-7 on p. 40.
14. 1  
2
15. a. 2 hours, 3 months  
b. 15 hours, 3 weeks  
c. at cutting of the cord, 1 week
16. e, h, a, f, g, b, c, d

17.

Characteristic	Monozygotic	Dizygotic
a. Same sex or different?	Always same sex	May or may not be same sex
b. Number of fertilized ova	1	2
c. Number of placentas	1 (varies according to when the twinning occurred after conception but most often a single placenta)	2 (although placentas may be fused)
d. Number of membranes	Also varies according to when the twinning occurred, but usually one amnion and two chorions	Two amnions and two chorions
e. Number of umbilical cords	2	2

### Review Questions

- Answer: 1  
Rationale: Genes are the smallest units of heredity and are located on chromosomes. The zygote is the developing baby for the first 2 weeks after conception. These structures, located in the placenta, are where the developing baby exchanges oxygen, carbon dioxide, and waste products. Somatic cells are non-reproductive, or body cells.
- Answer: 2  
Rationale: The embryonic yolk sac produces erythrocytes until six weeks after conception, at which time the liver performs this function, followed by the bone marrow. The placenta uses fetal blood cells to deliver oxygen and nutrition to the fetus and to remove fetal waste products.
- Answer: 2  
Rationale: The chorion is the outer fetal membrane. The amnion is the inner membrane that extends across the placenta and umbilical cord. Vernix is fetal skin covering.
- Answer: 1  
Rationale: Umbilical vessels are coiled within the umbilical cord. Wharton's jelly allows them to stretch, yet keeps them from being easily compressed with fetal movement.
- Answer: 2  
Rationale: Only a small amount of blood goes into the fetal lungs to nourish them while they develop. Most blood goes from the right atrium to the left atrium through the foramen ovale, thus bypassing the lungs. The ductus venosus allows most blood from the placenta to bypass the liver. The umbilical vein and umbilical artery are structures within the umbilical cord that carry blood from the body to the placenta and return it to the body after oxygenation and removal of wastes.
- Answer: 2  
Rationale: Because the umbilical arteries carry blood from the fetus to the placenta, most of its oxygen and nutrients have been consumed and it carries blood having a high concentration of fetal wastes. The umbilical vein carries blood with the highest concentration because it is returning from the placenta. The ductus venosus and ductus arteriosus are fetal circulatory bypasses to shunt most oxygenated blood away from the liver (ductus venosus) and lungs (ductus arteriosus).
- Answer: 2  
Rationale: After fertilization, the zygote must reproduce cells for growth by ordinary cell division (mitosis) to continue development. Meiosis is reduction cell division to produce gametes, or reproductive cells.
- Answer: 3  
Rationale: Amniotic fluid has five major purposes that are all protective: maintaining temperature, preventing membranes from adhering to skin, allowing room for symmetrical growth, providing a cushion, and allowing buoyancy. Amniotic fluid does not perform this function, although drugs given to the mother can speed lung development. Amniotic fluid helps maintain the stability of the fetal temperature, but will be gone after birth. The placenta is the pregnancy organ that produces hormones.
- Answer: 2  
Rationale: Among its functions, the placenta eliminates fetal waste products, substituting for the fetal liver, kidneys, and other organ systems. The yolk sac produces red blood cells in early development. *Endoderm* refers to one of the embryonic cell layers.

10. Answer: 2

Rationale: One of progesterone's effects is to reduce uterine contractions that would otherwise tend to occur with stretching by the growing baby. Spontaneous abortion is likely if there is insufficient progesterone to quiet the uterus. Release of multiple ova would result from development and release of two or more of these gametes and is not controlled by progesterone. Human chorionic gonadotropin (hCG) signals the corpus luteum to persist and continue production of estrogen and progesterone. Maternal and fetal blood do not normally mix before birth.

11. Answer: 4

Rationale: Fraternal (dizygotic) twins occur when two ova are released and each is fertilized by a different sperm.

12. Answer: 1

Rationale: Identical twins are of the same sex because they have the same genetic composition, including sex chromosomes. Although a couple may have more than one set of dizygotic twins and each set may have one child of each sex, it occurs by chance.

### Thinking Critically

1. For a contraceptive technique such as natural family planning to be successful, one or more techniques help the woman to predict a likely time of ovulation. The woman must have an idea of about when her menstrual periods usually begin and understand that ovulation, or her fertile period, occurs about 14 days before the onset of the next menstrual period, or in the middle of a 28-day cycle. Sperm may live up to 5 days after ejaculation. The couple wishing to use natural family planning uses these facts to avoid intercourse near the time of ovulation.
2. The communication should include facts that the father's sperm has a 50% chance of producing a boy or a girl. However, female factors such as the pH of her reproductive tract and estrogen levels also influence how long X-bearing or Y-bearing sperm survive and their speed of movement toward the ovum.

### Applying Knowledge

Answers will vary.