

### **Problem-Solving**

1. A ball is kicked with an initial velocity of 20 m/s at an angle of 30 degrees above the horizontal. Calculate the horizontal and vertical components of its velocity.
2. A car travels 100 meters north, then 200 meters east, and finally 50 meters south. Determine the magnitude and direction of its displacement from the starting point.
3. An object is launched horizontally from a cliff with a velocity of 15 m/s. Calculate the time it takes for the object to hit the ground below.

### **Critical Thinking**

1. Discuss all the factors that affect the range of a projectile. How can an increase in launch angle impact the range?
2. Explain why the horizontal motion of a projectile is independent of its vertical motion. Use the concept of vector decomposition to support your explanation.

### **Application**

1. Research and provide a real-world example where understanding vector addition is crucial. Explain why vector addition is essential in that context.