



▲ Figure 1.9 Scalar or vector?

*For all subsequent problems in this book, you will be using plus and minus signs to indicate direction. This method is more flexible for problem solving and easier to use.*

Like distance and displacement, speed and velocity is another scalar-vector pair. *Speed* is the rate at which an object moves. It is a scalar quantity, so it has magnitude only; for example,  $v = 50 \text{ km/h}$  (Figure 1.9). *Velocity* is a vector quantity, so it has both magnitude (speed) and direction. If you are travelling south from Fort McMurray to Lethbridge at  $50 \text{ km/h}$ , your velocity is written as  $\vec{v} = 50 \text{ km/h [S]}$ . If you designate south as negative, then  $\vec{v} = -50 \text{ km/h}$ . *Acceleration* is a vector quantity that represents the rate of change of velocity. You will study aspects of displacement, velocity, and acceleration, and their interrelationships, in the sections that follow.

## 1.1 Check and Reflect

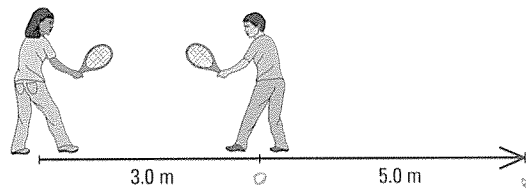
### Knowledge

1. What two categories of terms are used to describe motion? Give an example of each.
2. Compare and contrast distance and displacement.
3. What is the significance of a reference point?

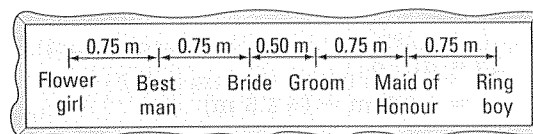
### Applications

4. Draw a seating plan using the statements below.
  - (a) Chad is  $2.0 \text{ m [left]}$  of Dolores.
  - (b) Ed is  $4.5 \text{ m [right]}$  of Chad.
  - (c) Greg is  $7.5 \text{ m [left]}$  of Chad.
  - (d) Hannah is  $1.0 \text{ m [right]}$  of Ed.
  - (e) What is the displacement of a teacher who walks from Greg to Hannah?
5. A person's displacement is  $50.0 \text{ km [W]}$ . What is his final position if he started at  $5.0 \text{ km [E]}$ ?

6. Using an autuk (a type of sealskin racquet), two children play catch. Standing  $3.0 \text{ m}$  apart, the child on the right tosses the ball to the child on the left, and then moves  $5.0 \text{ m [right]}$  to catch the ball again. Determine the horizontal distance and displacement the ball travels from its initial position (ignore any vertical motion).



7. Below is a seating plan for the head table at a wedding reception. Relative to the bride, describe the positions of the groom, best man, maid of honour, and flower girl.



### eTEST



To check your understanding of scalar and vector quantities, follow the eTest links at [www.pearsoned.ca/school/physicssource](http://www.pearsoned.ca/school/physicssource).