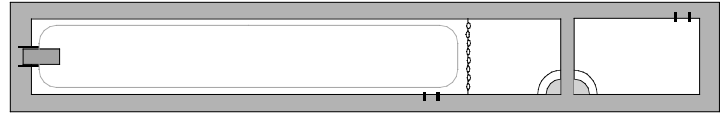
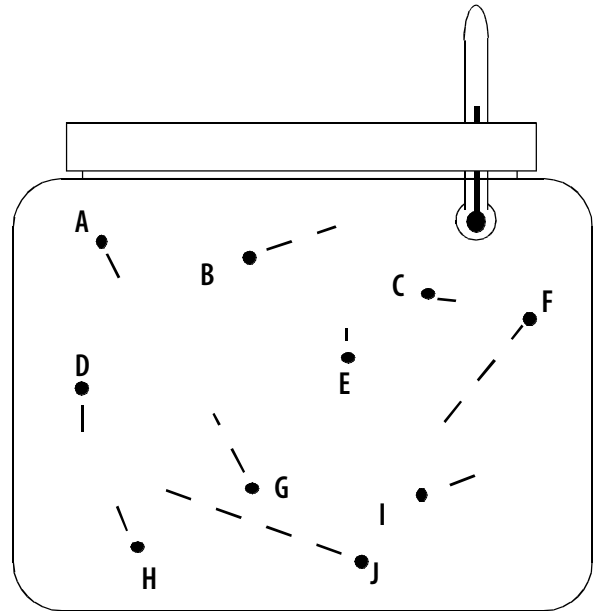
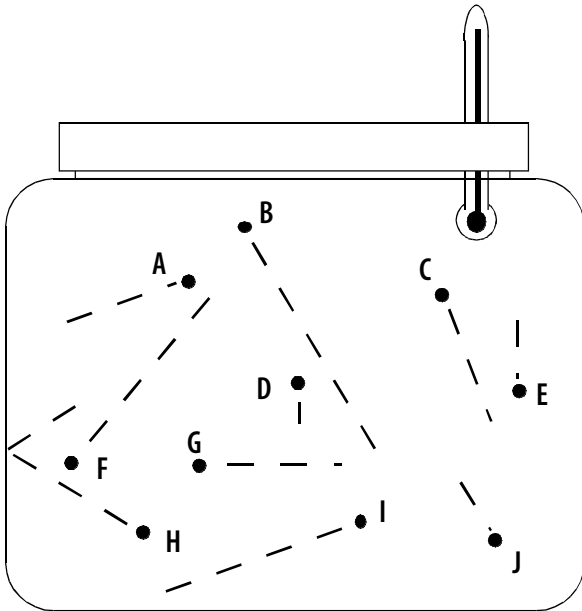


THE DISTRIBUTION OF MOLECULAR SPEEDS



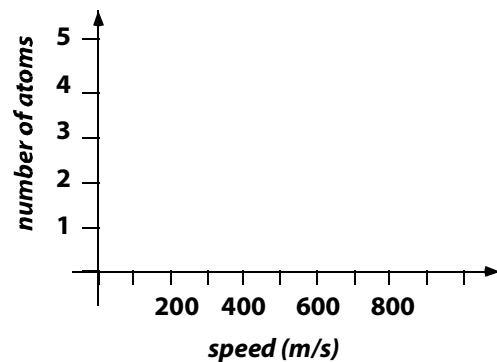
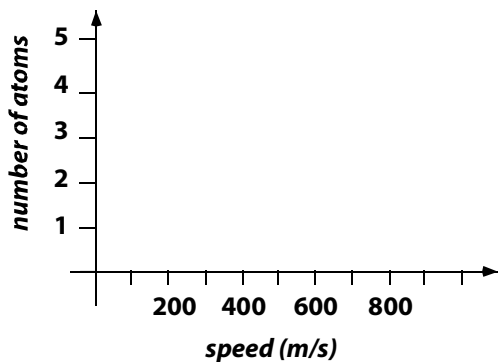
Consider two jars containing equal amounts of helium. For purposes of this Springboard, the jars are very tiny and have been magnified many times. The magnification is so great that we can even see the atoms of the gas. One of the jars contains helium at a high temperature, while the other contains helium at a low temperature.



1. Given the speed of each atom, complete the following tables and graphs.

Atom	Speed	Speed	# of Atoms
A	400	100	
B	800		
C	400	200	
D	100	400	
E	200		
F	600	600	
G	400	800	
H	900	900	
I	600		
J	200		

Atom	Speed	Speed	# of Atoms
A	200	100	
B	400		
C	100	200	
D	200	400	
E	100	600	
F	600	800	
G	400		
H	200		
I	200		
J	800		



Peak

2. From the graphs on the other side, identify the speed that corresponds to the peak of the curve—the most “popular” speed (in statistics, this is called the *mode*).

HOT: _____

COLD: _____

Average Speed

3. Calculate the average speed of the atoms in each container and mark it on the graphs.

HOT: _____

COLD: _____

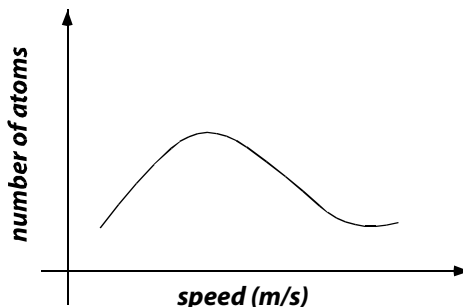
4. If the hot helium were further heated, explain how the following quantities would change.

a. The number of atoms

b. The peak of the speed distribution curve (the mode)

c. The average speed of the atoms

5. The graph below shows the atomic speed distribution in the hot helium. On the same axes, draw the graph of the hotter helium described above.



6. Going back to the original container of hot helium, describe the differences represented in a container with twice as much helium at the same temperature as our original hot helium.

a. The number of atoms

b. The peak of the speed distribution curve (the mode)

c. The average speed of the atoms

7. The graph below shows the atomic speed distribution in the original container of hot helium. On the same axes, draw the graph of the second container (with a greater quantity of helium) described above.

