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**Stepwise operation of “Bulb destroying machine”:**

Step No	Action
1	Incandescent Bulb is thrown & it bounces from platform to Starts the machine.
2	Bulb hits the lever & Pushes it down.
3	Other end of lever is raised & the string lifts the shutter to start the ball rolling.
4	Ball hits the lever & pushes it down to loosen the string.
5	The loosened string helps the plunger to compresses the fluid in the cylinder.
6	Nozzle sprays water jet on the lever .Pressure of jet operates the lever arrangement which pushes the hand downwards to operate the spring connected slide.
7	Spring connected slide pushes the lever forward.
8	The other end of lever pulls the cord to open the jaw and release the pot.
9	The pot hits the see saw lever & pushes it down.
10	Ball is thrown from the other side..
11	The ball hits the lever & pushes it down to raise the lever with pot upwards
12	The raised lever operates the scissors and cuts the string.
13	The counter weight drops down and the balloon tied on the other side sours up.
14	The balloon hits the lever & raises it.
15	The ball falls down from the cup on the other side ,rolls down and hits the pedal to operate the rack & pinion.
16	The rack moves forward & tilts the jug to fill the glass.
17	The weight of the filled glass pushes the rack & rotates the pinions, which in turn operates the rack on the other side, which pushes the lever no 18 downwards.
18	The lever opens the jaws to release the weight tied with strings ,through a set of pulleys.
19	The released weight hits the lever & pushes it down, which hits the mouse.This lever raises the rod on the other side , & the flag indicating “Turn off light not in use” is also raised.
20	Other side of lever pulls the Stopper rod downward from the slide, to enable ball to roll down.
21	The ball rolls down through the Slide & opens the lid of the box, to release the rabbit. Rabbit jumps on the roller ,which rolls the string to open the shutter of the box.
22	The forward moving hand out of the box activates a hammer.
23	The hammer hits the incandescent lamp bulb & destroys it.
24	The string is released and the belt turns the gear & the weight falls down. The gear train moves the pinion forward.
25	The forward movement of the pinion releases the lock.
26	The spring loaded lever pushes the hand upwards. The upward movement of the hand tilts the slide, which drops the ball.
27	The ball pushes the lever down & operates the lever arrangement .
28	The other side of the lever moves down and strikes the spring loaded matchbox and ignites match stick to light up candle.
29	The spring mounted matchbox operates the lever forward to throws the ball down.
30	The ball rolls down the slides ,and pushes the lever no 30 down ,which pulls the rod on other side, upwards to start the gear train ,rack & pinion arrangement . The pinion moves backward to release the platform, & Champagne bottle falls down.
31	The dropping bottle pulls the string, through pulleys which opens the poster of Energy saving benefits.

**Answers to Questions:**

1. An incandescent light bulb converts only **1.5%** of the energy in coal provided to a powerplant to generate a Useful energy output ( Light energy).

Calculation:

1 Unit of energy in coal used in powerplant.

Heat lost is 0.67 unit & useful energy (electricity ) is 0.33 unit from Powerplant.

Transmission & distribution losses is 0.03 of 0.33 (Assumed) i.e 0.0099.

Electricity received at home is 0.32.

Heat lost from Incandescent bulb is  $0.95 * 0.32$  unit & useful energy is  $0.05 * 0.32$  i.e 0.016 unit i.e **1.6%**

2. 80% of Energy is saved by using CFL, as compared to Incandescent lamp. i.e  $0.8 * 0.95 * 0.32$  unit saved = 0.2432 unit saved.  
**Total Useful Energy output of CFL** is Energy saved plus useful energy of bulb i.e  $0.2432 + 0.05 = 0.2932$  i.e **30% (say)**

3. The energy is lost in the following ways from coal to electricity consumed by the CFL.

- As heat in Thermal powerplant – 70%
- As transmission loss from Powerplant to Residence- 3%
- As heat in Incandencent Light bulb- 95%

