

7th Grade Matter Test Study Guide

1. Where did the original idea of the atom come from? What does the word “atom” mean? (Atom Timeline)

The original idea for the atom came from the ancient Greeks. It means “cannot be divided further”

2. How has our knowledge about atoms changed over time? Describe three of the changes and why they took place. (Atom Timeline, Notes)

How the Model Changed	Why it changed
It changed from being the same throughout to having positive and negative parts	Thomson’s experiments with cathode ray tube
A positive nucleus with negative electrons orbiting. Mostly Empty Space.	Rutherford’s experiments with shooting particles through gold foil
Nucleus with protons and neutrons, electrons moving outside the nucleus in “orbitals”	Further experiments

3. Why do we make models of atoms? What are the limitations of our models? (notes)

To show their parts and what they look like. Our models are limited because we cannot show accurate distances between parts of an atom (the orange and the school). It is also hard to show the true motion of electrons.

4. What is a molecule? (notes)

A combination of two or more atoms makes a molecule.

5. What is the relationship between atoms and molecules? Draw a sketch using small circles that shows how atoms and molecules are different. (Molecule Models Sheet)

Molecules are made of atoms. Just like words are made of letters.



6. What is mass? How do we measure it? (notes, mass/volume lab)

Mass is a measure of how much matter is in an object/substance. We measure it with a triple beam balance.

7. What is volume? Name two ways we can measure it. (notes, mass/volume lab)

Volume is how much space an object occupies. We measure it using l x w x h or by displacement (putting it in a graduated cylinder to see how much the level goes up)

8. What is density? How do we measure it? (notes)

Density is how tightly packed particles of matter are. We measure it with the formula: mass/volume .



9. What causes an object to sink or float? (Mystery Canisters)

An object will sink if it is denser than its surroundings. It will float if it is less dense than its surroundings.

10. Can we tell if one object is denser than another if we don't know their densities? How? (Graduated cylinder starter)

We can compare densities by seeing which object floats over another.

What happens to the speed of particles when their temperature increases? When it decreases?
As temperature increases, the speed of particles increases. As temperature decreases, the speed of particles decreases as well.

What happens to the volume of most substances when the temperature increases? What if it decreases?

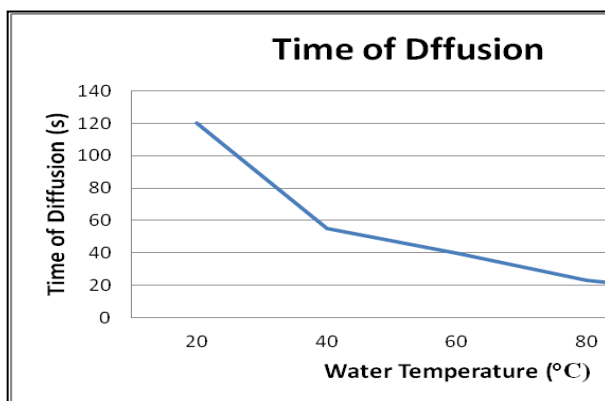
As temperature increases, volume increases. As temperature decreases, volume decreases as well. This is because the particles slow down and get closer together.

The information below is about an experiment done by a student

A student added a drop of red food coloring to 4 beakers of water. Each beaker contained 100 ml of different temperature water. The student recorded how long it took each beaker to mix completely (without stirring). The following table shows her results:

Beaker	Temperature of water	Time to mix.
#1	10 C	120 sec
#2	25 C	55 sec
#3	40 C	40 sec
#4	80 C	23 sec

Graph the data below with temperature on the x-axis and time on the y-axis. Place the zero values at the origin.



**Note: the data points on this graph do not exactly match the data in the table, but the labels, intervals and general pattern in the line do.

What inference can be made from the data in this experiment?

We can infer that the particles in hot water are moving faster, so they mix more quickly

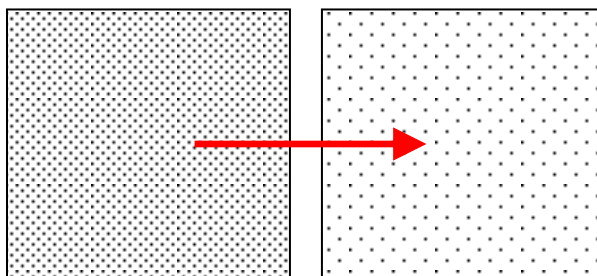
What are some examples of evidence that particles are in motion?

Examples include: air freshener, perfume, yummy smells from the kitchen, expansion and contraction of materials etc.

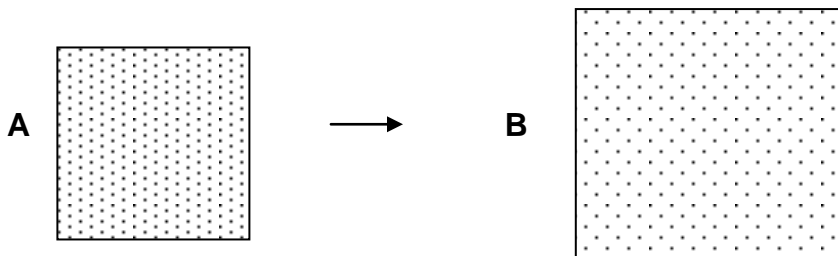
Compare the speed, volume and temperature of particles in different phases of matter by completing the table below

Phase	Speed	Volume	Temperature
Solid	Slowest	Smallest	Lowest
Liquid	Medium	Medium	Medium
Gas	fastest	Highest	highest

Draw an arrow showing the direction of diffusion between the two squares below



Picture A shows the particles of a substance in a flexible container and picture B shows the particles of the same substance after some time has passed.



What could have happened to the particles of the substance between picture A and picture B?

The substance was probably heated, causing the particles to speed up and spread out.

What difference would there be in the motion of the particles?

The particles in B would be moving faster than the ones in A

How do the expansion and contraction of solid materials affect the design of buildings, highways, and other structures? Can you think of some examples?

Materials expand and contract with changes in temperatures. This can affect buildings, highways and other structures. Examples include: leaving gaps in the plywood on the roof of a house to allow for expansion, expansion joints on a bridge or in sidewalks to prevent cracks, roads and driveways develop cracks or potholes over time due to repeated expansion and contraction.

The earth is organized into several layers. How does density affect this organization?

The denser layers are found at the center, with layers becoming less dense as you get closer to the surface

Fill in the table below by ranking the temperature, pressure and density of each of earth's layers. Rank them on a scale of 1-4, with 4 being the highest.

Layer	Temperature	Pressure	Density
Crust	1	1	1
Mantle	2	2	2
Outer Core	3	3	3
Inner Core	4	4	4

What pattern(s) do you notice in the data table above?

As you go deeper into the earth, the temperature, pressure and density of materials increases

A student shakes a jar filled with sediments, and the sediments form a series of layers. What are two possible reasons that this might happen?

1. The denser materials will move to the bottom
2. The larger materials will move to the bottom

If the layers in the jar mentioned above were sediments in a river bed, which sediments would you expect to wash away first?

The top layers would wash away first because they are small and less dense.

Density Practice:

1. A rectangular object has the dimensions of 2cm x 4cm x 8cm, and a mass of 96g. What is the density of the object? Would you expect the object to float or sink in water?
 $V=lwh$, so $V=2\text{cm} \times 4\text{cm} \times 8\text{cm} = 64\text{cm}^3$
 $D=m/v$, so $D = 96\text{g}/64\text{cm}^3 = 1.5\text{g}/\text{cm}^3$
2. A rock is placed in a graduated cylinder, and the level of water rises from 23mL to 35mL. The rock has a mass of 30g. What is the density of the rock?
 $V= \text{final volume} - \text{initial volume}$, so $35\text{mL}-23\text{mL} = 12\text{mL}$
 $D=m/v$, so $D = 30\text{g}/12\text{mL} = 2.5\text{g}/\text{mL}$
3. Fill in the layers of the cylinder with the following substances. Water ($d=1\text{g}/\text{cm}^3$), alcohol ($d=0.8\text{g}/\text{cm}^3$), salt water ($d=1.12\text{g}/\text{cm}^3$), corn syrup ($d=1.38\text{g}/\text{cm}^3$).

If you were to place a cube with a density of $1.26\text{g}/\text{cm}^3$ in the cylinder, where do you expect it to settle? Add it to the cylinder in the appropriate place.

The cube would settle on top of the corn syrup in the salt water, because it is less dense than the syrup, but more dense than the water

