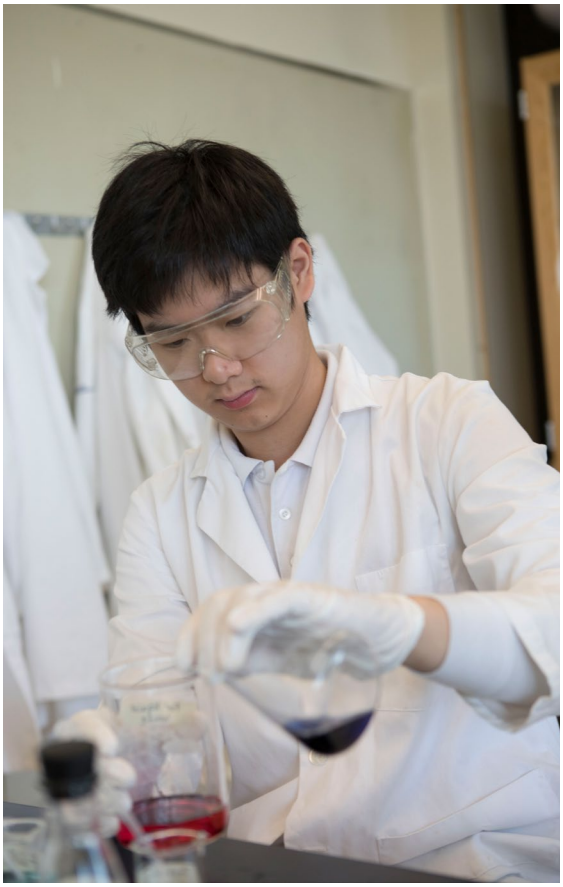
FIELDSTONE SCIENCE

Cambridge March Break

Chemistry Practical Preparation Camp 2020

THE IMPORTANCE OF PRACTICAL SCIENCE

Universities want to see evidence that a student has undertaken practical work during their science studies at school. We believe that the best preparation for university study is to provide practical science opportunities throughout a student's pathway, from Cambridge International AS & A Level. This gives students the practical experience that universities value so highly. The formal assessment of practical science skills delivers both immediate and long-term benefits:



• Practical science can be one of the most exciting and interesting elements of a science course, sparking curiosity and engagement and improving understanding. From a teacher's perspective, the motivational value of practical science can play a vital role in improving student performance across the class.

• Science is a practical subject and research suggests that success in future scientific studies, or a scientific career, requires a solid foundation of practical skills.

• When considering applications to science degree courses, universities want to see practical experience as well as theoretical understanding.

• Students with proven practical science skills are best placed to apply to science courses, especially at the most prestigious institutions, and to do well in their undergraduate studies.

• Practical skills improve understanding of the principles of scientific enquiry and of scientific theory.

• Many of the specific skills gained through practical science experience, such as accurate measurement and observation or the value of perseverance, are shown to support progress in many other courses of study or employment routes.

• As practical science is often a group activity, it can also encourage lifelong skills that are highly relevant to other subjects and career paths, such as team work, collaboration, and communication skills.

OUR MARCH BREAK CAMP WILL AIM TO:

- Provide learning opportunities so that students develop the skills they need to carry out experimental and investigative work.
- Reinforce students learning of the theoretical subject content of the syllabus.
- Instill an understanding of the interplay of experiment and theory in scientific method.
- Motivate students to achieve further success in the sciences.
- Teach how to safely and efficiently perform the practical skills required to be successful in the practical examination.
- Teach the theory behind the procedures.
- Learn the conventions required to maximize marks on their examination paper.
- Teach time-management skills to ensure that students can can complete the required procedures in the amount of time given to them.

This course goes from March 9 – March 13 and has a maximum enrollment of 15 students.

The course is 3 hours from 1:00 p.m. until 4:00 p.m.

All materials and safety equipment will be supplied to our students.

Paper 3 (AS-level): Advanced Practical Skills [Duration: 2 hours] [Marks: 40]

This paper requires candidates to carry out practical work in timed conditions. Candidates will be expected to collect, record, and analyse data so that they can answer questions related to the activity. The paper will consist of two or three experiments drawn from different areas of chemistry. Candidates will answer all questions. Candidates will answer on the question paper.

The exam paper consists of three questions.

One question will be an observational (qualitative analysis) problem in which the candidate will be asked to investigate an unknown substance or substances by specified experiments. The substances may be elements, compounds or mixtures. Candidates will be expected to record their observations, analyse their results and draw appropriate conclusions.

The other question or questions will be quantitative: either volumetric analysis or measurement of a quantity, e.g. the enthalpy change of a reaction, mass change on heating, changing the rate of a reaction or measuring a gas volume. Candidates will be expected to draw suitable tables, graphs and other appropriate means of presenting the data. They will analyse the data, perform calculations and draw appropriate conclusions from them. One or more of the questions may require candidates to comment on the accuracy of the procedure or identify sources of error and make suggestions for change.

The students will be assessed on their experimental skills and investigations skills such as:

- Plan and peform experiments and investigations.
- Collect, record and present observations, measurements and estimates.
- Analyse and interpret data to reach conclusions.
- Evaluate methods and quality of data, and suggest improvements.

For quantitative analysis students will become familiar with:

Acid-base titration common laboratory acids (hydrochloric acid, sulfuric acid, nitric acid)

A weak acid such as ethanoic or propanoic acid

Sodium hydroxide

Sodium carbonate

Indicators such as methyl orange or screened methyl orange, bromophenol blue and thymol blue or thymolphthalein

Manganate (VII) titration

Potassium manganate (VII)

Hydrogen peroxide

Iron (II) sulfate or ammonium iron (II) sulfate sodium nitrite

Ethanedioic acid or its soluble salts

Gravimetric, thermometric, rates and gas collection

Copper (II) sulfate

Group 2 carbonates

Iron, magnesium, zinc metals

Potassium iodide

Potassium peroxydisulfate

Sodium thiosulfate

Solid hydrated barium chloride and magnesium sulfate

For qualitative analysis students will become familiar with:

For inorganic analysis:

The carbonates (where they exist), sulfates, nitrates, chlorides of the cations, and the sodium and potassium salts

For organic analysis:

Alcohols (primary, secondary, tertiary)

Aldehydes and ketones (N.B. Tests for aldehydes may be performed by substituting glucose for the aldehyde)

Carboxylic acids

Esters

Halogenoalkanes

Each day will be consisting of 3 hrs of session.

Day and Date	Type of analysis	Time allotted	Learning goals
March 9th (Monday)	• Titration analysis • Lab safety guidelines • Lab equipment and apparatus • Lab safety quiz	• Lab safety guidelines • Lab equipment and apparatus • Lab safety quiz: **60 mins** • Titration: **60 mins** • Review and feedback: **60 mins**	1. Interpretation of data or observations and identifying sources of error 2. Choose a suitable and clear method of presenting the data, e.g. tabulations, graphs or a mixture of methods of presentation. 3. Successful collection of data and observations
March 10th (Tuesday)	1. Titration 2. Organic salt analysis	1. Titration: **60 mins** 2. Salt analysis: **45 mins** 3. Review and feedback: **75 mins**	1. Interpretation of data or observations and identifying sources of error. 2. Choose a suitable and clear method of presenting the data, e.g. tabulations, graphs or a mixture of methods of presentation. 3. Successful collection of data and observations.
March 11th (Wednesday)	1. Measurement of a quantity, e.g. the enthalpy change of a reaction, mass change on heating, changing the rate of a reaction or measuring a gas volume, and organic salt analysis.	1. Measurement of quantity: **60 mins** 2. Salt analysis: **45 mins** 3. Review and feedback: **75 mins**	1. Interpretation of data or observations and identifying sources of error. 2. Successful collection of data and observations.
March 12th (Thursday)	Measurement of a quantity, e.g. the enthalpy change of a reaction, mass change on heating, changing the rate of a reaction or measuring a gas volume.	1. Titration: **60 mins** 2. Salt analysis: **45 mins** 3. Review and feedback: **75 mins**	Interpretation of data or observations and identifying sources of error.
March 13th (Friday)	Mock Practical test	Mock test: **2 hours** Review and Feedback: **1 hour**	Interpretation of data or observations and identifying sources of error.

FIELDSTONE KING'S COLLEGE SCHOOL

2999 DUFFERIN STREET, TORONTO, ON, M6B 3T4
PHONE. +1 416-487-7381 | FAX. +1 416-487-8190
ADMISSIONS@FIELDSTONEKCSCHOOL.ORG
WWW.FIELDSTONESCHOOL.ORG