

Data Analysis 16 **Calculating Haploid and Diploid Numbers**

Goal

Explore the relationship between haploid and diploid numbers.

Skills Focus

Interpret Tables, Apply Concepts, Organize Data



Build Connections

One characteristic shared among members of a species is the number of chromosomes in its body cells. Because chromosomes in body cells exist as pairs, this number is referred to as the diploid number. It is represented by the term $2N$, which means “two times N .” The haploid number, N , represents the chromosomes that contain a full, single set of genes.

The number of chromosomes varies widely among organisms. The record for the smallest chromosome number goes to a subspecies of the ant *Myrmecia pilosula*. The females have just a single pair of chromosomes ($2N = 2$, $N = 1$). The male ants have only a single chromosome. The record for the largest chromosome number goes to the fern *Ophioglossum reticulatum*. It has 630 pairs of chromosomes or 1260 chromosomes per body cell.

If you know either the haploid or diploid number, you can calculate the other. For example, if the haploid number (N) is 3, the diploid number ($2N$) is 2×3 , or 6. If the diploid number ($2N$) is 12, the haploid number (N) is $12/2$, or 6. The table shows haploid or diploid numbers for several types of organisms. Complete the table. Then use it to answer the Analyze and Conclude questions.

Trait Survey		
Organism	Haploid Number	Diploid Number
Amoeba	$N = 25$	
Chimpanzee	$N = 24$	
Earthworm	$N = 18$	
Fern		$2N = 1010$
Hamster	$N = 22$	
Human		$2N = 46$
Onion		$2N = 16$

Analyze and Conclude

1. **Interpret Tables** Which organism in the table has the most chromosomes? Which has the fewest?

2. **Apply Concepts** Which cells in a body will have the haploid number of chromosomes?

3. **Analyze Data** How many chromosomes are in a chimpanzee's body cells? How many chromosomes are in a chimpanzee's gametes?

4. **Apply Concepts** Why is a diploid number always even?

5. **Organize Data** If you were asked to organize the data from this table into a graph, which kind of graph would you choose? Explain your choice.

Build Science Skills

Compare the number of chromosomes for the different types of organisms in the table. What can you conclude about the complexity of an organism and the number of chromosomes it has? *Hint:* Are there any single-celled organisms in the table?
