Water Hardness Explained

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Water hardness is the amount of dissolved minerals found in water. A large amount of dissolved minerals means the water is hard, a small amount means the water is soft. Water becomes hard by filtering through permeable rock, e.g. limestone or chalk. Indications of hardness include limescale on pipes, taps and inside kettles, and scum forming on water when soap is added. Hard water is seen in areas such as Lake Malawi, where the fish have adapted to a high pH and hardness. Limescale and soap scum do not occur in soft water areas. Soft water runs over impervious rock such as granite or filters through leaf litter or peat so does not pick up as many minerals. Jungle streams are a good example of soft water habitats, where fish such as tetras and corydoras have adapted to the acidic water with a low level of dissolved minerals. Leaf litter and peat add tannic acid to the water, which then turns brown. This is known as 'blackwater'. There are 2 types of hardness- carbonate or temporary hardness (also known as alkalinity) and general or total hardness.

Carbonate hardness is mostly calcium carbonate ($CaCO_3$) which comes from chalk and limestone and can be removed from water by boiling. A higher level of $CaCO_3$ in water means the water has a great buffering capability and the pH will be more stable than water with lower KH.

General hardness includes all minerals dissolved in the tap water. Boiling water will not remove general hardness. Hardness is measured in several ways:

KH is carbonate hardness is measured in mg of $CaCO_3$ per litre or ppm.

General hardness measures all dissolved minerals. This is the type of hardness that is generally referred to in fish care. It is measured in mg $CaCO_3$ per litre or ppm (even though other minerals are present) or in dH. 1 dH is equal to 17.9mg of $CaCo_3$ per litre. Monitoring the water hardness in the aquarium is very important as water that is too hard or soft for the fish can cause the fish's immune system to drop, leaving it susceptible to infection.