Negative Buoyancy

NEGATIVELY-buoyant item, or a body that will sink in a fluid :: Even with the buoyant force pushing the body up (which it always does), a negatively buoyant mass will have the force of gravity pull the body downward until it reaches a solid surface below it, such as the floor. Even though buoyancy lost the battle against gravity, this body still has the upward lift of the force working in its favor. If you measure the weight of the body before it is placed in the fluid, it will weigh more than it does after it has sunk to the bottom of the fluid. This is because even though the item has sunk down, buoyancy is still trying to push it upward.

Your SeaPerch ROV was never negatively buoyant.

Neutral Buoyancy

NEUTRALLY-buoyant item, or a body that will stay where it is placed in the vertical direction in a tank of fluid :: In this case, the buoyant force is equal to the gravitational force, so the body neither sinks nor floats. This is the ideal model for a submarine, as a neutrally buoyant item takes the least amount of force to keep it submerged in a position or to be moved in any direction in a fluid.

Your SeaPerch ROV became neutral buoyant by removing the floats.

Positive Buoyancy

POSITIVELY-buoyant item, or an item whose buoyant force is so great that it can push a body upward and fight the pull of gravity :: When this type of buoyancy exists, it can be said that the body is floating. If it were to be held at the bottom of the fluid and weighed, it would weigh a negative value and be constantly pushed up and away from the scale.

Your SeaPerch was positively buoyant at the start , until you cut off floats then it became neutral bouyant.

Density

Density is the measure of how much mass is contained in a measured volume, or how much stuff there is in one spot. Clearly, if you have a sponge and a rock that are the same size, there will be more material in the rock, because the sponge has hundreds of holes in the same volume of space.

The density of water is 1 g/ml.
If your seaperch floated (positively buoyant) it had a density that was less than 1.
If your SeaPerch had sank (negatively buoyant) is had a density that was greater than one.
When your SeaPerch stayed in the middle (neutral buoyancy) it had the same density of the water 1 g/ml

PVC

The pipes used to make your SeaPerch are made of PVC, or Polyvinyl Chloride. It is a thermoplastic polymer, which simply means that the material can be heated to it's melting point, then formed into a shape and allowed to cool to a brittle but rock solid material at room temperature. Typically it is used in plumbing.

Why is it good for my SeaPerch body?

Cost effectiveness (cheap), Rigid (resistance to bending),

Availability, Resistance to dropping or impact,

Safe handling, Waterproofing

Electric Motors

What they do?

The short answer to this question is that electric motors convert electrical energy into magnetic energy, and then into rotational force.

How they work:

Inside of a motor, there are essentially four magnets. Two are on opposite sides of the outer casing (the stator), with one that is "pulling" and one that is "pushing." Two other magnets are on opposite sides of the spinning shaft; these switch between one "pulling" and one "pushing" at the same time. The electricity that flows through the copper wire in the center of the motor, causing the magnets to push and pull causing the rotation.

Up and Down Buttons on the Controller

The up and Down buttons on the Controller work by turning the electricity on and off to the up and down motor. The right button has electricity run one way to cause the motor to spin the propellor causing the SeaPerch to surface. The down button make the electricity go the opposite way causing the motor to spin the opposite way, making the SeaPerch submerge.

This type of switch is called a Single Pole Single Throw (abbreviated SPST).

Forward and Backward Switch

These type of switches are called Single Pole Single Throw (abbreviated SPST). The one switch can send the electricity in opposite directions to the same motor, giving the motor the ability to spin the propeller both directions. It is helpful for turning and keeping the SeaPerch moving in a straight line.