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The pH of a solution measures its acidity or alkalinity. \[\ce{H_2O(l) \leftrightharpoons H^+ (aq) + O^- (aq)}\] This is done using litmus paper, filter paper that has been treated with a natural water-soluble dye. You may have even used it to check the water quality in your swimming pool. The pH test measures how much acid or base there is in a solution. It works by looking at how many hydrogen ions are in a given amount of water. In pure water, there are 1 × 10^-7 moles H+ ions per liter. This means that 1 mole of water has 6.02 x 10^23 particles. The pH is calculated using the negative base 10 logarithm of this concentration. So if you take the log10 of 1 × 10^-7, it comes out as -7.0. When you put a minus sign in front, it becomes +7.0. This is what we call neutral pH. The human body and blood have nearly-neutral pH levels. But when acids or bases are added to water, the pH changes. A low pH means there's too much acid in the solution. While a high pH means there's too much base in the solution. Acids increase the concentration of hydrogen ions. They do this by having one of their hydrogen atoms break away from it. Bases work in reverse - they reduce the number of hydrogen ions in the water. The pH scale measures acidity or alkalinity, with values below 7.0 being acidic and above 7.0 being alkaline. Most living organisms prefer a near-neutral pH of around 7.0, but some environments like the stomach are highly acidic, with a pH of 1 to 2. Cells in these environments constantly die and are replaced, with the lining of the human stomach completely renewed every seven to ten days. Buffers play a crucial role in maintaining a stable pH in living organisms. They absorb excess hydrogen or hydroxide ions, keeping the body's pH within a narrow range required for survival. In humans, carbonic acid, bicarbonate ion, and carbon dioxide work together as a buffer system to maintain blood pH levels. When too much hydrogen is present, it combines with bicarbonate to form carbonic acid, which can then be converted to carbon dioxide gas and exhaled through the lungs. This buffering process prevents extreme fluctuations in pH that could put survival at risk. Without this mechanism, the body's pH would swing wildly, posing a threat to life. Antacids used to treat excess stomach acid work similarly by absorbing hydrogen ions and moderating pH levels. The unique properties of water enable it to balance pH and support life on Earth. The capacity for buffers like carbonic acid and bicarbonate ion to regulate pH is essential for sustaining life. These mechanisms allow organisms to ingest acidic or basic substances without compromising their internal environment.

What are the 8 properties of water. What are the properties of the ocean water. What are the properties of the water molecule. What are the properties of the water state and explain. What are the physical properties of the water. What are the properties of the water cycle. What are the properties of water in its three states. Why are the properties of water different.