

# Pressure

Names:

1. Cantor has a pet rock he has taken swimming. The rock is rectangular in shape. (OK, it's a brick. Please don't tell him, he'd be crushed.) The rock has thickness  $T$  and horizontal surface area  $A$ . He takes it swimming with him down to a depth,  $d$ .  
What is the weight of the overlying water on the brick's surface? Express your answer in terms of the density of water,  $\rho$ , and the other variables I've mentioned. Plus any constants you might feel are important.
2. What is the pressure on the top surface of the brick?
3. Congrats, you've just worked out how pressure varies with depth! So let's take it another step: what's the pressure on the *bottom* of the brick?
4. Draw a free-body diagram of the brick indicating all of the forces acting on it in the vertical direction.

5. **Stretch:** What's the net force on the brick in terms of the mass of the water it displaces? Prove it starting with your above work.