

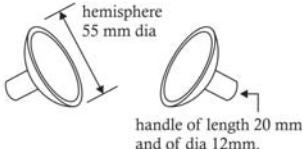
MAGDEBURG HEMISPHERES

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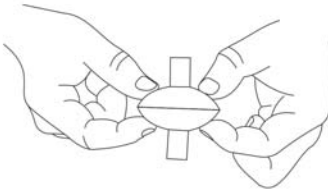
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Demonstration of air pressure without vacuum pump.


Assembly :
 Consists of two sections of hemispheres made from rubber. The hemisphere is 55 mm in diameter & has a handle of length 20 mm and of dia 12mm.




To do and notice :

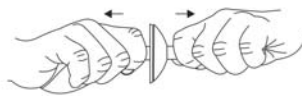


Step 1 :
 Hold the hemisphere together as shown in the diagram.



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Step 2 :
 Squeeze them as shown in the diagram forcing the air between them out.




Step 3 :
 Now try to pull them apart holding the handles as shown above.
 Can you separate them easily?


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What is going on :
 When the sections hemispheres are pressed against each other, the air in between them will be pushed out. Now there will be partial vacuum in between the spheres. As a result of this, the pressure between the sphere is less. But the pressure outside the sphere is more. That is force per unit area outside the sphere is more than the force per unit area inside the sphere. As a result there will be net inward force. This force brings the sphere together and make them difficult to separate.

History :
 The Magdeburg hemisphere were designed by German scientist Otto von Guericke in 1650 to demonstrate the air pump he had invented and the concept of air pressure. Von Guericke's demonstration was performed on 8th May 1654 in front of the Emperor Ferdinand III in Regensburg. Thirty horses in two teams of 15 could not separate the hemispheres until the vacuum was released. In 1656 he repeated the demonstration with 16 horses (2 teams of 8) in his home town of Magdeburg, where he was mayor.


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