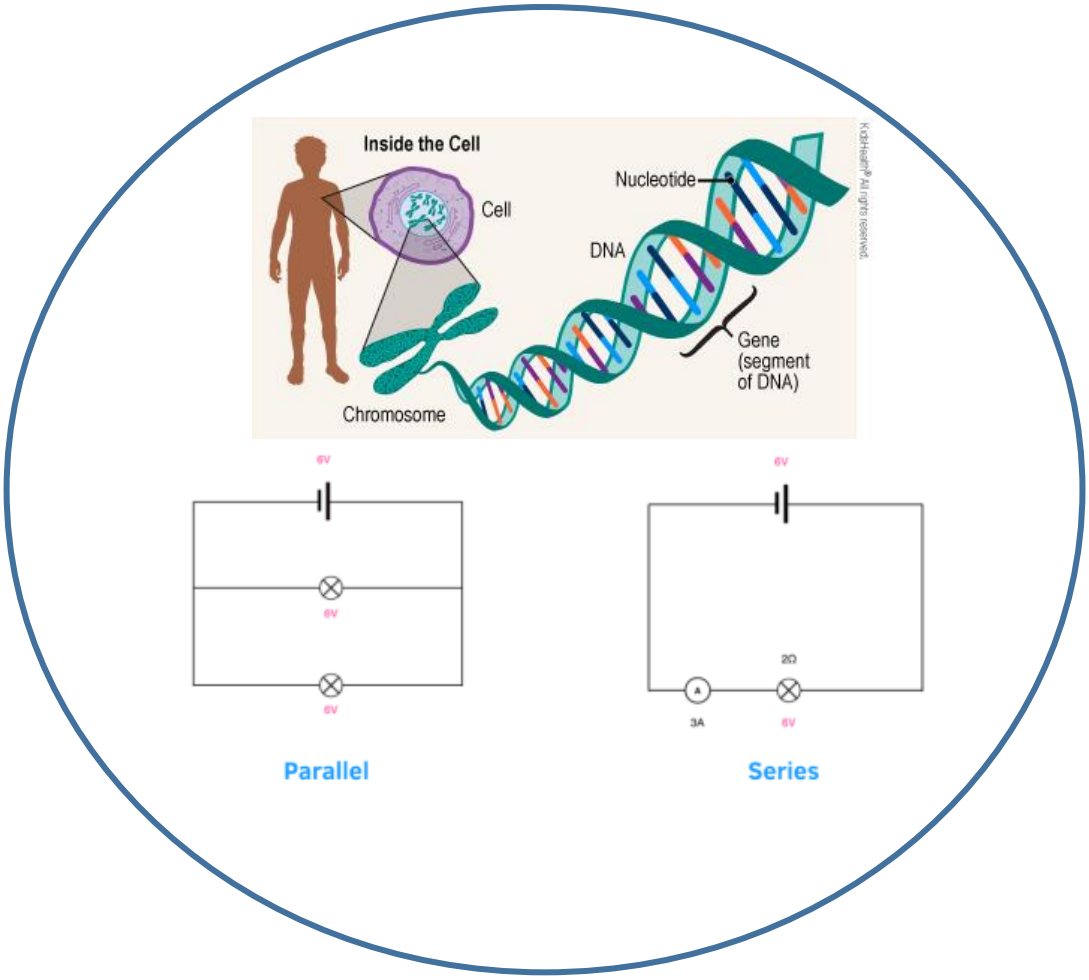
# Year 9 Home Learning

# Autumn term 1 2026

## Name:_____ Class:_____

**Aspiration**




**Home Learning expectations**

- -Written by yourself, in your own words.
- -Completed by the due date.
- -Finished to the best of your ability.
- -Closely followed the instructions.
- -Green penned and improved when needed.
- -Peer or self-assessed when asked to.
- -Presented so it is clear and neat
- -Proof read the work to ensure spelling, punctuation and grammar is to the best of your ability.

Due Date: _____

# Task 1

## Topic: Genetics

**Instructions**: Using the booklet and the internet, research and fill in the missing blanks using the word bank below.

**<u>Work bank:</u> section, characteristic/protein, parents, offspring, DNA, genetic, alleles, genes, pairs, version, gene, traits**

| Key words: | Definitions: (Provide a clear and concise definition of the key word.) | Add a diagram or example of the key word here! |
|---|---|---|
| 1. DNA | | |
| 2. Gene | | |
| 3. Chromosome | | |
| 4. Allele | | |
| 5. Inheritance | | |
| 6. Mutation | | |
| 7. Genotype | | |

| Teacher ticks here | Tick | Student comment: How to improve |
|---|---|---|
| Excellent homework **(good comment)** | | |
| Good/completed | | |
| Requires improvement | | |
| Incomplete/unsatisfactory | | |

**Peer assessed / Self-**

Due Date: _____

# Task 2

## Topic: How science works

**Instructions: Complete the tasks below**

Key information:

**Independent variable:** The variable that the investigator deliberately changes or selects different values for. There should only be one independent variable per investigation.
**Dependent variable:** The variable that is measured or observed as a result of changing the independent variable. It 'depends on' the independent variable.
**Control variable:** Any variable that is kept constant throughout an investigation to ensure the test is fair. If a control variable changed, it could affect the dependent variable and make results unreliable.

**1.** Match each term to its correct definition. [4 marks]

| | |
|---|---|
| Independent variable | The variable deliberately changed by the investigator |
| Dependent variable | A data point that does not fit the pattern of the other results |
| Control variable | A variable kept constant to ensure a fair test |
| Anomalous result | The variable measured as a result of the investigation |

**2.** A scientist studies the effect of temperature on the rate of evolution in bacteria by measuring how quickly antibiotic resistance develops in bacterial populations kept at different temperatures.

a. Name the independent variable in this investigation and give a unit that this could be measured in. [2 mark]

_____

b. Name the dependent variable in this investigation and suggest a unit this could be measured in [2 marks]

_____

c. State two variables that must be controlled to make this a fair test and explain the importance of these being kept the same. [4 marks]

1._____

2._____

| Teacher ticks here | Tick | Student comment: How to improve |
|---|---|---|
| Excellent homework **(good comment)** | | |
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| Requires improvement | | |
| Incomplete/unsatisfactory | | |

**Peer assessed / Self-**

Due Date: _____

# Task 3

## Topic: Genetics

**Instructions**: Complete the following tasks to understand how the structure of DNA was discovered. You can use lesson 2 in your genetics booklet to help you.

### TIMELINE: KEY EVENTS IN THE DISCOVERY OF DNA

**1869:** Friedrich Miescher first isolated DNA from cell nuclei. He called it 'nuclein'.

**1926–1940s:** Scientists confirmed that DNA, not protein, carries genetic information.

**1950:** Erwin Chargaff discovered that A always pairs with T and G always pairs with C (Chargaff's rules).

**1952:** Rosalind Franklin produced Photo 51 — a clear X-ray image showing that DNA has a helical (twisted) shape.

**1953:** Watson and Crick published their model of the DNA double helix in the scientific journal Nature. They used Franklin's X-ray data (shared without her knowledge by Wilkins) to complete their model.

**1962:** Watson, Crick, and Wilkins were awarded the Nobel Prize for Physiology or Medicine. Rosalind Franklin had died in 1958 and Nobel Prizes are not awarded posthumously.

1. **Match each term to it's correct definition:**

| | |
|---|---|
| DNA | A section of DNA that codes for a specific protein |
| Double helix | Molecule that carries genetic information in cells |
| Nucleotide | Technique used to reveal the shape of DNA using X-rays |
| Gene | A long coiled strand of DNA found in the nucleus |
| X-ray crystallography | The twisted ladder shape of the DNA molecule |
| Chromosome | Individual building block that makes up DNA |

**2.** Describe the structure of DNA [2 marks]

_____

_____

**3.** Which base pairing rule is correct? [1 mark]

**A** Adenine pairs with Guanine
**B** Thymine pairs with Cytosine
**C** Adenine pairs with Thymine
**D** Guanine pairs with Adenine

**4.** Answer the following questions about the key scientists involved in the discovery of DNA.

a. State what technique Rosalind Franklin used to study the shape of DNA. [1 mark]

_____

b. Name the two scientists who published the first accurate model of the DNA double helix in 1953 and describe what they used to come up with the model.

_____

_____

c. Give the name of the famous X-ray image produced by Rosalind Franklin that helped reveal the helical structure of DNA.

_____

d. Explain using research, why Rosalind Franklin was not recognised originally for her work in the DNA model. [4 marks]

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Due Date: _____

# Task 4

## Topic: Revision skills homework

**Instructions**:
Revise the genetics topic by creating 10 flashcards. Make sure you have the question on one side and the answer on the other.

Example:

### Front of revision card:

Describe the structure of DNA (2 marks)

### Back of revision card:

- Double helix (1)
- Twisted ladder (1)

Due Date: _____

# Task 5

## Topic: How Science Works

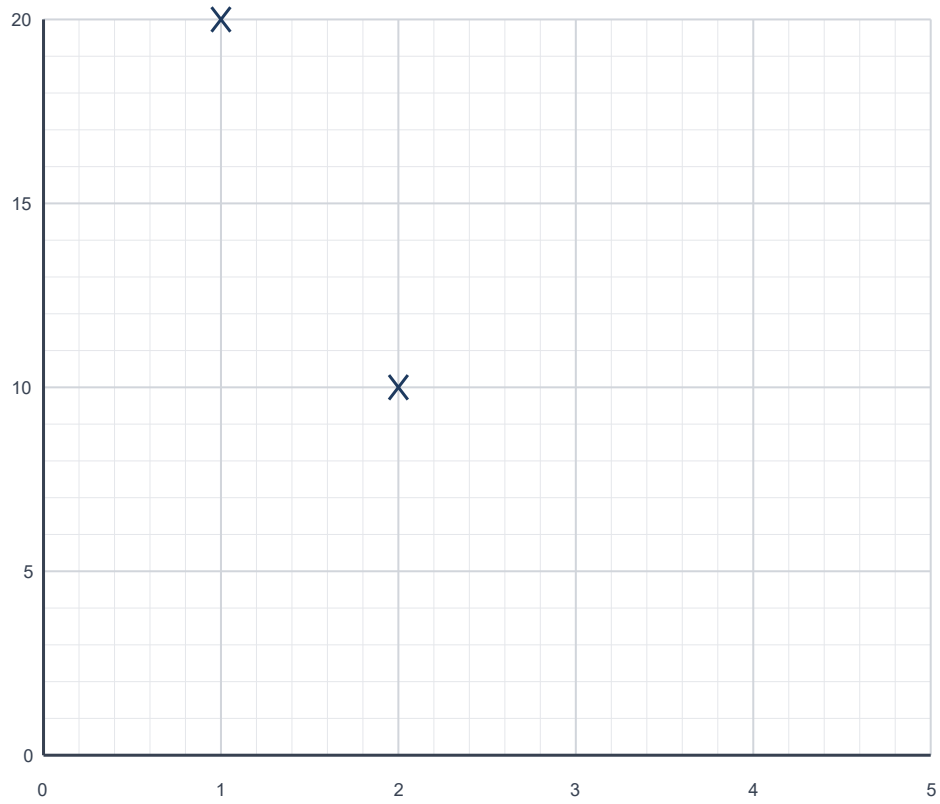
Instructions: Complete the following tasks to practice your graph skills.

**1.** Use Table 1 and Graph 1 to answer the following questions.

TABLE 1: CURRENT RECORDED AS BULBS ARE ADDED IN SERIES

| Number of bulbs | Current (A) |
|---|---|
| 1 | 20 |
| 2 | 10 |
| 3 | 5 |
| 4 | 2.5 |
| 5 | 1.5 |

GRAPH 1: CURRENT AGAINST NUMBER OF BULBS IN SERIES




**Complete the graph above:**

a. **Add your axis labels. Independent variable on the x axis and dependent on the y axis.**

b. Plot the remaining data points from Table 1 onto Graph 1 and draw a smooth curve of best fit through all six points. [3 marks]

c. Describe the shape of your graph. Include data in your answer. [3 marks]

_____

_____

d. Explain the graph above, you may need to research how the number of bulbs affects current in a circuit. (4 marks)

_____

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| Teacher ticks here | Tick | Student comment: How to improve |
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# Task 6

# Topic: Electricity

**Instructions**: Complete the tasks below

1. Use your textbook and the internet to fill in the gaps in the table below. The first one has been done for you. The website 'BBC Bitesize' is recommended to help you complete the homework.

| Component | Symbol | Function |
|---|---|---|
| switch |  | A switch used to turn a circuit on (closed) and off (open). |
| variable resistor | | |
| voltmeter | | |
| ammeter | | |
| cell | | |
| battery | | |
| motor | | |

2. Research how a variable resistor works and explain a real life example below (3 marks)

_____

_____

_____

| Teacher ticks here | Tick | Student comment: How to improve |
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# Task 7

## Topic: Electricity

**Instructions**: Complete the following questions on Ohm's Law. You can use lesson 1 and 2 from your booklet to help you and the information below. You will need a calculator.

V = Voltage in volts, I = Current in amps, R = Resistance in ohms
V = IR  R = V/I  I = V/R

**Worked example:**
Q. An alarm clock draws 0.5 A of current when connected to a 120 volt circuit. Calculate its resistance.

1. Write out the equation you need

**R = V/I**

2. Put the numbers from the question into the equation

**R = 120 / 0.5**

3. Now use your calculator to calculate the answer

**R = 240**

4. Write your answer, don't forget the unit!

**Resistance = 240 Unit: Ω**

1. Write the equation for calculating resistance

**Resistance =**

2. Write the name of the unit for resistance and draw the symbol below:

3. A subwoofer needs a household voltage of 110 V to push a current of 5.5 A through its coil. What is the resistance of the subwoofer?

1. Write out the equation you need

2. Put the numbers from the question into the equation

3. Now use your calculator to calculate the answer

4. Write your answer, don't forget the unit!

**Resistance = _____ Unit: Ω**

4. A Sony Walkman uses a standard 1.5 V battery. How much resistance is in the circuit if it uses a current of 0.01A?

**Resistance = _____ Unit: ___**

5. A circuit contains a 1.5 volt battery and a bulb with a resistance of 3 ohms. Calculate the current.

**Resistance = _____ Unit: ___**

6. What current flows through a hair dryer plugged into a 120 Volt circuit if it has a resistance of 25 ohms?

**Resistance = _____ Unit: ___**

**Challenge questions!**

7. A circuit contains a 6 V battery and a 12 Ω resistor. Calculate the current in the circuit.

**Resistance = _____ Unit: ___**

8. Why does a bulb shine brighter when the potential difference across it increases?

9. A student doubles the voltage and doubles the resistance in a circuit. What happens to the current? Explain your answer.

10. Compare the advantages and disadvantages of connecting bulbs in series and in parallel.

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