Name _____ Date _____ Class _____

Note-taking Worksheet

Forces and Fluids

Section 1 Pressure

A. _____—force per unit area that is applied on the surface of an object

B. Pressure can be _____ with a formula: *pressure (P) = force (N) / area (m^2)* or $P = F/A$.

1. The SI unit of measure for pressure is the *pascal.* (Pa).
   - **a.** One pascal is equal to a force of _____ applied over an area of 1 m^2, or $1\ Pa = 1\ N/m^2$.
   - **b.** The area is the area of contact in which the pressure is exerted.
   - **c.** Pressure _____ if the force applied increases or the area decreases.
   - **d.** The weight of a dollar bill resting flat on a table exerts a pressure of about _____ on the table.
2. 1 Pa is such a small unit of measure that pressure is sometimes expressed in units of kPa, or _____ Pa.
3. Sometimes, the _____ that is exerted is the weight of an object.
4. Changing the _____ over which force is applied is one way to change the pressure that is exerted on an object.

C. A _____ is any substance that has no definite shape and has the ability to flow.

1. Liquids, _____, and even air are fluids.
2. The Sun is made of another fluid, _____, a gas made of electrically charged atomic fragments.

D. When the _____ of a fluid above a surface is greater, the pressure exerted on the surface by the fluid is greater.

1. Pressure exerted by a fluid increases with _____.
2. The pressure on objects in a fluid is exerted on all sides _____ to the surface of the object.

E. The _____ exerts about 100,000 N of force over every square meter on Earth.

1. Atmospheric pressure _____ as elevation in the atmosphere increases.
2. A _____ measures atmospheric pressure.

Meeting Individual Needs

Note-taking Worksheet (continued)

Section 2 Why do objects float?

A. _____—an upward force exerted by a fluid on any object in the fluid

1. The buoyant force is caused by the _____ exerted by a fluid; the force exerted on the bottom of an object in a fluid is greater than the force exerted at the top of the object.
2. Buoyant force is an unbalanced force; the portion of the object that is deeper in the fluid will have a _____ force pushing it upward than the force pushing downward.
   a. If the weight of an object is _____ than the buoyant force, gravity will cause the object to sink.
   b. If the buoyant force is equal to or greater than the object's weight, the object will _____.
3. Weight can be spread out over a _____ surface area to increase buoyancy.
4. Buoyant force doesn't change with _____.

B. Buoyant force depends on the shape of the _____; an object with a _____ surface has more upward pressure exerted on the object, thus, the buoyant force is greater.

C. _____—the buoyant force on an object is equal to the weight of the fluid it displaces.

1. _____—mass of an object divided by its volume
   a. Any object that has a density _____ than the density of the fluid it is placed in will sink.
   b. Any object with a density _____ than the density of the fluid it is placed in will float.
2. A boat floats because its volume is large enough to _____ enough water so that the buoyant force is greater than the weight of the boat; its density is less than the density of water.

Meeting Individual Needs

Name _____ Date _____ Class _____

Note-taking Worksheet (continued)

Section 3 Doing Work with Fluids

A. Fluids at rest and in motion can exert _____ that do useful work.

1. Pushing on a fluid can increase _____.
2. The pressure the fluid exerts is _____ by the amount of the additional force being applied.

B. _____—when a force is applied to a fluid in a closed container, the pressure throughout the fluid increases by the same amount.

C. A _____ uses a fluid to increase an applied force.

D. _____—when the speed of a fluid increases, the pressure exerted by the fluid decreases.

1. A fluid will move from a higher pressure environment to a _____ pressure environment.
2. Wind can _____ the rate at which smoke rises in a chimney.
3. Hurricanes and other high winds can _____ the air pressure outside a house and the roof can be pushed off the house by the higher pressure of the still air inside.

E. Moving _____ produces a force that allows planes and birds to fly.

1. _____ is created by downward flowing air which exerts an upward reaction force on the wing.
2. Increasing the size or surface area of the wing can _____ lift.
3. Planes and birds have various wing _____ depending on the type of flight.
   a. _____ and gliders have long, narrow wings that help them glide long distances.
   b. Swallows, swifts, falcons, and jet fighter airplanes have small, narrow, tapered wings to help them fly at _____.
   c. Forest and field birds, such as pheasants, have _____, rounded wings that allow for quick take-offs and sharp turns.

Meeting Individual Needs