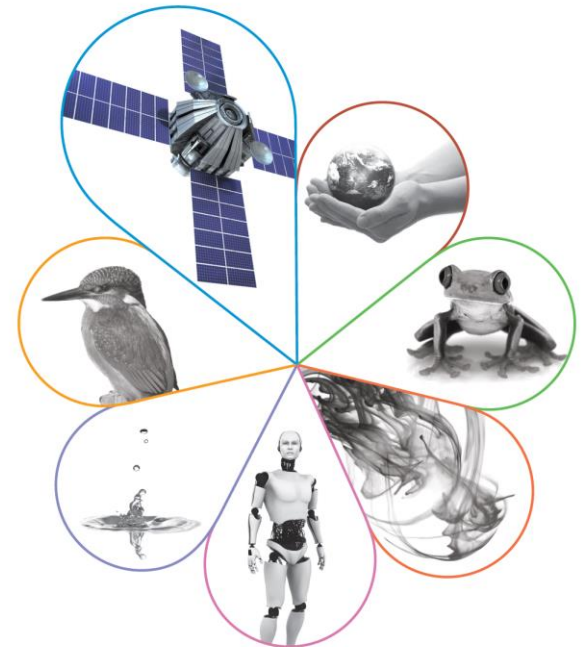


# GCSE Physics required practicals DIY equipment and tips for technicians

Marcin Poblocki, AQA Technician Adviser  
January 2018

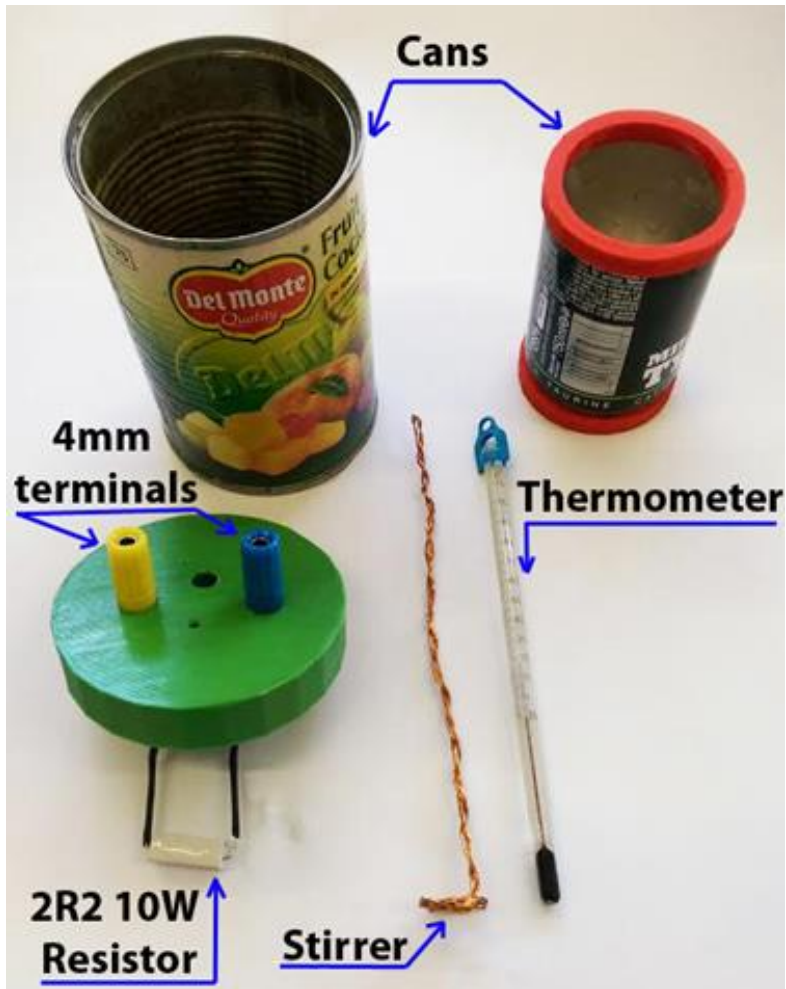


# 10 required activities

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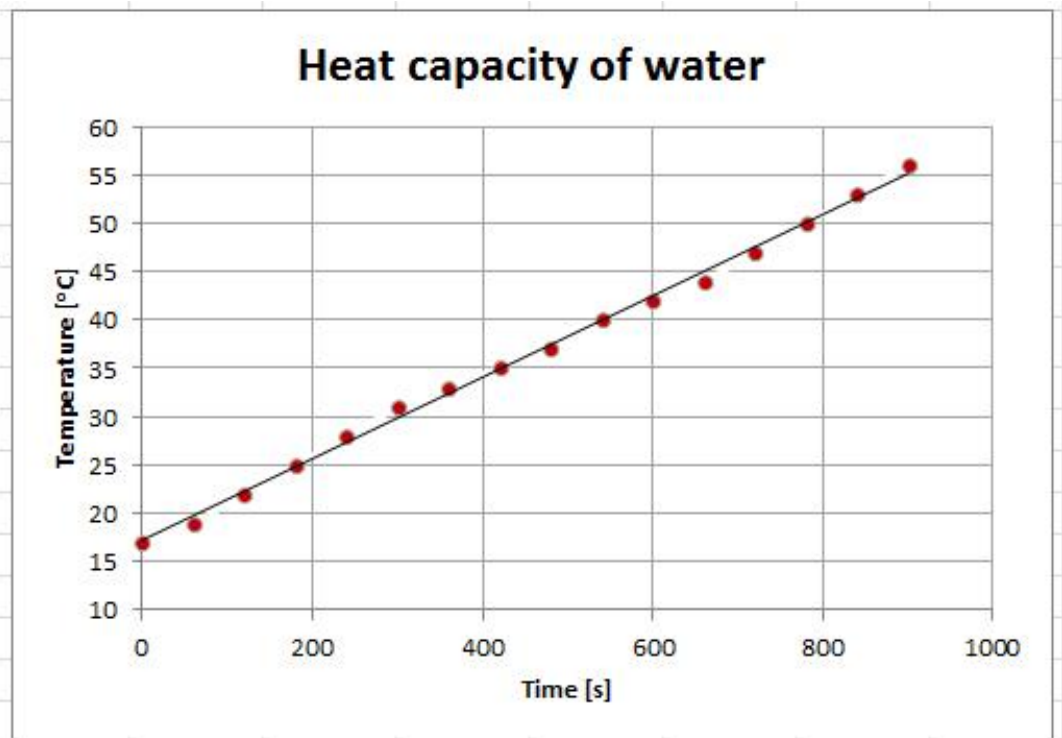
1. Specific heat capacity (solid)
2. Thermal insulation - Physics specification only
3. Resistance (wire)
4. V-I characteristics (filament bulb, resistor, diode)
5. Density
6. Light (reflection and refraction)
7. Force and extension (spring)
8. Acceleration ( $F=ma$ )
9. Waves (ripple tank) - Physics specification only
10. Radiation and absorption (Leslie cube)

# Specific heat capacity



# Specific heat capacity

t [s]	T [°C]	m [kg]	0.07233
0	17	U [V]	7.14
60	19	I [A]	1.98
120	22		
180	25		
240	28		
300	31	$c_w$ [J kg/°C]	4510
360	33	$c_w$ [J kg/°C]	4181
420	35		
480	37	Error [%]	7.3
540	40		
600	42		
660	44		
720	47		
780	50		
840	53		
900	56		



# Specific heat capacity



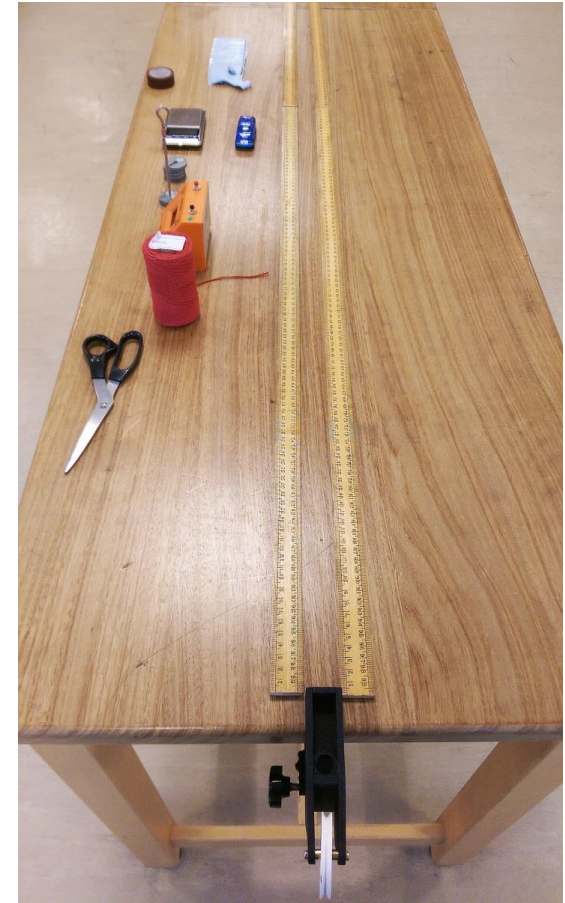
$m_{\text{copper}}$ [kg]	0.201
$T_{\text{copper}}$ [°C]	87
$m_{\text{water}}$ [kg]	0.265
$T_{\text{water}}$ [°C]	17
$T_{\text{water \& copper}}$ [°C]	21
$c_{\text{water}}$ [J/kg*K]	4198.9
Calculated value	
$c_{\text{copper}}$ [J/kg*K]	337.2
Real Value	
$c_{\text{copper}}$ [J/kg*K]	386.0





# Acceleration

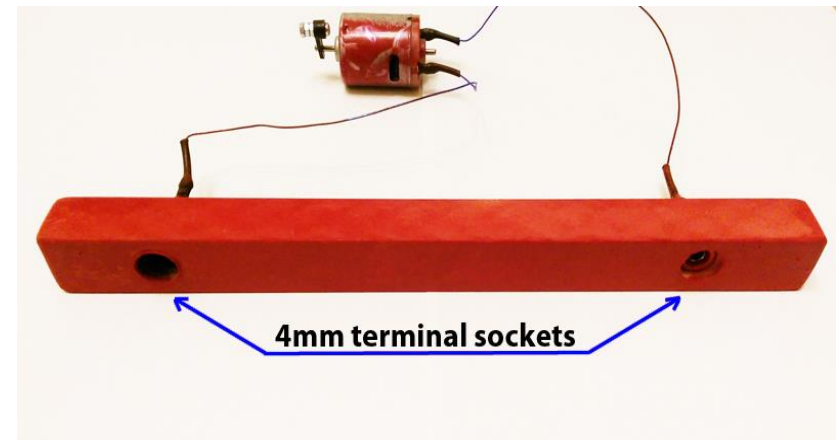
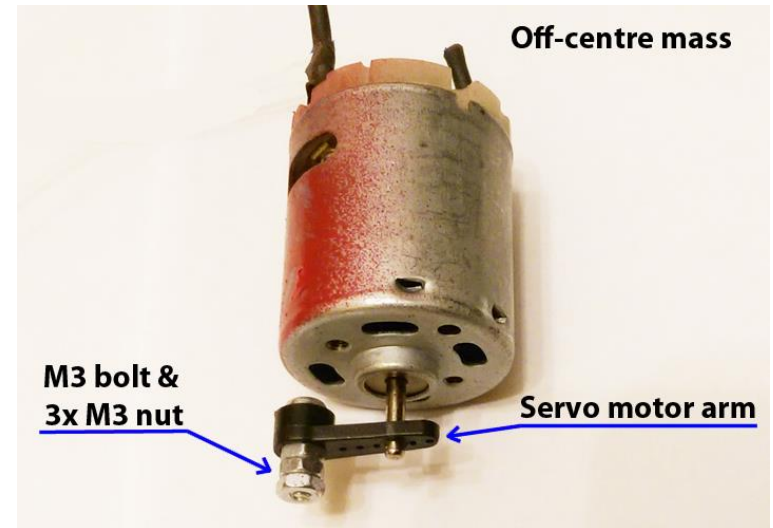
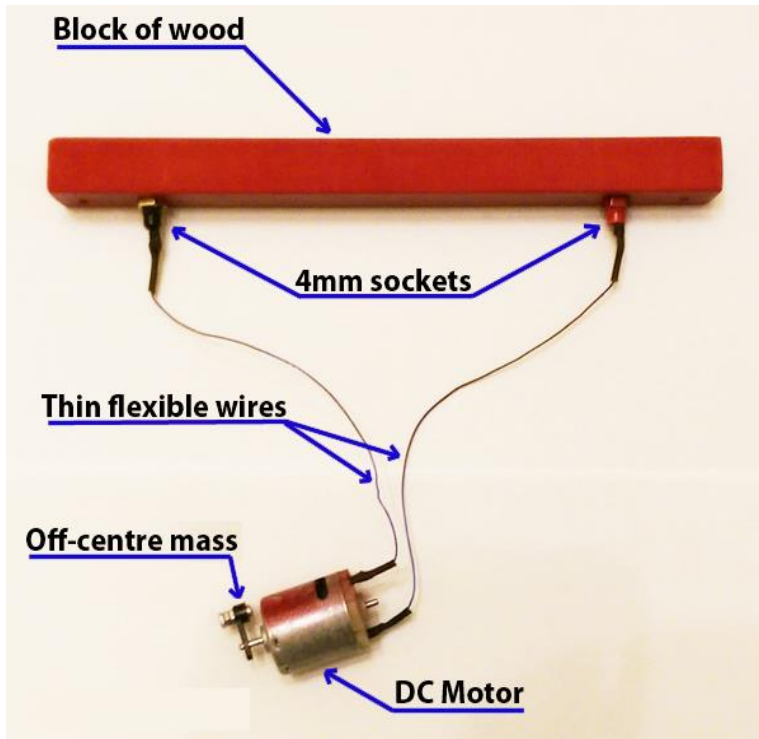
- Use a metal toy car
- Put extra 200g to 400g masses on top of the car
- Create a track using meter rulers
- Use a smartphone camera if possible



# Acceleration - results

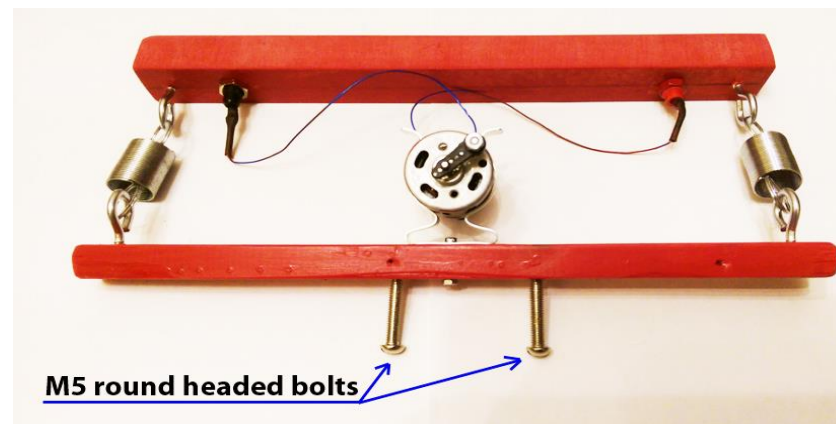
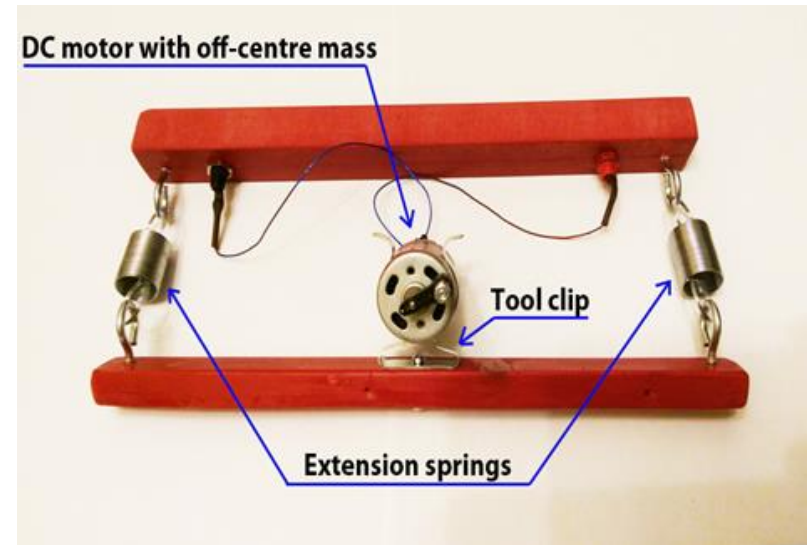
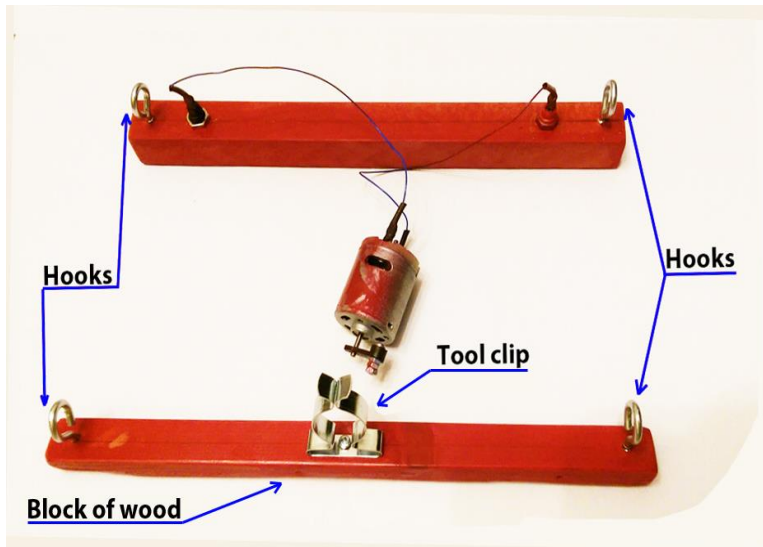
<b><math>m_{\text{Car}} = 461 \text{ g}</math></b>		<b><math>F = 0.2 \text{ N}</math></b>		<b><math>m_{\text{Car}} = 461 \text{ g}</math></b>		<b><math>F = 0.4 \text{ N}</math></b>	
<b>L [cm]</b>		<b>t [s]</b>		<b>L [cm]</b>		<b>t [s]</b>	
20.0		0.94		20.0		0.77	
40.0		1.77		40.0		1.38	
60.0		2.44		60.0		1.91	
80.0		2.89		80.0		2.30	
100.0		3.16		100.0		2.44	
<b><math>F = 0.2 \text{ N}</math></b>		<b><math>m_{\text{Car}} = 261 \text{ g}</math></b>		<b><math>F = 0.4 \text{ N}</math></b>		<b><math>m_{\text{Car}} = 461 \text{ g}</math></b>	
<b>L [cm]</b>		<b>t [s]</b>		<b>L [cm]</b>		<b>t [s]</b>	
20.0		0.64		20.0		0.59	
40.0		1.13		40.0		1.03	
60.0		1.52		60.0		1.43	
80.0		1.77		80.0		1.65	
100.0		1.92		100.0		1.75	

# DIY ripple tank

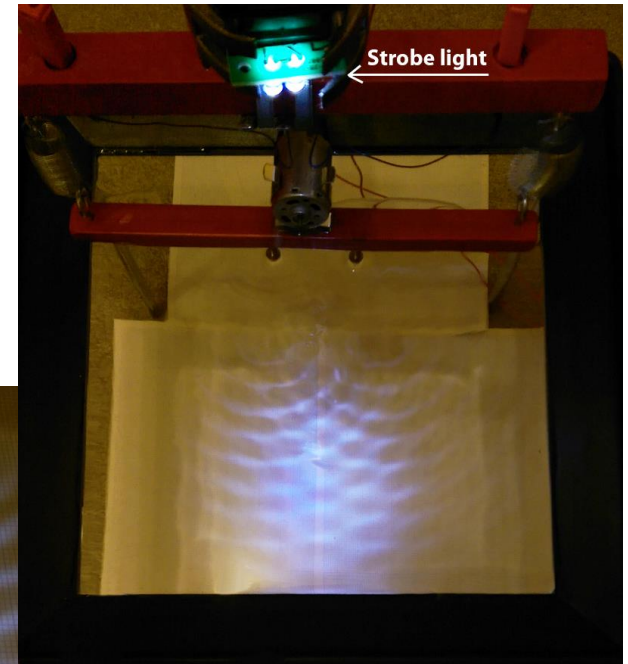
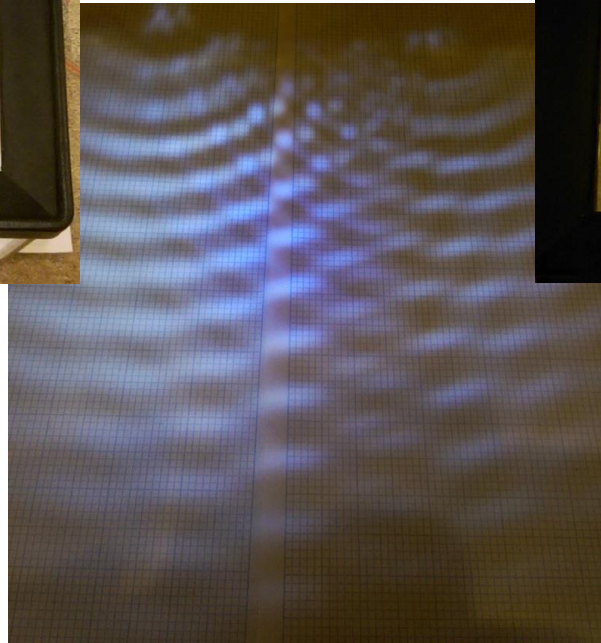
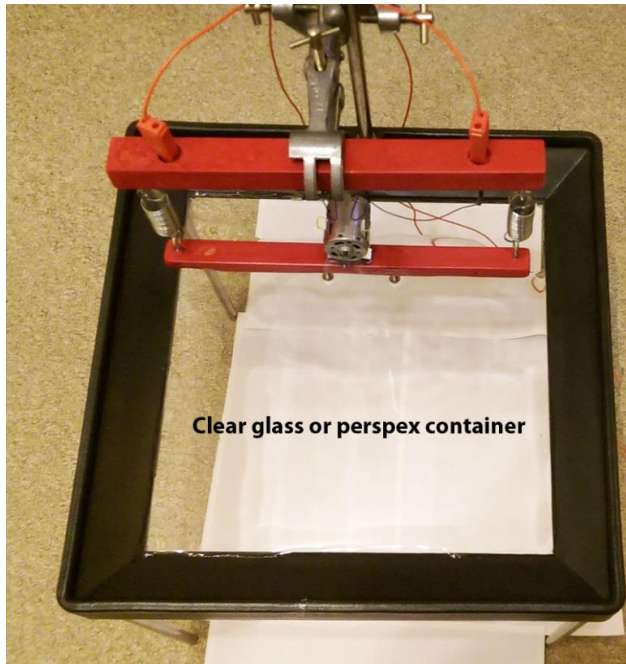




# DIY ripple tank



# DIY ripple tank



# Making a Leslie “can”



# Making a Leslie “can”

Exactly same results as using Leslie cube.



# How did we do?

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- Please rate this session on the **Sched Conference app**.
- Using the post-its provided, please write:
  - one thing you enjoyed about our session or will take away for your teaching
  - one thing you feel could be improved.
- Stick these on the feedback poster as you leave.



# Get in touch

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[aqa.org.uk/contact-us](https://aqa.org.uk/contact-us)

Customer Support Team

01483 477756

[gcsescience@aqa.org.uk](mailto:gcsescience@aqa.org.uk)

Events Team

0161 696 5994

[events@aqa.org.uk](mailto:events@aqa.org.uk)

[aqa.org.uk/professional-development](https://aqa.org.uk/professional-development)

Thank you

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