

*Module III: Energy &*

*Environmental Services*

Lesson 6: Electrical Services – IC Engines, Pumps, motors & Inverters Repairing

*Open Education Resource*

**Productive Tasks**:

1. Productive task 1 : Building an electromagnet
2. Finding answers –Motor
3. Building your own Inertia Pump

**Concept**:

In this lesson you will learn basic concepts and working principles of engines, Pumps and Motors. These three topics are very vast in nature so would be difficult to cover everything in detail. However this lesson will give you enough idea about the working principle and types and uses of them. Do visit You-tube links mentioned at the end of this document. It will help you to understand each topic in more detail.

**Class-Age Group**: 14 & above

**Introduction**

Steam Engine is among the 11 innovations that changed the course of human history. The steam engine’s basic principle of **energy-into-motion** set the stage for later innovations like internal combustion engines and jet turbines, which prompted the rise of cars and aircraft during the 20th century.

In this lesson you will be learning Internal Combustion (IC) engines, Pump and Motors. All of them are widely used in different applications.

Most cars have internal combustion engines that burn either diesel or petrol in order to drive them forward. That’s the big lump you would find under the bonnet.

Modern cars also have loads of much smaller electric motors to do things like moving the windows up and down, releasing the boot catch and moving the wing mirrors.

*Want to learn more on these interesting topics???? Let us take help from an expert.*

Hi Manish bhayya.... what are you doing?

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Kya karu Banty... this car is not working ... looks like there is some problem with the engine..

Ye engine kya hota hai???

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Don’t you know that? OK No problem!

I have good learning resources that will explain you how engine works.

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|  |  |
| --- | --- |
| S.No | Power Point Presentations |
| 1 | IC engines and its operation.pptx |

|  |  |
| --- | --- |
| S.No | Documents |
| 1 | diesel engine.doc |
| 2 | Diesel Engine-practical.doc |
| 3 | IC Engine.doc |

 

Kya karu Ramu, mere khet ka pump kam nahi kar raha hai !

Kyo Kisan pareshan lag rahe ho?

Pareshan mat hona ! mai tumhe Pump aur motor ke bare me sab janakari dunga. Mera bada beta engineer jo hai !!!

 

Wah !! Muze bhi sikhana hai ... Taki bhavishya me muze aaise pareshan nahi hona padega !!!

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|  |  |
| --- | --- |
| S.No | Power Point Presentations |
| 1 | Electrical Motor-AC.pptx |
| 2 | Electrical Motor-DC.pptx |
| 3 | Pump basics.pptx |
| 4 | Pump installation.pptx |
| 5 | Electrical Motor Starter.pptx |

|  |  |
| --- | --- |
| S.No | Document |
| 1 | Pumps.doc |

Hopefully you have read through all the above presentations and documents.

Now it’s time for activity !!!

**Productive Task 1: Building an electromagnet**

**Building an Electromagnet**

1. Material required to complete this activity :
   1. One nail
   2. Approximately 2 feet of single stand insulated wire
   3. One 1.5 V DC battery cell
   4. Ten paper clips (or tacks or pins)
   5. A rubber band.
2. Step 1 : - Wrap the wire around a nail at least 20 times
3. No further steps are given.

Now scratch your head and using above material build your own electromagnet.

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You will need to follow few additional steps to complete this activity.

**Expected Output:** Test the strength of the electromagnet by seeing **how many paperclips or pins your electromagnet can pick up ?**

- Note down the steps you have followed to complete this activity

- Can the electromagnet pick up paperclips when the current is disconnected? Why?

-List down your learning during this activity

**Productive Task 2: Finding answers -Motor**

In this productive task you will find answers for the following questions. (You can take help from internet, books ... or any other resource)

1. What are the differences between AC and DC motor in their working principles?
2. Find out at least five home applications where motor is used. (list them and find out type of motor used)
3. Visit the nearby flour mill and check if they have motor starter installed? Which type? Which type of motor and what is the capacity of the motor?

**Productive Task 3: Building your own Inertia Pump**

1. Can you convert a 40 -50 cm PVC pipe into a pump?

Any hollow tube - a PVC or metal pipe can be made to pump up water.



2. Take a 40 -50 cm PVC pipe, the kind, which is used, for household electrical wiring. Rub its ends on sandpaper to make than smooth. As shown in the above figure, Hold the pipe with your left-hand and move it up and dawn into a bucket of water. Keep the palm of your right-hand or the top of the pipe and open and close it with each up and down reciprocation like a hinge. Soon water will start squirting out. In this case the up-down motion of the left-hand does the pumping while the right-palm acts like a valve. The use of the hand palm gives an excellent physical feel for a valve.

**Explain: How does this pump work?**

Acknowledgement: Book: **Pumps from the dump by Arvind Gupta**

**Video links for your reference:**

1. **Working of four stroke petrol engine :**

[**http://www.youtube.com/watch?v=MNrVYG\_NdD4**](http://www.youtube.com/watch?v=MNrVYG_NdD4)

1. **How do Diesel Engines work ?**

[**http://www.youtube.com/watch?v=DZt5xU44IfQ**](http://www.youtube.com/watch?v=DZt5xU44IfQ)

1. **How does a Centrifugal pump work ?**

[**http://www.youtube.com/watch?v=BaEHVpKc-1Q**](http://www.youtube.com/watch?v=BaEHVpKc-1Q)

1. **dc motor**

[**http://www.youtube.com/watch?v=fWyzPdyCAzU**](http://www.youtube.com/watch?v=fWyzPdyCAzU)

1. **A. C. MOTOR - HINDI - Motor form a salvaged tube-light choke!**

[**http://www.youtube.com/watch?v=bdZ4dayl5mc**](http://www.youtube.com/watch?v=bdZ4dayl5mc)