You must draw a diagram to solve each problem.

1. **WORM JOURNEY**

   A worm is at the bottom of a 12-foot wall. Every day the worm crawls up 3 feet, but at night it slips down 2 feet. How many days does it take the worm to get to the top of the wall?

2. **UPS AND DOWNS OF SHOPPING**

   Roberto is shopping in a large department store with many floors. He enters the store on the middle floor from a skyway, and he immediately goes to the credit department. After making sure his credit is good, he goes up three floors to the housewares department. Then he goes down five floors to the children’s department. Then he goes up six floors to the TV department. Finally, he goes down ten floors to the
main entrance of the store, which is on the first floor, and leaves to go to
another store down the street. How many floors does the department
store have?

3. **FOLLOW THE BOUNCING BALL**
   A ball rebounds one-half the height from which it is dropped. The ball
   is dropped from a height of 160 feet and keeps on bouncing. What is
   the total vertical distance the ball will travel from the moment it is
dropped to the moment it hits the floor for the fifth time?

4. **FLOOR TILES**
   How many 9-inch-square floor tiles are needed to cover a
   rectangular floor that measures 12 feet by 15 feet?

5. **COUNTING ON NINJA TURTLES**
   Joanne sets up her Teenage Mutant Ninja Turtles in a big circle, spacing
each turtle at an equal distance from its neighbors. She then begins
       counting them in order around the circle, but she loses track of where
   she started before she finishes counting. Then she notices that the sixth
turtle is directly opposite the seventeenth turtle, and she realizes that
she can still figure out how many turtles are in the circle. How many
turtles are in the circle?

6. **DANGEROUS MANEUVERS**
   Somewhere in the Mojave Desert, the army set up training camps
   named Arachnid, Feline, Canine, Lupine, Bovine, and Thirty-Nine.
   Arachnid is 15 miles from Canine. Bovine is 12 miles from Lupine.
   Feline is 6 miles from Thirty-Nine. Lupine is 3 miles from Canine.
   Bovine is 9 miles from Thirty-Nine. Bovine is 7 miles from Canine.
   Thirty-Nine is 1 mile from Arachnid. Feline is 11 miles from Lupine.
   No other pairs of training camps are connected by roads.

   Answer each of the following questions (in each answer, indicate
   both the mileage and the route): What is the shortest route from

   Feline to Bovine?  
   Lupine to Thirty-Nine?  
   Canine to Feline?  
   Arachnid to Lupine?  
   Canine to Thirty-Nine?  
   Lupine to Bovine?  
   Arachnid to Feline?
Betty, Cathy, Isabel, Lani, Alma, and Ursula ran an 800-meter race. Alma beat Isabel by 7 meters. Ursula beat Betty by 12 meters. Alma finished 5 meters ahead of Lani but 3 meters behind Ursula. Cathy finished halfway between the first and last girls. In what order did the girls finish? What were the distances between each girl?

A WHOLE LOTTA SHAKIN' GOIN' ON!

If six people met at a party and all shook hands with one another, how many handshakes would be exchanged?

HAYWIRE

A telephone system in a major manufacturing company has gone haywire. The system will complete certain calls only over certain sets of wires. So, to get a message to someone, an employee of the company first has to call another employee to start a message on a route to the person the call is for. As far as the company can determine, these are the connections:

Cherlondia can call Al and Shirley (this means that Cherlondia can call them, but neither Al nor Shirley can call Cherlondia). Al can call Max. Wolfgang can call Darlene, and Darlene can call Wolfgang back. Sylvia can call Dalamatia and Henry. Max can get calls only from Al. Carla can call Sylvia and Cherlondia. Shirley can call Darlene.

Max can call Henry. Darlene can call Sylvia. Henry can call Carla.

Cherlondia can call Dalamatia.

How would you route a message from

Cherlondia to Darlene?
Carla to Max?
Sylvia to Wolfgang?
Henry to Wolfgang?

Shirley to Henry?
Max to Dalamatia?
Cherlondia to Sylvia?
Dalamatia to Henry?
10. CONNECTIONS

How have you used diagrams in other classes?

11. WRITE YOUR OWN PROBLEM

In each chapter you’ll be given the opportunity to write your own problem that can be solved by using the strategy you studied in that chapter. The book will give you suggestions for how to go about writing these problems. Each time you write your own problem, solve it yourself to be sure that it’s solvable. Then give it to another student to solve and, as needed, also to help you with the problem’s wording.

Create your own Draw a Diagram problem. Model it after either this chapter’s Worm Journey problem or the Ups and Downs of Shopping problem.