

## Physics 151 Class Exercise: Free-body Diagrams

Free-body diagrams are sketches that indicate each and every external force acting on a given object. For the near future, we will treat the object as a point particle and apply each of the forces acting on the object at that point. The tail of each force vector should begin at the point. Label each vector in the FBD with a meaningful symbol.

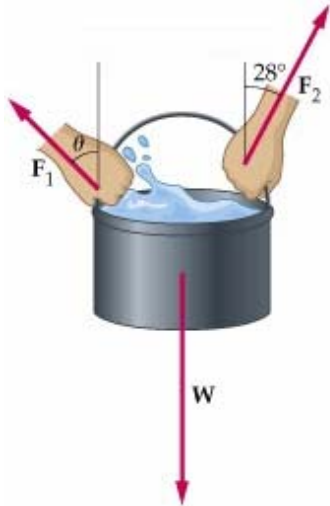
Include each of the following forces in your free-body-diagrams:

- Applied Forces – pushes, pulls, etc.
- Gravity – the weight of an object (always points toward the center of the Earth)
- Contact Forces – like the normal force (always point perpendicularly to an interface)
- Tension – in strings, ropes, etc. (there is tension all along a rope)

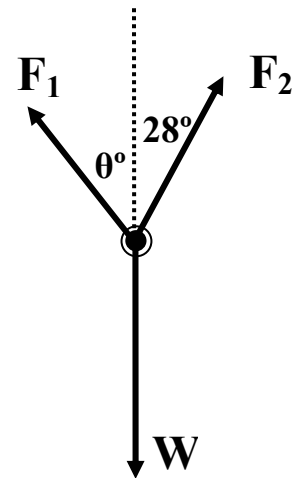
We will ignore the forces from springs and friction for this worksheet.

### Physical Situation

#### Two people holding a pail of water



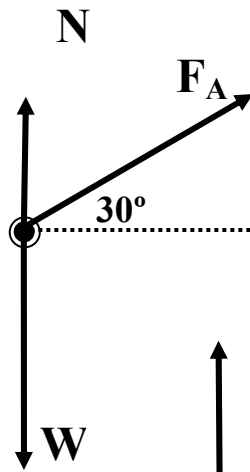
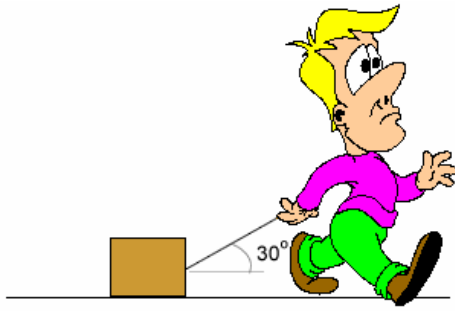
### Free-Body-Diagram



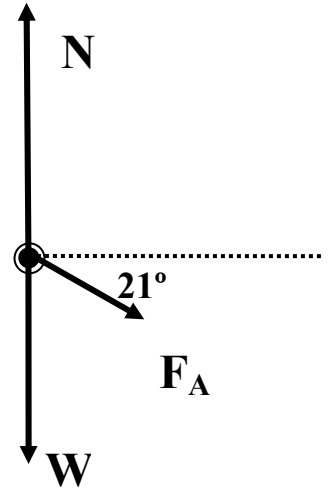
#### A Fish Being Weighed



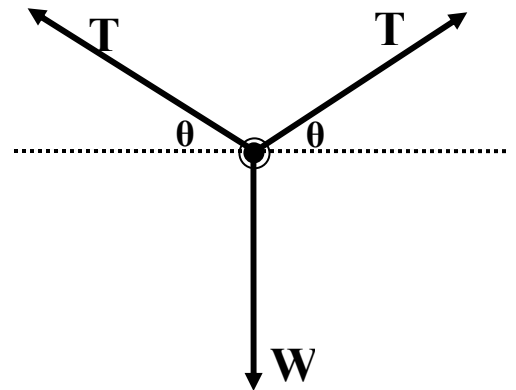
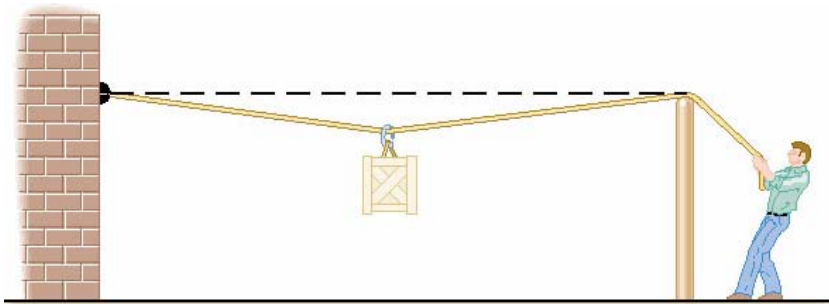
A Crate being pulled across a (smooth) floor



A Crate being pushed across a (smooth) floor



A Crate being supported by a rope



A Skier on a (smooth) Slope

