

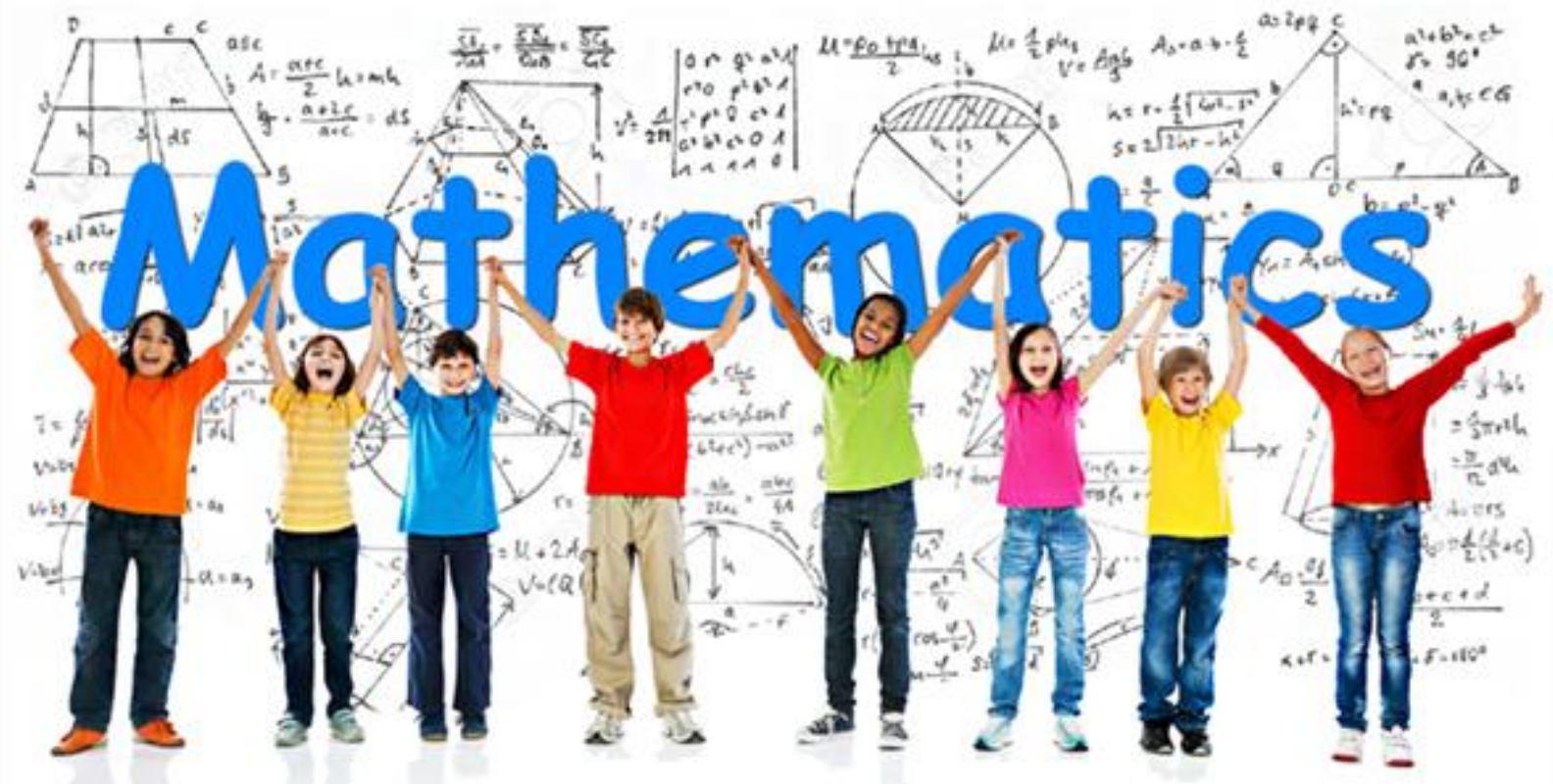
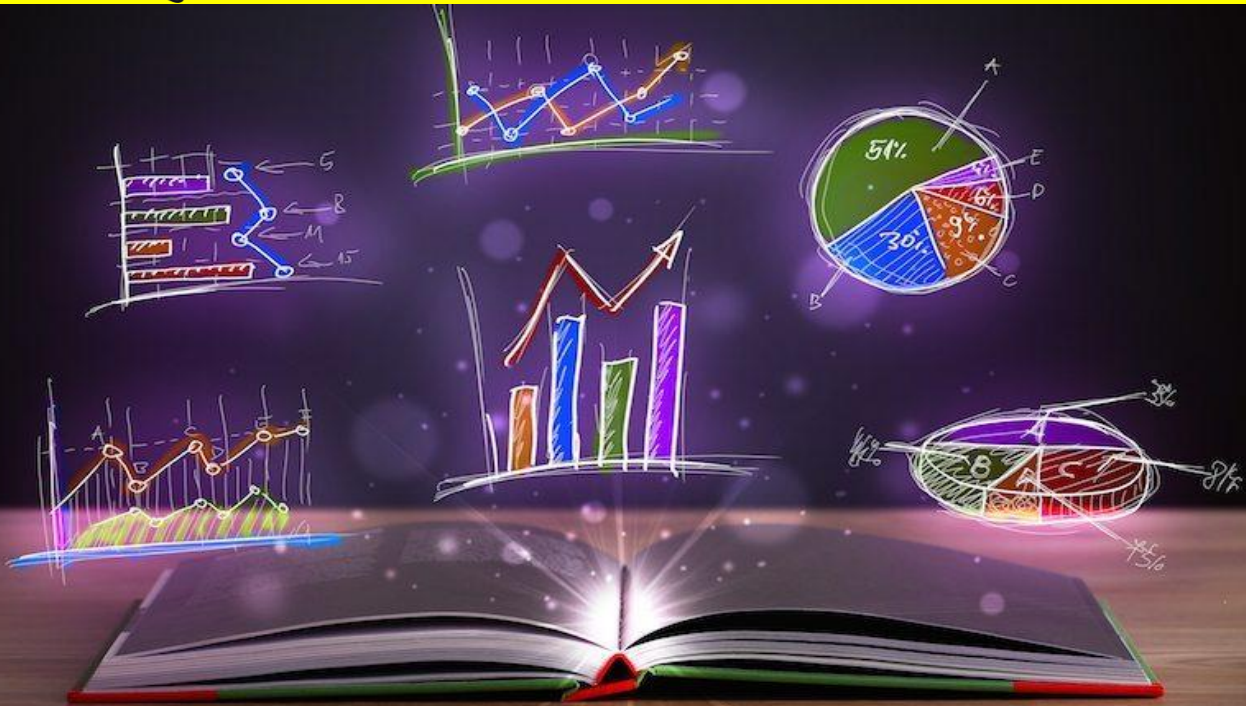
# MATHLETE



(अक्सर पूछा करते हैं.....)

Classes - 9<sup>th</sup> to 10<sup>th</sup>

Series  
2



MATHEMATICAL LITERACY GROUP- CHANDIGARH

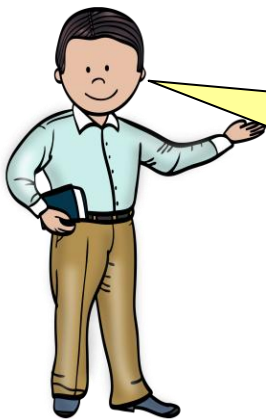
# Electricity Bill

**Bijli Bachao!**  
...because saving electricity saves money



Students, can you tell me how we can save electricity?

Sir, by reducing electricity Bill.



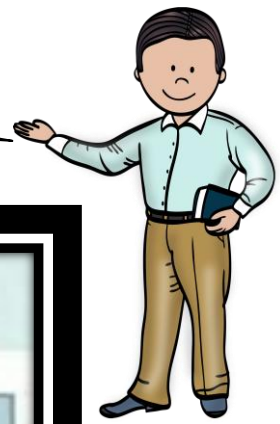
Student, have you seen an Electricity Bill?



Yes Sir, every month it comes in our postbox.



Ok, let me show you one



# Electricity Bill

**State Power Distribution Company Limited**

**Your Electricity Bill For: Dec 13**

Account Number : 123456	Bill Date : 11-12-13	<b>Payable Amount:</b>  <b>Rs 1572</b>  <b>Due Date</b> <b>31-12-13</b>
Name : Ram Prasad Sharma		
Address : 155B Shakti Coop Housing Society, Near New Era School, Pratap Nagar, New City, State - 567890		
Tariff : LT - Residential	Bill Number : 354756	
Type of Supply : Single Phase	Connected Load : 3 kW	
Meter Reading : 31-11-13	Meter Reading : 85788	
Date : 31-12-13	Previous Meter Reading : 85660	
Previous Reading : 31-10-13	Units Consumed : 269	

How was your bill calculated		Rate	Rs.
Fixed Charge			100
Energy Charge			635
Fuel Surcharge		100 p/units kWh	288
Electricity Duty		30%	254
Electricity Tax		15 p/units	44
Discount			
Arrears			
Total Charges			1522
Delayed Payment Charges			50
Total Charges (if paid after 31-12-13)			1572

Tariff Structure		Contact Us	
Slab	Rate	Website	www.spsdcl.com
0-100 units	230 p	24 Hours Helpline	1 800 123 4567
100-300 units	320 p		
300-500 units	400 p	Customer Care Center	155B Shopping Plaza, Near Mahatma Gandhi Chowk, Pratap Nagar, New City, State - 567890
Above 500 units	510 p		

On what does the bill depend?



It depends on consumption of Electricity.



How can we measure electricity consumption?

Ummmm....?????







Electricity is measured by using an Electric meter. Electric meter is the device that measures amount of electric energy consumed



Have you  
seen Electric  
meter?

Can you read  
the meter ?

# Did you know?

Electricity is measured in units of power called Watts or Kilowatts.

Amount of energy consumed by an appliance is given in KWH.



Sir, what do you mean by a 60 Watt bulb.



60 Watt bulb means if a bulb burns for one hour it will consume 60 watt of energy per hour.





Let's learn today how to calculate electricity bill using meter reading.

KWH = Keeping 100 watts bulbs on for 10 hours.

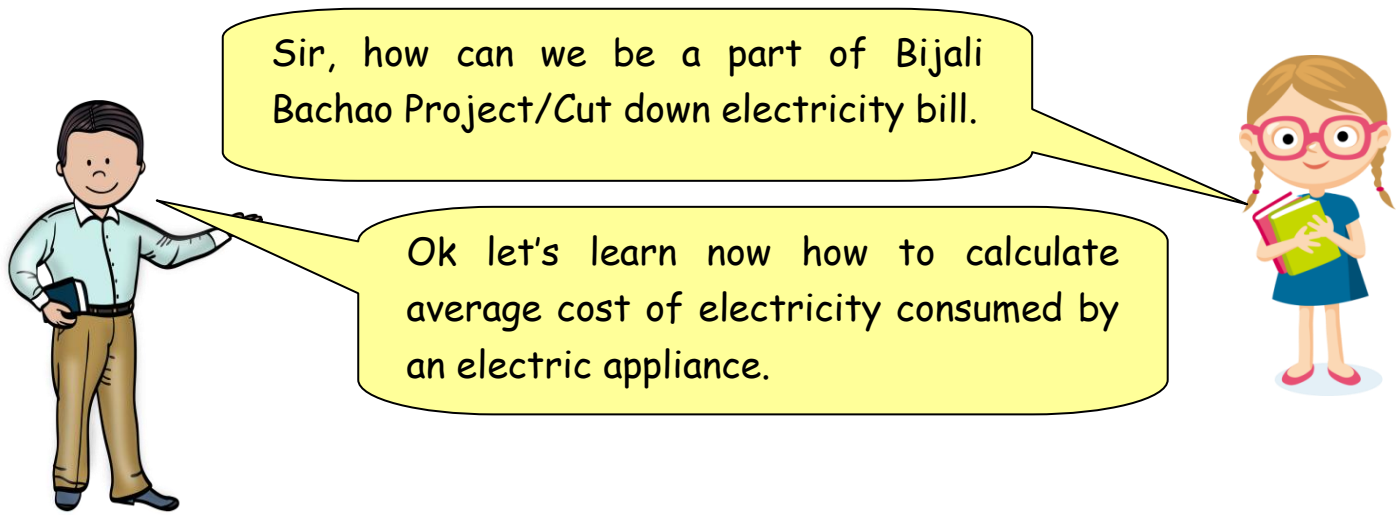
- Step 1**    Energy consumed = Current meter reading - Old Meter reading last month.
- Step 2**    Total energy charge = energy consumed x charge per unit.
- Step 3**    Final bill = Total energy charge + fixed monthly charges + tax.

### Example

If the meter reading for the month of January is 7095 units and that for the month of February is 7155 units. Calculate the electricity bill for the month of February at the rate of Rs 4.7 per unit.

### Try yourself!

Understanding the concepts of units you should try to estimate the units consumed by an appliance to cut down on the electricity bill.



**Steps to calculate average cost of electricity consumed by an electric appliance.**

**Step 1** Note down the power of the appliance written on it generally in watts.

**Step 2** Convert watts into kilo watts

$$\text{Watts} \div 1000 = \text{KW}$$

**Step 3** Energy consumed = Power X time of operation

$$\text{KWH} = \text{KW} \times \text{hours}$$

**Step 4** Cost = Energy X rate

$$= \text{KWH} \times \text{rate}$$

**Example:** In winters a room heater of 2800W works for 3 hours a day. Calculate the operating cost of room heater in a month at the rate of Rs. 5.20 per KWH

$$\begin{aligned} \text{Sol. Power of heater} &= 2800 \text{ W} \\ &= 2800 \div 1000 \\ &= 2.8 \text{ KW} \\ \text{Energy Consumed} &= 2.8 \times 3 = 8.4 \text{ KWH} \\ \text{Energy consumed in a month (30 days)} &= 8.4 \times 30 \\ &= 252 \text{ KWH} \\ \text{Cost of room heater in a month} &= 5.2 \times 252 = \text{Rs. } 1310.40 \end{aligned}$$

Now you can calculate the bill of any appliance and see for yourself on which appliance to cut down to reduce your electricity bill.

# Apply your knowledge

## ELECTRICITY BILL

Rahul & his family are living in Sarojini Nagar Delhi since January 2020 at Yamuna Apartments where current electricity rates are Rs.10/kWh. Rahul's family is having following electrical appliances at his apartment:

TABLE 1

	APPLIANCE CATEGORY		
	LED BULB	CEILING FAN	AIR CONDITIONER (AC)
Quantity	5	2	1
WATTAGE of each appliance (W)	20	100	3500
Average hourly usage per appliance per day (in Hr)	10	6	3

1 kWh = 1000 watt sustained for 1 hour

$$E = P \text{ (kW)} \times T \text{ (Hr)}$$

Q1. Which appliance consumes minimum energy per day?

- a) Bulbs
- b) Fans
- c) AC



Q2. Electricity Bill for the month of February 2020 will be \_\_\_\_\_.

- a) Rs.3556
- b) Rs.3683
- c) Rs.3810
- d) Rs.3937

Q3. Find the Average energy used by Rahul's family for the month of April, May & June for current year?

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Q4. List down the way you can reduced the electricity bill of your house.

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### CAN YOU TELL?

We all use oven and microwave in our home. If a potato takes about 1 hour to cook in a conventional oven of 600 watts and a microwave of 1360 watts takes approximately 12 minutes. Calculate the cost of cooking the potato in each appliance and write down which one is the cheaper option if the rate of charge is Rs. 5.3 per KWH?



# Amazing Facts

1. Appliances also use electricity when they are switched off. The average desktop computer idles at 80 watts, while the average laptop idles at 20 watts. A Sony PlayStation 3 uses about 200 watts, both when it's active and when it's idle.
2. In the electric eel, some 5,000 to 6,000 stacked electroplaques can generate a shock of up to 860 volts and up to 1 ampere of current. Electric eels use electricity in multiple ways. Low voltages are used to sense the surrounding environment. High voltages are used to detect prey and, separately, stun them.



3. Replace light bulbs and halogen spots with LED or Low energy bulbs because a light bulb produces 10% light and 90% heat.
4. Electricity travels at the speed of light, about 300,000 kilometers per second.

5. The basic principles of electricity generation were discovered during the 1820s and early 1830s by the British scientist Michael Faraday. His method is still used today: electricity is generated by the movement of a loop of wire, or disc of copper, between the poles of a magnet.
6. Did you know? You need to run your ceiling fan for more than 20 hours to use the same amount of electricity as your hair dryer uses in only a few minutes.

