

Rocky Waters

Solution

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The water level falls, once the rock has sunk and the water has settled.

While the rock is in the floating boat, the boat must displace enough water to support the rock's *weight*, in addition to everything else it already supports.

After the rock is thrown out and sinks, the boat no longer needs that extra displacement. The submerged rock itself displaces only its own *volume*.

A sinking rock is denser than water. Therefore a rock-sized volume of water weighs less than the rock. The volume of water needed to support the rock while it was in the boat is larger than the volume the rock occupies after sinking.

Less total water is displaced, so the water level falls.

For example, a rock with three times water's density makes the boat displace three rock-volumes of water. After sinking, it displaces only one rock-volume.

The assumption that the rock sinks matters. A floating object would continue displacing its own weight in water, leaving the level unchanged. Also ignore splashing, overflow, and any water trapped in the boat or rock.

History and sources: [companion history PDF](#).