Alder Grange School

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Dear Parents and Carers,

The Science Department is currently taking orders for new specification GCSE revision and practice guides for year nine and ten pupils. The package we are offering is for three books (one for each of the three sciences ) which combine revision notes and practise questions in a handy side by side manner – please see the graphic below for an example of this.

The books are from CGP, and are tailored towards the new specification science exams that will be taken for the first time in summer 2018. This means that unfortunately, if your child has inherited revision guides from an older sibling, their content will no longer be current. The good news is however, that as a school, we can purchase the new guides at a much cheaper price than you would be able to find them for in the shops or online. The guides contain the content for the complete course and as such will be useful from now until the point that your child takes their year eleven science exams.

Prices (retail price in brackets)

Set one pupils - **£16.50** (£32.97)

Pupils in all other sets - **£12.00** (£22.50)

Note: the books for set one pupils contain additional content as they are enrolled onto the Separate Sciences courses.

How to order

Pupils need to bring the money (either cash or cheques addressed to 'Alder Grange School') to **Student Services** by **Friday the 9th of June.** This will ensure that the guides arrive in time to be useful for the year ten mock exams and the year nine end of block tests. Pupils' names will be ticked off a list and we will ensure that the appropriate guides are ordered for each pupil.

The science department did a similar order earlier in the academic year – might my child already have these books?

The guides we are ordering this time round are the **CGP New Grade 9-1 GCSE Complete Revision & Practice guides with Online Edition**. These books were also on sale last time round, as part of a larger range of books (these books proved by far the most popular choice however). If your child is unsure whether or not they have already got these books, then they should bring their copies into school and ask their science teacher.

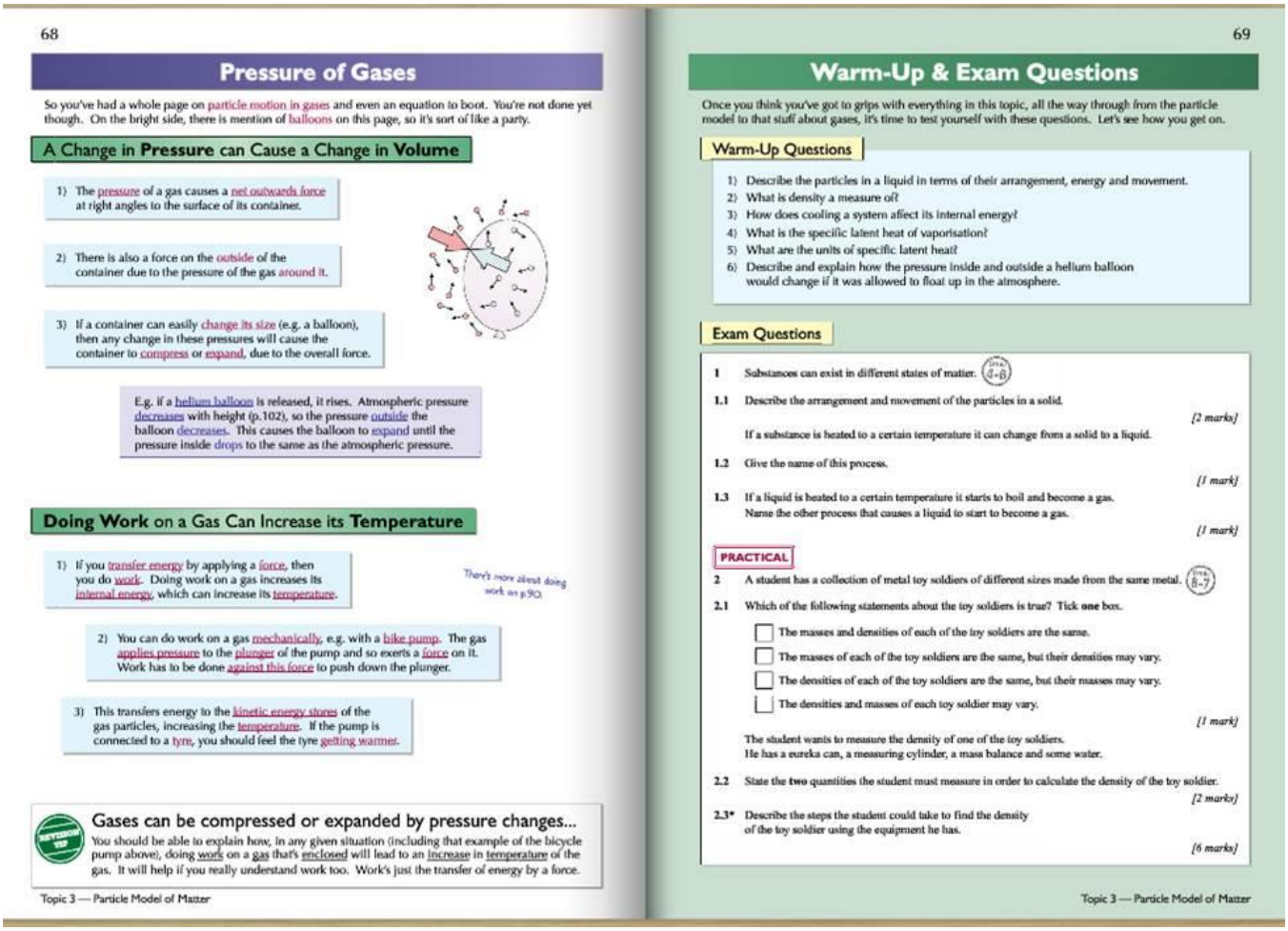
We are aware that some year nine pupils only ordered one out of the three books (e.g. biology but not chemistry or physics). If this is the case then they can buy the remaining books individually by the same means for £5.50 each (set one pupils) or £4.00 each (all other sets). They must indicate which books they require when they hand in their money and we will treat their order as a special case.

If parents have any questions, they can be addressed to science teachers via a note in the planner and we will be happy to help.

Kind Regards

Mr Grenfell

Curriculum Leader for Science.



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## Pressure of Gases

So you've had a whole page on particle motion in gases and even an equation to boot. You're not done yet though. On the bright side, there is mention of balloons on this page, so it's sort of like a party.

### A Change in **Pressure** can Cause a Change in **Volume**

1) The pressure of a gas causes a net outwards force at right angles to the surface of its container.

2) There is also a force on the outside of the container due to the pressure of the gas around it.

3) If a container can easily change its size (e.g. a balloon), then any change in these pressures will cause the container to compress or expand, due to the overall force.

E.g. if a helium balloon is released, it rises. Atmospheric pressure decreases with height (p.102), so the pressure outside the balloon decreases. This causes the balloon to expand until the pressure inside drops to the same as the atmospheric pressure.

### **Doing Work** on a Gas Can Increase its **Temperature**

1) If you transfer energy by applying a force, then you do work. Doing work on a gas increases its internal energy, which can increase its temperature.

There's more about doing work on p.90.

2) You can do work on a gas mechanically, e.g. with a bike pump. The gas applies pressure to the plunger of the pump and so exerts a force on it. Work has to be done against this force to push down the plunger.

3) This transfers energy to the kinetic energy stores of the gas particles, increasing the temperature. If the pump is connected to a tyre, you should feel the tyre getting warmer.

**Gases can be compressed or expanded by pressure changes...**

You should be able to explain how, in any given situation (including that example of the bicycle pump above), doing work on a gas that's enclosed will lead to an increase in temperature of the gas. It will help if you really understand work too. Work's just the transfer of energy by a force.



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## Warm-Up & Exam Questions

Once you think you've got to grips with everything in this topic, all the way through from the particle model to that stuff about gases, it's time to test yourself with these questions. Let's see how you get on.

### Warm-Up Questions

1) Describe the particles in a liquid in terms of their arrangement, energy and movement.
2) What is density a measure of?
3) How does cooling a system affect its internal energy?
4) What is the specific latent heat of vaporisation?
5) What are the units of specific latent heat?
6) Describe and explain how the pressure inside and outside a helium balloon would change if it was allowed to float up in the atmosphere.

### Exam Questions

**1** Substances can exist in different states of matter. (Grade 4–6)

**1.1** Describe the arrangement and movement of the particles in a solid.

*[2 marks]*

If a substance is heated to a certain temperature it can change from a solid to a liquid.

**1.2** Give the name of this process.

*[1 mark]*

**1.3** If a liquid is heated to a certain temperature it starts to boil and become a gas. Name the other process that causes a liquid to start to become a gas.

*[1 mark]*

**PRACTICAL**

**2** A student has a collection of metal toy soldiers of different sizes made from the same metal. (Grade 6–7)

**2.1** Which of the following statements about the toy soldiers is true? Tick **one** box.

- ☐ The masses and densities of each of the toy soldiers are the same.
- ☐ The masses of each of the toy soldiers are the same, but their densities may vary.
- ☐ The densities of each of the toy soldiers are the same, but their masses may vary.
- ☐ The densities and masses of each toy soldier may vary.

*[1 mark]*

The student wants to measure the density of one of the toy soldiers.
He has a eureka can, a measuring cylinder, a mass balance and some water.

**2.2** State the **two** quantities the student must measure in order to calculate the density of the toy soldier.

*[2 marks]*

**2.3*** Describe the steps the student could take to find the density of the toy soldier using the equipment he has.

*[6 marks]*