Christ Church
Grammar School
PERTH, WESTERN AUSTRALIA

Study and Test Skills

Physics and Chemistry

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Three Strands;

- **Science Inquiry Skills**
- **Science as a Human Endeavour**
- **Science Understanding**

These can be assessed through;

- **Calculation / Problem Solving**
- **Written Responses – these are generally short maximum 5-6 marks**
- **Drawing or Interpreting Graphs or Diagrams**

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Preparation for tests and examinations

- Completing homework
- Note making at home
- Ongoing Revision

Test and Examination Skills

- Efficient use of the data sheet
- Parsing questions for meaning and requirements
- Formatting of calculations

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Note Taking at Home

- Need to be hand-written
- Needs to be an ongoing process
- Should not be a word for word copy from the text – except for stated laws.

- Activity – highlight key words/phrases
- Rewrite as notes.
- 1 x chem 1 x physics paragraph (yr 10 or early Yr 11) students can choose

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- **There are four different states of matter – solid, liquid, gas and plasma.**

	Shape	Volume	Compressibility
Solid	Fixed	Fixed	Incompressible (mostly)
Liquid	Not fixed	Fixed	Incompressible (mostly)
Gas	Not fixed	Not fixed	compressible

- **Plasma – same as gas but made of charged particles.**
- **Kinetic particle model of matter – explains the states of matter and changes between states.**
- **Kinetic particle model of matter – all matter is made of small particles that are constantly moving.**

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Bonding in Metals

Physical Property	Reason
Malleability and ductility	layers of positive ions can slip over one another without disrupting the metallic bonding; metallic bonding is non-directional
Conductivity of electricity and heat	mobile, delocalised electrons transfer charge and heat energy in solids. Both neuclei and delocalized electrons act as charge carriers in a molten metal

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Studying for Understanding

- A large part of both Physics and Chemistry focuses on application of concepts.
- Your revision should not only involve the recall of key laws, formulae and concepts but also the understanding of them.
- You will be assessed on how you well you can utilise ideas not regurgitate them.

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So – what is the difference?

1. State Newton's First Law.

2. Seat belts are a compulsory car safety device in most countries. Explain, making reference to any appropriate laws, how a seat belt can prevent serious injury to a passenger in a car which is brought to a stop suddenly.

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1. An object in a state of uniform, straight-line motion will continue in its current state unless acted upon by a net, external force.
2.

- The seatbelt connects the passenger to the car, so that the force exerted by the brakes on the car is also exerted on the passenger.
- Newton's 1st Law states that An object in a state of uniform, straight-line motion will continue in its current state unless acted upon by a net, external force.
- If the passenger were not wearing a seatbelt, there would be no net, external force acting on them and they would continue in their uniform, straight-line motion.
- They would strike the windshield and the force of the windshield on the passenger would likely lead to serious injury.

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A CHEMISTRY EXAMPLE

1. What are the factors that affect the rate of a chemical reaction?
2. Use collision theory to explain why a chemical reaction between calcium carbonate and hydrochloric acid has a faster rate of reaction when the calcium carbonate is powdered.

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Factors Affecting Reaction Rate

1. The factors that affect the rate of a chemical reaction are temperature, concentration, gas pressure, state of subdivision of solids and addition of a catalyst.
2. Powdered calcium carbonate has a larger surface area than large lumps. This provides a greater surface area for reaction. There will be a higher frequency of collisions between the acid and the carbonate resulting in a higher number of collisions with energy greater than the activation energy and hence a higher rate of reaction.

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Consider the Scenario

- What is happening in the scenario.
- What law/concept does it link to?
- What are the key things that are being asked for in the question?

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A Chemistry Scenario:

- What is the question asking you to do?
- What tools do you need to solve the question?
- What skills do you need to have to be able to solve the problem?

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Working under timed conditions

- To prepare for sitting tests and examinations under timed conditions you should also aim to do some of your study under timed conditions.
- When you feel you have suitably revised, try sitting a past test paper under timed conditions – with no solutions near by.
- This will give you the best idea of how well you understand the concepts and how well you can apply them when under the pressure of time.
- Asking your teacher to mark practice tests that you do is another good way to gain feedback on your progress – they will not be as lenient as you might be tempted to be when it comes to marking your work.

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Formulae and Data Sheets

- **Knowing what is on the formulae and data sheet and where it is will save you time in a test/ examination.**

- **Always refer to them when completing homework and study.**

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Ask for assistance

- **Do not wait until you are struggling.**
- **Asking for assistance will**