**Free-Body Diagrams**

**Name and section number:**

**Partner’s name and section number:**

1. Sketch the forces acting on the table, your body, and the force plate while you are standing in equilibrium on the force plate (which is on the floor), pushing down on the table. Clearly label each force using the form FA on B, where “A on B” means Object A acting on Object B. In addition to Table = T, Body = B, and Force plate = P, use Earth = E and Floor = F. Two pairs of forces in these sketches make up two action-reaction pairs. Denote these pairs by changing the colors of their vectors to medium and light gray.

Table = T

Body = B

Force plate = P

FA on B

2. Sketch the forces acting on you and the force plate while you are accelerating upwards just prior to jumping off the plate. Label them and change their colors as described in Question 1.

Body = B

Force plate = P

3. Put graphs into the box below showing a) the force-plate data as a student pushes down upon the table, and b) the data as the same student jumps *up and off* the force plate. For c), explain why in one case the force is less than the student’s weight, and in the other case it is more.

a) b)

c)

4. Sketch the forces acting on the mass, your body, and the force plate while you are catching the mass after having dropped or thrown it. Label them and change their colors as described in Question 1, also using Mass = M.

Mass = M

Body = B

Force plate = P

5. Put graphs in the box showing the force as you a) drop and catch, b) throw and catch a mass.

a) b)

6. *In your own words,* compare the graphs you inserted for Question 5. Explain their features.