

Section

3-4

HOLT PHYSICS

Diagram Skills

Relative Motion

The water current in a river moves relative to the land with a velocity v_{WL} , and a boat is traveling on the river relative to the current with a velocity v_{BW} .

1. How is the velocity of the boat relative to the land (v_{BL}) related to v_{WL} and v_{BW} ?

2. Suppose that both the boat and the water current move in the same direction and that the boat is moving twice as fast as the current. Draw a vector diagram to determine the velocity of the boat relative to the land, v_{BL} .

2.

3. Suppose that the boat travels in the opposite direction of the current and that the boat is moving twice as fast as the current. Draw a vector diagram to determine the velocity of the boat relative to the land, v_{BL} .

3.

4. Suppose that the boat travels in a direction perpendicular to the current and that the boat is moving twice as fast as the current. Draw a vector diagram to determine the velocity of the boat relative to the land, v_{BL} .

4.

5. Assume that the boat travels with a speed of 4.0 km/h relative to the current and that the current moves due east at a speed of 2.0 km/h relative to the land. Determine the velocity of the boat relative to the land for each of the situations described in items 2–4.

- a. v_{BL} for item 2 _____
- b. v_{BL} for item 3 _____
- c. v_{BL} for item 4 _____

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