

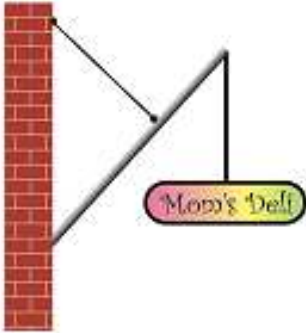
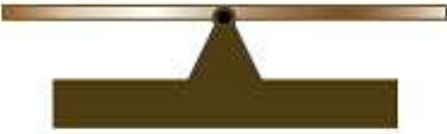
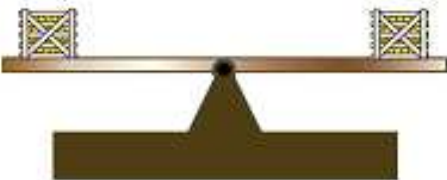
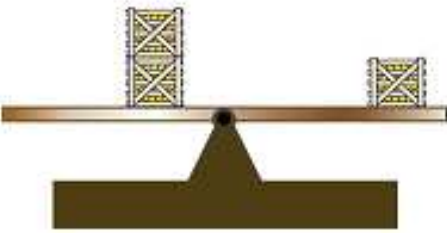
Extension 1: Constructing Rigid Body Diagrams

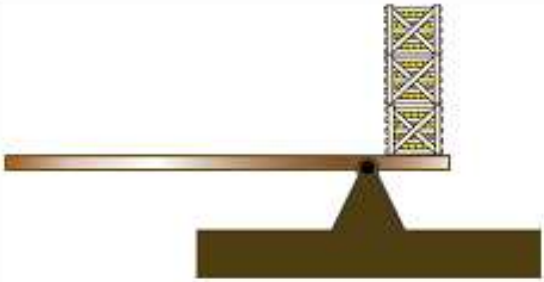
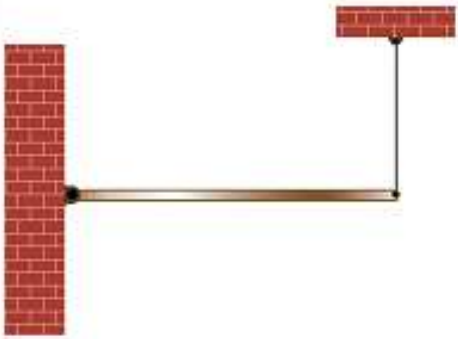


In each of the following cases the object shown in the diagram is acted on by one or more forces. All diagrams are in a vertical plane so that the earth is down in the diagram and the sky is up. The object is shown in the first box.




1. Circle the points on the sketches where forces are acting on the object.
2. Draw an arrow to represent each force and indicate what caused the force.
3. In the second box construct a rigid body force diagram with appropriate labels for all forces.

Example

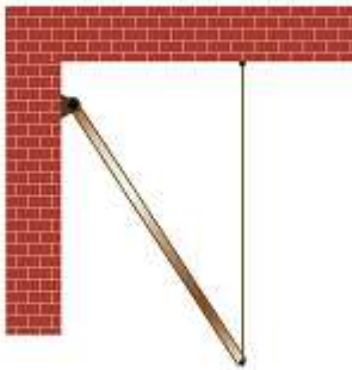
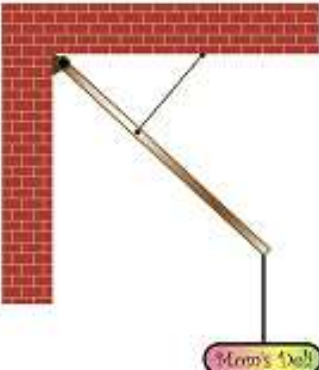
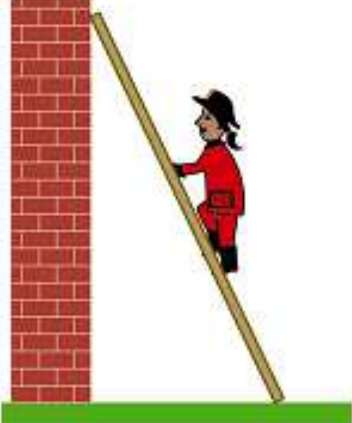
| Rigid body: Crane Boom | Rigid body diagram |
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| <p>The diagram shows a yellow crane boom attached to a base. At the base, there is a point P where a vertical force P_y acts upwards and a horizontal force P_x acts to the right. At the top of the boom, a cable is attached, exerting a tension force T to the left. A load is suspended from the boom, exerting a downward weight force W_L. The boom itself has a weight W_B acting downwards from its center. Red dashed circles highlight the points of application for the tension, load weight, and boom weight.</p> | <p>The rigid body diagram shows the crane boom as a single line. At the top end, there is a tension force T pointing up and to the left, and a weight force W_L pointing straight down. At the bottom end, there is a vertical force P_y pointing up and a horizontal force P_x pointing to the right. Along the boom, there is a weight force W_B pointing straight down.</p> |
| Sketches | Rigid Body Diagram |

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| <p>Sketches</p> | <p>Rigid Body Diagram</p> |

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| Sketches | Rigid Body Diagram |

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| Sketches | Rigid Body Diagram |
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|  <p>A diagram showing a pulley system. A rope is attached to a brick wall at the top left, passes over a pulley, and then hangs vertically down to a wooden plank. The plank is leaning against the brick wall at the bottom left.</p> | |
|  <p>A diagram showing a pulley system. A rope is attached to a brick wall at the top left, passes over a pulley, and then goes down to a sign that says "Mom's Del!". The sign is hanging from the rope. A wooden plank is leaning against the brick wall at the bottom left.</p> | |
|  <p>A diagram showing a firefighter in a red uniform climbing a wooden plank. The plank is leaning against a brick wall. The firefighter is standing on the plank, reaching up towards the top of the wall.</p> | |