

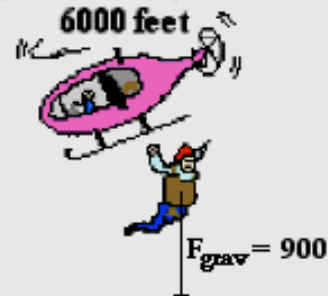
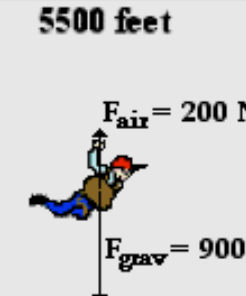
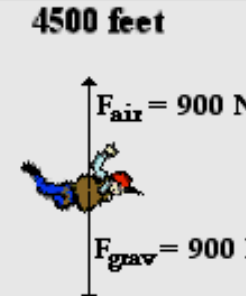
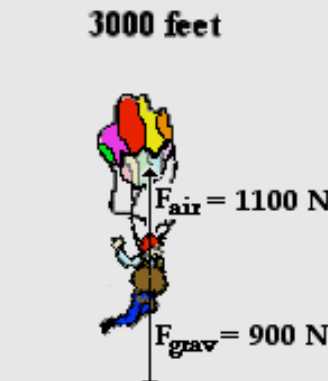

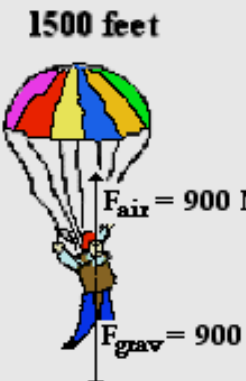
Skydiving

Read from Lesson 3 of the Newton's Laws chapter at The Physics Classroom:

<http://www.physicsclassroom.com/Class/newtlaws/u2l3e.html>

MOP Connection: Newton's Laws: sublevel 11

A 90-kg (approx.) skydiver jumps out of a helicopter at 6000 feet above the ground. As he descends, the force of air resistance acting upon him continually changes. The free-body diagrams below represent the strength and direction of the two forces acting upon the skydiver at six positions during his fall. For each diagram, apply Newton's second law ($F_{net} = m \cdot a$) to determine the acceleration value.

<p>6000 feet</p>  <p>$F_{grav} = 900\text{ N}$</p> <p>$a = \underline{\hspace{2cm}}\text{ m/s/s}$</p>	<p>5500 feet</p>  <p>$F_{air} = 200\text{ N}$</p> <p>$F_{grav} = 900\text{ N}$</p> <p>$a = \underline{\hspace{2cm}}\text{ m/s/s}$</p>	<p>4500 feet</p>  <p>$F_{air} = 900\text{ N}$</p> <p>$F_{grav} = 900\text{ N}$</p> <p>$a = \underline{\hspace{2cm}}\text{ m/s/s}$</p>
<p>3000 feet</p>  <p>$F_{air} = 1100\text{ N}$</p> <p>$F_{grav} = 900\text{ N}$</p> <p>$a = \underline{\hspace{2cm}}\text{ m/s/s}$</p>	<p>2900 feet</p>  <p>$F_{air} = 1500\text{ N}$</p> <p>$F_{grav} = 900\text{ N}$</p> <p>$a = \underline{\hspace{2cm}}\text{ m/s/s}$</p>	<p>1500 feet</p>  <p>$F_{air} = 900\text{ N}$</p> <p>$F_{grav} = 900\text{ N}$</p> <p>$a = \underline{\hspace{2cm}}\text{ m/s/s}$</p>

- At which two altitudes has the skydiver reached terminal velocity? _____
- At which altitude(s) is the skydiver in the state of speeding up? _____
- At which altitude(s) is the skydiver in the state of slowing down? _____
- At 2900 feet, the skydiver is _____. Choose two.
 a. moving upward b. moving downward c. speeding up d. slowing down
- Explain why air resistance increases from 6000 feet to 4500 feet.
- Explain why air resistance decreases from 3000 feet to 1500 feet.