

4. World Wide Web Treasure Hunt

Summary

Outline of the exercise

Students undertake a 'treasure hunt' to locate a variety of items on the World Wide Web (WWW). A wealth of useful chemistry information is available on the WWW covering exciting new developments, companies, university departments, people, events, literature, databases, safety, and basic chemistry and this exercise is primarily intended to be a way for students to develop their ability to locate some of this material. Although some students are confident at using computers and the web this exercise should help to give weaker students confidence.

Key aims

- to introduce information retrieval on the WWW; and
- to develop problem solving skills.

Time requirements

- 1 hour introduction (tutor contact time)
- 7 hours private study
- 8 hours total student time

Timetable

The following timetable is suggested:

1 hour	Introduction	(lecture slot)
7 hours	Preparation	(private study, at a computer)

S4

World wide web treasure hunt

Treasure Hunt 1

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the Web. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research which are undertaken in this department.
2. What is the electron configuration of iron?
3. Name three Royal Society of Chemistry journals in the area of analytical chemistry which can be accessed on-line.
4. Name four research institutes sponsored by the Biotechnology and Biological Science Research Council (BBSRC).
5. Who won this year's Nobel Prize for Chemistry?
6. What is the postal address of the Royal Society?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 2

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the WWW. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research which are undertaken in this department.
2. What are the hazards of oxygen?
3. Name three Royal Society of Chemistry journals in the area of organic chemistry which can be accessed on-line.
4. What are the eight main areas of science funded by the Engineering and Physical Sciences Research Council (EPSRC)?
5. What was Bristol University's Molecule of the Month for April 1997?

6. Which transition element is studied in the Virtual Laboratory at Oxford University?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 3

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the WWW. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research which are undertaken in this department.
2. What are the mineral sources of tantalum?
3. Name three Royal Society of Chemistry journals in the area of physical chemistry which can be accessed on-line.
4. How many studentships does the Medical Research Council (MRC) fund annually?
5. What was Bristol University's Molecule of the Month for August 1997?
6. What is the postal address of the Royal Society?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 4

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the Web. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research undertaken in this department.
2. What is the element osmium used for?
3. Name two Royal Society of Chemistry journals in the area of inorganic and material chemistry which can be accessed on-line.
4. Name the four main areas of research which are funded by the Natural Environmental Research Council (NERC).
5. Who won this year's Nobel Prize for Chemistry?

6. What is the Research Assessment Exercise (RAE) grade for this university's chemistry department?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 5

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the Web. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research undertaken in this department.
2. What is the calculated lattice energy of KH?
3. Name three general Royal Society of Chemistry journals which can be accessed on-line.
4. Name the three sites supported by the Council for the Central Laboratories of the Research Councils (CCLRC).
5. Who won this year's Nobel Prize for Chemistry?
6. Which transition element is studied in the Virtual Laboratory at Oxford University?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 6

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the WWW. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research undertaken in this department.
2. What is the abundance of gold in the Earth's crust?
3. Give the URL for Bath Information and Data Services homepage.
4. What is the name of the careers handbook published by the Royal Society of Chemistry for undergraduate chemistry students?
5. What is the postal address of the Royal Society?

6. Which transition element is studied in the Virtual Laboratory at Oxford University?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 7

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the WWW. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research undertaken in this department.
2. Name a radioisotope of vanadium and give its half-life.
3. List three databases or databanks containing chemical information which are available from the Royal Society of Chemistry.
4. Give the URL of the jobs database supported by the New Scientist magazine.
5. Which transition element is studied in the Virtual Laboratory at Oxford University?
6. What is the Research Assessment Exercise (RAE) grade of this university's chemistry department?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 8

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the WWW. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research undertaken in this department.
2. Give an example of a compound which contains xenon with oxidation number 6.
3. Which UK university hosts the Beilstein database? Give its URL.
4. The Royal Society of Chemistry provides careers advice on the internet. What suggestions are given for preparation for a job interview?
5. What was Bristol University's Molecule of the Month for May 1998?

6. What is the Research Assessment Exercise (RAE) grade of this university's chemistry department?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 9

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the WWW. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research undertaken in this department.
2. What is the chemical symbol of element 107?
3. How many structures can be found in the Cambridge Structural Database?
4. Give the URL of the Royal Society of Chemistry's job advertisement website.
5. What is the postal address of the Royal Society?
6. What is the URL of a guide to drug metabolism provided by a leading pharmaceutical company?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

Treasure Hunt 10

This exercise aims to

- introduce you to the World Wide Web;
- show you how much chemistry information is available on the internet; and
- develop your information retrieval skills.

Find the answers to the following questions by locating the relevant material from the WWW. Submit both the answers and the URLs indicating where the information can be found.

1. List three areas of chemical research undertaken in this department.
2. What is the biological role of arsenic?
3. Where can you obtain information about Chemical Abstracts on the WWW?
4. What is the jobseeker service offered by the Royal Society of Chemistry?
5. Who won this year's Nobel Prize for Chemistry?

6. What is the Research Assessment Exercise (RAE) grade of this university's chemistry department?
7. Suggest a URL which might be used in next year's treasure hunt (chemistry and science URLs are preferred, but imaginative educational suggestions are also welcome).

T4 World wide web treasure hunt

This exercise is a useful short introduction to the web; although some students are very confident using the computer (and will complete the treasure hunt in a couple of hours), this exercise is sufficient to give the weaker students confidence. Students seem to find the exercise enjoyable, and discover the extent to which useful chemistry information is available on the web.

The students are required to locate seven pieces of 'treasure', and must submit their results to the tutor before a deadline.

The exercise can be run using hard copies of the treasure hunt. Ten examples are provided in this book and can be randomly allocated to students. Students might be required to submit their results (ie the answers and the URLs where the answers to the questions can be found) to the tutor via email. It is also possible to run the exercise directly from the web by producing tailor-made pages.

The introduction (nominally scheduled for one hour) can be run in a number of ways, influenced by the experience of the students, the size of the group, and the facilities available. However, it is more important to let students 'have a go', than to spend a lot of time explaining the power of the web. A five-minute introduction to the web, and the nature of the exercise may be adequate. If a more in-depth introduction is required, performing a search in order to answer one of the questions is effective.

Answers

The URLs below give, as far as possible, the exact location where required information can be found, and in some cases an indication of how to reach the website. All the URLs listed were correct at the time of printing. However, URLs are often subject to change and the authors apologise for any inconvenience that this may cause.

Within each treasure hunt the following types of question are asked.

Type 1 questions

These questions relate to information about the research carried out by a particular chemistry department.

Type 2 questions

These questions relate to individual elements, their properties or their reactivity. Their answers can all be found via the University of Sheffield's Web Elements URL – http://www.sheffield.ac.uk/chemistry/web_elements followed by the symbol of the element concerned (ie Fe, O, Ta ...)

What is the electron configuration of iron?

$[\text{Ar}]3d^64s^2$

What are the hazards of oxygen?

At high partial pressures, oxygen can cause convulsions, pulmonary changes and teratogenic effects. Ozone, peroxide, and superoxide are highly toxic. Too little oxygen results in asphyxiation. Oxygen-enriched air is a fire hazard because the burning rate of combustible materials is increased.

What are the mineral sources of tantalum?

Stony and iron meteorites and the earth's crust

What is the chemical symbol of element 107?

Bh

What is the abundance of gold in the Earth's crust (in ppm)?

0.002 ppm

Name a radioisotope of vanadium and give its half-life.

radioisotope	half-life
^{47}V	32.6 mins
^{48}V	15.98 days
^{49}V	337 days
^{52}V	3.76 mins
^{53}V	1.61 mins

What is the calculated lattice energy of KH?

699 kJ mol⁻¹

What is the element osmium used for?

In combination with other metals of the platinum group, osmium is often used to produce very hard alloys. These are used for fountain pen nibs, instrument pivots and electrical contacts. Osmium tetroxide is used in forensic science to detect fingerprints. The platinum/osmium 90/10 alloy is used in medical implants such as pacemakers and replacement valves.

Give an example of a compound which contains xenon with oxidation number 6.

XeF₆

What is the biological role of arsenic?

Arsenic is a necessary ultratrace element for a number of species including red algae, chickens, rats, goats and pigs. It may also be necessary for humans. Deficiency results in inhibited growth.

Type 3 questions

The following questions all relate to information retrieval on the web.

All on-line RSC journals can be accessed from

<http://www.rsc.org/is/journals/current/ejs.htm>:

- *Analytical chemistry*
Analyst, Analytical Communications and Journal of Analytical Atomic Spectroscopy
- *Organic chemistry*
Natural Product Reports and Perkin Transactions 1 and 2
- *Physical chemistry*
Faraday Transactions and Faraday Discussions
- *Inorganic and materials chemistry*
Dalton Transactions and Journal of Materials Chemistry
- *General*
Annual reports on the Progress of Chemistry, Chemical Communications, New Journal of Chemistry, Mendeleev Communications, Journal of Chemical Research and Russian Chemical Reviews

Give the URL of the Bath Information and Data Services homepage.

<http://www.bids.ac.uk>

List three databases or databanks containing chemical information which are available from the Royal Society of Chemistry.

Agrochemicals; Analytical chemistry; Biotechnology; Chemical business; Chemical engineering; Health, safety & environment; Nutrition; Organic chemistry; Natural Products Updates
http://www.rsc.org/is/database/sec_serv.htm

Which university hosts the Beilstein database?

Manchester University
<http://midas.ac.uk/crossfire>

How many structures can be found in the Cambridge Structural Database?

More than 180 000
<http://www.ccdc.cam.ac.uk/prods/csd.html>

Where can you obtain information about the Chemical Abstracts Service on the web?

<http://www.cas.org>

Type 4 questions

The following questions relate to careers information and information about research councils.

Name four research institutes sponsored by the Biotechnology and Biological Science Research Council (BBSRC).

These are Babraham Institute, Institute of Arable Crops Research, Institute for Animal Health, Institute of Food Research, Institute of Grassland and Environmental Research, John Innes Centre, Roslin Institute, and Silsoe Research Institute.
<http://www.bbsrc.ac.uk/>

Name the four main areas of research which are funded by the Natural Environment Research Council (NERC).

Atmospheric Science and Technology, Earth Science and Technology, Marine Science and Technology; Terrestrial & Freshwater Science and Technology
<http://www.nerc.ac.uk/cgi-bin/loadframeset?title=Science&right=/science/&left=/main-menu.html>

What are the eight main areas of science funded by the Engineering and Physical Sciences Research Council (EPSRC)?

Chemistry, Physics, Mathematics, General Engineering, Engineering for the environment, infrastructure and healthcare, Engineering for manufacture, Information Technology and computer science and Materials
<http://www.epsrc.ac.uk/progs/program.htm>

Name the three sites supported by the Council for the Central Laboratories of the Research Councils (CCLRC).

Daresbury Laboratory in Cheshire, Rutherford Appleton Laboratory in Oxfordshire, and Chilbolton Observatory in Hampshire
<http://www.cclrc.ac.uk>

How many studentships does the Medical Research Council (MRC) fund annually?

Approximately 1200 studentships are sponsored annually.
http://www.mrc.ac.uk/left_5b.html

What is the name of the careers handbook published by the Royal Society of Chemistry for undergraduate chemistry students?

Got a Degree...What Next?
<http://www.rsc.org/lap/educatio/highered.htm>

Give the URL of the jobs database supported by the New Scientist magazine.
<http://www.sciencejobs.com> which can be accessed via
<http://www.newscientist.com>

Give the URL of the Royal Society of Chemistry's job advertisement website.
<http://www.chemsoc.org/gateway/chembyte/careers.htm>

What is the jobseeker service offered by the Royal Society of Chemistry?
 The Society offers a free 'Jobseeker' service to all members needing advice on employment issues. Jobseeker services include:

- CV advisory service;
- employment placing service in partnership with a specialist scientific recruitment agency;
- opportunities to participate in workshop and training activities on topics including CV writing, interview techniques and assertiveness;
- reference publications on employment related subjects, including a Guide to Consultancy;
- confidential telephone advice line.

<http://www.rsc.org/lap/profserv/profserv.htm>

The Royal Society of Chemistry provides careers advice on the internet.
 What suggestions are given for preparation for a job interview?

You should find out as much as you can about the organisation. Companies are usually very helpful in sending out their annual reports on request and it is also worth checking to see if they have a World Wide Web site (the Kompass directory should help you). This should give you an overall view of the type of organisation to which you are applying and may give you some ideas for possible interview questions.

You should find out:

- what the company or organisation does
- what the company produces
- the company's origins
- where the company operates
- the type and number of company employees
- current initiatives and new products
- who the head of the organisation is
- any recent press comment.

<http://www.chemsoc.org/gateway/careersbefore.htm>

Types 5 and 6 questions

These questions are made up from a selection of the following miscellaneous questions.

What is the postal address of the Royal Society?

6 Carlton House Terrace
 LONDON SW1Y 5AG
<http://www.royalsoc.ac.uk/>

What is the Research Assessment Exercise (RAE) grade for this university's chemistry department?

These can all be obtained via <http://www.niss.ac.uk/education/hefc/rae96/>, or will be directly obtainable via a specific department's own website.

Who won this year's Nobel Prize for Chemistry?
<http://www.nobel.se/laureates/chemistry-YEAR.html>

What is Bristol University's Molecule of the Month for February/April 1997 and May 1998?

This can be accessed via the RSC's website at
<http://www.chemsoc.org/links/toptwenty.htm>

Its actual URL is <http://www.bris.ac.uk/Depts/Chemistry/MOTM/motm.htm>

February 1997 – Sulfanilamide

April 1997 – Cyclooctene

May 1998 - Proline

Which transition element is studied in the Virtual Laboratory at Oxford University?

Ni or Fe

<http://neon.chem.ox.ac.uk/vrchemistry/>

What is the URL of a guide to drug metabolism provided by a leading pharmaceutical company?

<http://www.glaxowellcome.co.uk/science/drugmet>

Assessment

The students must hand in the URLs of their seven 'treasures' as well as the answers to the questions – submission by e-mail is particularly appropriate. A mark can be given for the number of correct URLs, although they ought to be able to get full marks (especially if a tutor is available to offer help). However, the main point of the exercise is for students to explore the Internet and learn how to use it effectively to find chemical information.