Pressure-Volume Relationships for Gases

Activity 1: Basic Relationship
Question Group 1
Question 1
A sample of gas has a constant temperature and number of particles. For such a gas, the relationship between the pressure and the volume is best described as a _____ relationship.
direct
inverse
quadratic

Question 2
A sample of gas has a constant temperature and number of particles. For such a gas, the relationship between the pressure and the volume is best described as a _____ relationship.
inverse
quadratic
direct

Question 3
A sample of gas has a constant temperature and number of particles. For such a gas, the relationship between the pressure and the volume is best described as a _____ relationship.
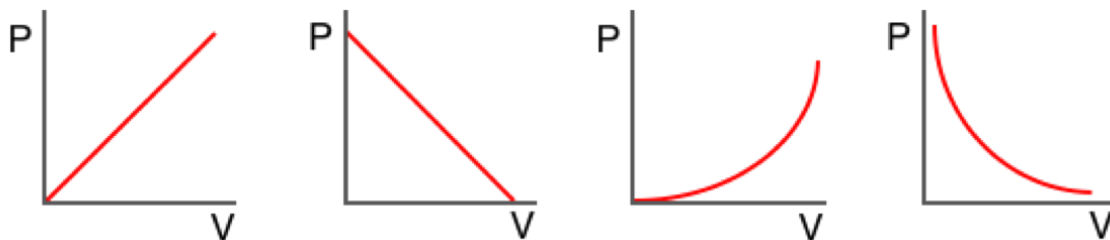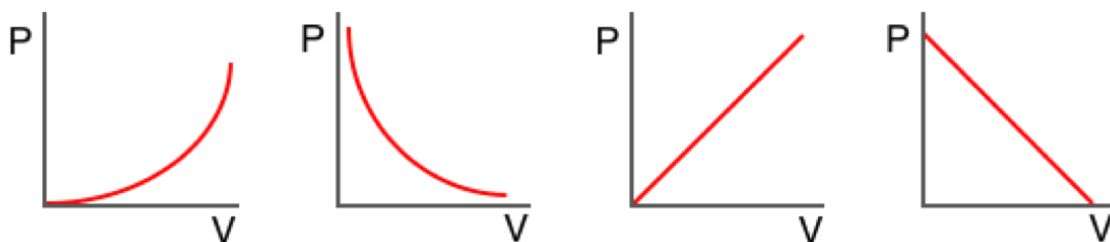quadratic
direct
inverse

Question Group 2
Question 4
Which plot best represents the relationship between the pressure and the volume of a sample of gas? (Assume a constant temperature and number of particles.)

Question 5
Which plot best represents the relationship between the pressure and the volume of a sample of gas? (Assume a constant temperature and number of particles.)

Question 6
Which plot best represents the relationship between the pressure and the volume of a sample of gas? (Assume a constant temperature and number of particles.)
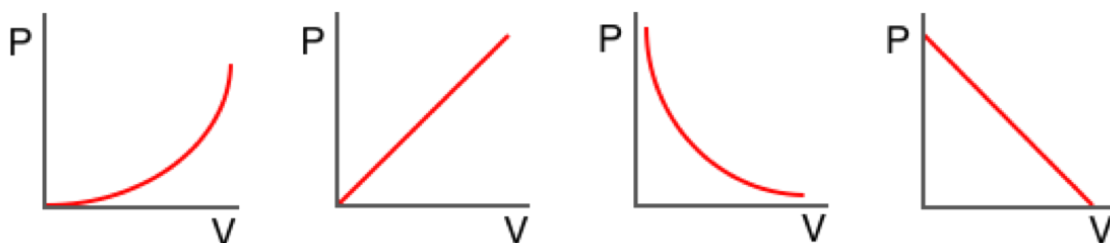
Question Group 3
Question 7
A sample of gas has a constant temperature and number of particles. As the volume of the gas sample is increased, the pressure of the gas will _____.
increase
decrease
remain constant

Question 8
A sample of gas has a constant temperature and number of particles. As the volume of the gas sample is increased, the pressure of the gas will _____.
decrease
remain constant
increase

Question 9
A sample of gas has a constant temperature and number of particles. As the volume of the gas sample is increased, the pressure of the gas will _____.
remain constant
increase
decrease

Activity 2: Proportional Reasoning
Question Group 4
Question 10
Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table to answer the next two questions.

Trial	Volume (L)	Pressure (atm)
1	2.00	6.00
2	3.00	4.00
3	4.00	3.00
4	6.00	2.00
5	8.00	1.50

When the volume of the gas is doubled, the pressure of the gas becomes _____.
a. Two times larger
c. Eight times larger
e. One-fourth the size
g. Not possible to tell

b. Four times larger
d. One-half the size
f. One-eighth the size

Which pairs of trials demonstrate this relationship? Select all that apply.
a. 1 and 2   b. 1 and 3   c. 1 and 4   d. 1 and 5
e. 2 and 4   f. 2 and 5   g. 3 and 4   h. 3 and 5

Question 11
Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table to answer the next two questions.

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	1600
2	8.00	1200
3	12.0	800
4	16.0	600
5	24.0	400

When the volume of the gas is doubled, the pressure of the gas becomes _____.
a. Two times larger

b. Four times larger
c. Eight times larger   d. One-half the size
e. One-fourth the size   f. One-eighth the size
g. Not possible to tell

Which pairs of trials demonstrate this relationship? Select all that apply.
a. 1 and 2   b. 1 and 3   c. 1 and 4   d. 1 and 5
e. 2 and 4   f. 2 and 5   g. 3 and 4   h. 3 and 5

Question Group 5
Question 12
Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table to answer the next two questions.

Trial	Volume (L)	Pressure (atm)
1	2.00	6.00
2	3.00	4.00
3	4.00	3.00
4	6.00	2.00
5	8.00	1.50

When the volume of the gas is tripled (i.e., three times larger), the pressure of the gas becomes _____.
a. three times larger   b. six times larger
c. nine times larger   d. one-third the size
e. one-sixth the size   f. one-ninth the size

g. Not possible to tell

Which pairs of trials demonstrate this relationship? Select all that apply.
a. 1 and 2   b. 1 and 3   c. 1 and 4   d. 1 and 5
e. 2 and 4   f. 2 and 5   g. 3 and 4   h. 3 and 5

Question 13

Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table to answer the next two questions.

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	1600
2	8.00	1200
3	12.0	800
4	16.0	600
5	24.0	400

When the volume of the gas is tripled (i.e., three times larger), the pressure of the gas becomes _____.
a. three times larger   b. six times larger
c. nine times larger   d. one-third the size
e. one-sixth the size   f. one-ninth the size
g. Not possible to tell

Which pairs of trials demonstrate this relationship? Select all that apply.
a. 1 and 2   b. 1 and 3   c. 1 and 4   d. 1 and 5
e. 2 and 4   f. 2 and 5   g. 3 and 4   h. 3 and 5

Question Group 6
Question 14

Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table to answer the next two questions.

Trial	Volume (L)	Pressure (atm)
1	2.00	6.00
2	3.00	4.00
3	4.00	3.00
4	6.00	2.00
5	8.00	1.50

When the volume of the gas is quadrupled (i.e., four times larger), the pressure of the gas becomes _____.
a. four times larger   b. eight times larger
c. sixteen times larger   d. one-fourth the size

e. one-eighth the size   f. one-sixteenth the size
g. Not possible to tell

Which pairs of trials demonstrate this relationship? Select all that apply.
a. 1 and 2   b. 1 and 3   c. 1 and 4   d. 1 and 5
e. 2 and 4   f. 2 and 5   g. 3 and 4   h. 3 and 5

Question 15

Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table to answer the next two questions.

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	1600
2	8.00	1200
3	12.0	800
4	16.0	600
5	24.0	400

When the volume of the gas is quadrupled (i.e., four times larger), the pressure of the gas becomes _____.
a. four times larger   b. eight times larger
c. sixteen times larger   d. one-fourth the size
e. one-eighth the size   f. one-sixteenth the size
g. Not possible to tell

Which pairs of trials demonstrate this relationship? Select all that apply.
a. 1 and 2   b. 1 and 3   c. 1 and 4   d. 1 and 5
e. 2 and 4   f. 2 and 5   g. 3 and 4   h. 3 and 5

Question Group 7
Question 16

Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table predict the pressure of the gas when it's volume is 24.0 L.

Pressure at 24.0 L: _____

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	2400.
2	12.0	1200.
3	18.0	800.

Question 17
Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table predict the pressure of the gas when it's volume is 24.0 L.

Pressure at 24.0 L: _____

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	3600
2	12.0	1800
3	18.0	1200

Question Group 8
Question 18
Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table predict the pressure of the gas when it's volume is 36.0 L.

Pressure at 36.0 L: _____

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	2400.
2	12.0	1200.
3	18.0	800.

Question 19
Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table predict the pressure of the gas when it's volume is 36.0 L.

Pressure at 36.0 L: _____

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	3600
2	12.0	1800
3	18.0	1200

Question Group 9

Question 20

Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table predict the pressure of the gas when it's volume is 48.0 L.

Pressure at 48.0 L: _____

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	2400.
2	12.0	1200.
3	18.0	800.

Question 21

Observe the data table shown at the right for a sample of gas that has a constant temperature and number of particles. Use the data table predict the pressure of the gas when it's volume is 48.0 L.

Pressure at 48.0 L: _____

Trial	Volume (L)	Pressure (mm Hg)
1	6.00	3600
2	12.0	1800
3	18.0	1200

Activity 3: P-V Data
Question Group 10
Question 22
The temperature of a sealed container of gas is kept constant while the volume is changed. This results in a change in the pressure of the gas sample. Based on this information, complete the table below.

Trial	Pressure (atm)	Volume (L)	P*V (L·atm)
1	0.60	24.0	
2		18.0	
3	1.20		
4	1.80		

Question 23
The temperature of a sealed container of gas is kept constant while the volume is changed. This results in a change in the pressure of the gas sample. Based on this information, complete the table below.

Trial	Pressure (atm)	Volume (L)	P*V (L·atm)
1	0.80	32.0	
2		24.0	
3	1.60		
4	2.40		

Question 24
The temperature of a sealed container of gas is kept constant while the volume is changed. This results in a change in the pressure of the gas sample. Based on this information, complete the table below.

Trial	Pressure (atm)	Volume (L)	P*V (L·atm)
1	0.50	36.0	
2		24.0	
3	1.00		
4	1.50		

Question 25
The temperature of a sealed container of gas is kept constant while the volume is changed. This results in a change in the pressure of the gas sample. Based on this information, complete the table below.

Trial	Pressure (atm)	Volume (L)	P*V (L·atm)
1	1.20	48.0	
2		36.0	
3	2.40		
4	3.60		