Gas Law Simulation B Criteria

I. Data Collection

A. 1=m, 2=n, 3=o, 4=p. [Particles, atoms, molecules], [collisions, crash], [velocity, speed], [energy, force].

_____a. particles are moving in straight lines

_____b. particles are colliding with walls

_____c. particles are colliding with each other

_____d. particles collide or crash

_____e. speeds of particles are not the same

_____f. speed(s) of particle(s) change(s)

_____g. force or energy of collision influences speed of particles.

В.

OBSERVATION (graph)

_____a. straight line

_____b. angle of collision with walls

EXPLANATION:

____c. speed changes as a result of collision with other particles

____d. direction changes

MISCONCEPTION:

_____e. speed changes as a result of collision with wall

С.

____a. organized

LABELS (incl. correct units)

_____b. 1.01 atm (pressure)

_____c. 22.4 L (volume)

_____d. 275.25 K (temp.)

D. (pt. 1)

a. different particles have different speeds

_____b. speed(s) of particle(s) change(s)

_____c. average speed is constant

D. (pt. 2)

____a. draw graph

b. label axis (x: speed, y: number of particles)

_____c. label line (average speed)

d. label blocks (number of particles in a particular speed)

E.

OBSERVATION

____a. as temperature increases, pressure increases, or vice versa

_____b. velocity distribution shift

EXPLANATION

_____c. average speed increases as temperature increases

- d. number of collisions (per unit time) with each other increases as temperature increases
- e. number of collisions (per unit time) with walls of container increases as temp.

MISCONCEPTION

- _____f. pressure increases because collision between particles increases
- g. speeds don't change as temperatures change

II. Data Analysis

- ____a. correct graph
- b. temp. and pressure are directly proportional (in word)
- _____c. p/T=Constant or p T
- MISCONCEPTION
- _____d. wrong graph
- _____e. p=T
- _____f. y=ax + b

III. Interpretation and Conclusions

- A.
 - ____a. Temp. and pressure are directly proportional, or p/T=Constant or p T

В.

- _____a. show two situations with same volumes and same number of particles
- _____b. explain speed difference between two situations
- _____c. (because) average speeds are different

С.

- a. correct answer (e.g. 0.037 atm at 22.4 L) extrapolated from graph that p/T=c=0.0037 (at 22.4 L). e.g., p=cT=0.0037 *10
- b. correct answer from pV=nRT or $p_1/T_1=p_2/T_2$
- _____c. correct answer only