***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. |  |
| --- | --- | --- | --- |

|  |  |  |  |
| --- | --- | --- | --- |
| 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