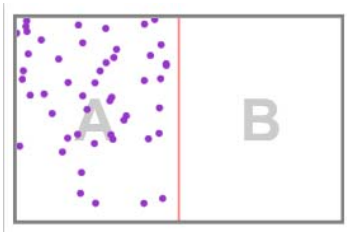
Name: _____

Student Exploration: Diffusion

Activity A: **Temperature and diffusion**	Get the Gizmo ready: - Set the **Wall** to 100%.

Question: How does temperature affect the rate of diffusion?

1. Set the temperature (**Temp.**) to 100 K, press **Play**.
2. Observe the motion of particles.
3. Click **Reset**.



4. Set the temperature to 600 K, click **Play**, and observe.

Describe how the particles move when the temperature is higher _____

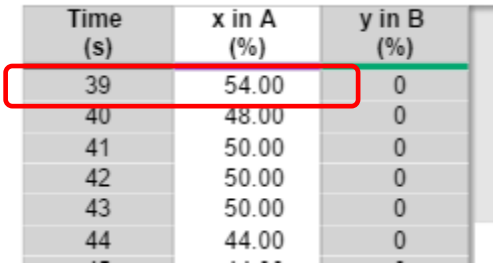
_____

_____

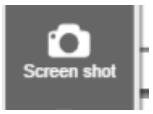
(faster/slower, more/less…)

Find the time to reach equilibrium for each temperature:

5. Set the temperature (**Temp.**) to 100 K, press **Play**.
6. Let the molecules move until they look spread out.
7. Click the TABLE tab
8. Look through the X in A until you see a number smaller than 55%
9. Record the time in the chart below.
10. Click the Tools Tab, select screen shot.



Time (s)	x in A (%)	y in B (%)
39	54.00	0
40	48.00	0
41	50.00	0
42	50.00	0
43	50.00	0
44	44.00	0



10. Set the temperature to 600 K, click **Play**,
11. Repeat steps 6-10

Time to reach equilibrium

Temperature	Time (s)
100K	
600K	

Question: How do factors other than temperature affect the rate of diffusion?

x in A
y in B
} Concentration gradient

1. Click **Reset**
2. Pick a variable to investigate.
   Which one did you choose? _____

Particle mass ⇨ Size of particles

3. Form hypothesis: How do you think this variable will affect rates of diffusion?

   (If…then… because…) _____

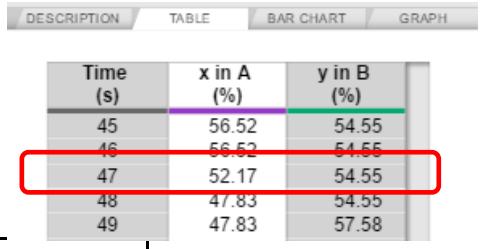
   _____

   _____

In an **experiment**, only one variable is changed.

4. In the list below **circle** the one variable you picked in #1 that will be changing.
5. Set up your experiment so that that only difference is in the variable you circled. Everything else needs to stay the same.
6. List the settings you will use for each set-up below.

Set-up 1		Set-up 2	
Wall	_____	**Wall**	_____
x in A	_____	**x in A**	_____
y in B	_____	**y in B**	_____
Temp.	_____	**Temp.**	_____
Particle mass	_____	**Particle mass**	_____



7. Use the Gizmo to fill in each table.
   The "time to reach equilibrium" is the time it takes for the number of **x** particles in region A to reach **55% or lower**.

Set-up 1

Trial	Time to reach equilibrium
1	
2	
3	
4	
5	

Set-up 2

Trial	Time to reach equilibrium
1	
2	
3	
4	
5	

7. Compare the times to reach equilibrium for each set-up.
   How did the variable you investigated affect the rate of diffusion? _____

   _____