

## Your Answers

### Lesson 1

Q1. Are cows made of atoms?

Q2. Is helium gas made of atoms?

Q3. Hydrogen, H:

Q4. How many holes are there in a model H atom?

Q5. Would 4 H atoms make an H<sub>4</sub> molecule?

### Lesson 2

Q1. Does an F atom bond, or is it a loner?

Q2. In how many different ways can H and F be joined?

Q3. What are the formulas of the possible molecules?

Q4. .... makes 2 bonds, ..... makes 3 bonds.

Q5. Formula of molecule:                      Non-molecule is .....

Q6. Symbols of nitrogen ( ), carbon ( ), and oxygen ( ).

### Lesson 3

Q1. How do gases pressurise balloons?

Q2. Will heating alter the force of collisions?

Q3. Will heating alter the number of collisions?

Q4. Is He an atom or a molecule?

### Lesson 4

Q1. Results of model building:

(a)

(b)

Q2. How many tubes to model  $N_2$ ?

Q3. How many  $O_2$  molecules in 100 molecules of air?

Q4. Ammonia:

Formaldehyde:

## Lesson 5

Q1. Weight of the lightest atom?

Q2. Weight of hydrogen molecule?

Q3. Molecular weight of oxygen?

Q4. Is there a  $\text{CH}_3\text{F}_2$  molecule?

Q5. Two molecular formulas.

Q6. Which of the two is heavier?

Q7. Do  $\text{CF}_4$  and  $\text{CHF}_3$  exist?

## Lesson 6

Q1. How many holes in an He model?

Q2. Which is the helium balloon?

Q3. Why are the molecules drawn far apart?

Q4. The structure of the  $\text{CO}_2$  molecule.

Q5. Did you draw the atoms in line?

Q6. Does carbon dioxide rise or fall?

## **Lesson 7**

Q1. Molecular weight of helium?

Q2. Why does a helium balloon rise?

Q3. Will hydrogen rise or fall?

Q4. Which would win the upward race?

Q5. The molecular weight of propane,  $C_3H_8$ .

Q6. Will propane rise or fall?

Q7. Why does an air balloon fall?

Q8. Which wins,  $CO_2$  or propane?

## **Lesson 8**

Q1. Atomic weight of chlorine?

Q2. How many bonds does a Cl atom make?

Q3. Formulas of two molecules.

Q4. Would the balloons be buoyant?

Q5. Molecules of H and Cl?

Q6. Molecules so far modelled?

Q7. Bottle or cylinder?

## Lesson 9

Q1. Cooling a toy balloon.

Q2. Would hydrazine (boiling point  $114^{\circ}\text{C}$ ) be kept in a bottle?

Q3. Would ethylene (boiling point  $-104^{\circ}\text{C}$ ) be kept in a bottle?

Q4. Which has the stickier molecules?

Q5. Formula and a note about hydrazine.

Q6. Bigger molecules:

## Lesson 10

Q1. Why is it a model of a real molecule?

Q2. Write the two formulas.

Q3. The formula of both molecules.

Q4. Is there a third molecule?

Q5. Write the two structures.

## Lesson 11

Q1. Are the melting points above  $25^{\circ}$  or below it?

Q2. Which has the stickier molecules?

## Lesson 12

Q1. Which of  $\text{CH}_2\text{Cl}_2$ ,  $\text{CCl}_5$ ,  $\text{CHCl}_3$ ,  $\text{CCl}_4$ ,  $\text{CH}_2\text{Cl}$  are unlikely to be molecules?

Q2. Molecular weight of  $\text{CCl}_4$  stuff. Will the gas rise or sink?

Q4. Can you model a third molecule  $\text{C}_2\text{H}_6\text{O}$ ?

Q5. Draw the two structures:

## **Lesson 13**

Q1. Would you be able to see the point of the needle?

Q2. Would you see the needle moving?

Q3. How would those atoms appear under an ordinary microscope?

Q4. How many holes should a xenon cube have?

## **Lesson 14**

Puzzle 1.

Puzzle 2

## **Lesson 15**

Q1. How are the molecules moving when the temperature is below  $0^{\circ}\text{C}$ ?  
(Include a drawing.)

Q2. How are the molecules moving between  $0$  and  $100^{\circ}\text{C}$ ? (Include a drawing.)

Q3. How are the molecules moving at  $100^{\circ}\text{C}$ ? (Include a drawing.)

## **Lesson 16**

Puzzle 1

Puzzle 2.