

Humpty Dumpty
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Class
Date

Dancing Qoin

The problem

Some spit was applied to one side of a brass coin and placed on the mouth of a wine bottle containing some wine. The wine bottle was then placed inside a trough which contained hot water. After a minute or so, the coin started bouncing up and down. Why did the coin bounce?

The Solution

If heat is provided to a liquid in a closed container, as the liquid particles gain kinetic energy, it may evaporate. As more and more liquid particles are released into the empty part of the container, the overall kinetic energy of the particles in the gas phase increase, which in turn increases the pressure exerted by them. The pressure inside then becomes higher than the air pressure outside.

The hot water in the trough heats up the wine in the bottle causing the alcohol to evaporate. As the spit on the coin at the mouth of the bottle forms a seal, the alcohol is not able to escape. However, as more and more alcohol evaporate, the pressure in the wine bottle builds up, until it is so much greater than the air pressure outside that it is able to break the seal between the coin and the mouth and escape making the coin bounce in the process. But as soon as some of the alcohol vapor escape from the bottle, the pressure inside goes down and the coin falls back and seals the bottle. This continues on until the water in the trough cools down and is not hot enough to evaporate the alcohol.