

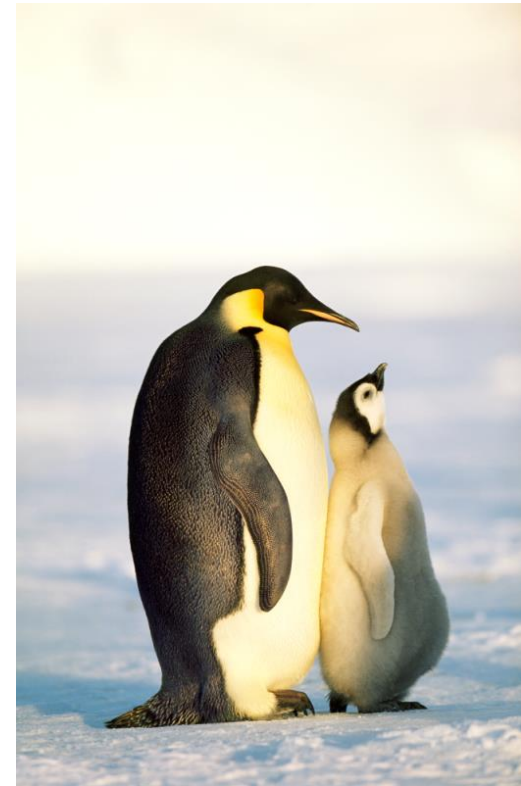
## Chapter Menu

### Chapter Introduction

Lesson 1 Sexual  
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and Meiosis

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Reproduction

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Why do living things reproduce?

## Get Ready

**What do you think?**

Before you begin, decide if you agree or disagree with each of these statements. As you view this presentation, see if you change your mind about any of the statements.



### Get Ready

## Do you agree or disagree?

1. Humans produce two types of cells: body cells and sex cells.
2. Environmental factors can cause variation among individuals.
3. Two parents always produce the best offspring.

### Get Ready

## Do you agree or disagree?

4. Cloning produces identical individuals from one cell.
5. All organisms have two parents.
6. Asexual reproduction occurs only in microorganisms.



## Lesson 1

# Sexual Reproduction and Meiosis

## Key Concepts

- What is sexual reproduction, and why is it beneficial?
- What is the order of the phases of meiosis, and what happens during each phase?
- Why is meiosis important?



## Lesson 1

# Sexual Reproduction and Meiosis

## Vocabulary

- sexual reproduction
- egg
- sperm
- fertilization
- zygote
- diploid
- homologous chromosomes
- haploid
- meiosis



## What is sexual reproduction?

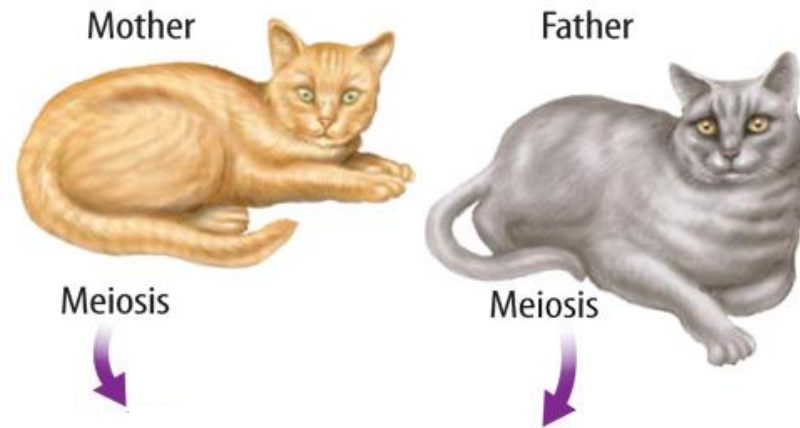
- Sexual reproduction is a type of reproduction in which the genetic materials from two different cells combine, producing an offspring.
- The female sex cell, an egg, forms in an ovary.
- The male sex cell, a sperm, forms in the testis.





# What is sexual reproduction? (cont.)

During a process called **fertilization**, an egg cell and a sperm cell join together to create a **zygote**.



## Diploid Cells

- Organisms that reproduce sexually form body cells and sex cells.
- In body cells of most organisms, similar chromosomes occur in pairs.
- Diploid cells are cells that have pairs of chromosomes.



## Diploid Cells (cont.)

- Pairs of chromosomes that have genes for the same traits arranged in the same order are called homologous chromosomes.
- Because one chromosome is inherited from each parent, the chromosomes are not identical.
- Different organisms have different numbers of chromosomes.



## Chromosomes of Selected Organisms

Organism	Number of Chromosomes	Number of Homologous Pairs
Fruit fly	8	4
Rice	24	12
Yeast	32	16
Cat	38	19
Human	46	23
Dog	78	39
Fern	1,260	630

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# Haploid Cells

Haploid cells are cells that have only one chromosome from each pair of chromosomes.

## WORD ORIGIN

**haploid**

from Greek *haploides*, means “single”



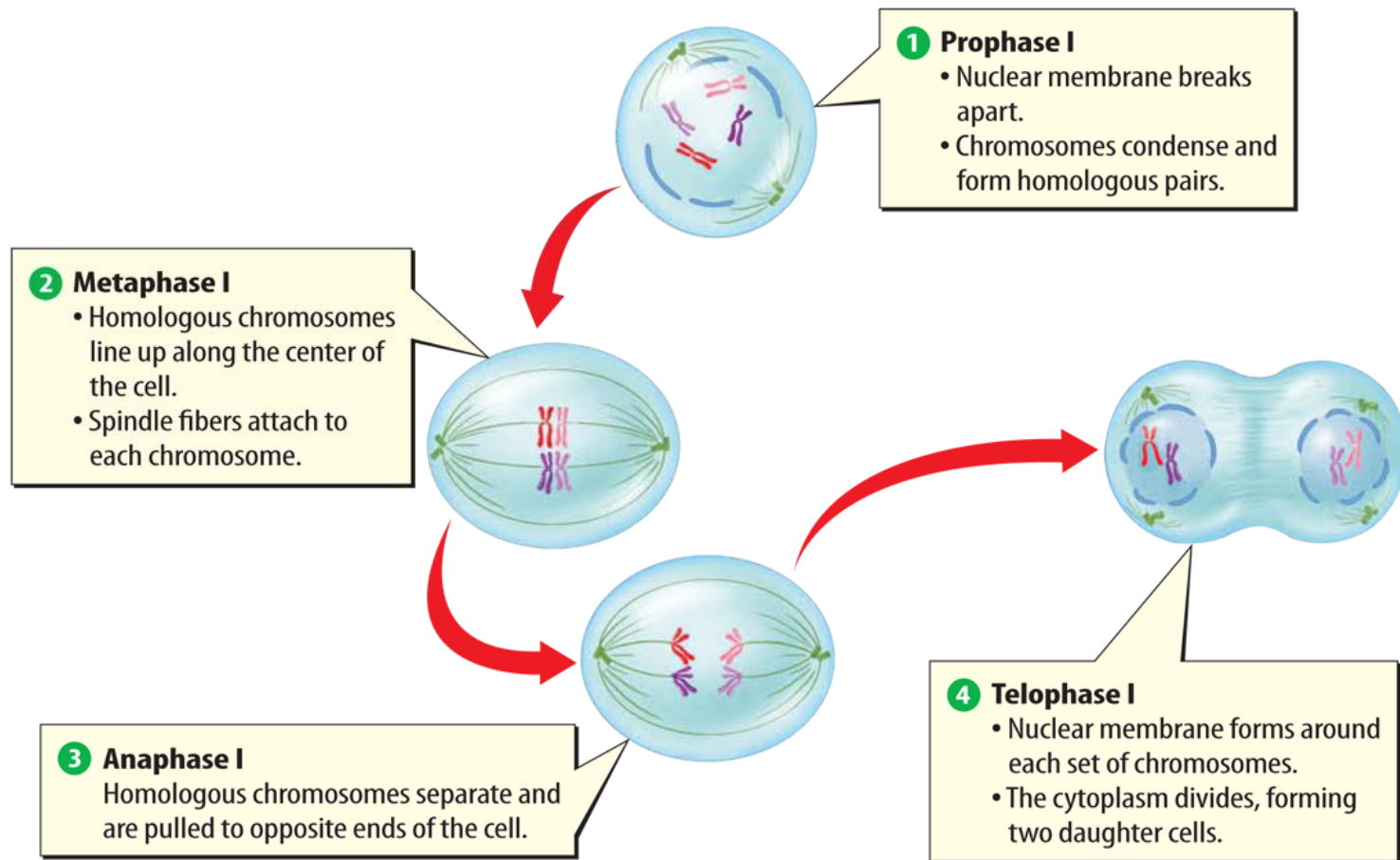
## Haploid Cells (cont.)

- In meiosis, one diploid cell divides and makes four haploid sex cells.
- Meiosis occurs only during the formation of sex cells.
- Meiosis involves two divisions of the nucleus, meiosis I and meiosis II.
- A reproductive cell goes through interphase before beginning meiosis I.



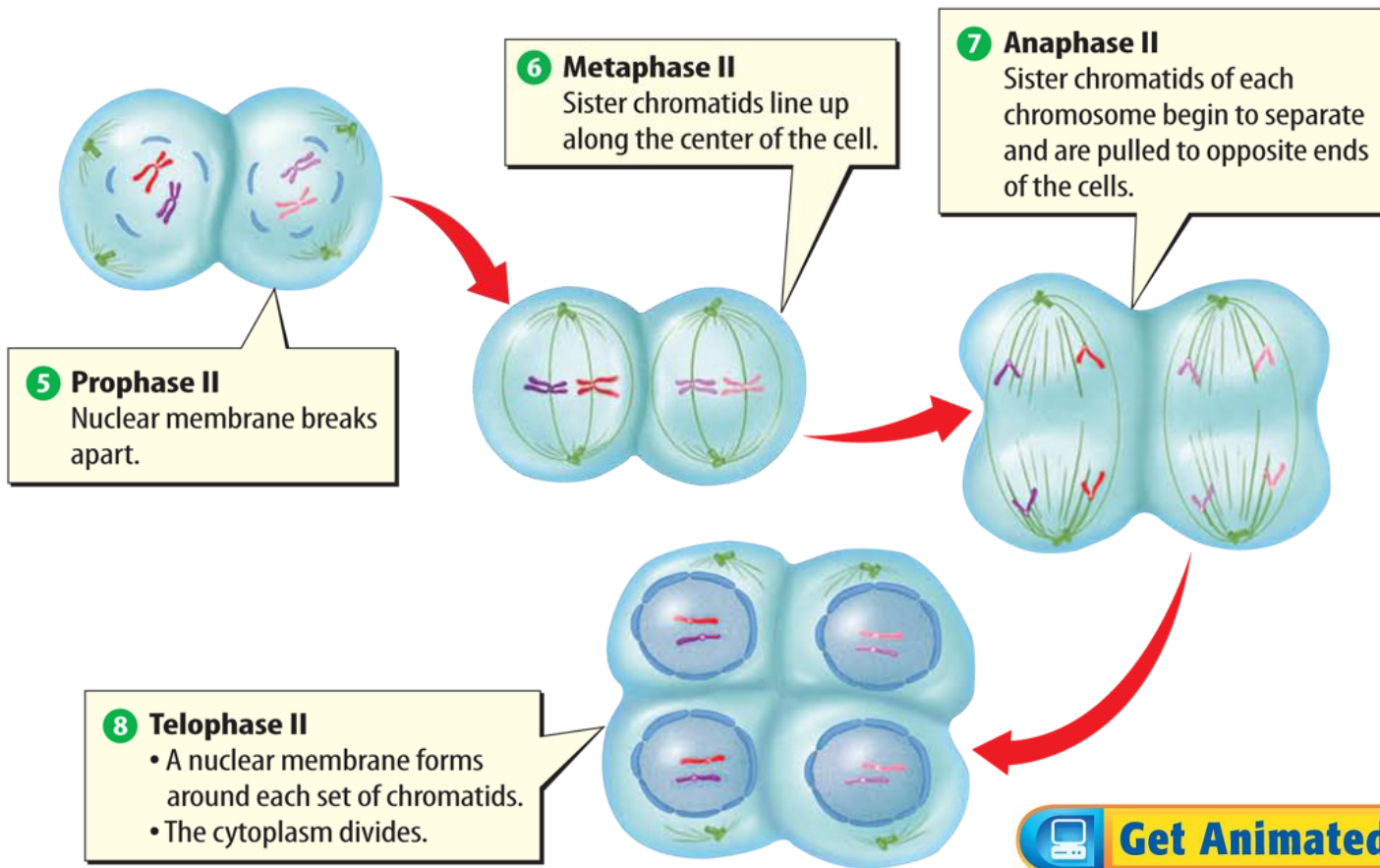
## The Phases of Meiosis (cont.)

There are four phases of meiosis I.



# The Phases of Meiosis (cont.)

There are four phases of meiosis II.



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## The Phases of Meiosis (cont.)



### KEY CONCEPT CHECK

List the phases of meiosis in order.



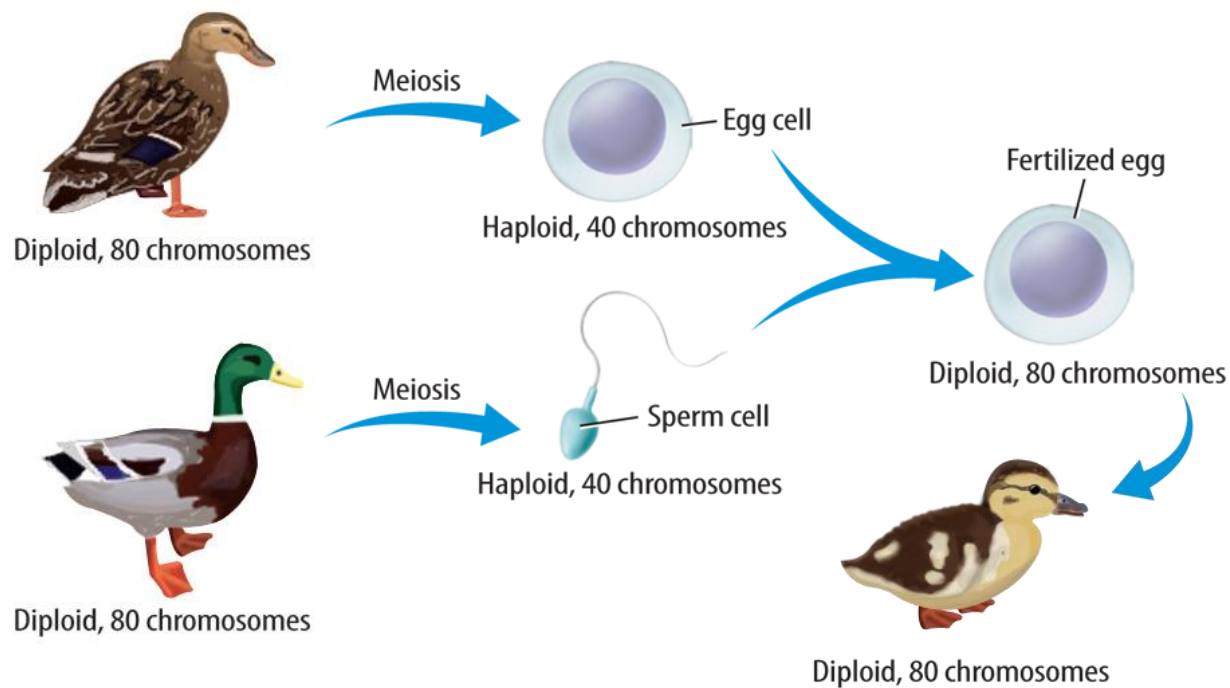
## Why is meiosis important?

- Meiosis forms sex cells with the correct haploid number of chromosomes.
- Meiosis also creates genetic variation by producing haploid cells.
- When haploid sex cells join together during fertilization, they make a diploid zygote, or fertilized egg.



## Why is meiosis important? (cont.)

The fertilized egg, formed when sex cells join together, divides by mitosis to create a diploid organism.



## Why is meiosis important? (cont.)



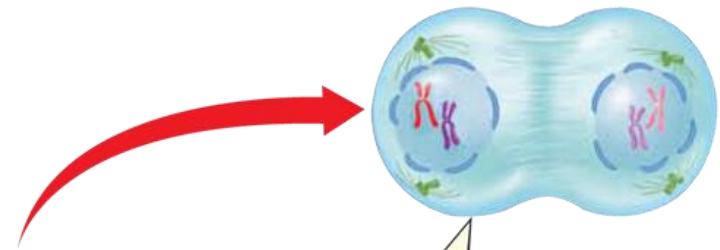
### KEY CONCEPT CHECK

Why is meiosis important?



## How do mitosis and meiosis differ?

- During mitosis and cell division, a body cell and its nucleus divide once and produce two identical cells.
- The two daughter cells produced by mitosis and cell division have the same genetic information.



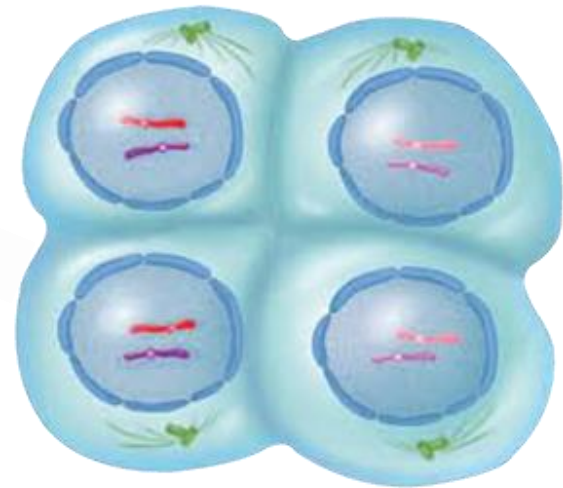
#### 4 Telophase I

- Nuclear membrane forms around each set of chromosomes.
- The cytoplasm divides, forming two daughter cells.



## How do mitosis and meiosis differ? (cont.)

- During meiosis, a reproductive cell and its nucleus divide twice and produce four cells—two pairs of identical haploid cells.
- Meiosis forms sex cells used for sexual reproduction.



## Comparison of Types of Cell Division

Characteristic	Meiosis	Mitosis and Cell Division

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## Advantages of Sexual Reproduction

- Genetic variation occurs in all organisms that reproduce sexually.
- Due to genetic variation, individuals within a population have slight differences.





## Advantages of Sexual Reproduction

(cont.)

Genetic variation may enable one plant to be more disease-resistant than another within the same species.

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Disease-resistant cassava leaves



Cassava leaves with cassava mosaic disease



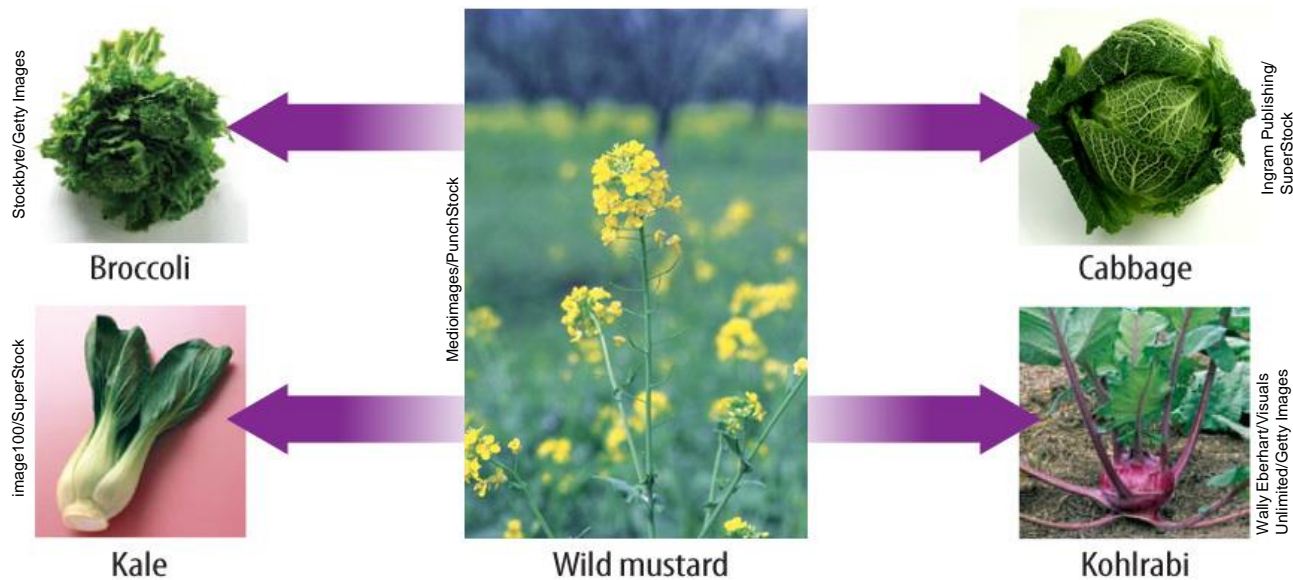
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## Advantages of Sexual Reproduction

(cont.)

Selective breeding has been used to develop many types of plants and animals with desirable traits.



## Advantages of Sexual Reproduction

(cont.)



### KEY CONCEPT CHECK

Why is sexual reproduction beneficial?



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## Disadvantages of Sexual Reproduction

- Organisms have to grow and develop until they are mature enough to produce sex cells.
- Organisms must form sex cells—either eggs or sperm.



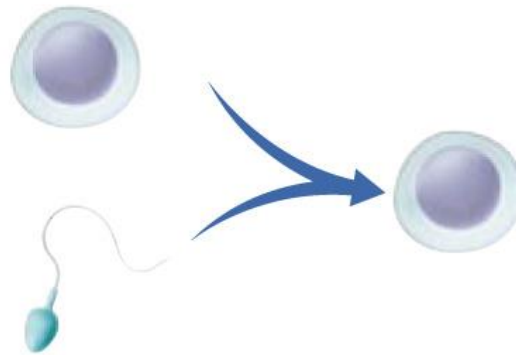


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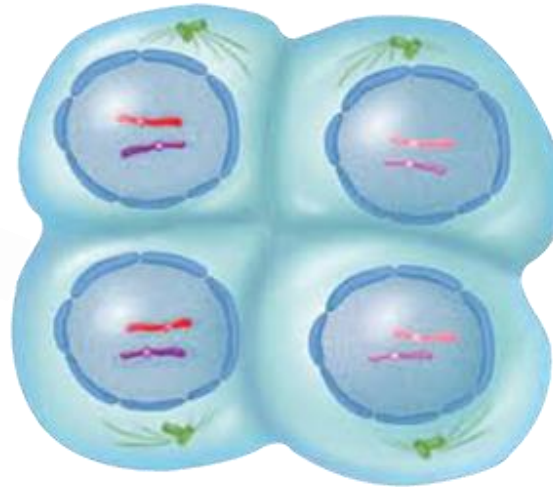
### Summary

- Fertilization occurs when an egg cell and a sperm cell join together.



## Summary

- Organisms produce sex cells through meiosis.



### Summary

- Sexual reproduction results in genetic variation among individuals.



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## Lesson Review

Cells that have pairs of chromosomes are called \_\_\_\_\_.

- A. chromosomes
- B. body cells
- C. diploid cells**
- D. sex cells



## Lesson Review

**During which process does one diploid cell divide and make four haploid sex cells?**

- A. osmosis
- B. fertilization
- C. reproduction
- D. meiosis**



## Lesson Review

During which phase of meiosis I do chromosome pairs separate and pull to opposite ends of the cell?

- A. prophase I      C. anaphase II  
B. metaphase I      **D. anaphase I**



## Lesson Review

**What do you think** **NOW?**  
**Do you agree or disagree?**

1. Humans produce two types of cells: body cells and sex cells.
2. Environmental factors can cause variation among individuals.
3. Two parents always produce the best offspring.

