11-1

- Pressure (Newtons per meter squared) is force (Newtons) over an area (square meters).
- Pascal = Newtons per square meters
- Fluid is any substance (liquid/gas) that can flow easily because it can change shape.
- Fluid Pressure is equal to all the forces exerted by the moving individual molecules over a certain area.
- Air pressure is atmospheric pressure; pressure exerted by air around you; at sea level it is 10.13 Newtons per centimeter squared.
- Air exerts pressure because it is matter and has mass and weight.
- Balanced pressures: in a fluid which is not moving, pressure at a given point is exerted equally in all directions; this is why we are not crushed under the huge air pressure. The pressure inside our bodies exerted by the body fluids equals the pressure outside the body exerted by the air.
- Variations in fluid pressure:
    - as the elevation increases, the pressure decreases because there are less air molecules and therefore less force
    - as you go deeper in water, the pressure increases because of more water and air and therefore more force on you

11-2

Pascal's Principle: when force is applied to a confined fluid, an increase in pressure is transmitted equally to all parts of the fluid.

Know the examples in the book:

- figure 8
- toothpaste tube
- force pump
- heart
- figure 9
- hydraulic system
- sea star

11-3

- Pressure in a fluid increases with depth. The upward pressure on the bottom of an object submerged in a fluid is greater than the downward pressure on the top. The resulting net force in the upward direction is the buoyant force. It is against the force of gravity. This force makes the object seem lighter in water than in air.
- The volume of fluid displaced by a submerged object is equal to the volume of the submerged object. A small volume will be displaced by an object that floats. In that case the volume of the fluid displaced will be equal to the portion of the object which is submerged in the fluid.
- Archimedes' Principle: The buoyant force exerted on an object by a fluid in which the object is submerged is equal to the weight of the fluid displaced by that object.
  If the buoyant force by the fluid on a submerged object or the weight of the fluid displaced by the submerged object is less than the weight of the object submerged, then the object will sink.
  If the buoyant force by the fluid on a submerged object or the weight of the fluid displaced by the submerged object is equal to the weight of the object submerged, then the object will float.
  If the buoyant force by the fluid on a submerged object or the weight of the fluid displaced by the submerged object is greater than the weight of the object submerged, then the object will sink enough, then stop sinking deeper, and float.
- Density = mass divided by volume
  If the density of the submerged object is more than the density of the fluid in which it is submerged, the object will sink.
  If the density of the submerged object is less than the density of the fluid in which it is submerged, the object will float.
  If the density of the submerged object is equal to the density of the fluid in which it is submerged, the object will float at constant level.

  Changing the density of an object can make it float/sink.
  Mass less with same volume means less density means floating
  Mass more with same volume means more density means sinking
  Mass same volume more means less density means floating
  Mass same volume less means more density means sinking

11-4

Bernoulli's Principle: the pressure exerted by a moving stream of fluid is less than the pressure of the surrounding fluid.

See examples in the book:
- tissue paper in book
- spoon in water
- flight
- fireplace
- atomizer

lift is the upward force on the wing created by the difference in pressure below and above the wing.