



## Online Work to Support the Booklets

**Remember, Mr Cottrill is very happy to help. Please email!**



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### **Week 1: Week beginning 18<sup>th</sup> May**

Year 7	Year 8
<p><b><u>Lesson 1</u></b></p> <ul style="list-style-type: none"><li>• Read information in booklet and learn the properties of metals using look, cover, write and check.</li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li></ul> <p><b><u>Lesson 2</u></b></p> <ul style="list-style-type: none"><li>• Read information about chemical reactions and watch the video <a href="https://www.youtube.com/watch?v=37pir0ej_SE">https://www.youtube.com/watch?v=37pir0ej_SE</a></li><li>• You can watch the reaction in the example here: <a href="https://www.youtube.com/watch?v=s5ciTT5fOvs">https://www.youtube.com/watch?v=s5ciTT5fOvs</a></li><li>• Use these to help you answer the knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• Extension, watch this reaction <a href="https://www.youtube.com/watch?v=UdQ3GkIDRo4&amp;t=2s">https://www.youtube.com/watch?v=UdQ3GkIDRo4&amp;t=2s</a> and complete the extension questions in the booklet</li><li>• Check answers (using answers page) and correct using green pen.</li></ul> <p><b><u>Lesson 3</u></b></p> <ul style="list-style-type: none"><li>• Read the information in the booklet</li><li>• Watch the video: <a href="https://www.youtube.com/watch?v=t5srg32crLY">https://www.youtube.com/watch?v=t5srg32crLY</a></li></ul>	<p><b><u>Lesson 1</u></b></p> <ul style="list-style-type: none"><li>• Read information in the booklet</li><li>• When you get to the videos, click on this link: <a href="https://www.bbc.co.uk/bitesize/topics/zw982hv/articles/z7rtng8">https://www.bbc.co.uk/bitesize/topics/zw982hv/articles/z7rtng8</a></li></ul> <p>Both videos are on this page.</p> <ul style="list-style-type: none"><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• Complete the quiz at the bottom of the BBC Bitesize page</li></ul> <p><b><u>Lesson 2</u></b></p> <ul style="list-style-type: none"><li>• Read information in the booklet</li><li>• When you get to the video, click on this link: <a href="https://www.bbc.co.uk/bitesize/topics/zw982hv/articles/z27mgdm">https://www.bbc.co.uk/bitesize/topics/zw982hv/articles/z27mgdm</a></li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• <b><u>Practical Activity:</u></b> Newton's Disc</li></ul> <p><i>You can experiment with light by making your own Newton's disc!</i></p> <p><a href="https://www.stem.org.uk/resources/elibrary/resource/28166/newton-wheel#&amp;gd=undefined&amp;pid=1">https://www.stem.org.uk/resources/elibrary/resource/28166/newton-wheel#&amp;gd=undefined&amp;pid=1</a></p>



- Answer knowledge questions in full sentences
- Check answers (using answers page) and correct using green pen.

#### **Lesson 4**

- Read the information in the booklet and answer knowledge questions in full sentences
- Check answers (using answers page) and correct using green pen.
- Complete the Friday Quiz:

<https://forms.gle/N8MiJ8za6BzvtKQz5>

#### **Lesson 3:**

- Read information in the booklet
- When you get to the videos, click on this link:  
<https://www.bbc.co.uk/bitesize/topics/zw982hv/articles/z8mmb82>
- Answer knowledge questions in full sentences
- Check answers (using answers page) and correct using green pen.
- Make notes on the documentary, pause regularly and use the remaining time in this lesson and next lesson to make your notes (open in chrome)

<https://www.dailymotion.com/video/x60naop>

#### **Lesson 4:**

- Continue to watch documentary and make notes, pausing as you go.
- Complete the Friday Quiz:

<https://forms.gle/EUrFSDbWdsvQfUER7>



## Week 2: Week beginning 25<sup>th</sup> May (Half term – have a break!)

## Week 3: Week beginning 01<sup>st</sup> June

Year 7	Year 8
<p><b><u>Lesson 1</u></b></p> <ul style="list-style-type: none"><li>• Read the booklet</li><li>• Watch the reaction of the alkali metals with water <a href="https://www.youtube.com/watch?v=JAPWCJEo9Iw">https://www.youtube.com/watch?v=JAPWCJEo9Iw</a></li><li>• As you watch the video fill in the results table.</li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• As an extension, go to <a href="https://www.bbc.co.uk/bitesize/guides/z3773k7/revision/2">https://www.bbc.co.uk/bitesize/guides/z3773k7/revision/2</a></li><li>• Make notes on the video</li><li>• Use this to explain why reactivity increases down group</li><li>• Complete the quiz on BBC Bitesize.</li></ul> <p><b><u>Lesson 2</u></b></p> <ul style="list-style-type: none"><li>• Read the booklet</li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• Then memorise the names and symbols of the metals in the reactivity series in order. Do this by doing look, cover, write, check. When you think you have learnt them ask someone to quiz you.</li></ul> <p><b><u>Lesson 3</u></b></p> <ul style="list-style-type: none"><li>• Read the booklet</li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li></ul>	<p><b><u>Lesson 1</u></b></p> <ul style="list-style-type: none"><li>• Watch the video clip: <a href="https://www.youtube.com/watch?v=TsQL-sXZOLc">https://www.youtube.com/watch?v=TsQL-sXZOLc</a></li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li></ul> <p><b><u>Lesson 2</u></b></p> <ul style="list-style-type: none"><li>• Answer knowledge questions in full sentences</li><li>• Watch video clips: <a href="https://www.youtube.com/watch?v=CVsdXKO9xIk">https://www.youtube.com/watch?v=CVsdXKO9xIk</a> <a href="https://www.youtube.com/watch?v=0Anh9HthWgQ">https://www.youtube.com/watch?v=0Anh9HthWgQ</a></li><li>• Check you are happy with your answers.</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• Answer remaining knowledge questions</li><li>• Check answers</li></ul> <p><b><u>Lesson 3</u></b></p> <ul style="list-style-type: none"><li>• Watch video clip: <a href="https://www.youtube.com/watch?v=BL2MtP7j-xk">https://www.youtube.com/watch?v=BL2MtP7j-xk</a></li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• Complete definitions task</li></ul> <p><b><u>Lesson 4</u></b></p> <ul style="list-style-type: none"><li>• Complete the Friday quiz: <a href="https://forms.gle/fGkoPrclMFZbJeoB6">https://forms.gle/fGkoPrclMFZbJeoB6</a></li></ul>



- You can watch a video of the reaction mentioned in the booklet here:  
<https://www.youtube.com/watch?v=KmhD8BmEFlo>

#### **Lesson 4**

- Watch the videos of the displacement reaction experiment: (*you will need to watch both videos to know the result*):  
<https://www.youtube.com/watch?v=-QhDuVtS35E>  
<https://www.youtube.com/watch?v=7Pm5-ox6YGM>

*The metals used in the second video are the same, however the some of the metal solutions used are different e.g. magnesium sulfate ( $MgSO_4$ ) rather than magnesium nitrate ( $Mg(NO_3)_2$ ). This does not affect the experiment at all as the metals in the solutions are still the same, in this case magnesium.*

- Fill in the results table below by writing 'displacement' or 'no displacement' in each of the boxes.
- Answer knowledge questions in full sentences
- Check answers (using answers page) and correct using green pen.
- Complete the Friday quiz:  
<https://forms.gle/XCg1w83h7mySkj4N9>

- Watch the videos:  
<https://www.youtube.com/watch?v=CVsdXKO9xlk>  
<https://www.youtube.com/watch?v=0Anh9HthWgQ>  
<https://www.youtube.com/watch?v=BL2MtP7j-xk>  
<https://www.youtube.com/watch?v=TsQL-sXZOLc>
- Answer knowledge questions in full sentences
- Check answers (using answers page) and correct using green pen.



## Week 4: Week beginning 08<sup>th</sup> June

Year 7	Year 8
<p><b><u>Lesson 1</u></b> <i>Try to answer the questions from memory first but use the booklet to help you if you need it.</i></p> <ul style="list-style-type: none"><li>• Complete the deliberate practice questions</li><li>• Check answers (using answers page) and correct using green pen.</li></ul> <p><b><u>Lesson 2</u></b> <i>Try to answer the questions from memory first but use the booklet to help you if you need it.</i></p> <ul style="list-style-type: none"><li>• Complete the deliberate practice questions</li><li>• Check answers (using answers page) and correct using green pen.</li></ul> <p><b><u>Lesson 3</u></b></p> <ul style="list-style-type: none"><li>• Read the booklet and answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li></ul> <p><b><u>Lesson 4</u></b></p> <ul style="list-style-type: none"><li>• Read the booklet</li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• Complete the Friday quiz: <a href="https://forms.gle/SG9uAeh11DY1bBV28">https://forms.gle/SG9uAeh11DY1bBV28</a></li></ul>	<p><b><u>Lesson 1</u></b></p> <ul style="list-style-type: none"><li>• Watch the video clip: <a href="https://www.youtube.com/watch?v=CYY_RJgmvAc">https://www.youtube.com/watch?v=CYY_RJgmvAc</a></li><li>• Read the booklet</li><li>• Answer knowledge questions</li><li>• Check your answers and mark with green pen.</li><li>• Finish with video clip up to 1.06 mins: <a href="https://www.bbc.co.uk/bitesize/clips/z7qb9i6">https://www.bbc.co.uk/bitesize/clips/z7qb9i6</a></li></ul> <p><b><u>Lesson 2</u></b></p> <ul style="list-style-type: none"><li>• Watch the video clip from 2.26-3.06 mins: <a href="https://www.youtube.com/watch?v=BL2MtP7j-xk">https://www.youtube.com/watch?v=BL2MtP7j-xk</a></li><li>• Read the booklet</li><li>• Answer knowledge questions</li><li>• Check your answers and mark with green pen.</li><li>• Watch video clip 2.10 min to end: <a href="https://www.bbc.co.uk/bitesize/clips/z7qb9i6">https://www.bbc.co.uk/bitesize/clips/z7qb9i6</a></li><li>• Answer knowledge questions</li><li>• Check your answers and mark with green pen.</li></ul> <p><b><u>Lesson 3</u></b></p> <ul style="list-style-type: none"><li>• Watch the video clips: <a href="https://www.youtube.com/watch?v=CYY_RJgmvAc">https://www.youtube.com/watch?v=CYY_RJgmvAc</a> <a href="https://www.youtube.com/watch?v=7aU8sX8cFNs">https://www.youtube.com/watch?v=7aU8sX8cFNs</a> <a href="https://www.youtube.com/watch?v=Gr4if3vZXgw">https://www.youtube.com/watch?v=Gr4if3vZXgw</a></li><li>• Answer knowledge questions</li><li>• Check answers and mark in green pen.</li><li>• Complete Bitesize quiz:</li></ul>



<https://www.bbc.co.uk/bitesize/guides/zq7thyc/test>

- Answer remaining knowledge questions in your book by drawing out the ray diagrams in full.
- Check your answers and mark with green pen.

#### **Lesson 4**

- Complete the Friday quiz:  
<https://forms.gle/Rg4AitsU6dFA5dc3A>
- Read the information from the booklet
- Watch the video (a favourite!)  
<https://www.youtube.com/watch?v=Gf33ueRXMzQ>
- Answer knowledge questions
- Check answers and mark in green pen.
- Watch the video on the EM spectrum:  
<https://www.youtube.com/watch?v=bjOGNVH3D4Y>
- Answer knowledge questions
- Check answers and mark in green pen
- Complete extension question and mark it.



## Week 5: Week beginning 15<sup>th</sup> June

Year 7	Year 8
<p><b>Lesson 1</b></p> <ul style="list-style-type: none"><li>• Read the booklet and answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• There are also instructions in the back of the booklet for making and testing your own indicator.</li></ul> <p><i>We would love to see a picture of your experiment if you give it a try, send them to Mr Cottrill at <a href="mailto:scottrill@merciaschool.com">scottrill@merciaschool.com</a></i></p> <p><b>Lesson 2</b></p> <ul style="list-style-type: none"><li>• Read the booklet</li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li><li>• Watch a video demonstration of neutralisation here: <a href="https://www.youtube.com/watch?v=5HpcEaQI40U">https://www.youtube.com/watch?v=5HpcEaQI40U</a></li></ul> <p><b>Lesson 3</b></p> <ul style="list-style-type: none"><li>• Read the booklet</li><li>• Answer knowledge questions in full sentences</li><li>• Check answers (using answers page) and correct using green pen.</li></ul> <p><b>Lesson 4</b></p> <ul style="list-style-type: none"><li>• Complete the <b>BIG QUIZ</b> of 100 questions, this will test your knowledge of the entire unit: <a href="https://forms.gle/t1eyw3ofGJrLs4TLA">https://forms.gle/t1eyw3ofGJrLs4TLA</a></li></ul>	<p><b>Lesson 1</b></p> <ul style="list-style-type: none"><li>• Read the booklet</li><li>• Watch the videos <a href="https://www.youtube.com/watch?v=CsKuHp4bPkQ">https://www.youtube.com/watch?v=CsKuHp4bPkQ</a> <b>Warning – The video below contains a dissection of a horse eye</b> <a href="https://www.youtube.com/watch?v=kFzGvIFAp_w">https://www.youtube.com/watch?v=kFzGvIFAp_w</a></li><li>• Annotate the eye diagram in your booklet</li><li>• Check your answers and mark with green pen.</li><li>• Self-test the eye parts and functions.</li></ul> <p><b>Lesson 2</b></p> <ul style="list-style-type: none"><li>• Watch the video clip: <a href="https://www.bbc.co.uk/bitesize/guides/z8d2mp3/revision/3">https://www.bbc.co.uk/bitesize/guides/z8d2mp3/revision/3</a></li><li>• Read the booklet</li><li>• Answer knowledge questions</li><li>• Check your answers and mark with green pen.</li><li>• Watch this interesting hearing video and test yourself: <a href="https://www.youtube.com/watch?v=SHFwmPQ_rQ">https://www.youtube.com/watch?v=SHFwmPQ_rQ</a></li></ul> <p><b>Lesson 3</b></p> <ul style="list-style-type: none"><li>• Watch the video clip at: <a href="https://www.bbc.co.uk/bitesize/guides/zt7srwx/revision/1">https://www.bbc.co.uk/bitesize/guides/zt7srwx/revision/1</a></li><li>• Answer knowledge question</li><li>• Check your answer and mark with green pen.</li></ul> <p><b>Lesson 4</b></p> <ul style="list-style-type: none"><li>• Complete the <b>BIG QUIZ</b> of 100 questions, this will test your knowledge of the entire unit: <a href="https://forms.gle/wtywTp57WbDJxKZx8">https://forms.gle/wtywTp57WbDJxKZx8</a></li></ul>



## Week 6: 22<sup>nd</sup> June

Year 7	Year 8
<p><b>Extension</b></p> <ul style="list-style-type: none"><li>• Watch this short documentary on acid rain and make notes: <a href="https://www.youtube.com/watch?v=5cqCvcX7buo">https://www.youtube.com/watch?v=5cqCvcX7buo</a></li><li>• Turn this into a piece of extended writing about what acid rain is and what causes it</li></ul>	<p><b>Extension</b></p> <ul style="list-style-type: none"><li>• Watch these videos extension videos to increase your knowledge to the next level: <a href="https://www.youtube.com/watch?v=RVyHkV3wlyk">https://www.youtube.com/watch?v=RVyHkV3wlyk</a> <a href="https://www.youtube.com/watch?v=g0JGEmbSiE">https://www.youtube.com/watch?v=g0JGEmbSiE</a> <a href="https://www.youtube.com/watch?v=9JPNVJ_LC3E">https://www.youtube.com/watch?v=9JPNVJ_LC3E</a></li></ul>

## Week 7: 29<sup>th</sup> June

Year 7	Year 8
<ul style="list-style-type: none"><li>• Make your own knowledge organiser for this unit of work</li><li>• Have a go on the sporcle quizzes</li><li>• Self-test yourself on the contents of the unit</li><li>• Email you work to Mr Cottrill to have it checked or get feedback on how to make it even better.</li></ul> <p> <a href="mailto:scottrill@merciaschool.com">scottrill@merciaschool.com</a></p>	<ul style="list-style-type: none"><li>• Make your own knowledge organiser for this unit of work</li><li>• Have a go on the sporcle quizzes</li><li>• Self-test yourself on the contents of the unit</li><li>• Email you work to Mr Cottrill to have it checked or get feedback on how to make it even better.</li></ul> <p> <a href="mailto:scottrill@merciaschool.com">scottrill@merciaschool.com</a></p>

Additional Science Work  
Mercia School  
May 2020

# Year 7

# Booklet

# Answers

## **BOOKLET 2 YEAR 7 – CHECK YOUR WORK! GREEN PEN** **YOUR RESPONSES.**

### **Week 1: w/b 18<sup>th</sup> May**

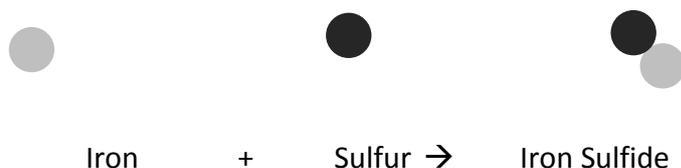
#### **Lesson 1: Metals and Non-metals**

1. All metals are good conductors of electricity and heat, lustrous (shiny), ductile, malleable and sonorous.
2. The properties of non-metals are generally the opposite of metals. Where metals are usually solid at room temperature and lustrous, non-metals are usually liquids or gases at room temperature and are dull. Non-metals are poor conductors of heat and electricity and brittle, unlike metals.
3. Plastic is used as a coating for copper in electrical wiring because unlike copper it does not conduct electricity. The plastic around the copper wire stops electricity being conducted to any person or object which touches the wire which would be dangerous.
4. Mercury is a liquid at room temperature. This shows that the intermolecular forces between particles of mercury are weaker than in other metals. At room temperature the intermolecular forces in mercury are too weak to hold the particles together, allowing particles to move freely and flow.
5.
  - a. The property of metal most useful for making a barbecue is that metal is a good conductor of heat. The metal conducts the thermal energy of the hot coals, which cooks the food.
  - b. The properties of metal most useful for making water pipes is that metal is malleable and so can be shaped into hollow pipes. Metal is also strong which means that it can withstand the force of being knocked without the pipe breaking.
  - c. The properties of metal most useful for making a cymbal for a drum kit is that metal is sonorous and so rings when it is hit.
  - d. The properties of metal most useful for making a car is that metal is malleable and so can be hammered and bent into shape.

#### **Lesson 2: Chemical Reactions**

1. A chemical change is when new products are made.
2. The signs that a chemical reaction has taken place are that bubbles of gas are given off, there is a change in temperature, a colour change, or a solid is formed.
3. Freezing water is not a chemical reaction because it does not produce any new substance. The water particles undergo a change of state when their internal energy decreases. This is reversible and increasing the temperature changes the water from a solid back into a liquid.
4. A reactant is a chemical which goes into a reaction.
5. A product is a chemical which is made in a reaction.
6. The reactants in the reaction Methane + Oxygen  $\rightarrow$  Carbon Dioxide + Water are methane and oxygen. The products are carbon dioxide and water.

- Aluminium + Oxygen  $\rightarrow$  Aluminium oxide
- Sulfur is a dull, yellow solid and iron is a lustrous, silvery metal solid before the reaction.
- Heat is needed to start the reaction between iron and sulfur.
- A chemical reaction has taken place because the appearance of the reactants has changed. The two reactants have formed one new solid product which is a different colour to the reactants.
- The product of the reaction is a dull black solid whereas the reactants were a dull yellow solid and a lustrous silvery solid. The product of the reaction is also magnetic whereas sulfur was not.
- 



### Lesson 3: Metals and Acids

- When magnesium and hydrochloric acid are added to a test tube bubbles of gas are produced and the temperature of the mixture increases, these are signs that a chemical reaction is taking place.
- The test for hydrogen gas is called the squeaky pop test. Hydrogen gas is collected in a test tube and ignited using a lit splint. If hydrogen gas is present a squeaky pop sound will be heard.
- The reactants in the reaction are magnesium and hydrochloric acid, because they are written to the left of the arrow. In this reaction they will react and be used up.
- The products in the reaction are magnesium chloride and hydrogen, because they are written to the right of the arrow. They will not be present at the start of the reaction but will be made during the reaction.
- The reactant in the reaction is sodium hydrogen carbonate, because it is written to the left of the arrow. In this reaction they will react and be used up.
- The products in the reaction are sodium carbonate, carbon dioxide and water because they are written to the right of the arrow. They will not be present at the start of the reaction but will be made during the reaction.
- Hydrogen is formed in the reaction between nitric acid and zinc metal as nitric acid contains hydrogen atoms. When nitric acid reacts with zinc, the zinc atom replaces the hydrogen atoms in nitric acid to form zinc nitrate. The hydrogen atoms which remain form hydrogen gas.

### Lesson 4: Alkali Metals + Quiz

- The Alkali Metals are called alkali because they react with water to form alkaline compounds.
- The Alkali metals are found in group 1 of the periodic table.
- The Alkali Metals react with water to form metal hydroxides.

- Alkali metals react with water to form hydrogen gas, the squeaky pop test is used to test for the presence of hydrogen.
- Sodium hydroxide and hydrogen are produced when sodium reacts with water.

## Week 2: w/b 25<sup>th</sup> May – Have a break

## Week 3: w/b 1<sup>st</sup> June

### Lesson 1: Reactivity of Alkali Metals

- Reactivity increases down group 1.
- The Alkali Metals are stored under oil as they react with oxygen in the air which causes them to tarnish. Storing them under oil also prevents them from reacting with water, as some alkali metals react vigorously with water.
- Lithium + Water → Lithium Hydroxide + Hydrogen  
Sodium + Water → Sodium Hydroxide + Hydrogen  
Potassium + Water → Potassium Hydroxide + Hydrogen  
Rubidium + Water → Rubidium Hydroxide + Hydrogen  
Caesium + Water → Caesium Hydroxide + Hydrogen  
Francium + Water → Francium Hydroxide + Hydrogen

### Lesson 2: The Reactivity Series

- The order of the reactivity series is; K, Na, Li, Ca, Mg, Al, C, Zn, Fe, Pb, H, Cu, Ag, Au, Pt.
- The most reactive metal in the reactivity series is potassium.
- The least reactive metal in the reactivity series is platinum.
- Lithium would be a poor choice of metal for making water pipes as lithium is high on the reactivity series and so easily reacts with water to form lithium hydroxide and hydrogen.

### Lesson 3: Displacement Reactions

- The signs that a chemical reaction has taken place are that bubbles of gas are given off, there is a change in temperature, a colour change, or a solid is formed.
- The rule of displacement is that a more reactive element displaces a less reactive element from its compound.
- Magnesium and iron are both more reactive than copper as they both displace copper from copper sulfate. However, magnesium is more reactive than iron as it displaces copper from copper sulfate more quickly.

### Lesson 4: Displacement Investigation + Quiz

	Mg(NO <sub>3</sub> ) <sub>2</sub>	CuSO <sub>4</sub>	Zn(NO <sub>3</sub> ) <sub>2</sub>	FeCl <sub>2</sub>
Mg		Displacement	Displacement	Displacement
Cu	No displacement		No displacement	No displacement

<b>Zn</b>	No displacement	Displacement		Displacement
<b>Fe</b>	No displacement	Displacement	No displacement	

1. Iron is more reactive than copper because iron can displace copper from its compound, but copper cannot displace iron from its compound.
2. Magnesium is more reactive than copper because magnesium can displace copper from its compound, but copper cannot displace magnesium from its compound.
3. Zinc is more reactive than iron because zinc can displace iron from its compound, but iron cannot displace zinc from its compound.
4. The order of reactivity of the metals tested from most to least reactive is; magnesium, zinc, iron, copper.
5. Magnesium is the most reactive of the four metals because it can displace all of the other metals from their compounds, copper is the least reactive because it cannot displace any of the other metals from their compounds. Zinc is more reactive than iron because zinc can displace iron from its compounds and so is the second most reactive of the metals.
6. If aluminium were placed into magnesium nitrate solution the aluminium will not displace magnesium as it is less reactive.
7. If magnesium metal were placed into aluminium sulfate solution, there would be no chemical reaction as magnesium is less reactive than aluminium and so is unable to displace it from a compound.
8.  $\text{Zinc} + \text{Iron Sulfate} \rightarrow \text{Zinc Sulfate} + \text{Iron}$
9.  $\text{Lead} + \text{Iron Sulfate} \rightarrow \text{Lead} + \text{Iron Sulfate}$
10. No hydrogen is produced when hydrochloric acid is added to copper because copper is an unreactive metal and so does not react with hydrochloric acid.
11. Displacement of metals using metal salts is used in extraction of metals.

## Week 4: w/b 8<sup>th</sup> June

### Lesson 1: Reactivity Deliberate Practice

1. The alkali metals are found in group 1 of the periodic table. They are all soft metals which are lustrous when cut. They appear dull before they are cut as the surface of the metal reacts with oxygen in the air.  
 All the alkali metals react vigorously with water to form alkaline compounds called metal hydroxides, and hydrogen.  
 Lithium (Li) – fizzes steadily on surface of water, slowly becomes smaller until it disappears.  
 Sodium (Na) – melts to form a ball, fizzes rapidly, quickly become smaller until it disappears.  
 Potassium (K) – quickly melts to form a ball, burns violently with sparks and a lilac flame, disappears rapidly with a small explosion.
2. Lithium + Water  $\rightarrow$  Lithium Hydroxide + Hydrogen  
 $\text{Li} + \text{H}_2\text{O} \rightarrow \text{LiOH} + \text{H}_2$   
 Sodium + Water  $\rightarrow$  Sodium Hydroxide + Hydrogen



Potassium + Water  $\rightarrow$  Potassium Hydroxide + Hydrogen



3. Reactivity increases down group 1 of the periodic table. This is because all the group 1 elements have one electron in their outer shell, which is given away when the metal reacts with water. This outer electron is negatively charged and so attracted to the positively charged protons in the nucleus of the atom. The number of shells of electrons increases down the group as the atoms get bigger, and so the distance between the outer electron and the nucleus increases. This means that the strength of the attraction between the outer electron and the nucleus decreases down the group and the outer electron is more easily lost, increasing reactivity.
4. The group 1 elements are called the Alkali Metals because they react with water to form alkaline compounds called metal hydroxides, such as lithium hydroxide. Metal hydroxides dissolve in water to give a pH greater than 7. This reaction also produces hydrogen gas which will produce a squeaky pop sound if ignited.

## Lesson 2: Displacement Deliberate Practice

1. The order of the reactivity series is; K, Na, Li, Ca, Mg, Al, C, Zn, Fe, Pb, H, Cu, Ag, Au, Pt.
2. The reactivity series shows metals in order of their reactivity and shows which metals a metal will be able to displace.
3. A more reactive metal will be able to displace a less reactive metal from its compound e.g. Magnesium + Zinc Sulfate  $\rightarrow$  Magnesium Sulfate + Zinc.
- 4.

Chemical	Symbol / formulae	Chemical	Symbol / formulae
Iron	Fe	Sodium chloride	NaCl
Sulfur	S	Calcium	Ca
Oxygen	O	Hydrogen	H
Sulfate	SO <sub>4</sub>	Lithium	Li
Magnesium	Mg	Copper sulfate	CuSO <sub>4</sub>
Zinc	Zn	Magnesium sulfate	MgSO <sub>4</sub>
Copper	Cu	Zinc sulfate	ZnSO <sub>4</sub>
Potassium	K	Iron sulfate	FeSO <sub>4</sub>
Sodium	Na	Aluminium sulfate	Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>
Chlorine	Cl	Hydrochloric acid	HCl

5.

a. Copper + Copper sulfate → No reaction



b. Zinc + Copper sulfate → Zinc Sulfate + Copper



c. Magnesium + Zinc sulfate → Magnesium Sulfate + Zinc



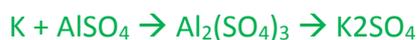
d. Iron + Magnesium sulfate → No reaction



e. Magnesium + Iron sulfate → Magnesium sulfate + Iron



f. Potassium + Aluminium sulfate → Potassium sulfate + Aluminium



### Lesson 3: Acids

1. Some examples of common acids are citric acid, found in fruits such as lemons and oranges, ethanoic acid found in vinegar, carbonic acid found in fizzy drinks, and tannic acid found in tea.
2. Sulfuric acid and nitric acid are used to make fertilisers.
3. All acids contain hydrogen atoms.
4. All acids release hydrogen ions.
5. A substance which contains oxygen, sulfur and hydrogen and has a sour taste could be an acid because all acids contain the element hydrogen, and some have a sour taste. This substance could be sulfuric acid based on the elements it contains.

### Lesson 4: Alkalis + Quiz

1. Bleach, oven cleaner, disinfectant and washing powder contain alkalis.
2. One basic substance which are safe to put in your mouth is baking powder. Basic substances which are not safe to put in your mouth are bleach, oven cleaner, disinfectant, washing powder and soap.
3. If there were no alkalis you would find it harder to clean your body, hair, house and clothes. You would also struggle to make a cake rise as baking powder is a basic ingredient.
4. All alkalis contain the elements hydrogen and oxygen and release hydroxide ( $\text{OH}^-$ ) ions.

## Week 5: w/b 15<sup>th</sup> June

### Lesson 1: Indicators

1. An indicator changes colour based on pH.

2. Red litmus paper does not change in acid but turns blue in an alkaline solution. Blue litmus paper does not change in an alkali but turns red in an acidic solution.
3. If universal indicator is added to a liquid and changes to yellow, the liquid has a pH of 4.
4. As pH number decreases, the strength of an acid increases.
5. As pH number decreases, the strength of an alkali decreases.

## Lesson 2: Neutralisation

1. Neutralisation occurs when an acid and an alkali react together to form a salt and water. This produces a solution with a pH of 7.
2. The products of a neutralisation reaction are a salt and water. The name of the salt depends on the acid and alkali which are reacted together.
3. The pH of an acidic solution increases when an alkali is added. This is because the alkali will neutralise some of the acid, producing water which has a pH of 7. As more alkali is added more of the acid will be neutralised and the pH will get closer to 7.
4. As the solution changed from a strong alkali to neutral the colour of the indicator changed from purple to blue to green.
5. If more acid is added to an alkali after the neutral point is reached the pH of the solution will decrease as it becomes more acidic. Universal indicator will turn from green to yellow.

## Lesson 3: Neutralisation – Part 2

1. The general equation for neutralisation is Acid + Alkali  $\rightarrow$  Salt + Water
2.
  - a. Water is always produced in neutralisation.
  - b. A salt is always produced in neutralisation but the name of the salt will depend on the name of the acid and alkali which are reacted together.
3.
  - a. Hydrochloric Acid + Sodium Hydroxide  $\rightarrow$  Water + Sodium Chloride
  - b. Hydrochloric + Magnesium  $\rightarrow$  Water + Magnesium Chloride  
Acid                      Hydroxide                      Chloride
  - c. Sulfuric Acid + Sodium Hydroxide  $\rightarrow$  Water + Sodium Sulfate
  - d. Sulfuric Acid + Magnesium Hydroxide  $\rightarrow$  Water + Magnesium Sulfate
  - e. Phosphoric + Potassium  $\rightarrow$  Water + Potassium Phosphate  
Acid                      Hydroxide                      Phosphate
  - f. Calcium Hydroxide + Nitric Acid  $\rightarrow$  Water + Calcium Nitrate
  - g. Barium Hydroxide + Ethanoic Acid  $\rightarrow$  Water + Barium Ethanoate

## Lesson 4: Acids and Alkalis Deliberate Practice + Quiz

1. All acids contain hydrogen atoms.
2. All acids release hydrogen ions (H<sup>+</sup>)
3. Some examples of common acids are citric acid, found in fruits such as lemons and oranges, ethanoic acid found in vinegar, carbonic acid found in fizzy drinks, and tannic acid found in tea.
4. Acids have a pH between 1 and 7.
5. All alkalis contain the elements oxygen and hydrogen.

6. All alkalis release hydroxide ions ( $\text{OH}^-$ )
7. Bases take in  $\text{H}^+$  ions. All alkalis are bases which can take in  $\text{H}^+$  ions and dissolve in water.
8. Alkalis found in the home include baking powder, bleach, oven cleaner, disinfectant, washing powder and soap.
9. Alkalis have a pH between 7 and 14.
10. Red litmus paper does not change in acid but turns blue in an alkaline solution. Blue litmus paper does not change in an alkali but turns red in an acidic solution.
11. Universal indicator changes colour depending on the pH of a substance e.g. it is red at pH 1, green at pH 7 and purple at pH 14.
12. An advantage of using universal indicator to test pH rather than litmus paper is that litmus paper can only tell you if a substance is an acid or an alkali, whereas universal indicator can tell you the pH of a substance.
13. Neutralisation occurs when an acid and alkali react together to produce salt and water. If a substance is completely neutralised it will have a pH of 7.
14. Acid + Alkali  $\rightarrow$  Salt + Water
15. Hydrochloric acid + Sodium hydroxide  $\rightarrow$  Water + Sodium chloride  
 $\text{HCl} + \text{NaOH} \rightarrow \text{H}_2\text{O} + \text{NaCl}$
16. Universal indicator could be used to show that neutralisation occurs when an acid and an alkali are added together as when universal indicator is added to the acid and alkali, they will turn red and purple respectively. If the alkali is gradually added to the acid the universal indicator will turn from red to yellow to green, showing that the pH of the solution is now neutral.

# Year 8 Booklet Answers

## **BOOKLET 2 YEAR 8 – CHECK YOUR WORK! GREEN PEN YOUR RESPONSES.**

### **Week 1: w/b 18<sup>th</sup> May**

#### **Lesson 1: Colour**

##### **Knowledge Questions**

1. What is it that determines colour?

The frequency/wavelength of the light

2. Visible light is one part of what spectrum?

The electromagnetic spectrum

3. Which colour has the lowest frequency?

Red

4. Which colour has the highest frequency?

Blue

5. Which 3 colours of light are needed to make up all other colours?

Red, green and blue

6. What is the collective name for the three colours of light that make up all colours?

The primary colours

7. What rains down from the sun?

White light

8. Why do you get rainbows?

The sun's white light is split into its different colours. Different colours of light are reflected at different angles from raindrops.

9. Which colours can our eyes detect?

Red, green and blue

10. How would you make yellow light?

Mix red and green light

11. How would you make white light?

Mix all colours of light

#### **Lesson 2: Light waves**

##### **Knowledge Questions**

1. Do light waves need to travel through particles?

No

2. What is faster? Light or sound?

Light

3. How does light travel?

As an electromagnetic wave

4. Can light travel through a vacuum?

Yes

5. How can you detect light?

With our eyes or with cameras

6. Which substances cause light to change direction?

Glass and water

7. How fast does light travel?

300 million metres per second

8. What is the SI unit of speed?

Metres per second (m/s)

### **Extension Question**

9. What is the conversion from m/s to km/h to miles per hour? Use 1 m/s to help you.

Multiply by 3.6

## **Lesson 3: Sound waves**

### **Knowledge Questions**

1. What affects how sounds sound?

The size of the vibrations affects

2. How do sound diffusers work?

It reflects the sound in different directions away from the listener

3. Why do you hear a drum when it is hit?

When you bang a drum its skin vibrates. The harder you bang, the bigger the vibrations. The vibrating drum skin causes nearby air particles to vibrate, which in turn causes other nearby air particles to vibrate. These vibrating particles make up a sound wave.

4. How does sound travel?

Sound travels as a wave

5. How fast does sound travel?

343 m/s

6. How do we detect sounds?

Sounds cause our ear drum to vibrate

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7. What do hard surfaces do to sounds?

Hard surfaces reflect sound well

8. What do soft surfaces do to sounds?

Soft surfaces absorb sounds

**Lesson 4:** Sound documentary + Quiz

n/a

## Week 2: w/b 25<sup>th</sup> May – Have a break

## Week 3: w/b 1<sup>st</sup> June

### Lesson 1: Describing sound waves

#### Knowledge Questions

1. What are the two types of sound?

High pitch and low pitch

2. How do loudspeakers work?

Loudspeakers push on the air next to it repeatedly. This causes the air to push on the air next to it and so the pulse travels away from the speaker.

3. How fast does sound travel?

343m/s

4. What are the two types of wave?

Transverse and longitudinal waves

5. What is frequency?

The number of vibrations, also known as oscillations, per second

6. What is the unit of frequency?

Hertz, Hz

7. What frequency can human hearing detect?

20Hz – 20,000Hz

8. What is the name for a device that takes a sound and represents it as a wave?

An oscilloscope

9. What happens to a speaker as frequency increases?

The speaker moves in and out more times per second

10. What is pitch?

Pitch is the frequency of sound

11. What is the relationship between pitch and frequency?

A high pitch sound has a high frequency

12. What is wavelength?

One wavelength is the distance between one peak or trough of a wave.

13. What is amplitude?

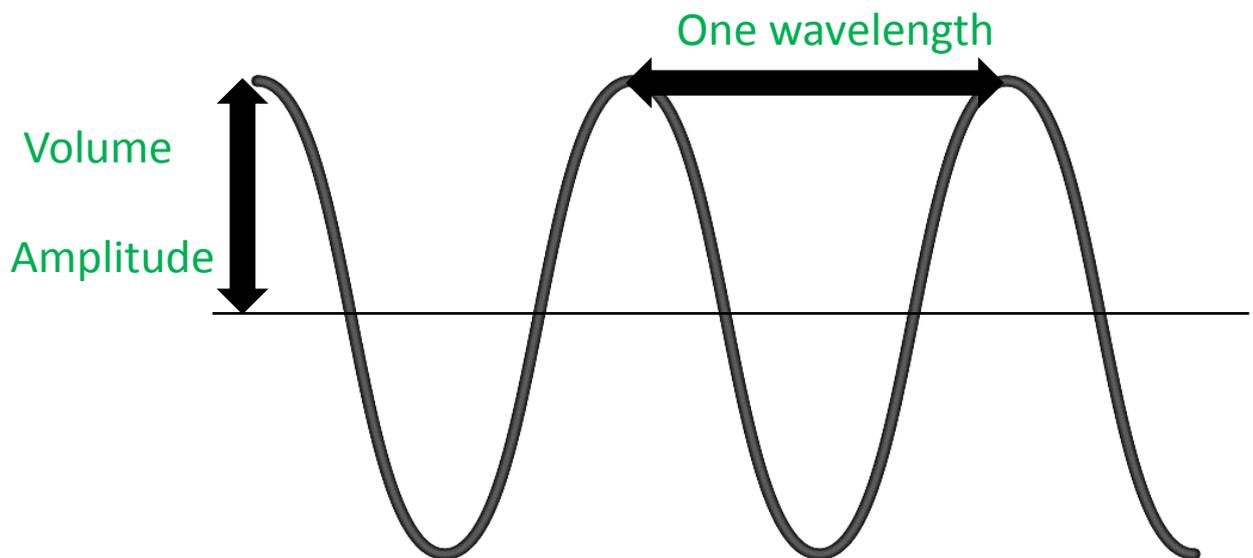
Amplitude is the size or height of an oscillation

14. What does a higher amplitude mean?

A higher amplitude wave has a louder sound

15. Annotate the wave below to identify the following:

*Wavelength / Amplitude / Volume / Frequency (frequency is not necessary here)*



## Lesson 2: Different sounds

### Knowledge Questions

1. From the diagram above, describe in words what is meant by:
  - a) Amplitude

The distance from the maximum disturbance to the undisturbed position

- b) A crest

A crest is the highest point of a wave

- c) A trough

A trough is the lowest point of a wave

- d) Wavelength

One wavelength is the distance between a trough and the next trough on a wave

2. What would a louder sound look like on the diagram? *Use the term amplitude in your answer.*

A louder sound would have a larger amplitude

3. What would a high pitch sound look like? – *Use the key words from the diagram to describe this.*

A high pitch sound has a large frequency. This means it has a short wavelength

4. What is a longitudinal wave?

In a longitudinal wave the oscillations are in the same direction as the direction the wave energy is traveling.

5. When particles are close together how is it described?

High density

6. When particles are far apart how are they described?

Low density

7. How are particles moved?

Particles are moved by being hit by particles next to them

8. What is a transverse wave?

In a transverse wave the oscillations are perpendicular (at a right angle to) the direction of travel of energy

9. What are transverse waves used to show?

Transverse waves represent sound waves on an oscilloscope even though they are longitudinal waves. Light waves are transverse waves.

### **Lesson 3: Wave behaviour**

#### **Knowledge Questions**

1. What are the two types of waves?

Transverse and longitudinal

2. What are the typical wave behaviours?

Transmission, reflection, refraction, diffraction, absorption, scattering

3. What is reflection?

Reflection is when waves bounce off a surface

4. What type of surfaces reflect sound?

Hard, flat surfaces

5. What type of surface reflects light?

Smooth surfaces like glass or polished metal

6. What does white light contain?

All the colours of light

7. What determines the colour of light?

The wavelength/frequency of the light

8. What do white objects reflect?

All colours of light

9. What do black objects reflect?

They do not reflect any light

10. What do red objects reflect?

Red light

11. What do green objects absorb?

All the colours except green

12. What type of objects absorb sound?

Carpets, furniture and curtains

13. How does the substance a wave travels through affect its speed?

Its density affects its speed

14. What is the term for when light is slowed down?

Refraction

15. What is diffraction?

The spreading of a wave after it passes through a gap

16. What is scattering?

When waves depart from the expected path and spread out in different directions

17. What determines how a wave behaves?

The material they hit

### **Extension Question**

18. Why is the sky blue?

The white light from the sun hits air molecules. The blue light scatters out in all directions much more than other colours, so this is the colour of light which hits our eyes when we look at the sky.

## **Lesson 4: Quiz & Re-cap**

### **Knowledge Questions**

1. What is it that determines colour?

The wavelength/frequency of light

2. Visible light is one part of what spectrum?

The electro-magnetic spectrum

3. Which colour has the lowest frequency?

Red light

4. Which colour has the highest frequency?

Blue light

5. Which 3 colours of light are needed to make up all other colours?

Red, green and blue

6. What is the collective name for the three colours of light that make up all colours?

### The primary colours

7. What rains down from the sun?

White light, which contains all the colours of light

8. How would you make white light?

To make a light which appear white you would mix green, blue and red light

9. What is faster? Light or sound?

Light

10. How does light travel?

Light travels as a wave

11. Can light travel through a vacuum?

Yes. (Space is a vacuum so we know this must be true!)

12. How can you detect light?

With our eyes or with an instrument like a camera

13. Which substances cause light to change direction?

Hard, flat surfaces cause reflection

14. How fast does light travel?

300 millions m/s

15. What is the SI unit of speed?

Meters per second, m/s

16. What affects how sounds sound?

The frequency and amplitude of the sound wave

17. Why do you hear a drum when it is hit?

When you bang a drum its skin vibrates. The harder you bang, the bigger the vibrations. The vibrating drum skin causes nearby air particles to vibrate, which in turn causes other nearby air particles to vibrate. These vibrating particles make up a sound wave.

18. What do hard surfaces do to sounds?

Reflect it

19. What do soft surfaces do to sounds?

Absorb it

20. What are the two types of sound?

High pitch and low pitch

21. How do loudspeakers work?

Loudspeakers push on the air next to it repeatedly. This causes the air to push on the air next to it and so the pulse travels away from the speaker.

22. How fast does sound travel?

340 m/s

23. What are the two types of wave?

Transverse and longitudinal

24. What is frequency?

The number of vibrations per second

25. What is the unit of frequency?

Hertz, Hz

26. What is the name for a device that takes a sound and represents it as a wave?

An oscilloscope

27. What happens to a speaker as frequency increases?

It vibrates more times each second

28. What is pitch?

The frequency of a sound wave

29. What is the relationship between pitch and frequency?

A high pitch sound has a high frequency. They are proportional

30. What is wavelength?

One wavelength is the distance between a trough and the next trough on a wave

31. What is amplitude?

The distance from the maximum disturbance to the undisturbed position

32. What does a higher amplitude mean?

A larger maximum disturbance to the undisturbed position

33. What is a longitudinal wave?

In a longitudinal wave the oscillations are in the same direction as the direction the wave energy is traveling.

34. When particles are close together how is it described?

High density

35. When particles are far apart how are they described?

Low density

36. What is a transverse wave?

In a transverse wave the oscillations are perpendicular (at a right angle to) the direction of travel of energy

37. What are transverse waves used to show?

Sound waves on an oscilloscope

38. What is reflection?

Reflection is when a wave hits a surface and bounces off it in the opposite direction

39. What type of surfaces reflect sound?

Hard surfaces

40. What type of surface reflects light?

Smooth and shiny surfaces

41. What does white light contain?

All colours of light

42. What determines the colour of light?

The wavelength/frequency of the light

43. What do white objects reflect?

All colours of light

44. What do black objects reflect?

No colours of light

45. What do red objects reflect?

Red light

46. What do green objects absorb?

All colours except green

47. How does the substance a wave travels through affect its speed?

Its density affects its speed

48. What is the term for when light is slowed down?

Refracted

49. What is diffraction?

The spreading of a wave after it passes through a gap

50. What is scattering?

When waves depart from the expected path and spread out in different directions

## Week 4: w/b 8<sup>th</sup> June

### Lesson 1: Reflection

1. Copy the image from the previous page into your exercise book.

2. How are rays drawn on a ray diagram?

With a straight line and an arrowhead pointing in the direction that the light travels

3. What are the names of the two types of ray?

Incident and reflected rays

4. What does a hatched line on a ray diagram represent?

A mirror

5. What is meant by the normal on a ray diagram?

90° to the surface of the mirror

6. What is the relationship between the angle of incidence and the angle of reflection?

The law of reflection states that the angle of incidence equals the angle of reflection

7. What happens if light hits a mirror at the normal?

If a light ray travelling along the normal hits a mirror, it is reflected straight back the way it came

8. What is the name for reflection from a flat surface?

Specular reflection

9. What type of reflection causes scattering?

Diffuse reflection

10. Describe how an image appears when it is reflected in a plain mirror.

It appears to be behind the mirror, is the right way up and is 'laterally inverted' (letters and words look as if they have been written backwards. The letters on the front of an ambulance are written so they can be read from a car rear view mirror).

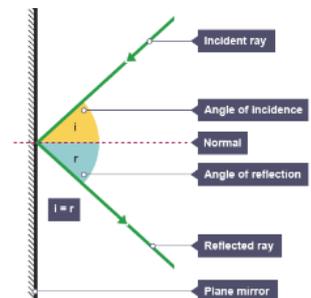
11. What is the law of reflection?

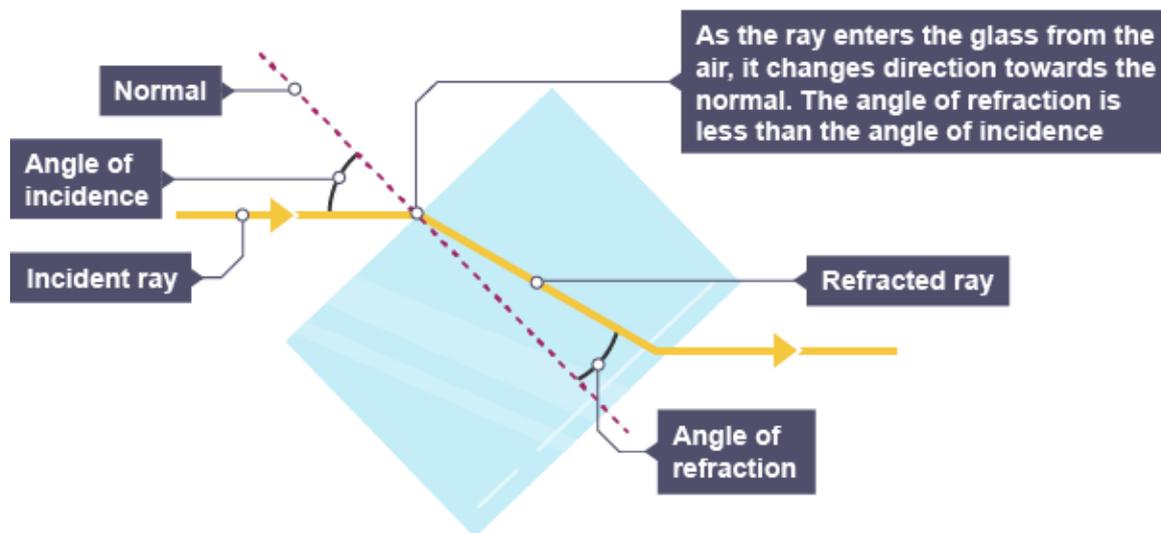
Angle of incidence = angle of reflection

### Lesson 2: Refraction

#### Knowledge Questions

1. Copy out the diagram above neatly into your exercise book.





2. What is refraction?

Refraction is when light changes speed at the boundary between two substances causing it to change direction

3. How does the angle of incidence determine whether refraction happens?

If there is a small angle of incidence there will be very little refraction but if there is a large angle of incidence there will be a lot of refraction.

### Lesson 3: Refraction & Re-cap

#### Knowledge Questions

1. What happens in refraction?

In refraction light changes speed at a boundary causing it to change direction

2. When does the light bend toward the normal?

When it slows down

3. When does the light refract away from the normal?

When it speeds up

4. Why doesn't the angle of incidence and refraction equal each other?

The light changes direction

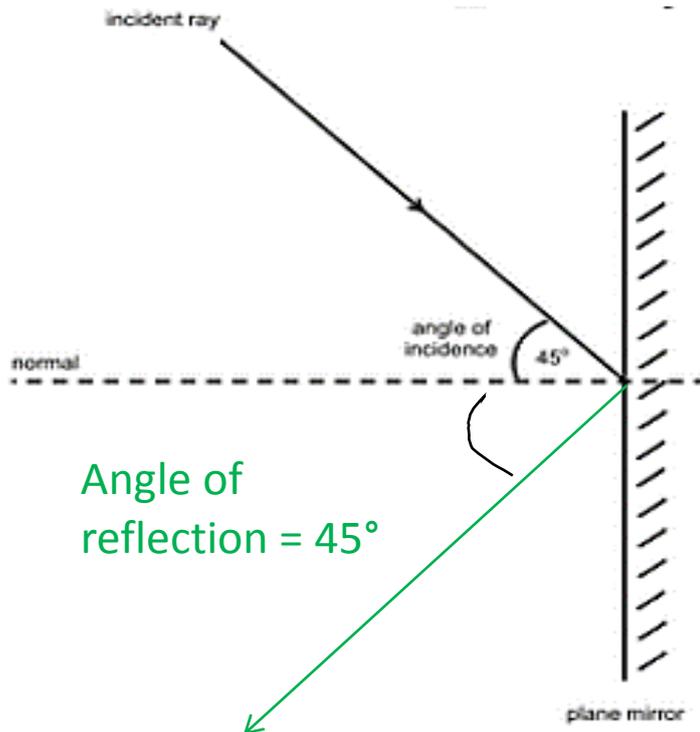
5. When doesn't refraction happen when light passes into different substances?

When the density of the substances is the same

6. What is meant by refractive index?

It determines the speed that light travels through the substance

7. Complete the diagram below by drawing on the reflected ray and stating the angle of reflection.



8. If the angle of incidence of a ray is  $45^\circ$  travelling through air into a glass rectangle, would the angle of refraction increase or decrease?

The angle of refraction will be less than 45 degrees

9. When the same light ray passes through the rectangle back into the air, what angle would it be at?

$45^\circ$  because it will bend back when it speeds up as it leaves the glass

## Lesson 4: Quiz + Spectrum of light

### Knowledge Question

1. What determines the colour of light?

The wavelength/ frequency of the wave

2. How would white be made from light?

Red, green and blue light would need to be mixed

3. What are the three primary colours?

Red, green and blue

4. If an object appears a certain colour, what does that mean about the light it absorbs and reflects?

It reflects the colour it appears and absorbs all other colours

5. Watch the video below and list the order of the electromagnetic spectrum

Radiowaves, microwaves, infra red, visible light, ultra violet, X-rays, gamma rays

**Extension Question:** Give a use for each type of EM wave.

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Radio waves - Communicating Television Signals

Microwaves – Heating food

Infra red radiation - Heat treatment, taking pictures in the dark, T.V remotes

Visible light – Seeing!

Ultra violet – Getting a suntan, detecting forgery in bank notes, killing bacteria and viruses.

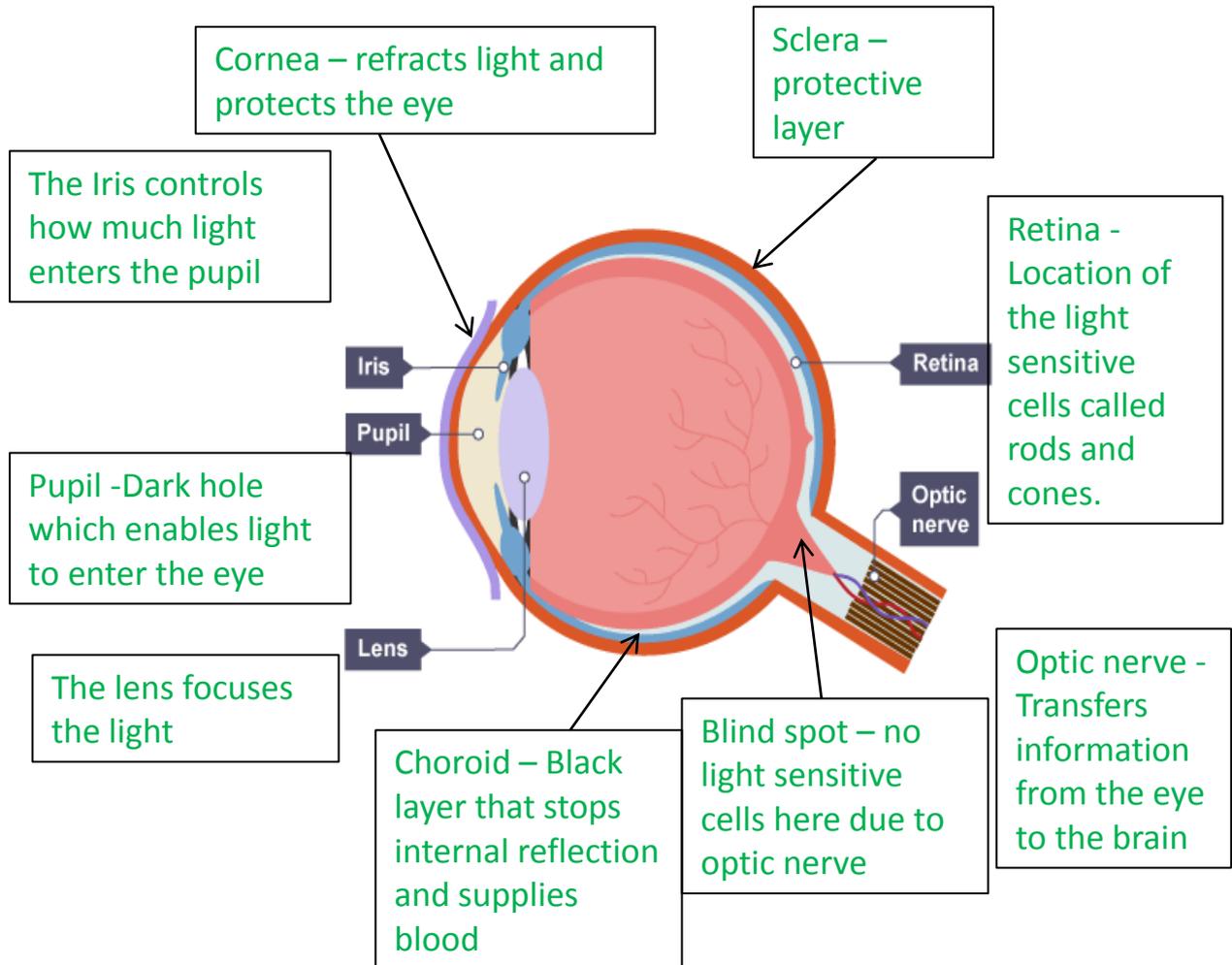
X-rays – Medical imaging and security imaging

Gamma rays - Kill cancer cells and sterilise medical equipment

## Week 5: w/b 15<sup>th</sup> June

### Lesson 1: Detecting light

**Task:** Watch the videos and annotate the diagram below to show how each part of the eye works. You may need to add further labels.



### Lesson 2: Detecting sound

#### Knowledge Questions

1. Which parts of the ear are bones?

The anvil, hammer and stirrup

2. Which part of the ear is a spiral shape?

The cochlea

3. What is the name of the nerve that connects the ear to the brain?

The auditory nerve

4. What is the order that sounds travel down from the ear to the brain?

Eardrum, ossicles, cochlea, auditory nerve, brain

5. Which diagram has a wave with the highest amplitude?

Diagram 3

6. Which has a wave with the highest volume?

Diagram 3

7. Which has a wave with the longest wavelength?

Diagrams 1 and 2 have the longest wavelength

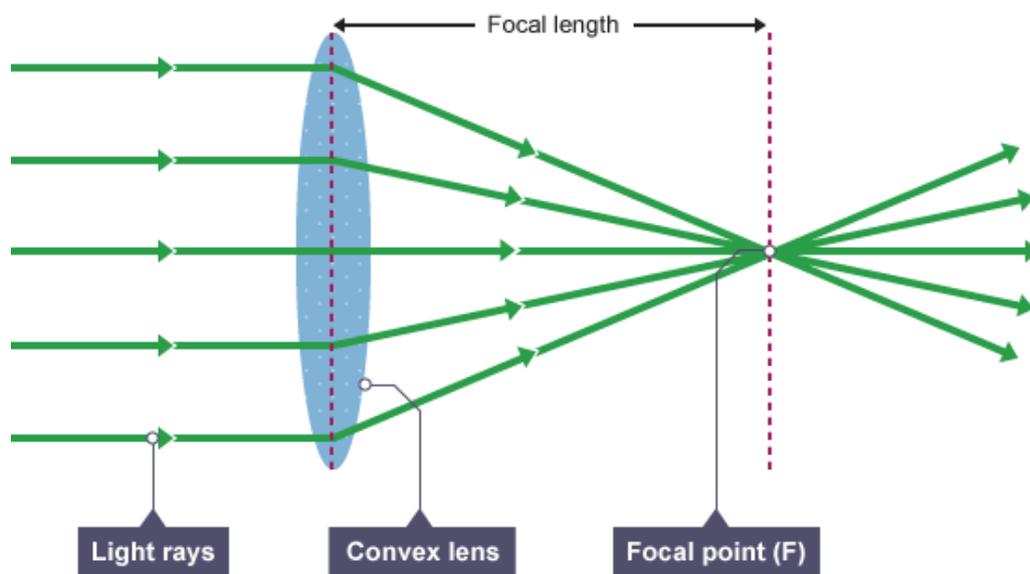
8. Which diagram has a wave with the highest pitch?

Diagram 3 has the wave with the highest pitch

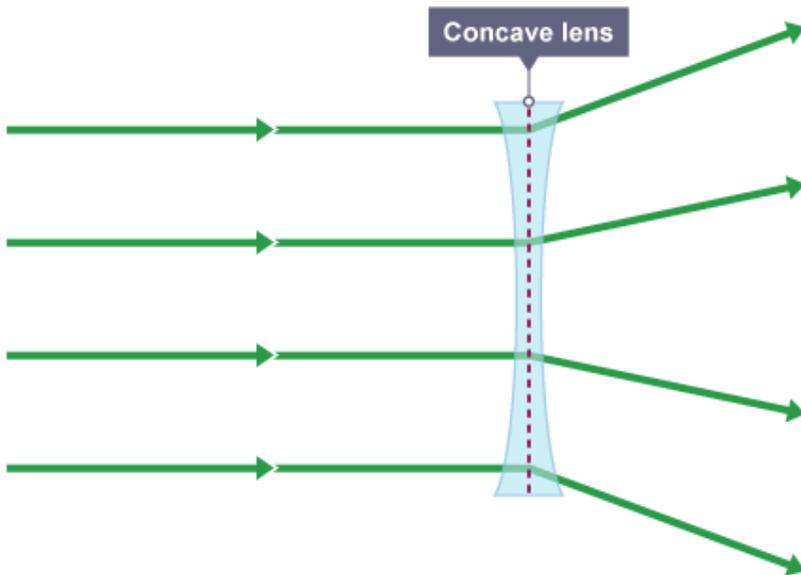
### Lesson 3: Lenses

#### Knowledge Question

1. Describe using diagrams the difference between concave and convex lenses



A convex lens is thicker in the middle than at the edges. Light that enters the lens converges (comes together) and meets at the focal point.



A concave lens is thinner in the middle than at the edges. Light that enters the lens diverges (separates) when it leaves.

#### **Lesson 4: Big Quiz**

This quiz is self-marking, Good luck!