***Incorporating 5E instructional model,CT and PS in T/L***

Topic; Magnetic Effect of an Electric Current

Sub Topic; Electromagnets

Class; Form 2B

Duration; 40minutes

No. Of Students; 46

***Rationale***

Electromagnets are found and used in electric motors, Electric bells and alarms.Electric motors are used in fans,Radios, Blenders,Hydro-electric power stations which converts mechanical energy to electrical energy to be used to perform crucial tasks ***Prerequisite knowledge***

➢ Determining the direction of a magnetic field round a current carrying conductor ➢ Performing an experiment to determine the direction of a magnetic field round a current carrying conductor.

***Learning Objectives***

By the end of the lesson, the learners should be able to;

• Determine magnetic field pattern of a solenoid carrying current

• Determine the factors that affect the strength of an electromagnet.

***Teaching and learning resources***

• A solenoid (coil of copper wire which is uninsulated)

• A 3 inch iron Nail

• Six new size D dry cells in a cell holder

• 2 crocodile clips

• Iron filings

• 10 optical pins

• Ammeter

***References***

KLB secondary physics book 2, Longhorn physics book 2

***Lesson flow***

| Stage/Time  | T/L activities  | T/L points  | Remarks |
| --- | --- | --- | --- |
| Introduction (5minutes) Engage | ✓ Learners are guided to do activity 1 in the worksheet in groups of 5 ✓ Ask learners to state markswell’s corkscrew rule and Fleming’s right hand grip rule | ✓ Determining the direction of magnetic field on a current carrying conductor using Markswell’s corkscrew rule and Fleming’s Right hand grip rule |  |

| Lesson development (25minutes) Explore Explain Elaborate | ✓ In groups learners are guided to do activity 2 ✓ Learners to construct an electromagnet and test its strength and efficiency in a complete circuit with other components ✓ Learners to be guided on the best answers for the questions in the worksheet ✓ Learners to use the complete circuit consisting of the electromagnet to attract iron filings and optical pins, record the number of pins while varying current through the circuit ✓ Learners to vary the number of turns of coil and the number of batteries and observe the effect they have on the strength of the electromagnet | ✓ Construction of an electromagnet ✓ Connecting components into a circuit ✓ Magnetic and non magnetic materials ✓ Hard and soft magnetic material ✓ Magnetisation and demagnetisation ✓ Good and bad conductors of electricity ✓ Factors affecting the strength of an electromagnet ✓ Factors affecting the strength of an electromagnet ✓ Magnetisation and demagnetisation. |  |
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| Conclusion (5minutes) | ✓ Instructor/ Teacher to recap the lesson by summarising what the learners have acquired/learnt  |  |  |
| Evaluation (5minutes) | ✓ Teacher to probe Learners to establish whether the objectives were met  |  |  |

***Student Worksheet***

*Activity 1*

• State Fleming’s Right hand grip rule and markswell’s corkscrew rule

• Using Maxwell’s corkscrew rule and Flemings’ Right hand grip rule, determine the direction of the magnetic field lines round the current carrying conductors shown below

a.) X b.) .

*Activity 2*

• Explain why copper wire is used in this experiment

• Explain the effect on the strength of the electromagnet when ;

*i.* The current in the circuit is increased

*ii.* The number of turns of the solenoid is reduced