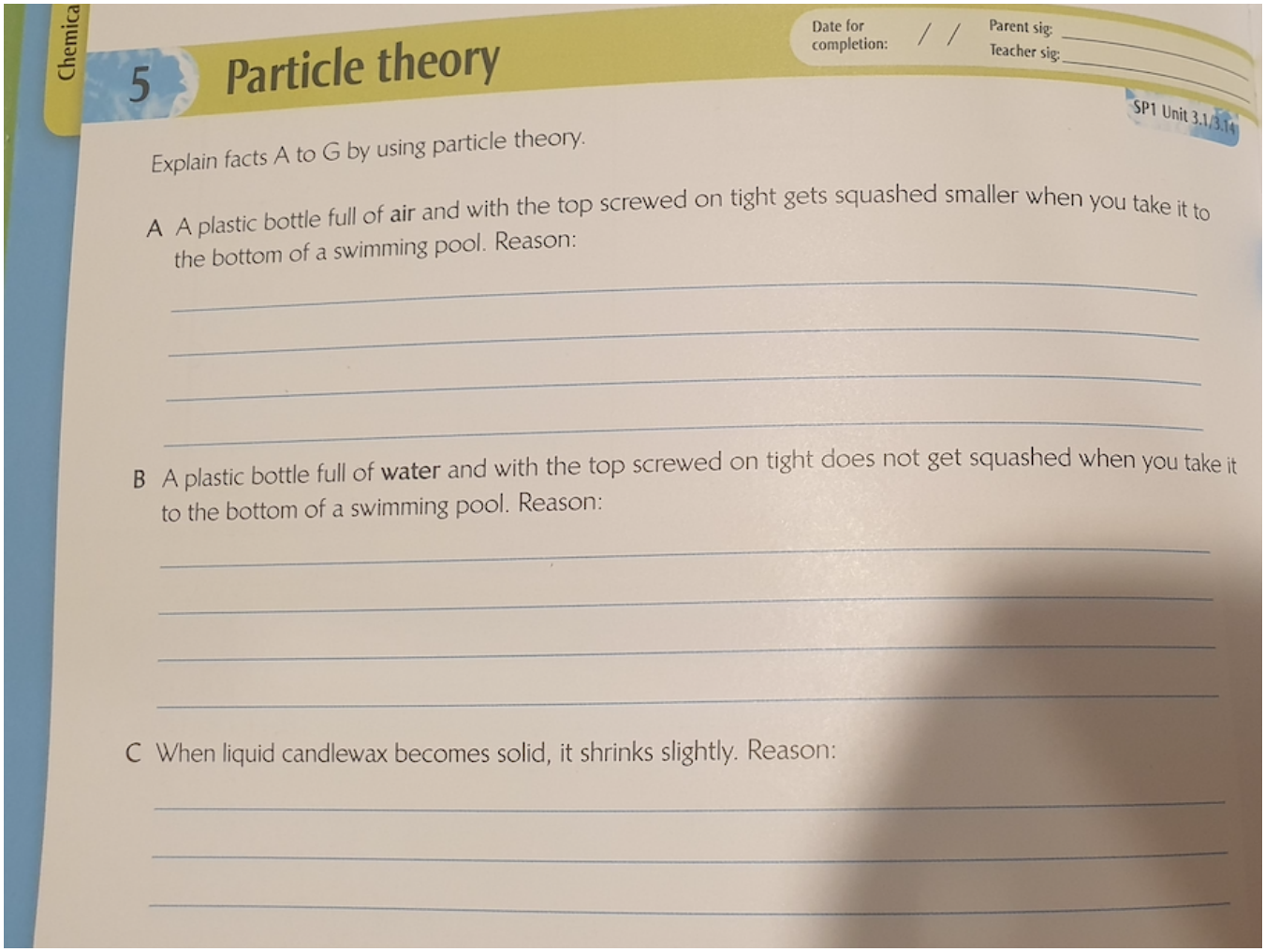
Partice theory of matter



Chemica

5 Particle theory

Date for completion: / /

Parent sig: _____

Teacher sig: _____

SP1 Unit 3.1/3.14

Explain facts A to G by using particle theory.

A A plastic bottle full of **air** and with the top screwed on tight gets squashed smaller when you take it to the bottom of a swimming pool. Reason:

B A plastic bottle full of **water** and with the top screwed on tight does not get squashed when you take it to the bottom of a swimming pool. Reason:

C When liquid candlewax becomes solid, it shrinks slightly. Reason:

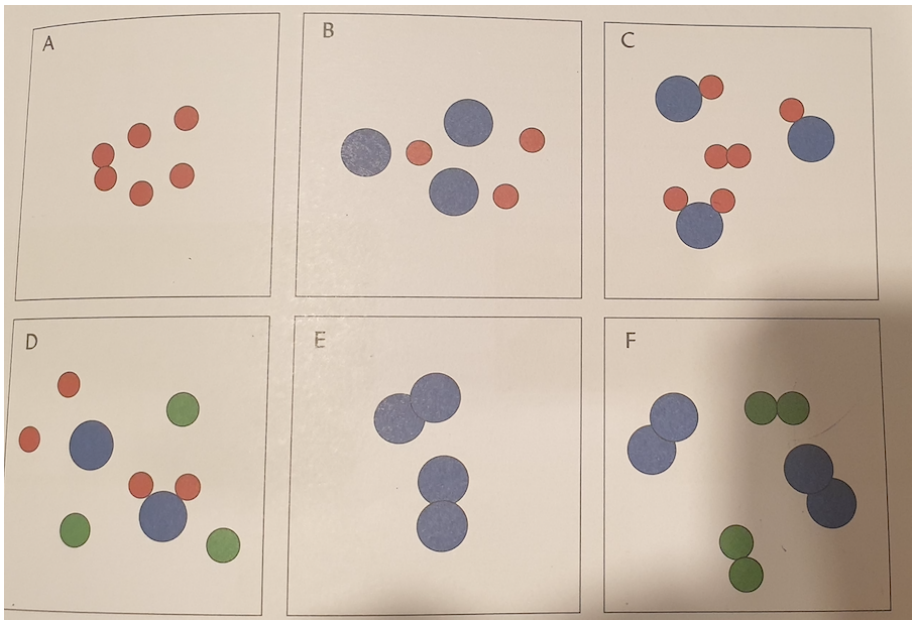
D If you pour any liquid into a cup, it will fill the cup and take the shape of the cup. Reason:

E If you try to cook an unbroken egg in a microwave oven, the egg will explode. Reason:

F When it starts snowing the air temperature warms slightly; but when snow is melting the air becomes much colder. Reason:

G When you put a pot of water on the stove it may take only a few minutes for the water to reach 100 °C, but it takes much longer for the water to boil away completely. Reason:

Elements, compounds and mixture



15 Naming compounds

Date for completion: / /

Parent sig: _____

Teacher sig: _____

SP1 Unit 3.7

The name of a compound can tell you what elements make it up. In many cases, two element names are simply joined together and '**-ide**' put at the end. If the name ends in '**-ate** ' or '**-ite**', this tells you the compound contains oxygen atoms as well as the other elements named.

1 Complete this table.

Compound name	The elements that make up this compound
zinc chloride	Zn *and* Cl
copper sulfate	Cu *and* S *and* O
zinc oxide	
copper nitrate	
zinc hydroxide	
magnesium chloride	
sodium nitrate	
iron sulfate	
	K *and* I
calcium carbonate	

2 A **chemical formula** tells you which atoms are involved, and how many of each.

The ***letters*** show which elements make up the compound. Metal atoms are written first.

The ***numbers underneath*** show how many of each kind of atom make up one molecule of the compound. If no number is given, it means there is a single atom of that kind.

Another way of showing this kind of information is with **particle pictures**. The particle pictures drawn in the next table show the numbers of atoms, but not their exact arrangement or sizes.

CHALLENGE

3 Complete this table. For particle pictures show C particles = black, Na = grey, Cl = yellow, Mg = silver, O = red.

Compound name	Chemical formula	Number of atoms	Particle picture
Carbon dioxide	CO_2	3	
	NaCl	2	
Magnesium chloride			
Magnesium oxide			
	$AlCl_3$		

16 Formula to name

Date for completion: / / Parent sig: Teacher sig:

SP1 Unit 3.2 3.3

Rule reminders:

- The name of a compound can tell you what elements make it up. In many cases, two element names are simply joined together and '**-ide**' put at the end.
- If the name ends in '**-ate**' or '**-ite**', this tells you that the compound contains oxygen atoms as well as the other elements named.
- A metal atom is written first, non-metal(s) last.
- Some atoms tend to remain in groups. See the following table for details.

Group formula	Name of this group
OH	hydroxide
SO_4	sulfate
NO_3	nitrate
CO_3	carbonate
HCO_3	hydrogen carbonate (or bicarbonate)
NH_4	ammonium

Using the above rules, write a name for each of the following 10 compounds. When counting the number of atoms, a number after a bracket shows that there are two (or three) groups of all the atoms inside the brackets. If no number is given, it means there is a single atom (or group) of that kind.

Chemical formula	Total number of atoms	Name of compound
LiCl	2	
$CaCO_3$	5	
K_2CO_3		potassium carbonate
NaCl		
MgO		
$CaSO_4$		calcium sulfate
$Al_2(SO_4)_3$	17	
$Cu(NO_3)_2$		
KOH		_____ hydroxide
PbI_2		lead _____