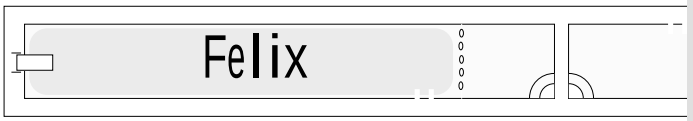
PhyzSpringboard:
This Way & That Way II

VELOCITY



1. Both little people in the diagram to the right are moving at 2m/s.
a. How can we distinguish the dude's velocity (speed and direction) from that of the dudette? For example, we cannot simply say that each has a velocity of "2m/s," since that would imply they're both moving the same way.

Refer to dudette's velocity as +2m/s and dude's velocity as –2m/s.

b. What is the meaning of "positive velocity"?

Moving to the right. (Position values increasing.)

c. What is the meaning of "negative velocity"?

Moving to the left. (Position values decreasing.)

d. What is the meaning of "zero velocity"?

Not moving. (Position values not changing.)

e. The dudette shown above has (positive / negative) velocity and (positive / negative) position.

f. The dude shown above has (positive / negative) velocity and (positive / negative) position.

2. All dudes and dudettes in the diagrams to the right are moving at the same *speed*.
a. Do the dudes to the right have the same velocity?

No. (Opposite directions.)

b. Do the dudettes the right have the same velocity?

Yes. (Same direction.)

3. a. Indicate whether or not each of the following is possible. Place a check (√) in the blank of each description that is possible and an x in the blank of each description that is impossible.

√ *An object has both positive position and positive velocity.*
√ *An object has positive position and zero velocity.*
√ *An object has positive position and negative velocity.*
√ *An object has both negative position and negative velocity.*
√ *An object has negative position and zero velocity.*
√ *An object has negative position and positive velocity.*
√ *An object has both zero position and zero velocity.*
√ *An object has zero position and positive velocity.*
√ *An object has zero position and negative velocity.*

b. What relationship—if any—is there between the sign of position and the sign of velocity? Select the correct statement from the choices below.

___*The sign of position indicates the sign of velocity.*
__*The sign of position is opposite the sign of velocity.*
__√__*There is no relationship between the sign of position and the sign of velocity.*

4. a. Which is *mathematically greater*: a velocity *value* of +3m/s or a velocity *value* of –4m/s? Justify your answer.

+3m/s is higher or righter on a number line than –4m/s.

b. Which is *faster*: a velocity of +3m/s or a velocity of -4m/s? Justify your answer.

–4m/s is faster than +3m/s. (Speed is greater.)

5. A number line could be drawn vertically as well as horizontally. In the vertical case, positive and negative velocities would involve moving up and down instead of left and right. With this in mind, what must be true of any object that has
a. positive velocity? (Hint: consider what is happening to the values of position.)

Position values are increasing.

b. negative velocity?

Position values are decreasing.