

SCIENCE

Textbook for Class IX



STUDY
PATRA

SCIENCE

CLASS 9 CHAPTER 1

MATTER IN OUR SURROUNDINGS(PART 4)

हमारे आस-पास के पदार्थ

States Of Matter

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- EVERY STUDENT HAS A DIFFERENT UNDERSTANDING LEVEL. SOME GRASP THINGS VERY EASILY AND SOME TAKE MORE TIME TO GRASP BUT IT DOESN'T MATTER AS LONG AS YOU **DO NOT GIVE UP AND KEEP ON TRYING.**
- IF ANYBODY WANTS TO GIVE ANY POSITIVE OR NEGATIVE FEEDBACK ON MY VIDEOS YOU ARE MOST WELCOME .YOU CAN **COMMENT BELOW.**
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STATES OF MATTER

- THE SOLID STATE
- THE LIQUID STATE
- THE GASEOUS STATE



- MATTER AROUND US EXISTS IN THREE DIFFERENT STATES– SOLID, LIQUID AND GAS.
- THESE STATES OF MATTER ARISE DUE TO THE VARIATION IN THE CHARACTERISTICS OF THE PARTICLES OF MATTER.



PROPERTIES OF THESE THREE STATES OF MATTER

A, B AND C SHOW THE MAGNIFIED SCHEMATIC

PICTURES OF THE THREE STATES OF MATTER.
THE

MOTION OF THE PARTICLES CAN BE SEEN
AND

COMPARED IN THE THREE STATES OF MATTER

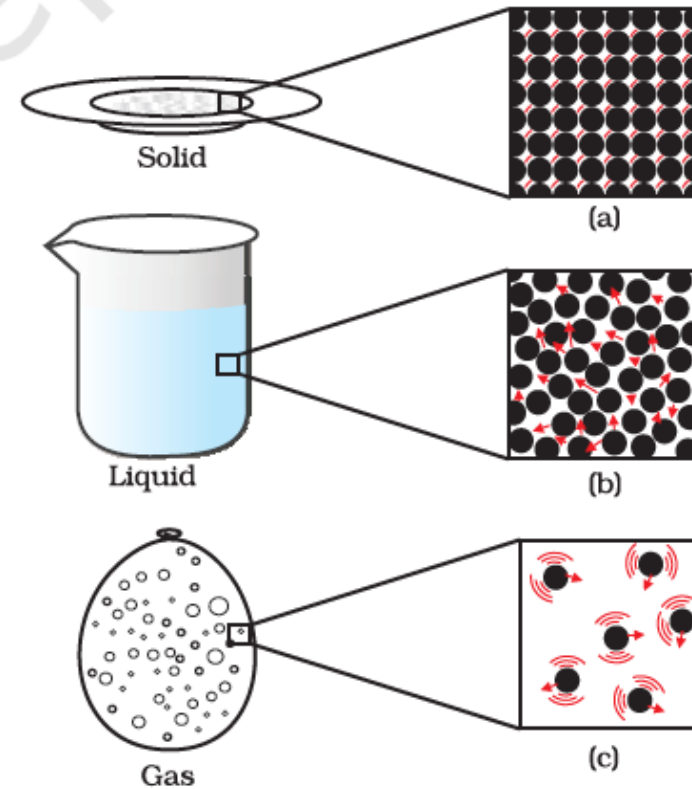


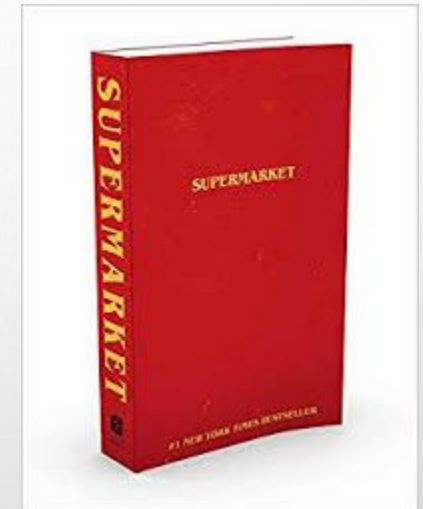
Fig.1.5: a, b and c show the magnified schematic pictures of the three states of matter. The motion of the particles can be seen and compared in the three states of matter.

THE SOLID STATE

PROPERTIES OF SOLID

- DEFINITE SHAPE
- DISTINCT BOUNDARIES
- FIXED VOLUMES
- RIGID (NEGLIGIBLE COMPRESSIBILITY)
 - a. solids have a tendency to maintain their shape when subjected to outside force.
 - b. solids may break under force but it is difficult to change their shape

EXAMPLE : PEN, BOOK, NEEDLE ,WOODEN STICK, RUBBER



(A) WHAT ABOUT A RUBBER BAND, CAN IT CHANGE ITS SHAPE ON STRETCHING? IS IT A SOLID?

YES, AS A RUBBER BAND CHANGES SHAPE UNDER FORCE AND REGAINS THE SAME SHAPE WHEN THE FORCE IS REMOVED. IF EXCESSIVE FORCE IS APPLIED, IT BREAKS

(B) WHAT ABOUT SUGAR AND SALT? WHEN KEPT IN DIFFERENT JARS THESE TAKE THE SHAPE OF THE JAR. ARE THEY SOLID?

YES, THE SHAPE OF EACH INDIVIDUAL SUGAR OR SALT CRYSTAL REMAINS FIXED, WHETHER WE TAKE IT IN OUR HAND, PUT IT IN A PLATE OR IN A JAR

(C) WHAT ABOUT A SPONGE? IT IS A SOLID YET WE ARE ABLE TO COMPRESS IT. WHY?

A SPONGE HAS MINUTE HOLES, IN WHICH AIR IS TRAPPED, WHEN WE PRESS IT, THE AIR IS EXPELLED OUT AND WE ARE ABLE TO COMPRESS IT



THE LIQUID STATE

PROPERTIES OF LIQUID

- NO FIXED SHAPE (THEY TAKE UP THE SHAPE OF THE CONTAINER IN WHICH THEY ARE KEPT)
- FIXED VOLUME.
- LIQUIDS FLOW (HENCE, THEY ARE NOT RIGID AND CAN BE CALLED FLUID)
- SOLIDS AND LIQUIDS CAN DIFFUSE INTO LIQUIDS.
- THE GASES FROM THE ATMOSPHERE DIFFUSE AND DISSOLVE IN WATER. THESE GASES, ESPECIALLY OXYGEN AND CARBON DIOXIDE, ARE ESSENTIAL FOR THE SURVIVAL OF AQUATIC ANIMALS AND PLANTS.



CONCLUSION

- SOLIDS, LIQUIDS AND GASES CAN DIFFUSE INTO LIQUIDS.
- THE RATE OF DIFFUSION OF LIQUIDS IS HIGHER THAN THAT OF SOLIDS.

(This is due to the fact that in the liquid state, particles move freely and have greater space between each other as compared to particles in the solid state)



THE GASEOUS STATE

PROPERTIES OF GASES

- VOLUME-NOT DEFINITE
- SHAPE-NOT DEFINITE
- MASS-CONSTANT
- HIGHLY COMPRESSIBLE
- GASES ARE HIGHLY COMPRESSIBLE AS COMPARED TO SOLIDS AND LIQUIDS.

THE LIQUEFIED PETROLEUM GAS (LPG) CYLINDER THAT WE GET IN OUR HOME FOR COOKING OR THE OXYGEN SUPPLIED TO HOSPITALS IN CYLINDERS IS COMPRESSED GAS.

- COMPRESSED NATURAL GAS (CNG) IS USED AS FUEL THESE DAYS IN VEHICLES. DUE TO ITS HIGH COMPRESSIBILITY, LARGE VOLUMES OF A GAS CAN BE COMPRESSED INTO A SMALL CYLINDER AND TRANSPORTED EASILY

- WE COME TO KNOW OF WHAT IS BEING **COOKED IN THE KITCHEN** WITHOUT EVEN ENTERING THERE, BY THE **SMELL** THAT REACHES OUR NOSTRILS. HOW DOES THIS SMELL REACH US?
- THE **PARTICLES OF THE AROMA OF FOOD** **MIX WITH THE PARTICLES OF AIR** SPREAD FROM THE KITCHEN, REACH US AND EVEN FARTHER AWAY
- THE **SMELL OF HOT COOKED FOOD REACHES US IN SECONDS**; COMPARE THIS WITH THE RATE OF DIFFUSION OF SOLIDS AND LIQUIDS. DUE TO HIGH SPEED OF PARTICLES AND LARGE SPACE BETWEEN THEM.
- **GASES** SHOW THE **PROPERTY OF DIFFUSING VERY FAST INTO OTHER GASES**.



COMPARISON OF PROPERTIES OF SOLID, LIQUID, GASES

PROPERTY	SOLID	LIQUID	GAS
MASS	YES	YES	YES
INTERMOLECULAR SPACE	VERY LESS (MINIMUM)	MORE (COMPARED TO SOLID)	MAXIMUM
INTERMOLECULAR FORCE OF ATTRACTION	VERY STRONG	WEAKER	NEGLECTIBLE
DENSITY	HIGH	LOW	VERY LOW
SHAPE	DEFINITE	NOT DEFINITE	NOT DEFINITE
VOLUME	DEFINITE	DEFINITE	NOT DEFINITE
KINETIC ENERGY OF PARTICLES	LOW	HIGH	VERY HIGH
COMPRESSIBILITY	VERY LOW	MORE COMPARED TO SOLIDS	HIGHLY COMPRESSIBLE
MOTION OF PARTICLES	FIXED	NOT FIXED	NOT FIXED



*Thanks
for watching*

AND

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