Name_____

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Net Force Particle Model Worksheet 2:
Newton's 2nd Law

1. A 4600 kg helicopter accelerates upward at 2.0 m/s^2. Determine the lift force exerted on the propellers by the air. **Make a quantitative force diagram. Write a net force equation for the axis along which forces are not balanced.**

2. The maximum force that a grocery bag can withstand without ripping is 250 N. Suppose that the bag is filled with 20 kg of groceries and lifted with an acceleration of 5.0 m/s^2. Do the groceries stay in the bag? **Make a quantitative force diagram. Write a net force equation for the axis along which forces are not balanced.**

3. A student, standing on a scale in an elevator at rest, sees that his weight is 840 N. As the elevator rises, the scale reading increases to 1050 N, then returns to normal. When the elevator slows to a stop at the 10th floor, the scale reading drops to 588 N, then returns to normal. Draw a motion map for the student during his elevator ride. Determine the acceleration at the beginning and end of the trip. **Make quantitative force diagrams. Write a net force equation for the axis along which forces are not balanced.**

4. A sign in an elevator states that the maximum occupancy is 20 persons. Suppose that the safety engineers assume the mass of the average rider is 75 kg. The elevator itself has a mass of 500 kg. The cable supporting the elevator can tolerate a maximum force of 30, 000 N. What is the greatest acceleration that the elevator's motor can produce without snapping the cable? **Make a quantitative force diagram. Write a net force equation for the axis along which forces are not balanced.**