A LEVEL PHYSICS

What to expect.

OCR PHYSICS A

Spec Overview for Year 12

Content Overview	Assessment Overview	
Content is split into four teaching modules: • Module 1 – Development of practical skills in physics • Module 2 – Foundations of physics • Module 3 – Forces and motion • Module 4 – Electrons, waves and photons Both components assess content from all four modules.	Breadth in physics (01) 70 marks 1 hour 30 minutes written paper	**50%** of total AS level
	Depth in physics (02) 70 marks 1 hour 30 minutes written paper	**50%** of total AS level

We will use these test papers in year 12

Spec Overview for the Full A Level
Remember Year 12 content is examined at the end of year 13

Content Overview	Assessment Overview	
Content is split into six teaching modules: • Module 1 – Development of practical skills in physics • Module 2 – Foundations of physics • Module 3 – Forces and motion • Module 4 – Electrons, waves and photons • Module 5 – Newtonian world and astrophysics • Module 6 – Particles and medical physics Component 01 assesses content from modules 1, 2, 3 and 5. Component 02 assesses content from modules 1, 2, 4 and 6. Component 03 assesses content from all modules (1 to 6).	Modelling physics (01) 100 marks 2 hours 15 minutes written paper	**37%** of total A level
	Exploring physics (02) 100 marks 2 hours 15 minutes written paper	**37%** of total A level
	Unified physics (03) 70 marks 1 hour 30 minutes written paper	**26%** of total A level
	Practical Endorsement in physics (04) (non exam assessment)	Reported separately

Module 2 – Foundations of physics

2.1 Physical quantities and units
2.2 Making measurements and analysing data
2.3 Nature of quantities

Module 3 – Forces and motion

3.1 Motion
3.2 Forces in action
3.3 Work, energy and power
3.4 Materials
3.5 Newton's laws of motion and momentum

Module 4 – Electrons, waves and photons

4.1 Charge and current
4.2 Energy, power and resistance
4.3 Electrical circuits
4.4 Waves
4.5 Quantum physics

Module 5 – Newtonian world and astrophysics

5.1 Thermal physics
5.2 Circular motion
5.3 Oscillations
5.4 Gravitational fields
5.5 Astrophysics and cosmology

Module 6 – Particles and medical physics

6.1 Capacitors
6.2 Electric fields
6.3 Electromagnetism
6.4 Nuclear and particle physics
6.5 Medical imaging

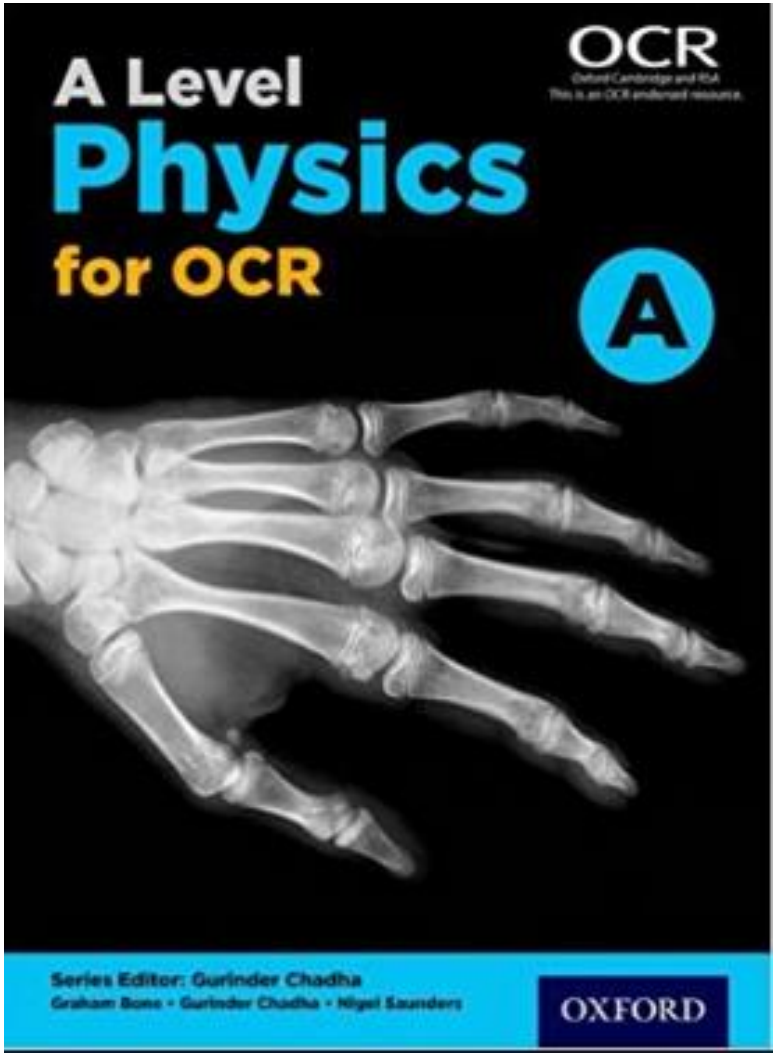
This gives you more information about what is in each Module

PRACTICAL'S IN YEAR 12

PAG1
1.1 Comparing methods of determining g
1.2 Investigating terminal velocity
1.3 Investigating the effect of initial speed on stopping distance
PAG2
2.1 Determining the Young Modulus for a metal
2.2 Force/extension characteristics for arrangements of springs
2.3 Investigating a property of plastic
PAG3
3.1 Determining the resistivity of a metal
3.2 Investigating electrical characteristics
3.3 Determining the internal resistance and maximum power available from a cell

PAG4
4.1 Investigating resistance
4.2 Investigating circuits with more than one source of e.m.f.
4.3 Investigating potential divider circuits including a non-ohmic device
PAG5
5.1 Determining the wavelength of light with a diffraction grating
5.2 Determining the speed of sound in air using a resonance tube
5.3 Determining frequency and amplitude of a wave using an oscilloscope
PAG6
6.1 Determining the Planck constant
6.2 Experiments with light
6.3 Experiments with polarisation

TEXT BOOK TO BUY



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Language: English

ISBN-10: 0198352182

ISBN-13: 978-0198352181

WHAT ELSE DO YOU NEED TO HAVE.

You need 2 folders

You must have 2 sets of dividers

You need a scientific calculator.

(If you are doing maths they have a specific calculator to buy which can also be used for Physics)

ENTRY REQUIREMENTS

SUITABILITY

- APS 5.3
- Grade 6 in GCSE Sciences. If more than one Science at least two must be at a grade 6 (one must be Physics).
- Grade 6 in GCSE Maths
- Pass the entry exam

EXAMINATION & ASSESSMENT BREAKDOWN

- 100% external examination

The entry exam will be based around the content of the Paper 2 for the Separate Physics exam and will be in the first lesson.

WHAT DO WE EXPECT YOU TO DO

For every hour you are timetabled for Physics, we expect you to complete 1 hour in your own time.

- Go through notes made in the lesson to make sure you understand them
- Add extra notes from other text books
- Try exam questions and then mark them using the mark schemes.
- Make sure your notes are organised and up to date

WHERE CAN YOU FIND INFORMATION TO HELP YOU STUDY THIS SUBJECT ?

Use the 6th form learning platform and the Physics folder. It contains:

- **Powerpoints from the lessons**
- **Extra information and questions for the topics**
- **Exam questions with mark schemes**
- **Useful websites**

Useful if you have missed a lesson and need to catch up

LETS TRY SOME PRACTICAL WORK

BUILD A CD SPECTROMETER

Theory First

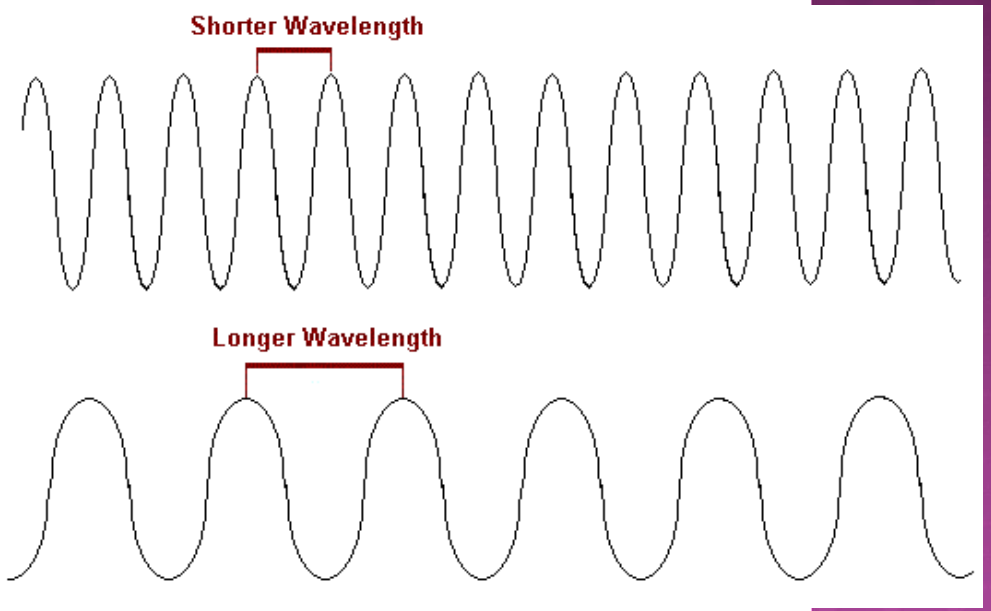
WHAT'S A SPECTROMETER?

- An instrument that measures a spectrum
- Spectrum: all the colours that make up light
- Can include ultraviolet and infrared

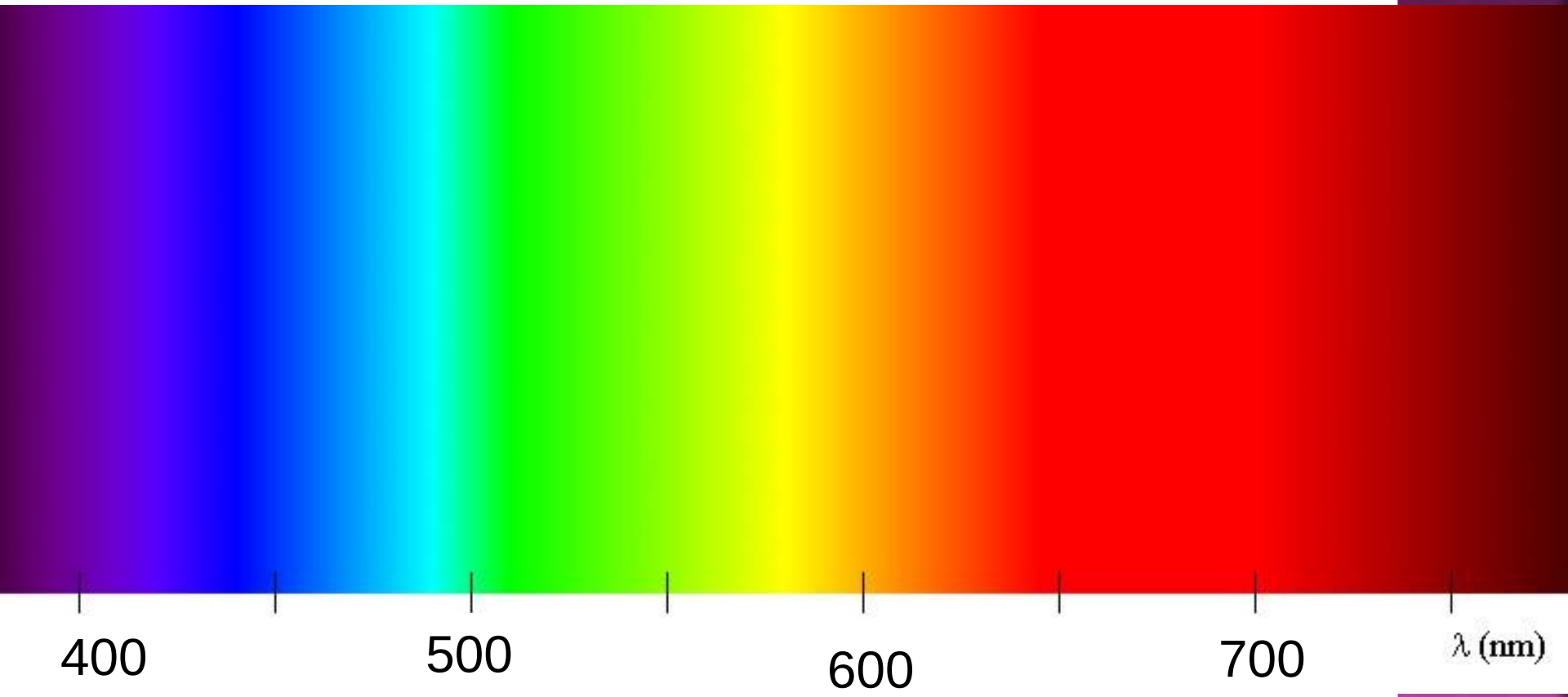
LIGHT IS A WAVE

- Light is part of the **Electromagnetic Spectrum**

and we can look at it through a spectrometer.



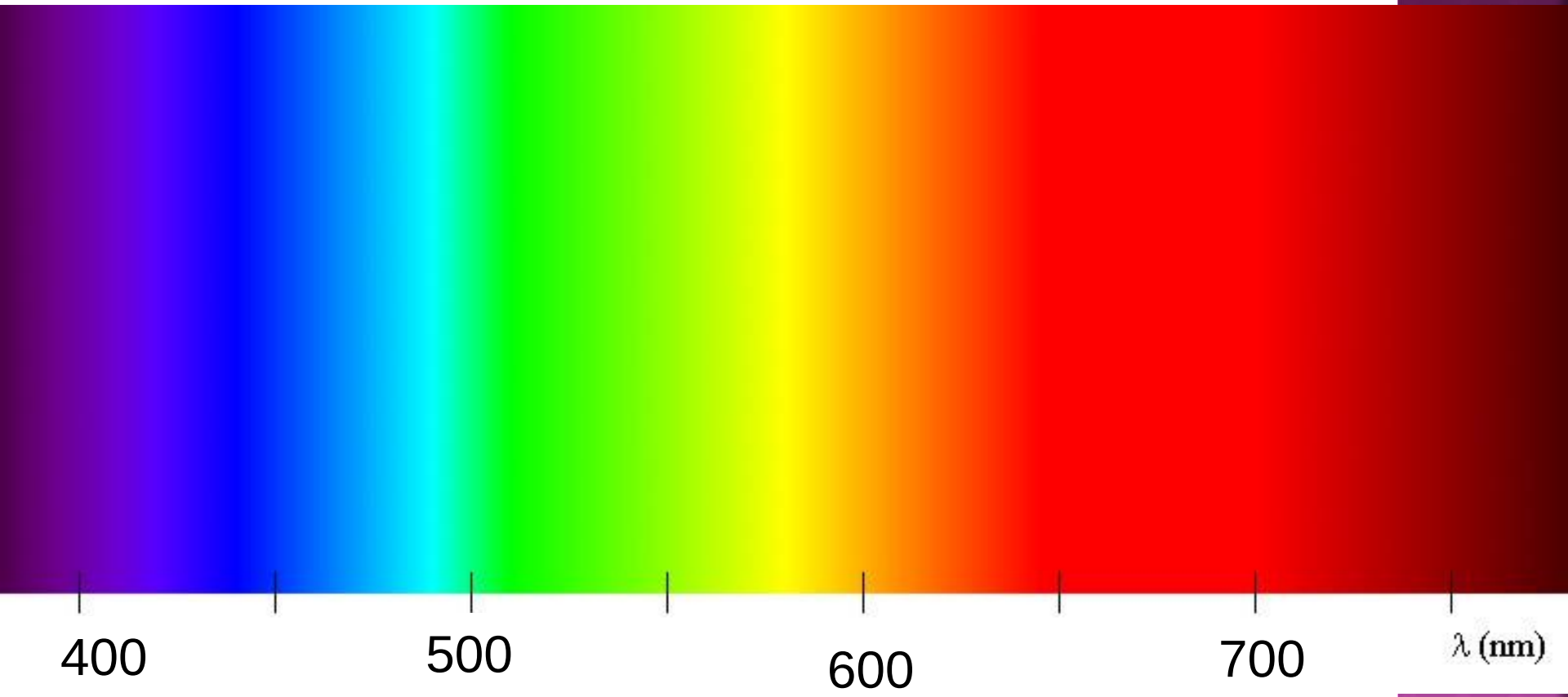
THE WAVELENGTH RELATES TO THE COLOUR



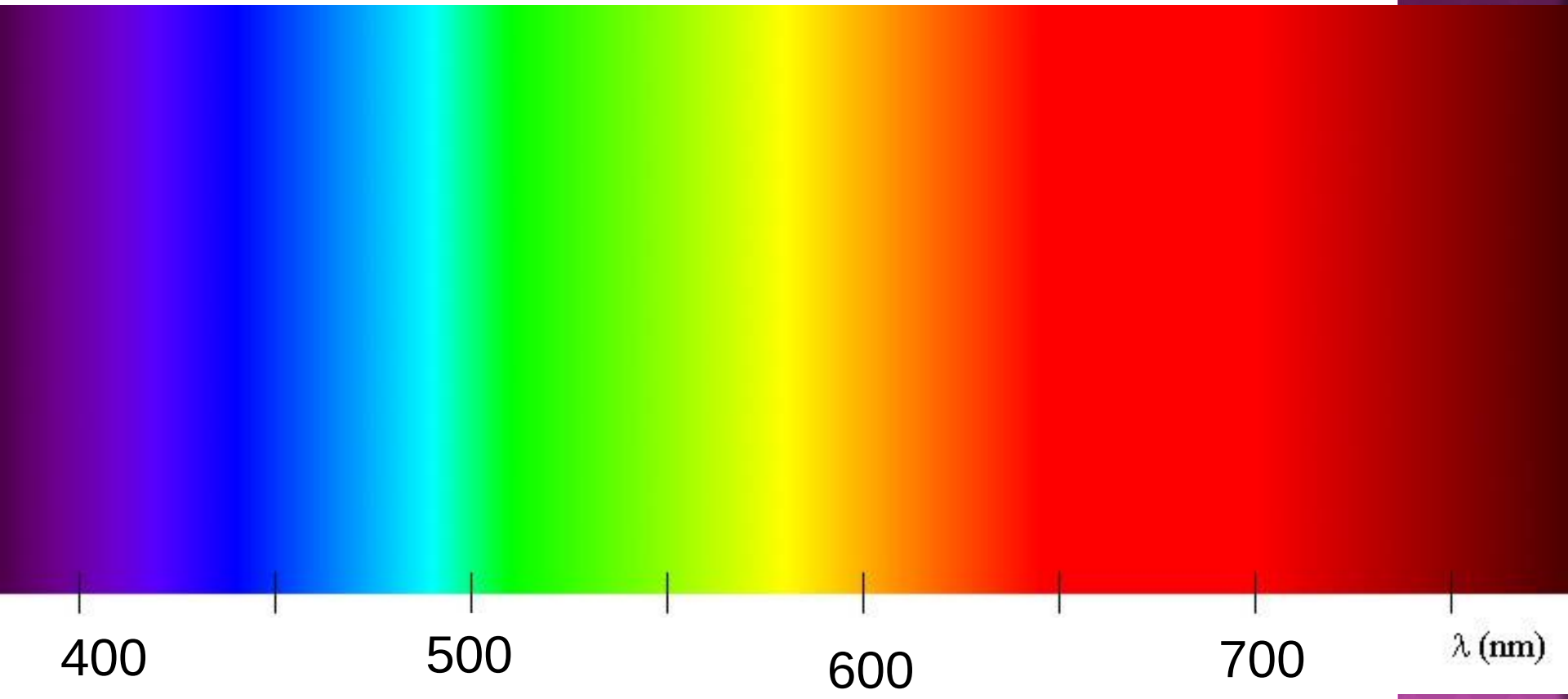
- Wavelengths measured in nanometers

http://www.chm.davidson.edu/vce/coordchem/color.html

WHICH COLOUR HAS THE LONGEST WAVELENGTH?



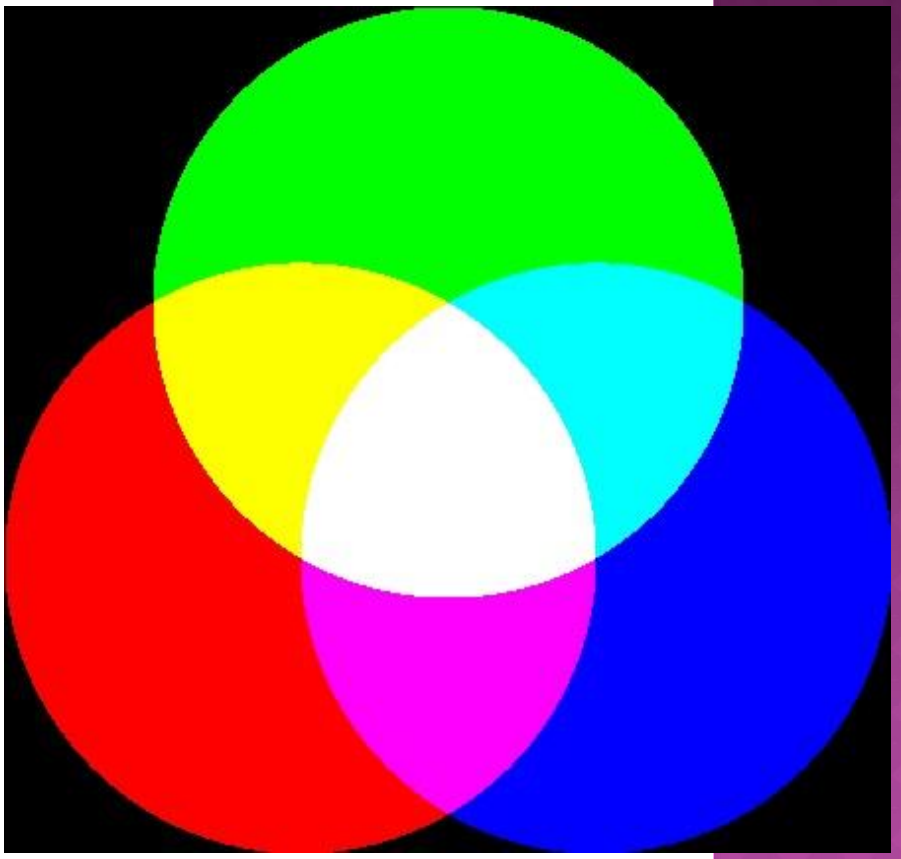
WHAT IS THE WAVELENGTH OF INFRARED?



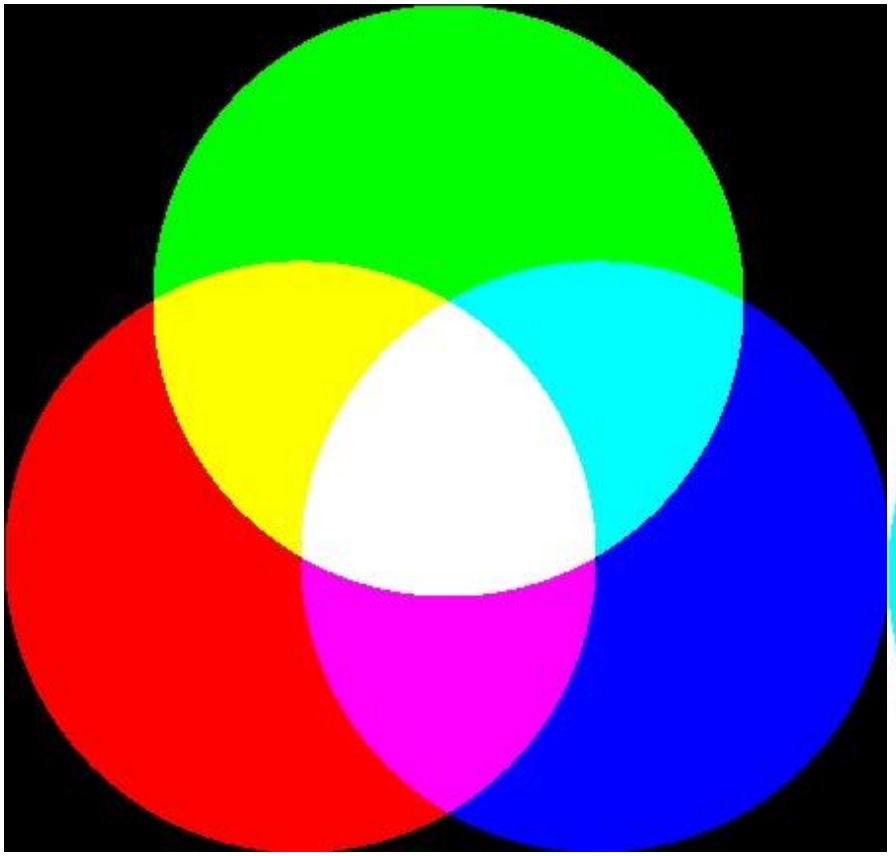
Take an educated guess

HOW DO COLOURS MIX?

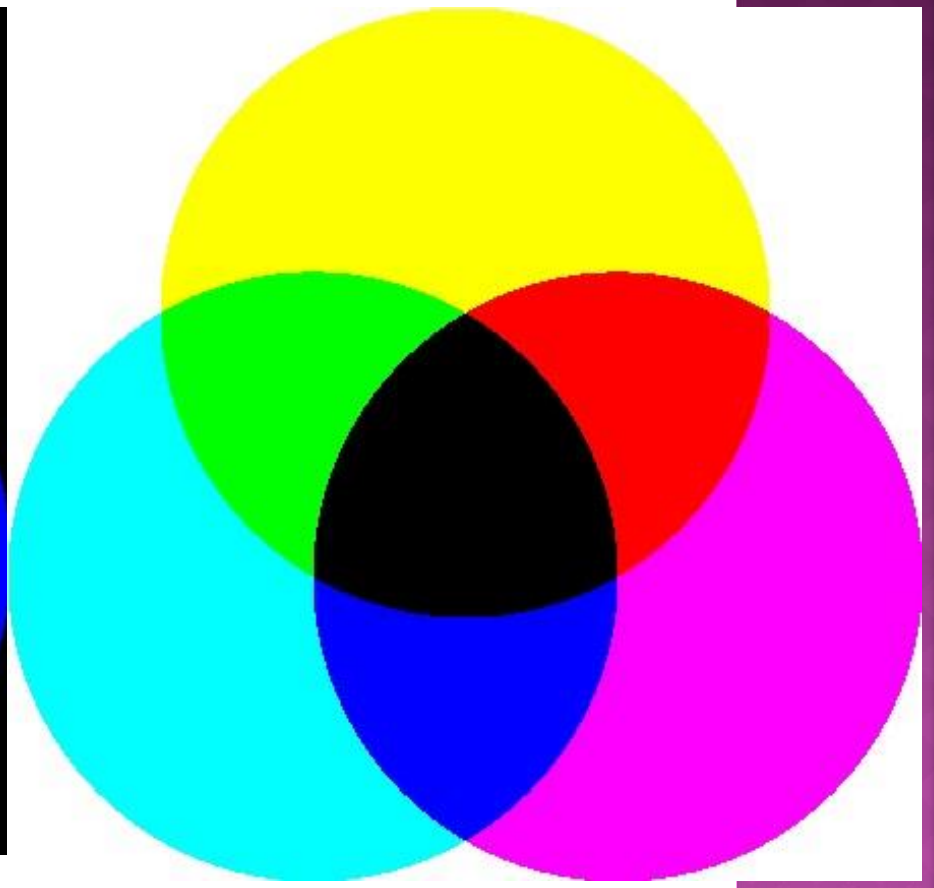
- White light contains lots of wavelengths



LIGHT WORKS DIFFERENTLY THAN PAINT OR INK

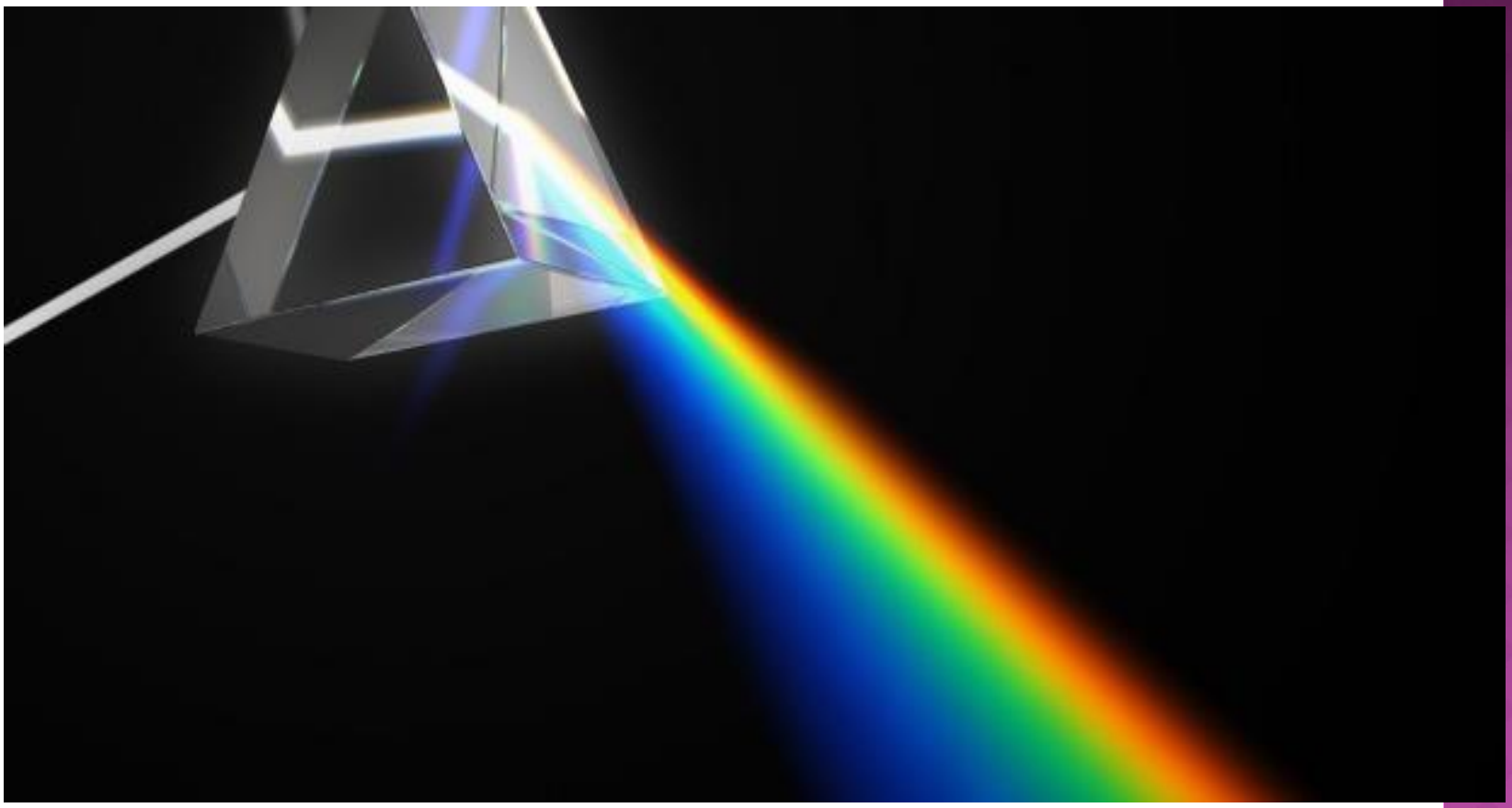


Light: start with black, add colours to make white



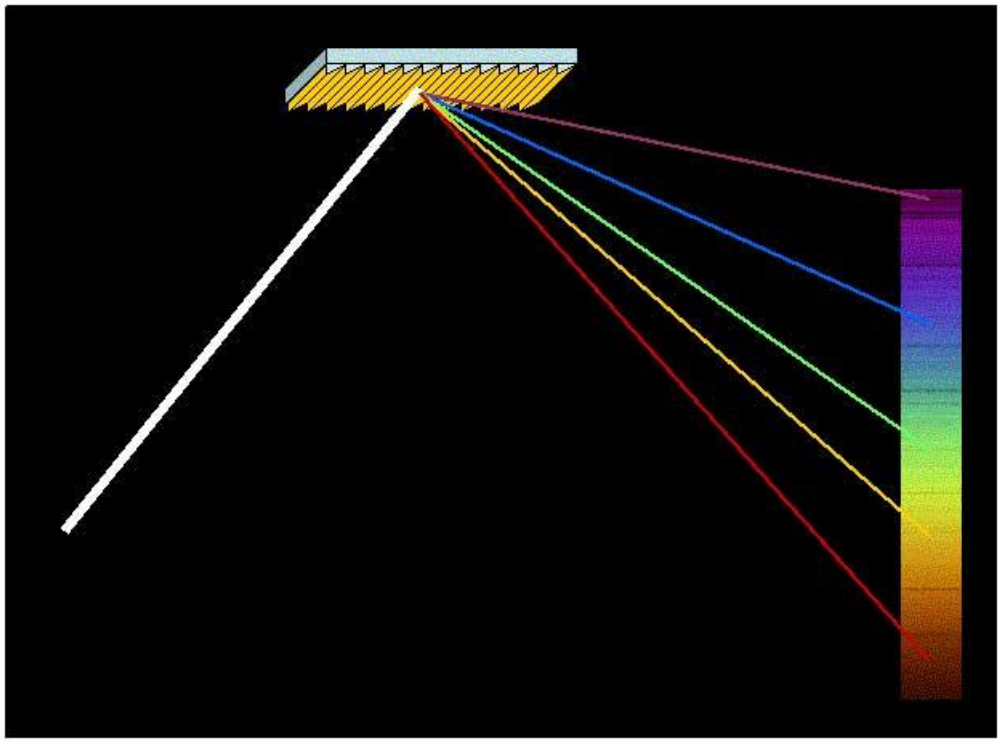
Paint: start with white, add colours to make black

A PRISM SEPARATES THE LIGHT INTO COLOURS

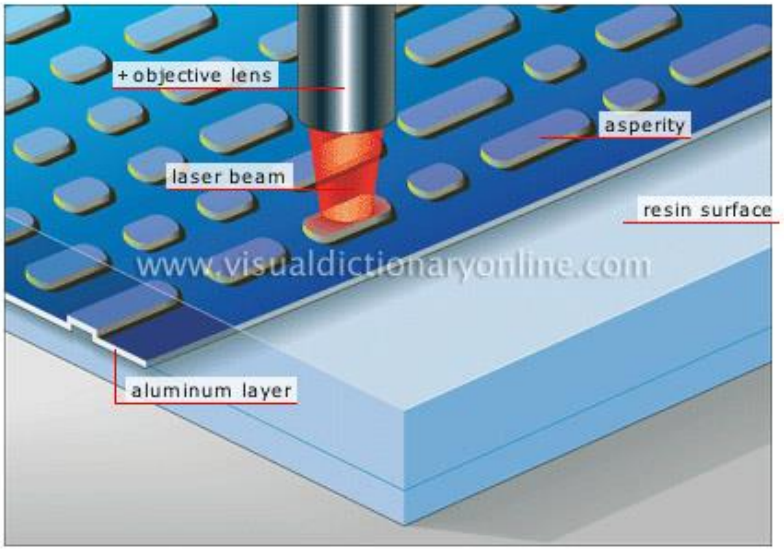


A GRATING ALSO SEPARATES LIGHT

- Grating: a system of parallel lines (or bars) built onto a surface



A CD CAN ACT LIKE A GRATING



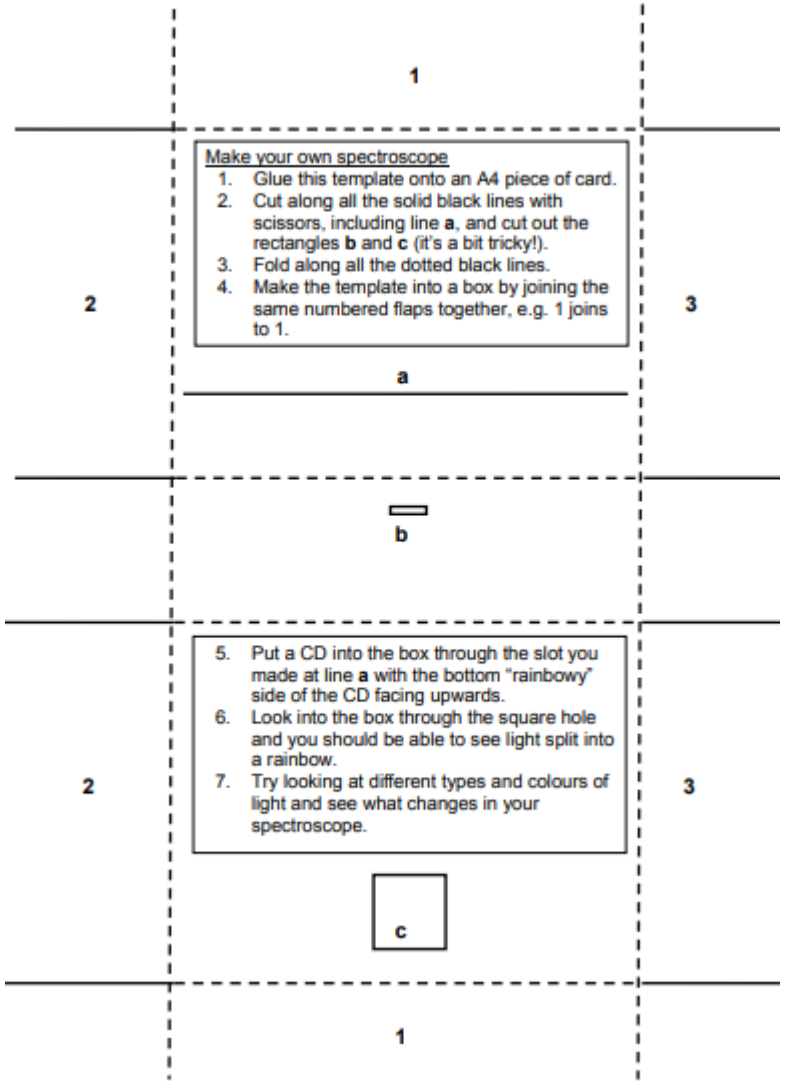
We can use a Cd to built a spectroscope

OK, LET'S BUILD!

You need to **each** collect:

a) A template
b) Black card
c) A scalpel
d) Sellotape
e) Scissors
f) A CD

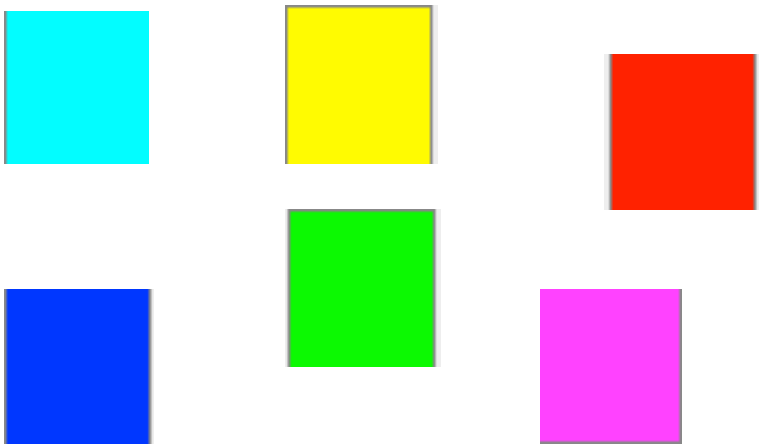
Follow the instruction to complete.

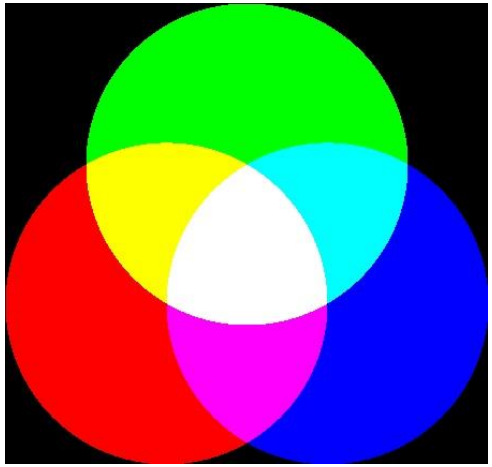


When you have built it then use it to view different types of light to see what you get

Some colours on a monitor to look at:

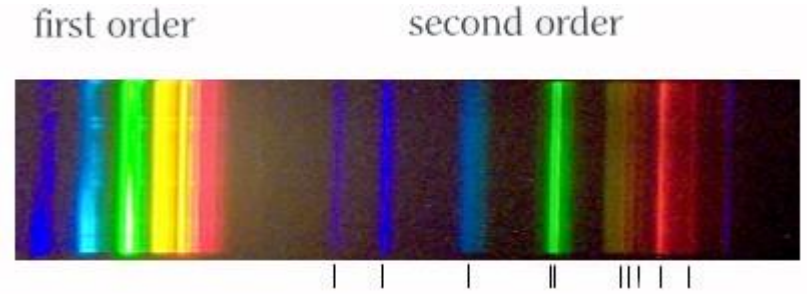
- What do you expect to see in the spectrometer for each of these?





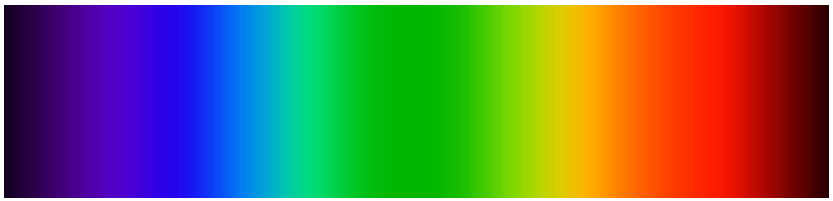
THERE ARE DIFFERENCES IN THE LIGHT GIVEN OFF WHICH CAN BE SEEN WHEN PUT THROUGH A SPECTROSCOPE

- Spectrum of fluorescent light



What's different?

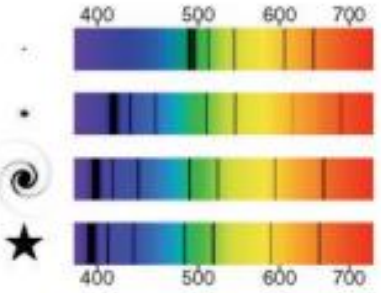
Spectrum of sunlight



What can Spectroscopes be used for?

Astronomy

Astrophysicists
use spectroscopy to find out what stars are made of and how galaxies move by studying the light they emit into space.



[1]Image from http://cosmology.com/BigBang4.html

Chemistry

New chemical compounds are identified using spectroscopy to find out what elements they are made of.
Solar scientists use spectroscopy to investigate new dyes and materials for solar cells.