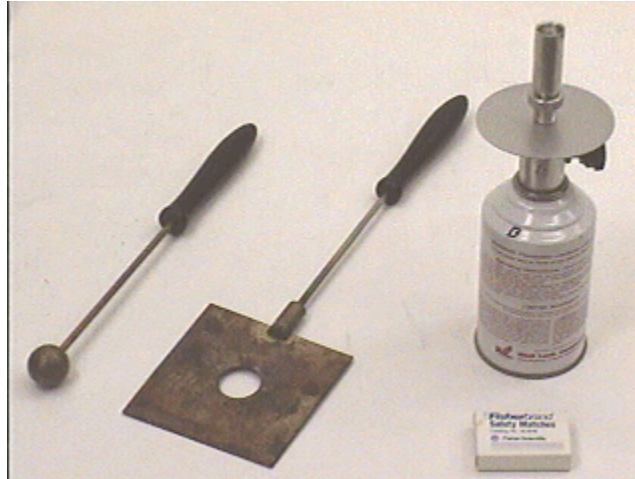


## Answer #57

The answer is (a): the hole will get bigger. We can see this experimentally by performing two demonstrations using the hole and the ball seen in the photograph below.



First, we attempt to [push the ball through the hole when the plate is cool \(at room temperature\)](#).

Now we attempt to [push the ball through the hole after the plate has been heated by the gas torch](#).

The concept of *linear thermal expansion* indicates to us how the metal (or other solid material) expands when heated. In particular, the expansion occurs such that the distance between any two points on the metal plate increases by the same ratio - for example, the distance between two adjacent corners, between two diagonal corners, or a diameter across the hole. One method of expansion that is specifically excluded is that the brass could expand inward into the hole. The brass *does not expand* equally in all directions, such as inward into the hole.

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For questions and comments regarding the *Question of the Week* contact [Dr. Richard E. Berg](#) by e-mail or using phone number or regular mail address given on the [Lecture-Demonstration Home Page](#).