

## Free-Body Diagrams and Forces

### 4. Experimental Objectives

- The student will design an experiment that is able to determine experimentally
- the magnitude and direction of the forces acting on a body in equilibrium
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### 5. Background

Newton's first law of motion states that an object at rest will remain at rest unless acted upon by an external force. This law is the basis for the concept of equilibrium. An object is in equilibrium if the net force acting on it is zero. This is the case for an object at rest or for an object moving with a constant velocity. The forces acting on the object must be balanced, meaning that the sum of the forces must be zero.

Newton's second law of motion states that the acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass. This law is the basis for the concept of force. A force is a vector quantity, meaning that it has both magnitude and direction. The forces acting on an object must be balanced for the object to be in equilibrium.

In this experiment, the student will design an experiment that is able to determine experimentally the magnitude and direction of the forces acting on a body in equilibrium. The student will design an experiment that is able to determine experimentally the magnitude and direction of the forces acting on a body in equilibrium. The student will design an experiment that is able to determine experimentally the magnitude and direction of the forces acting on a body in equilibrium.

A free-body diagram is a diagram that shows the forces acting on a body. It is a vector diagram, meaning that the forces are represented by arrows. The forces acting on a body must be balanced for the body to be in equilibrium. The forces acting on a body must be balanced for the body to be in equilibrium. The forces acting on a body must be balanced for the body to be in equilibrium.

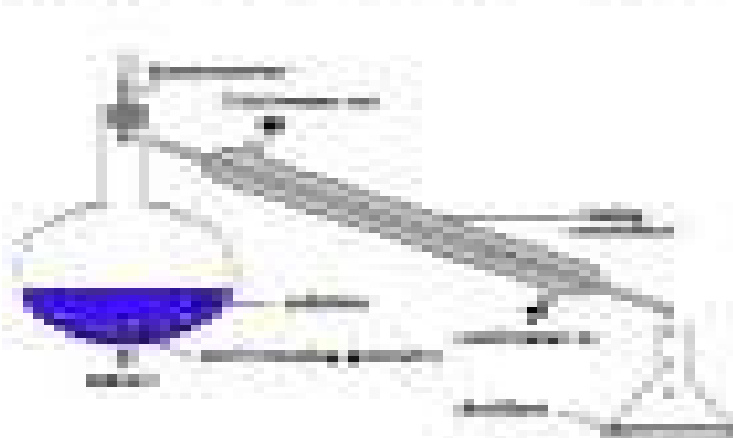


Figure 1: Free-body diagram of a hanging mass.

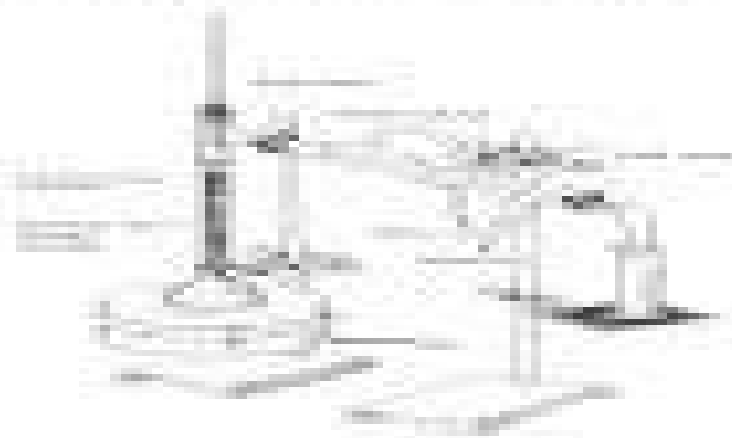


Figure 2: Free-body diagram of a mass on a horizontal surface.

# Fractional Distillation Manual

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