

# Candle power



### How powerful is a candle?

- ❖ Is a candle more or less powerful than a typical domestic LED lightbulb?
- ❖ What is meant by 'energy efficient lighting'?

**Estimated time: 10 minutes + 2 hour wait between measurements.**  
**No prior knowledge needed.**

### Instructions

Watch the video ( [YouTube link to go here](#) )

1. Use the kitchen scales to find the candle's **start mass** (in grams). Write it down.
2. Start the timer or note the time as you light the candle.
3. Don't leave candles unattended, so keep an eye on it.
4. After 2 hours of burning, blow it out.
5. Use the kitchen scales to find the candle's **end mass** (in grams). Include any wax that has spilled as we only want to count wax that has burnt. Write it down.
6. Do the following calculations to find the amount of wax used:
7. **Wax used** (in grams) = start mass (in grams) – end mass (in grams).  
 E.g. 14 g – 8 g = 6 g.
8. **Energy transferred** (in joules) = **wax used** (in grams) x 43 000 (joules per gram)  
 E.g. 8 g x 43 000 J/g = 258 000 J
9. **Power** (in watts) = **energy transferred** ÷ burn time (in hours) x 3600 (seconds per hour)  
 E.g. 258 000 J ÷ (2 x 3600) s = 36 W
10. Enter results below or into NPL webpage:  
[npl.co.uk/measurement-at-home/candle-power](http://npl.co.uk/measurement-at-home/candle-power)

Start candle mass (in grams)	
End candle mass (in grams)	
Wax used = start-end candle mass (in grams)	
Calculated candle power (in watts)	

**#MeasurementAtHome**  
[npl.co.uk/measurement-at-home](http://npl.co.uk/measurement-at-home)

### Equipment required

- A new candle or tealight
- A match or other lighter
- Kitchen scales
- A clock or timer
- Paper and pencil for results and calculation.

### Risks

- ❖ Adult supervision as there is fire involved – candles are hot and shouldn't be left unattended.

### SI measurement units

- ❖ kilogram (kg) for mass
- ❖ second (s) for time

### Challenge Topics

- ❖ Measurement Science, Maths, Energy, Physics.

### Thoughts, tips and information

- ❖ Do all candles burn at the same rate? You can repeat this experiment with different candle types.
- ❖ Candles are dimmer than typical LED lightbulbs though they transfer more energy as they generate more heat.
- ❖ Electric lighting was first main reason electricity was brought into UK homes.

**Adult direction or supervision is required. All experiments are carried out at your own risk.**  
**For more experiments, visit [NPL Measurement at Home](http://NPL Measurement at Home).**