Sexual Reproduction and Meiosis

What is sexual reproduction?
I found this on page 117.

Model the process of sexual reproduction. Complete the diagram using these labels:
- egg
- sperm
- fertilization
- zygote

New organism

Detail the relationship between diploid cells and homologous chromosomes.

Diploid cells have pairs of chromosomes. These chromosome pairs, which have genes for the same traits arranged in the same order, are called homologous chromosomes.

Define haploid cells, and explain how they are produced.

Haploid cells are cells that have only one chromosome from each pair. They are produced through meiosis.
# Lesson 1 | Sexual Reproduction and Meiosis (continued)

## The Phases of Meiosis

I found this on page 120.

### Model the stages of meiosis I. Draw and describe each stage.

<table>
<thead>
<tr>
<th>Stage of Meiosis I</th>
<th>Drawing</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophase I</td>
<td>Drawings should show chromosome pairs condensed in the center of a single cell.</td>
<td>Chromosome pairs condense in the center of a single cell.</td>
</tr>
<tr>
<td>Metaphase I</td>
<td>Drawings should show sister chromatids lined up at the center of the cell.</td>
<td>Sister chromatids line up at the center of the cell.</td>
</tr>
<tr>
<td>Anaphase I</td>
<td>Drawings should show sister chromatids at opposite ends of the cell.</td>
<td>Sister chromatids are pulled to opposite ends of the cell.</td>
</tr>
<tr>
<td>Telophase I</td>
<td>Drawings should show cytoplasm divided around each set of sister chromatids, forming two daughter cells.</td>
<td>The cytoplasm divides around each set of sister chromatids, forming two daughter cells.</td>
</tr>
</tbody>
</table>

I found this on page 121.

### Model the stages of meiosis II. Describe each stage.

<table>
<thead>
<tr>
<th>Stage of Meiosis II</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophase II</td>
<td>Chromosome pairs condense in the center of a single cell.</td>
</tr>
<tr>
<td>Metaphase II</td>
<td>Sister chromatids line up at the center of the cell.</td>
</tr>
<tr>
<td>Anaphase II</td>
<td>Sister chromatids are pulled to opposite ends of the cell.</td>
</tr>
<tr>
<td>Telophase II</td>
<td>The cytoplasm divides around each set of sister chromatids, forming two daughter cells.</td>
</tr>
</tbody>
</table>
Lesson 1 | Sexual Reproduction and Meiosis (continued)

**Main Idea**

Why is meiosis important?  
I found this on page 122.

**Details**

**Summarize** the importance of meiosis.

- Maintains diploid cells by making haploid sex cells that join during fertilization and form a diploid zygote.

- Creates haploid cells that help 1. maintain the correct number of chromosomes in each generation of offspring

2. provide genetic variation

**Compare and contrast** meiosis and mitosis and cell division.

- Mitosis has 1 division of nucleus

- 2 diploid daughter cells produced

- Both have 1 diploid parent cell

- Meiosis has 2 divisions of nucleus

- 4 haploid daughter cells produced

How do mitosis and meiosis differ?  
I found this on page 123.
Lesson 1 | Sexual Reproduction and Meiosis (continued)

Main Idea

Advantages of Sexual Reproduction

I found this on page 124.

Sample answers shown.

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic variation</td>
<td>Instead of being exact genetic copies of parents, members of the same species have different traits, which enable some of them to survive environmental changes.</td>
</tr>
<tr>
<td>Selective breeding</td>
<td>The process of choosing and breeding individuals with desirable traits allows breeders to create offspring with those traits.</td>
</tr>
</tbody>
</table>

Disadvantages of Sexual Reproduction

I found this on page 125.

Identify two main disadvantages of sexual reproduction.

1. takes time
2. takes energy

Connect It

Explain how the process of meiosis relates to the way in which a child resembles but is not an exact copy of his or her parents.

Accept all reasonable responses. Student answers should identify observable characteristics, such as eye color, hair type and color, the shapes of facial features, and height and build, and attribute the combinations of these to the portions of DNA inherited from each parent. Students should also indicate that a child does not carry DNA identical to either parent.