

Magdeburg Hemispheres

By Khara Criswell

Warm-up Activity

Obtain Magdeburg hemispheres, spring coils (50 N), and a ruler.

Can air exert a force? Explain.

Forcefully place the suction cups together. Predict whether you be able to pull the suction cups apart?

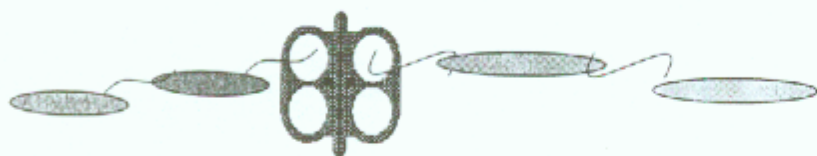
Test your prediction. Was your prediction correct? Why or why not?

Now gently place the suction cups together leaving some air between the cups. Will you be able to pull the cups apart? Why?

Explain why you observed a difference.

Measuring Air Pressure

1. Gently place the suction cups together. Using the spring coils attach them to the suction cups in series as shown. Pull on the spring coils and record the force needed to separate the suction cups.



2. Gently place the suction cups together. Using the spring coils attach them to the suction cups in a parallel as shown. Pull on the spring coils and record the force needed to break the suction cups. Remember to add the force from each scale.



- If you were to use 3 spring scales would the force reading on each side be *greater, lesser, or equal* to the force reading with 2 spring scales on each side?
3. Does connecting the spring coils in series or in parallel provide more force on the suction cups? Why?
4. Connecting the spring coils in parallel record the force it takes to break apart the suction cups.

Number of Spring coils	Force (N)
1	
2	
3	
4	

5. Pressure equals Force per Area. Calculate the amount of pressure on the suction cups.

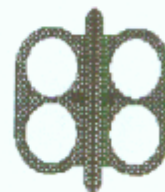
Number of Spring coils	Force (N)	Area (m ²)	Pressure (N/m ²)
1			
2			
3			
4			

6. Does air exert force? Using your data explain the answer.

Pre-Test Magdeburg Hemispheres

Name _____ Date _____

José wants to prove his strength by separating two suction cups placed together. The suction cups have no air between them. Will José be able to separate the suction cups? Why or Why not?



Post-Test Magdeburg Hemispheres

Name _____ Date _____

One of the suction cups is attached to a lab table.
Will the force needed to separate the suction cup
from the table be *greater than, less than or equal*
to the force to separate two suction cups? Explain.

