

Sexual Reproduction

Textbook pages 204–223

Before You Read

You began as a zygote. How many cells were you made up of then? How many cells are you made up of now? Record your ideas on the lines below.

Create a Quiz

After you have read this section, create a five-question quiz based on what you have learned. After you have written the questions, be sure to answer them. Then share them with your classmates.

What is the difference between external and internal fertilization?

Mating is the means by which gametes (sperm and egg cells) meet in the same place at the same time. Mating enables fertilization to take place. Recall that fertilization is the joining of a haploid sperm cell with a haploid egg cell to form a diploid zygote.

When sperm and egg cells join outside of the bodies of the parents, the joining is called **external fertilization**. This type of fertilization is common with animals that live in water and with plants that live in moist places.

When sperm and egg cells join inside the body of the female parent, the joining is called **internal fertilization**. This type of fertilization is common with birds, mammals, and flowering and cone-forming plants.

How does the embryo develop?

Embryonic development takes place during the first eight weeks after fertilization. During this time, the embryo develops. Its cells divide constantly, and tissues and organs form. During the first week, the single fertilized cell, the zygote, develops into a mass of many cells. This mass of cells then hollows out and is called a **blastula**. The cells of the blastula are embryonic stem cells. All tissues and organs will develop from these cells. ✓

During the second week, the blastula cells become organized into three distinct layers of cells. The outer layer is called the ectoderm. The middle layer is called the mesoderm. The inner layer is called the endoderm. The illustration on the next page shows which organs and body structures are formed from the cells of these layers. The development of organs and body structures from these cell layers is called **differentiation**.

✓ Reading Check

1. When does embryonic development take place?

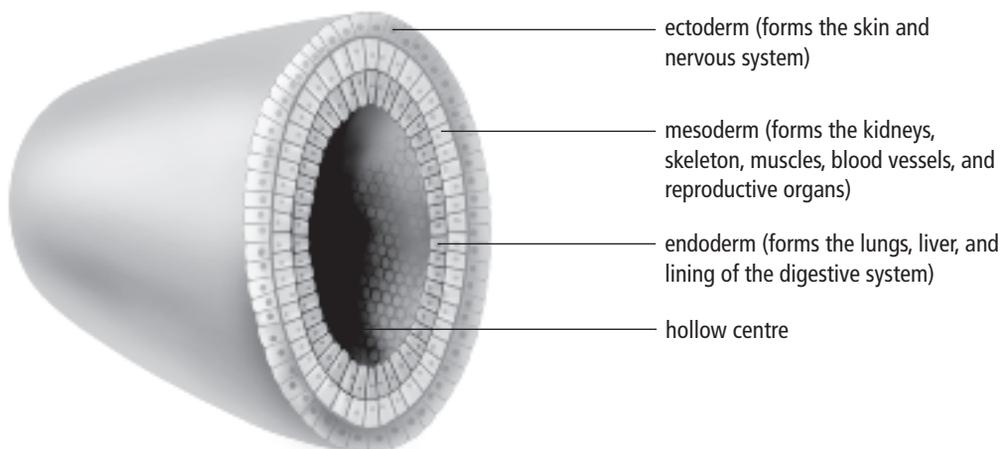
What happens during fetal development?

After the first eight weeks of development, the embryo is called a fetus. During fetal development, the organs and parts of the body continue to develop. The body adds a great deal of mass. At birth, the human baby is made up of trillions of cells. The table below summarizes some key events in fetal development. ✓

Trimester (Group of 3 Months)	Stage	Time from Fertilization	Length of Embryo/ Fetus
First	◆ Brain and spinal cord are forming.	4 weeks	4 mm
	◆ Fingers and toes have appeared. Ears, kidneys, lungs, liver, and muscles are developing.	8 weeks	4 cm
	◆ Sexual differentiation almost complete.	12 weeks	9 cm
Second	◆ Fetal movements are felt.	16–18 weeks	20 cm
	◆ Eyelids open. Fetus can survive outside of the mother with specialized care.	24 weeks	35 cm
Third	◆ Rapid weight gain occurs due to the growth and accumulation of fat.	26–38 weeks	40–50 cm

✓ Reading Check

2. What happens during fetal development?



Blastula cells organize into three layers of cells.

Use with textbook pages 204–220.

Embryonic and fetal development

Vocabulary

birds	fetus
blastula	fish
differentiation	gametes
ectoderm	internal
embryo	mating
embryonic stem cells	mesoderm
endoderm	offspring
external	

Use the terms in the vocabulary box to fill in the blanks. Use each term only once. You will not need to use every term.

- _____ is how gametes meet in the same place at the same time.
- When sperm and egg cells join outside of the bodies of the parents, the joining is called _____ fertilization. This type of fertilization is common with _____.
- When sperm and egg cells join inside the body of the female parent, the joining is called _____ fertilization. This type of fertilization is common with _____.
- During embryonic development, the _____ develops. Its cells divide constantly, and tissues and organs form.
- During the first week, the mass of cells hollows out and is called a(n) _____. Its cells are _____. All tissues and organs will develop from these cells.
- During the second week, the blastula cells become organized into three distinct layers of cells. The outer layer is called the _____. The middle layer is called the _____. The inner layer is called the _____.
- The development of organs and body structures from the blastula cell layers is called _____.
- After the first eight weeks of development, the embryo is called a(n) _____.

Use with textbook pages 206–220.

Types of sexual reproduction

Complete the following table to compare external fertilization with internal fertilization.

	External fertilization	Internal fertilization
Definition		
Draw and label two examples of organisms that use each type of fertilization	1.	1.
	2.	2.

Name _____

Date _____

Use with textbook pages 216–219.

From human embryo to human baby

Label the diagram and complete the charts below.

Embryonic development	Questions
	<ol style="list-style-type: none"> Label the three layers of blastula cells on the illustration. What develops from the ectoderm? _____ _____ What develops from the mesoderm? _____ _____ _____ What develops from the endoderm? _____ _____ _____

5. What happens during each of the three trimesters?

Trimester	What is happening at this stage of fetal development?
(a) First	
(b) Second	
(c) Third	

Name _____

Date _____

Use with textbook pages 204–220.

Sexual reproduction

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ differentiation	A. development during first eight weeks
2. _____ embryonic development	B. development after first eight weeks
3. _____ external fertilization	C. the process by which gametes arrive in the same place at the same time
4. _____ internal fertilization	D. sperm cell and egg cell meet within the female
5. _____ mating	E. development of organs and body structures from blastula
	F. sperm cell and egg cell meet outside the bodies of the parents

Circle the letter of the best answer.

6. Which of the following is true of how many flowering plants reproduce?

I.	internal fertilization
II.	external fertilization
III.	sperm and egg cell meet inside the female
IV.	sperm and egg cell meet outside the female

- A.** I and III
- B.** I and IV
- C.** II and III
- D.** II and IV

- 7. In a fetus, the brain and spinal cord are starting to form at
 - A.** two weeks
 - B.** four weeks
 - C.** eight weeks
 - D.** twelve weeks
- 8. Fetal movements are felt at
 - A.** four weeks
 - B.** eight weeks
 - C.** twelve weeks
 - D.** sixteen weeks

Use the following chart to answer questions 9 and 10.

I.	the first and second month after fertilization
II.	the third and fourth month after fertilization
III.	the fifth and sixth month after fertilization
IV.	the seventh and eighth month after fertilization

- 9. Embryonic development occurs during
 - A.** I only
 - B.** I and II only
 - C.** I, II, and III only
 - D.** I, II, III, and IV
- 10. Fetal development occurs during
 - A.** I only
 - B.** II and III only
 - C.** II, III, and IV only
 - D.** I, II, III, and IV