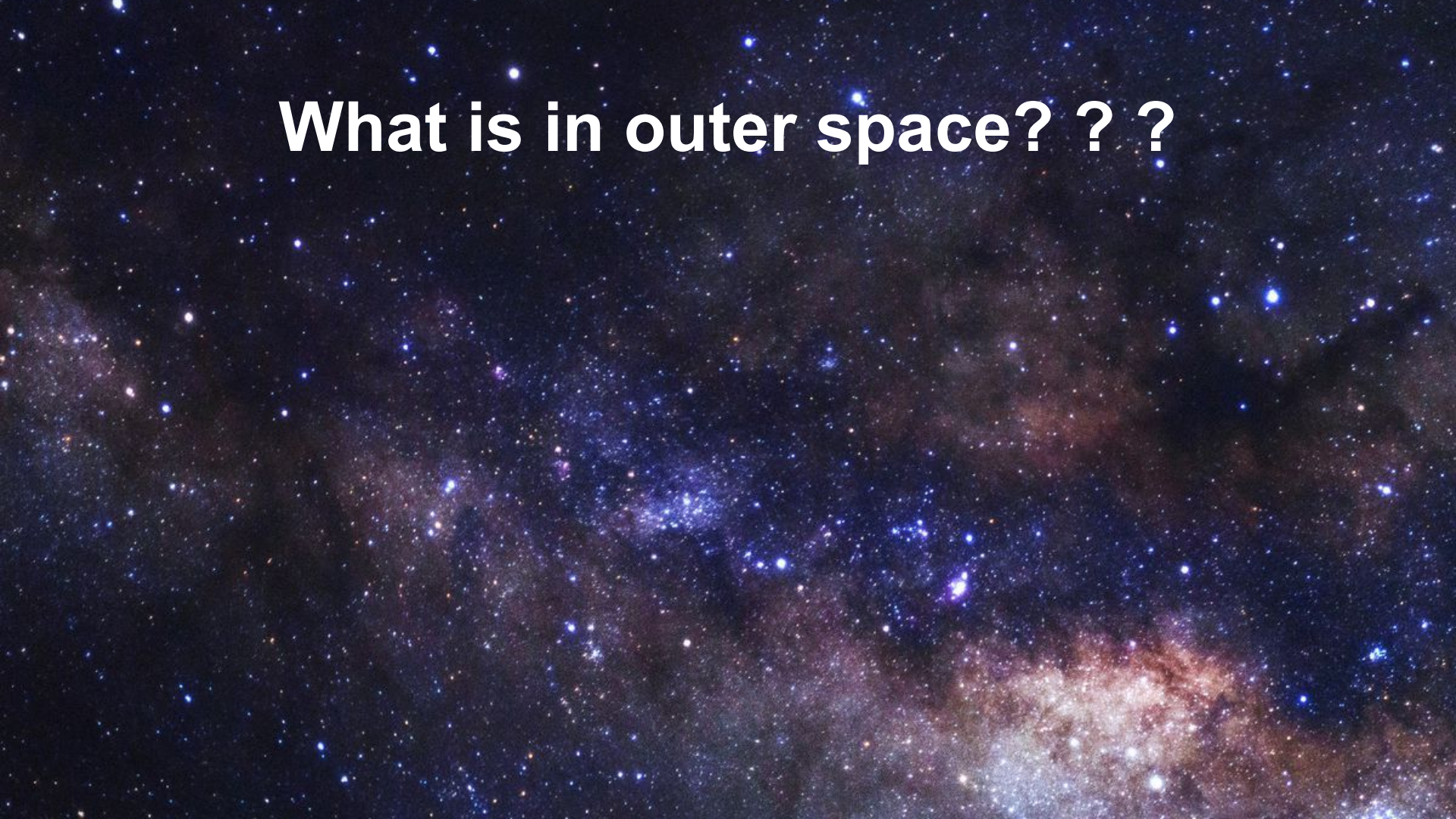


**UW Science Explorers**  
Physics and Astronomy  
Week 4

**What is in outer space? ? ?**





**What is in outer space? ? ?**

**Planets!**

**Asteroids!**

**Stars!**

**Comets!**

**What about the space in between these things?**



**What about the space in between these things?**

**Moon**



**Earth**

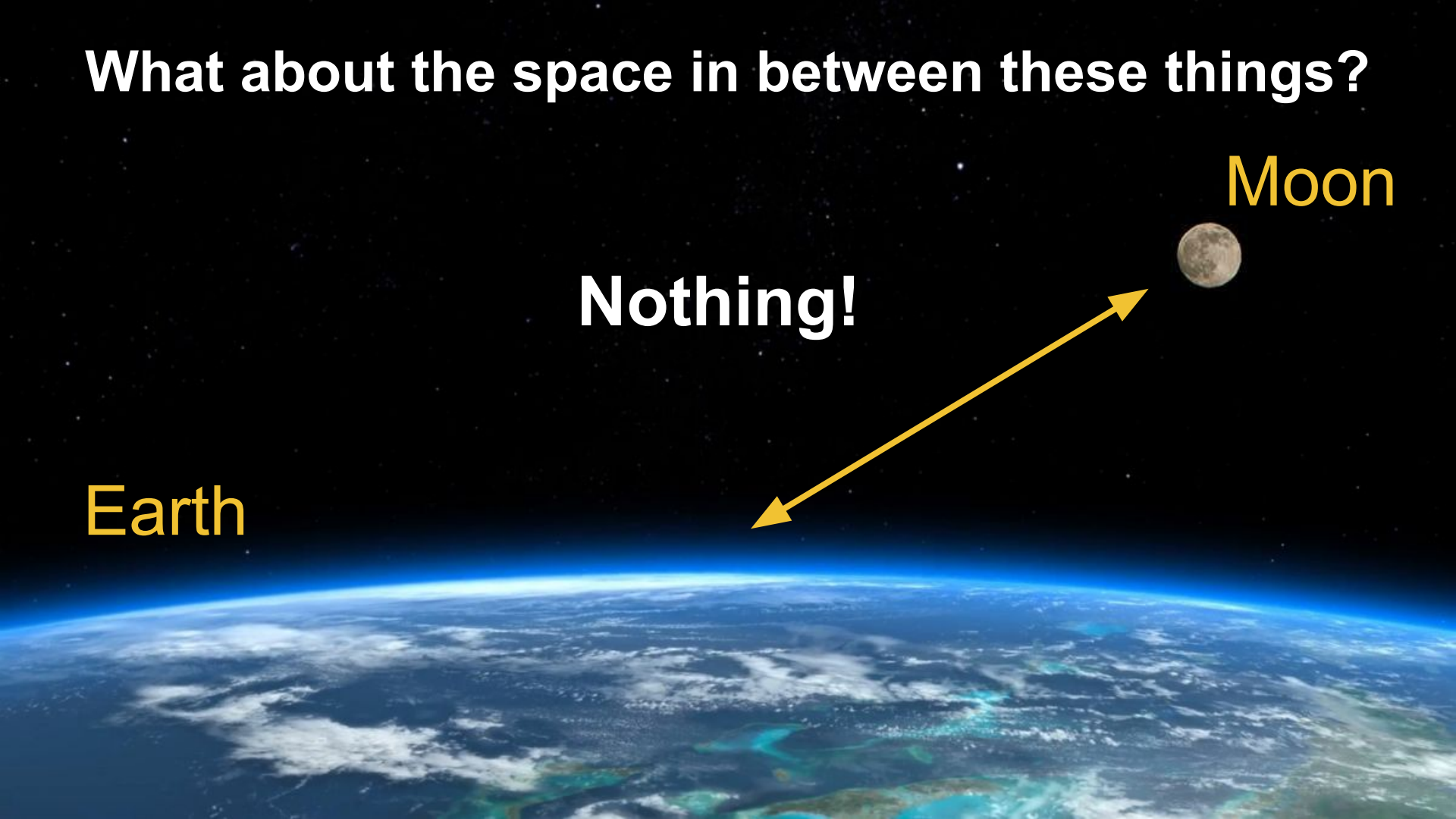


**What about the space in between these things?**

**Moon**

**Nothing!**

**Earth**



**What about the space in between these things?**

**Moon**



**Vacuum!**

**Earth**



# What is a vacuum?

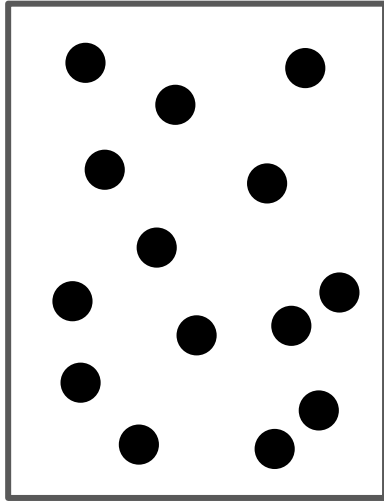
A vacuum is a space devoid of molecules



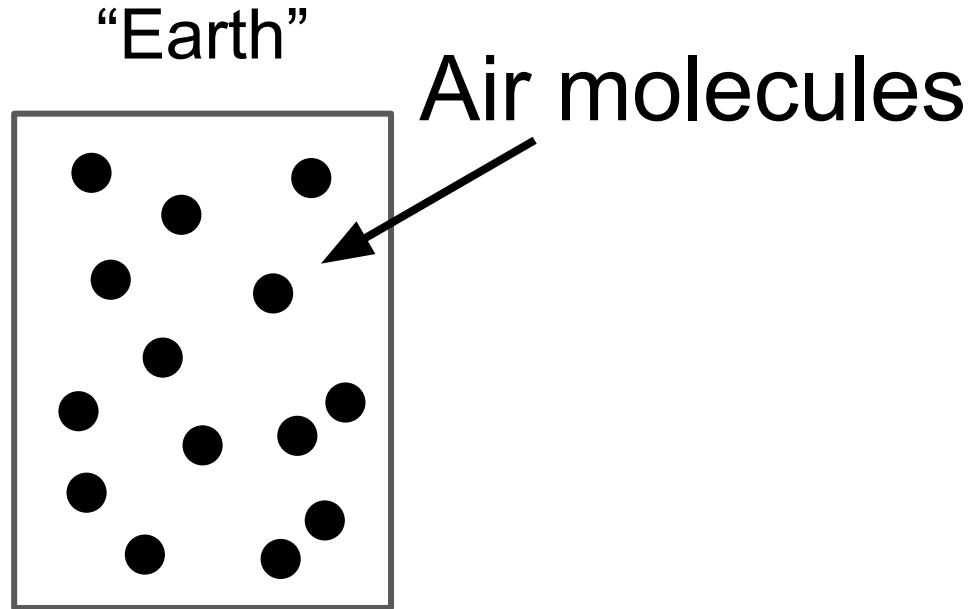


A vacuum is a space devoid of molecules

“Earth”

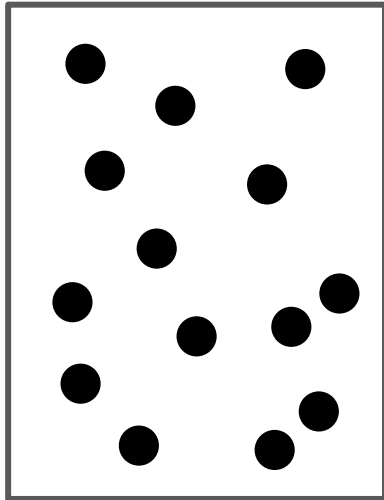


A vacuum is a space devoid of molecules



A vacuum is a space devoid of molecules

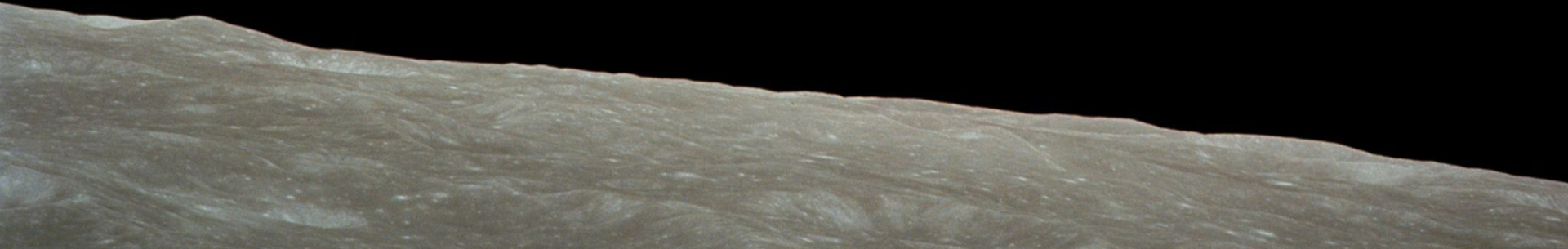
“Earth”



“Space”



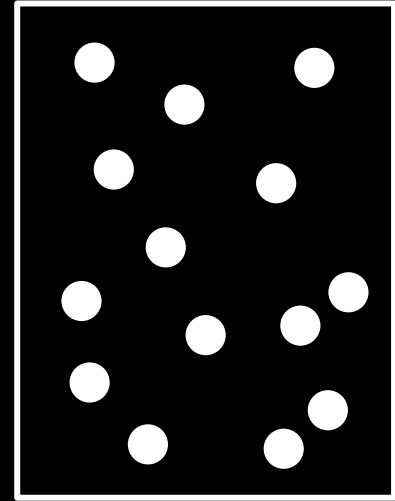
**Air molecules E X P A N D when they are in space!**



Air molecules E X P A N D when they are in space!



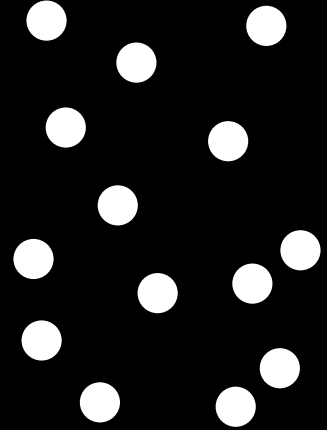
Air molecules



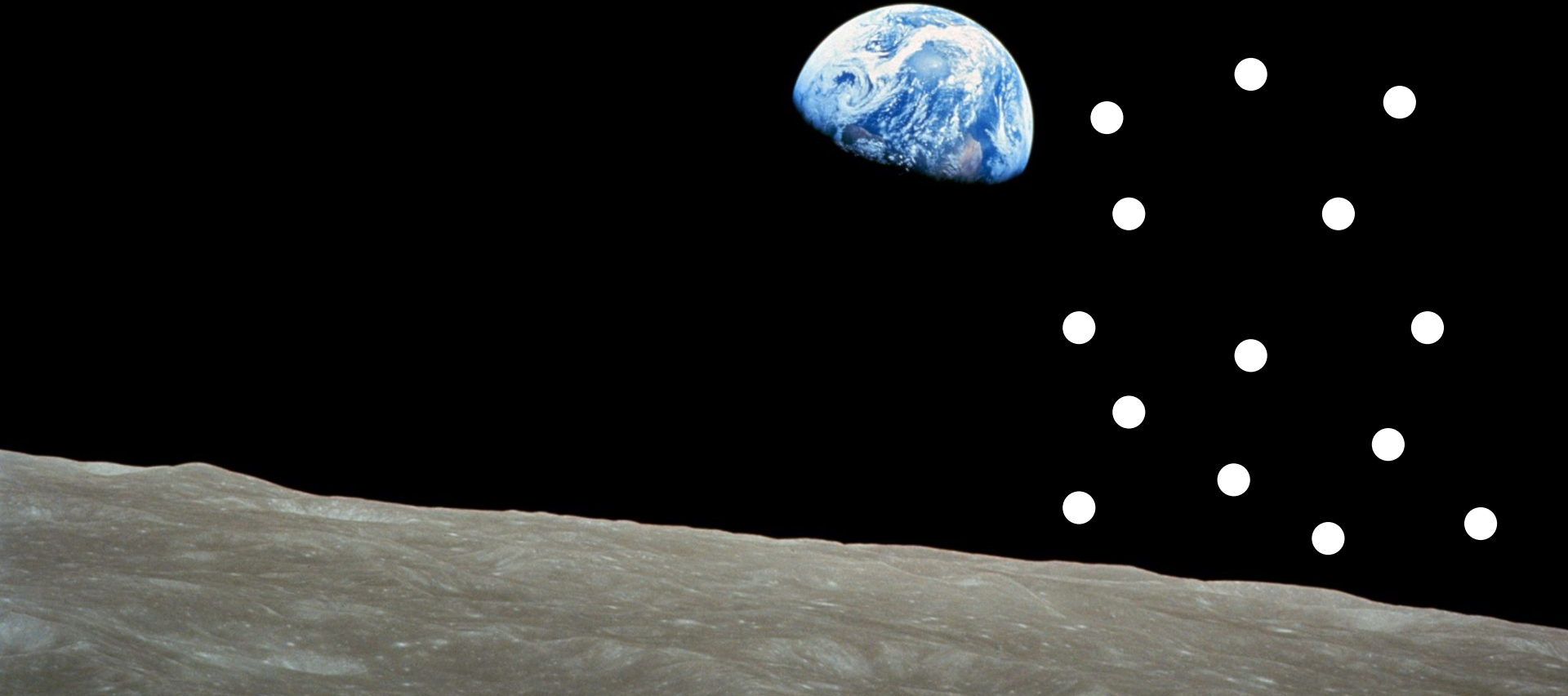
Air molecules E X P A N D when they are in space!



Air molecules



Air molecules E X P A N D when they are in space!



Air molecules E X P A N D when they are in space!





Air molecules E X P A N D when they are in space! ●



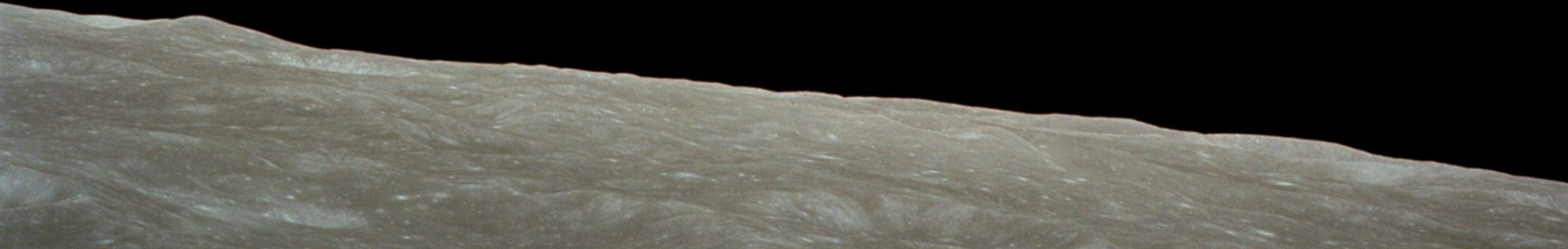
Air molecules E X P A N D when they are in space!



Air molecules E X P A N D when they are in space!

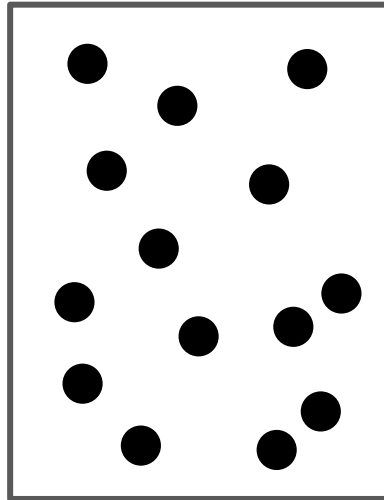


Air molecules E X P A N D when they are in space!



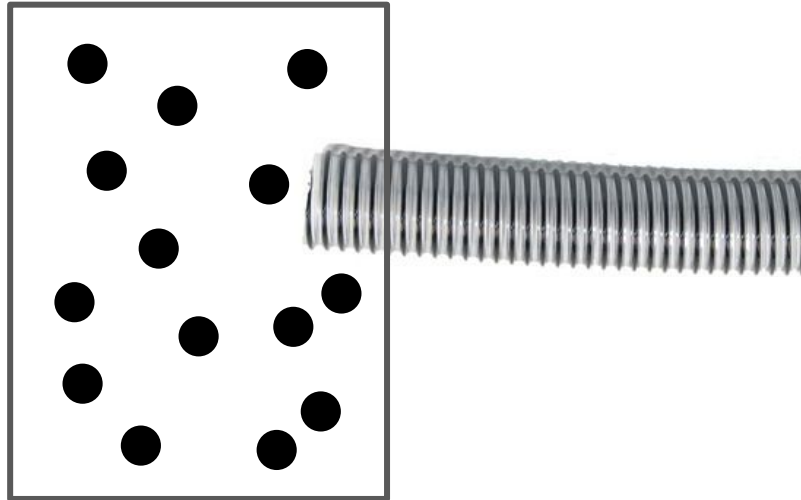
Scientists create vacuum chambers on planet Earth!

Chamber

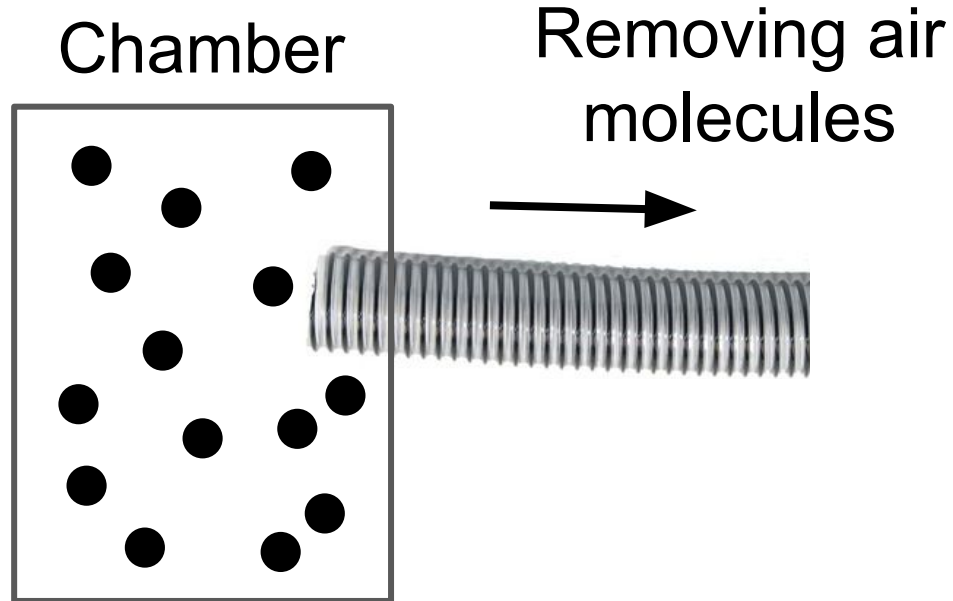


Scientists create vacuum chambers on planet Earth!

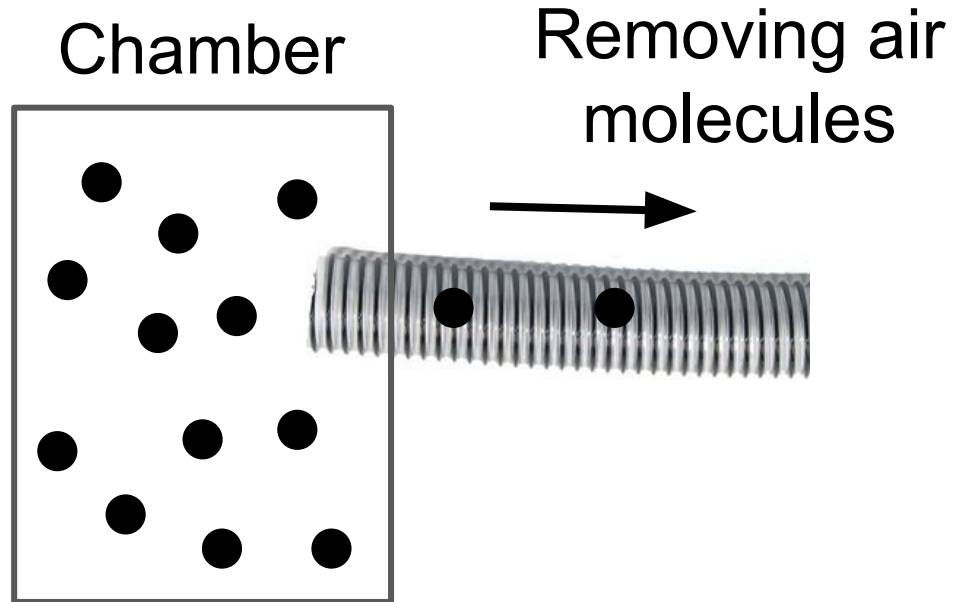
Chamber



Scientists create vacuum chambers on planet Earth!

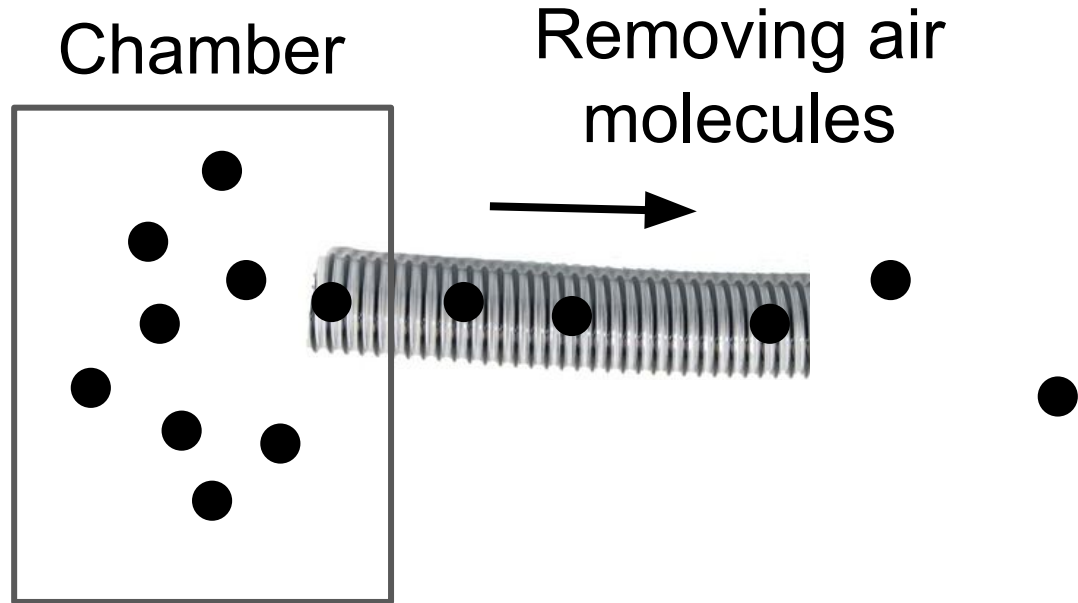


Scientists create vacuum chambers on planet Earth!

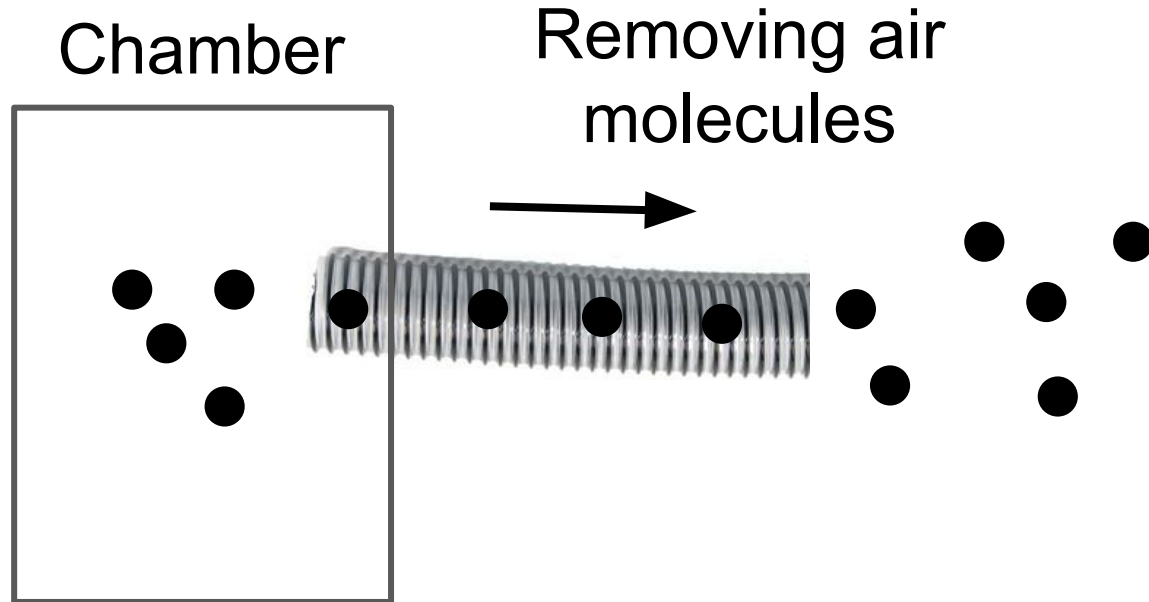




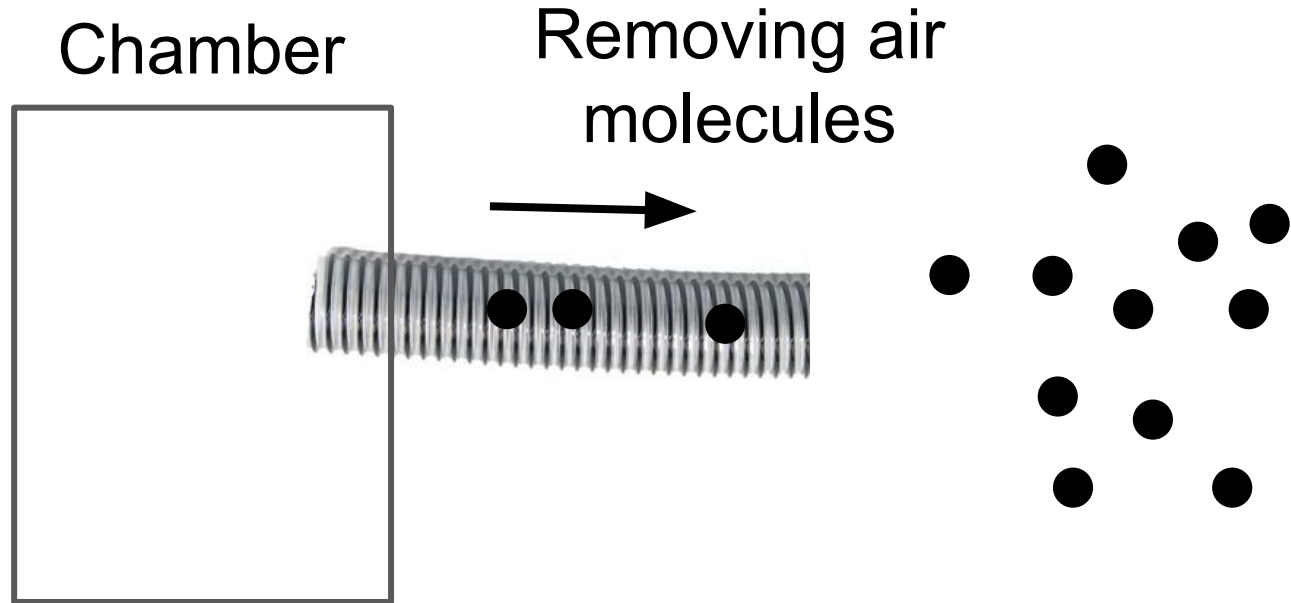
Scientists create vacuum chambers on planet Earth!



Scientists create vacuum chambers on planet Earth!

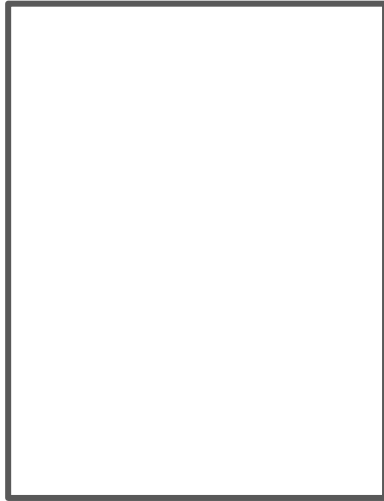


# Scientists create vacuum chambers on planet Earth!

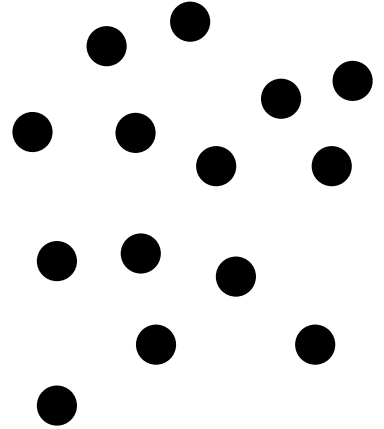


# Scientists create vacuum chambers on planet Earth!

Chamber

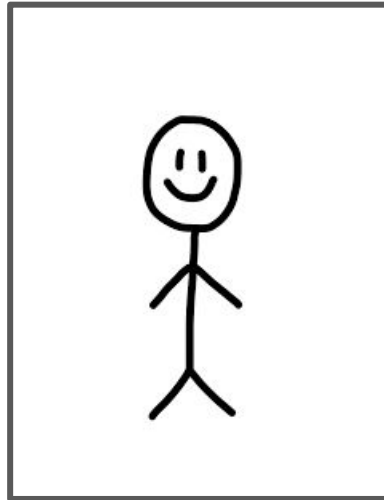


Removing air  
molecules

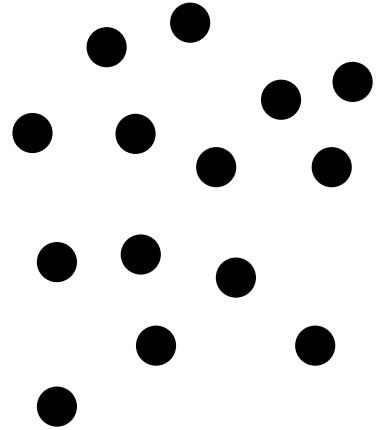


# Scientists create vacuum chambers on planet Earth!

Chamber



Removing air molecules





# Experiment 1: Building your very own vacuum chamber!



# Experiment 2: Test the effects of a vacuum on different objects



Be careful with the lids on your jar!  
Also, there is rubber!





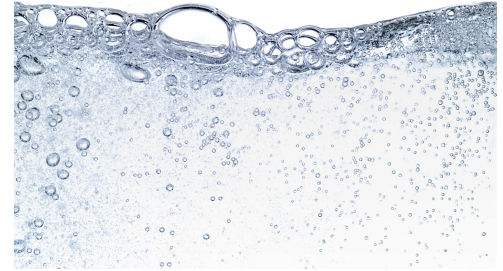
# Activity 1: Building your very own vacuum chamber!



## Questions:

1. What is each part for?
2. How can you figure out which way air can go through the one-way valves?
3. How does the syringe make a vacuum?

## Activity 2: Exploring the effect of a vacuum



What tissue/organs might these be modeling?