

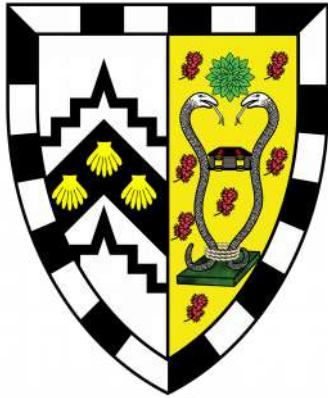


Gonville & Caius  
UNIVERSITY OF CAMBRIDGE

# How to succeed in the Physical Natural Sciences

Gareth Conduit

# Teaching in the College and the University

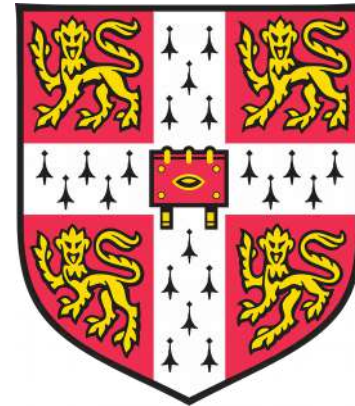


## College

Admissions

Director of Studies

Supervisions



## University

Lectures

Practicals

Examinations

# Your Director of Studies



Dr Gareth Conduit  
Physics & Maths

# Your Directors of Studies



Dr Gareth Conduit  
Physics & Maths



Dr Andrew Bond  
Chemistry & Materials

# Your Directors of Studies



Dr John Ellis  
Physics & Maths



Dr Andrew Bond  
Chemistry & Materials

# Role of your Directors of Studies



Dr Gareth Conduit  
Physics & Maths



Dr Andrew Bond  
Chemistry & Materials

Guidance on subject choice

Organize supervisions and mock exams

Review academic progress at the start and end of term

Write reference letters

Can meet to discuss academic issues at any time – please contact by email [gjc29@cam.ac.uk](mailto:gjc29@cam.ac.uk) and [adb29@cam.ac.uk](mailto:adb29@cam.ac.uk)

# Activity: Introductions

What is your name?

Where do you come from?

What pastime / sport do you enjoy?

Something interesting that you did over the summer?

# Punt jousting





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# Pokémon



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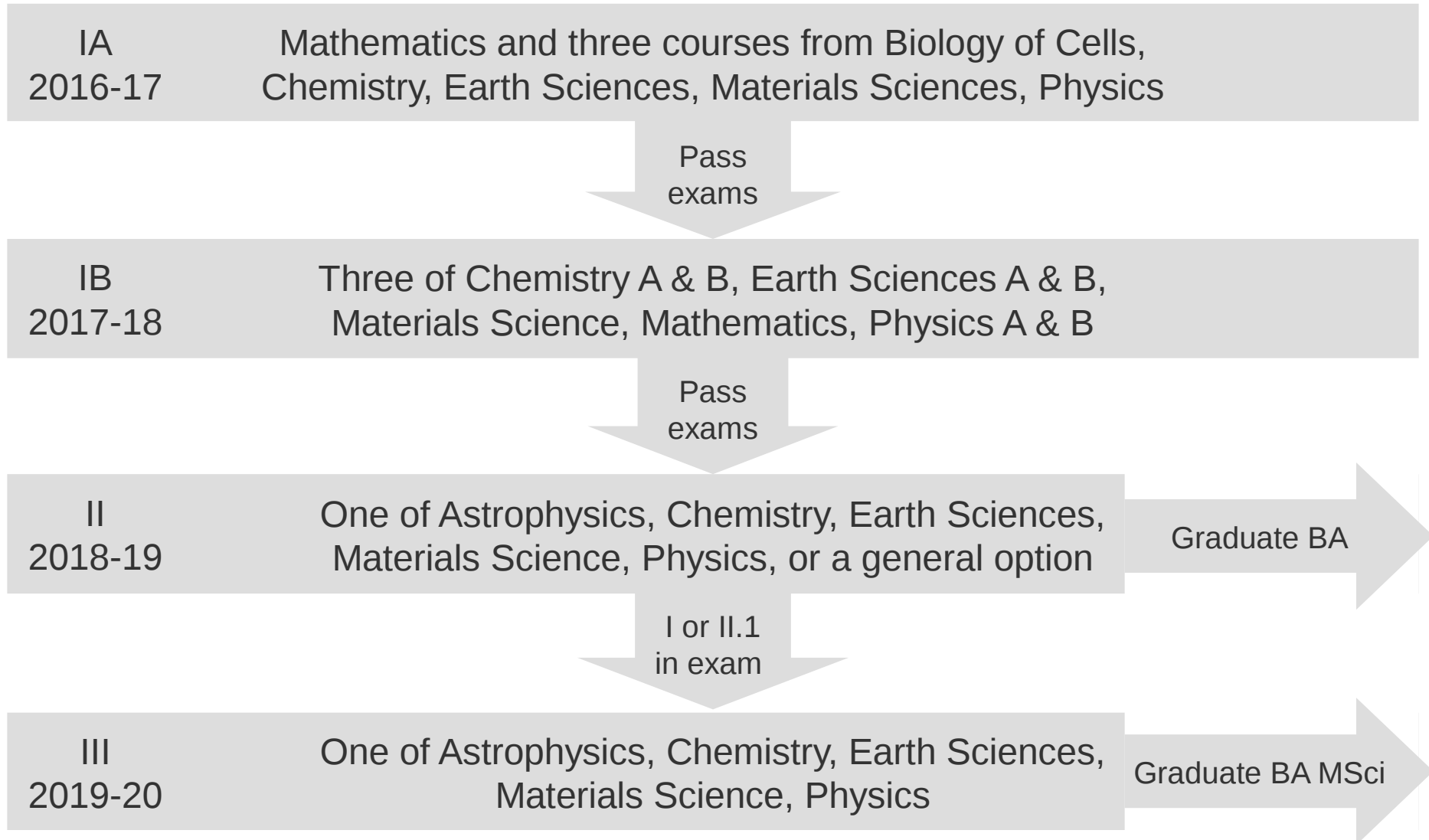
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# Structure of the Natural Sciences Physical course



# Courses in the first year

Choose 3 from	Physics	Materials science	Chemistry	Biology of cells	Evolution and behavior
		Earth sciences	Computer science		Physiology of organisms
1 of	Maths B	Maths A			Mathematical biology

# How to get the most out of lectures

Turn up on time

Look through the handout just before the lecture

Annotate the handout during the lecture

Use the spare time between lectures for supervision work or to review the material covered

Ask the lecturer questions immediately after the lecture

If you find yourself getting confused by the material immediately ask a friend or your supervisor for help

# Supervisions

Each week the lecturers will set supervision questions

A question set should take you 3 hours to complete (so a total of 12 hours per week)

Hand in the answers to your supervisor, probably the day before the supervision

Meet your supervisor weekly in pairs to discuss work

Supervisions are not assessed. Use them to help your learning

# Activity: Finding your supervision partner

Each person has part of an integrand

$$\int_0^1 f_i(x) f_j(x) dx = 1$$

Can you find your partner?



# How to get the most out of supervisions

Discuss supervision work with your supervision partner beforehand, you will both learn from the process

Highlight on the supervision answers anything you would like to discuss so that they will not be missed

Submit the work punctually

Go to the supervision with list of topics you would like to discuss aside from the answers

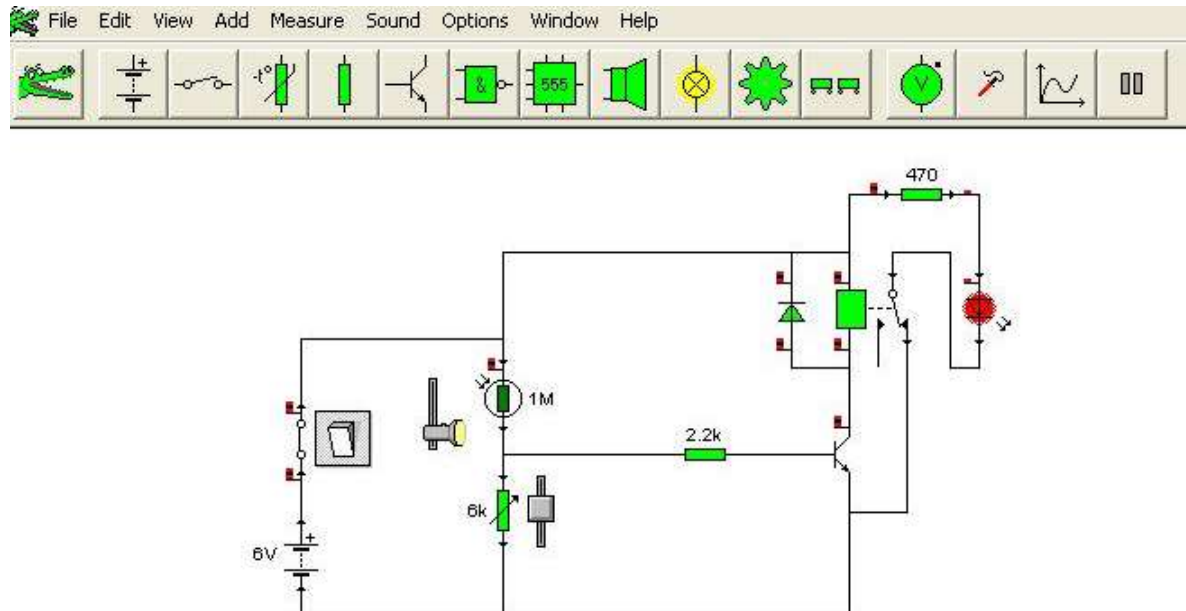
# How to get the most out of practicals

Practicals reinforce the lecture and contribute 25% of the IA mark

Practicals are written up and then assessed

Once a term write up one experiment in a report that is marked

It is helpful to prepare for the practical beforehand e.g. simulate electrical circuits on a computer



# Exams

Each subject has a three hour exam at the end of academic year (maths has two exams)

Papers set in the previous 20 years can be downloaded from each Department's website, answers are often available

Practice is essential: to work through 20 years of exams should take  $5 \times 20 \times 6 = 600$  hours (working year contains 1725 hours, lectures, practicals, and supervisions take 688 hours)

Practice exams questions against the clock

Discuss answers with your supervisor and friends

You should do past exam questions as you learn the material

# Schedule for the academic year 2016-2017

Exams	26 May
Trinity term lectures	27 Apr
Easter vacation	16 Mar
Lent term lectures	19 Jan
Christmas vacation	1 Dec
Michaelmas term lectures	6 Oct

# Make best use of the vacation

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During the vacation you should revise as if doing a full-time job

## Activity: working together

Sample short notes questions. In pairs please prepare a 3-minute presentation on:

Chemistry	<i>Compare acids to alkalis</i>
Chemistry	<i>Why is life made from carbon?</i>
Materials 2012	<i>Why does wood have anisotropic properties?</i>
Materials 2011	<i>How do you measure a liquid's viscosity?</i>
Mathematics	<i>Simultaneous equations</i>
Physics 2016	<i>Orbits in gravitational fields</i>
Physics 2015	<i>Force fields and potential energy</i>
Physics 2014	<i>Faraday and Lenz laws</i>

# Skills needed to succeed at Cambridge

Time management

Independence, self-motivation, and being proactive

Discipline to practice past exam papers

Communication skills in supervisions and exams

Confidence and the humility to seek help from peers

The initiative to find approaches that work well for you

# Preparation for the Monday 15:00 DoS session

30 minutes of past exam questions from each of Mathematics, Physics, Chemistry, and Material Sciences so 2 hours in total

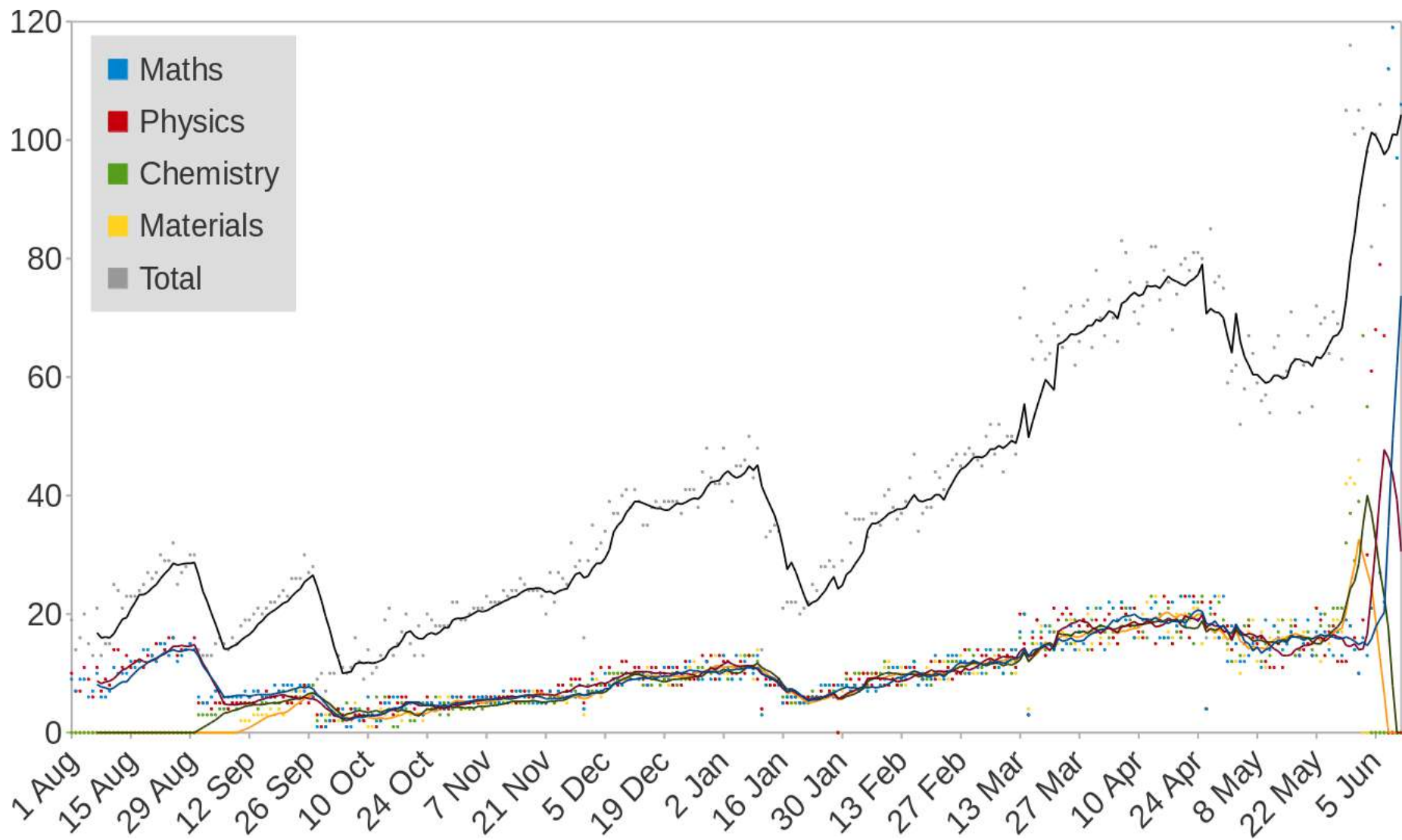
All questions can be done from A-level knowledge

Over the weekend please prepare written answers for the questions, and talk to each other about how to do them

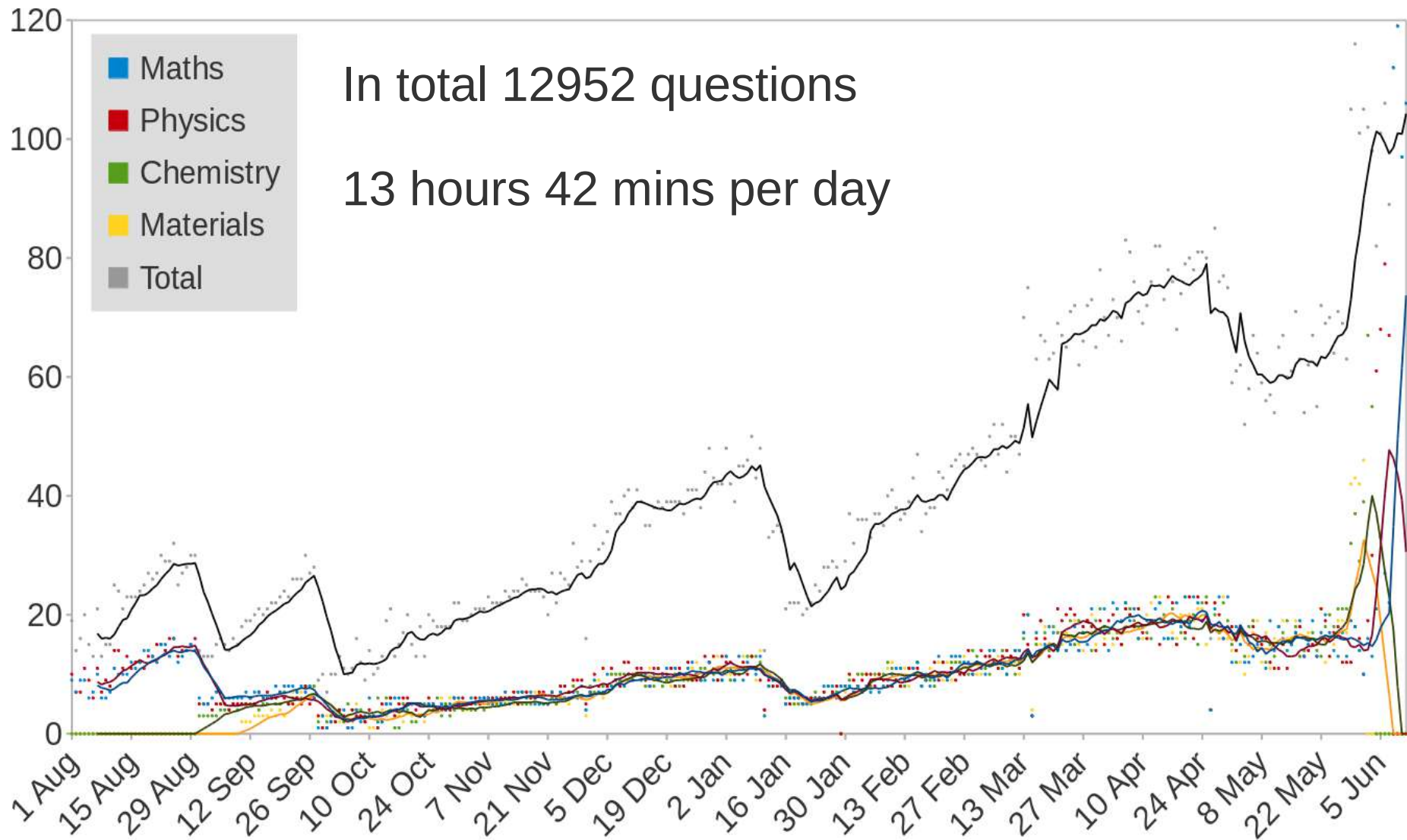
During the session we will go through the written answers and compare to model solutions prepared by the DoS



# Practising past exam papers in 2002-2003



# Practising past exam papers in 2002-2003



# Practical activity: making squares

Each group has the tiles to make exactly one square per person

All tiles should be used