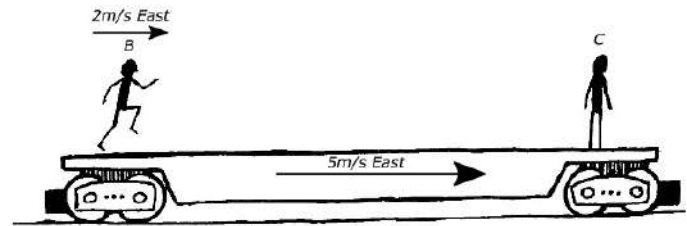


NAME _____

DATE _____

Scenario

Blake and Carlos are playing on a train while Angela watches. While the train passes Angela, it is traveling at 5 m/s to the east. At this time, Blake is running at 2 m/s east relative to the train toward Carlos (who is taking a break). (All speeds given for Blake are relative to the train.)

**Using Representations**

PART A: Identify and label a direction to be positive. In the sketch above, label the positive direction.

Sketch a motion map based on Angela's measurement of Blake's motion.

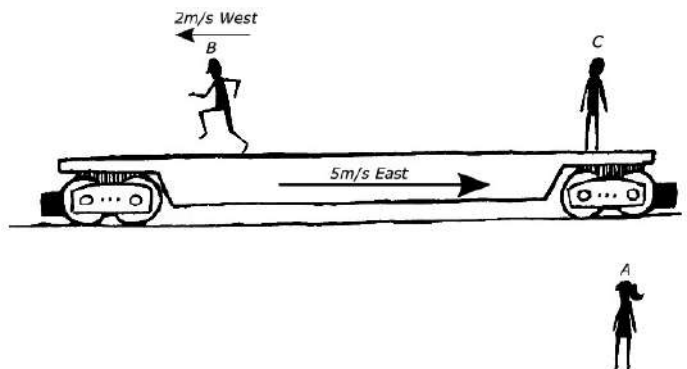
Sketch a motion map based on Carlos's measurement of Blake's motion.

Data Analysis

PART B: Use the diagram in Part A to determine Blake's speed relative to Angela.

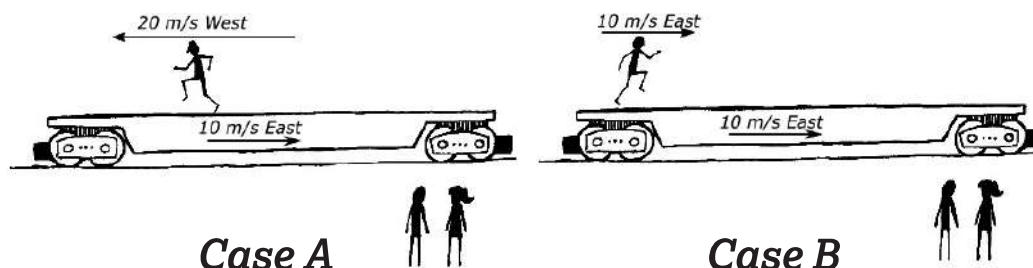
PART C: Blake now turns around and runs at 2 m/s west.

Use the diagram at right to determine Blake's velocity relative to Angela's.



Argumentation

PART D: In both cases shown below, Blake is running on a train as it travels. In which case is Blake's speed relative to the ground the greatest?



Circle the correct parts of each student's argument.

Blake: I'm running the fastest in Case A. Therefore, I will appear to be moving fastest relative to the ground. Who cares what the train is doing?

Carlos: No, the train does matter, but since $20 + 10$ is greater than $10 + 10$, you are right that in Case A is where Blake is the fastest.

Angela: Blake is running fastest relative to the ground in Case B because Blake's velocity and the train's velocity are in the same direction and add up to 20 m/s east; but in Case A, Blake's velocity is in the opposite direction of the train and they add up to 10 m/s west.