The Mechanical Universe
TEMPERATURE & THE GAS LAWS 18

Read the following questions before the video begins. Answer the questions while the video is in progress. This is an INDIVIDUAL effort, so complete it by yourself.

DON'T ASK OTHERS FOR ANSWERS since doing so would be cheating.

Most of the important information (and answers to the questions on this sheet) is in the text spoken during the presentation. So don't become entranced by the visuals and imagery; concentrate and stay focused on the words!

1. Temperature scales are effective scientific scales because they offer a

_____ _____ _____.

2. PRESSURE = _____ / _____

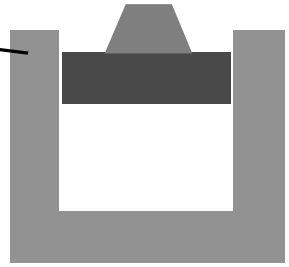
3. Draw connecting lines to label the following:

Container Walls

Gas Molecules

Piston

Weight



4. The animated simulation shown is called a _____

_____ _____.

5. Because of the heater, the balloon needs (MORE / FEWER / THE SAME NUMBER OF) air molecules to maintain the balance of pressure.

6. Joule, Maxwell, and Boltzmann found the pressure of a gas is (select all that apply).
A. proportional to the number of particles in the gas
B. proportional to the volume of the gas
C. proportional to the kinetic energy of the particles in the gas
D. inversely proportional to the number of particles in the gas
E. inversely proportional to the volume of the gas
F. inversely proportional to the kinetic energy of the particles in the gas

7. Robert Boyle worked in his lab at
A. The Royal Society of London
B. Oxford University
C. Cambridge University
D. The University of London

> > > continued > > >

8. *PV* is proportional to the total _____ _____ of all the molecules of the gas.

9. All gases expand the same amount with a given rise in _____.

10. The equation for the kinetic theory of gases is *kT* =

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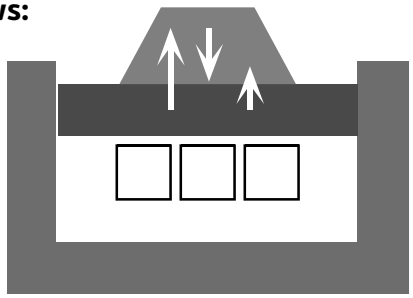
1. Temperature scales are effective scientific scales because they offer a

_____ _____ _____.

2. PRESSURE = _____ / _____

3. In the boxes in the diagram, label the force vector arrows:
(Note: the answer is not stated in the narration.)



W: the force of the weight

G: the force of the gas molecules

∑F: the net force on the piston

4. The mass on top of the piston indicates the _?_ of the gas in the container
A. temperature B. volume C. pressure D. mass

5. Heating a gas _____ its pressure.

6. Joule, Maxwell, and Boltzmann found the pressure of a gas is (select all that apply).
A. proportional to the number of particles in the gas
B. proportional to the volume of the gas
C. proportional to the kinetic energy of the particles in the gas
D. inversely proportional to the number of particles in the gas
E. inversely proportional to the volume of the gas
F. inversely proportional to the kinetic energy of the particles in the gas

7. Robert Boyle
I. worked on his own in a lab at Cambridge University
II. worked in seclusion (away from the public)
III. emphasized the QUALITATIVE approach
A. I only B. II only C. III only D. I and II only
E. I and III only F. II and III only G. I, II, and III H. None of these

> > > continued > > >

8. Robert Boyle determined that the product of the pressure and volume of a gas is

A. equal to 1.0 **B. equal to its temperature**

C. a variable **D. a constant**

9. Joseph Louis Guy-Lussac flew hot air balloons to heights of _____ miles.

10. The equation for the ideal gas law is *PV* =