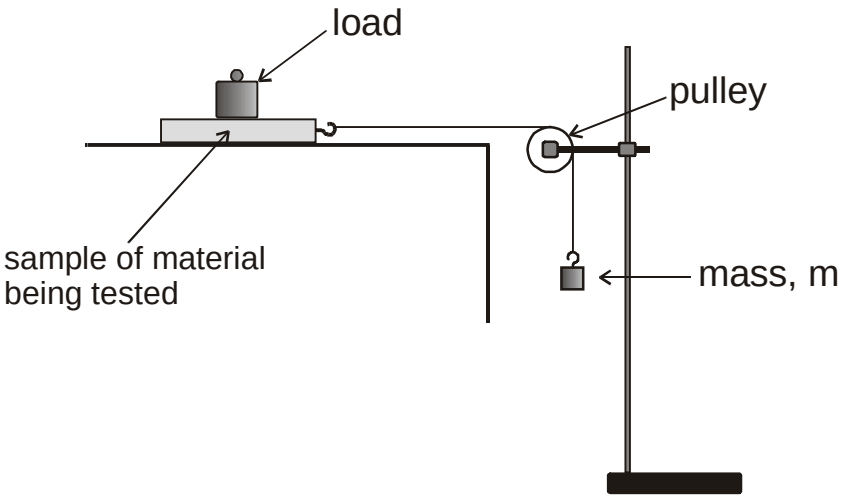
2M

Friction

1. **Preparation:**
   a) Read about friction.
   b) Your report should include a diagram, similar to the first diagram below, but having arrows representing the four forces acting on the object being tested. Think about the relation between the magnitudes of these forces when the object is moving *at constant speed* on a horizontal surface.
   c) See part 3 below.

2. Dynamic Friction

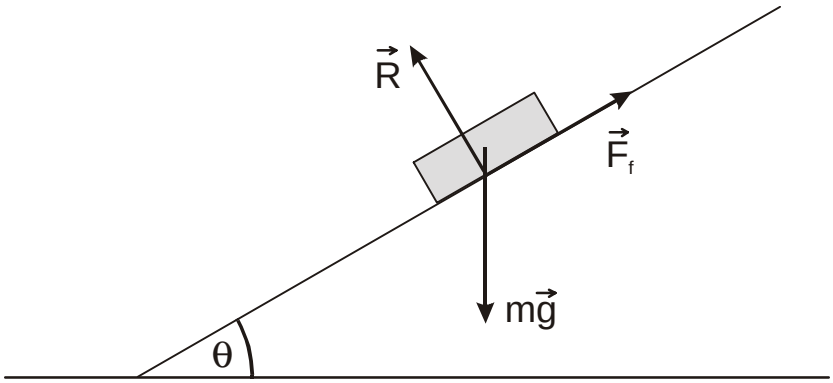


For a range of loads, find the force, mg which is needed to keep the object moving at (approx) constant speed *once you have given it a small push to start it moving*. Why do you need to give it a push ?

Find the coefficient of dynamic friction μ_d (= F_f/R), taking your answer from a suitable graph.

3. Static Friction

Put the object on the surface and slowly increase the angle of the slope. Find the *maximum* angle at which the object remains stationary (see the diagram on the next page).



Just before the object starts to slip down the slope, the forces acting on it are in equilibrium. Therefore, the magnitude of F_f must be equal to a component of mg and the magnitude of R must be equal to another component of mg. Using these ideas you should be able to show that the coefficient of static friction μ_s is given by

μ_s = tangent of maximum angle of slope

Prove this for yourself before starting the experiment.