Lab Report: Searching the Chemical Literature Online

This exercise is intended to help you become familiar with the resources available online for finding information related to chemistry and the chemical literature. In addition, you will be able to compare several search engines and see how they provide different results with the same search terms. Finally, you will delve deeply into some databases in order to see how much information can be obtained on one topic.

**Keep in mind that this is a web *searching* lab – not necessarily a web *finding* lab. If you cannot find the information requested, document what you did and provide the information that you did find!**

1. Choose a topic to search on the internet. The topic may be anything you wish as long as it is related to chemistry, medicine, the environment, or other similar topic. The topic may be one or several words, but should be clearly specific to one topic. Ex. **Ozone hole** *not just* **ozone**, **aspirin toxicity** *not just* **aspirin**. You may need to try a few searches before you find one that allows you to answer the questions which follow. If necessary, use google shortcuts to eliminate Wikipedia or other sites from your results.

Search Terms:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

	1. **Select several search engines in addition to the ones listed below** and enter your search terms. Record each search engine, the number of hits, and scan the contents to see how much similarity there is between the engines. The first five or so hits will often be identical, so skip to page two of hits & see if the search engines provide different hits.

|  |  |  |
| --- | --- | --- |
| Engine: | How many hits | Do the results appear useful? Unique? |
| * [www.google.com](http://www.google.com)
 |  |  |
| * [www.bing.com](http://www.bing.com)
 |  |  |
| * <http://scholar.google.com>
 |  |  |
| * (your choice)
 |  |  |
| * (your choice)
 |  |  |

* 1. Narrow your search by **adding one or two new terms** to the search and repeat with the same search engines. The new terms should be key words that appear in your hits or subcategories suggested by the search engines

	New Search Terms:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Engine: |  |  |
| * Google
 |  |  |
| * bing
 |  |  |
| * scholar.google
 |  |  |
| * (your choice)
 |  |  |
| * (your choice)
 |  |  |

* 1. Search Google with your *original* search terms but use the search command filetype:pdf and filetype:doc (example: filetype:pdf aspirin toxicity . Note that ‘filetype:xxx’ must be all lowercase). Try some other shortcut commands to see what they provide: site: relatedto: etc. Open and browse several documents.

|  |  |  |
| --- | --- | --- |
| Google filetype: | # of hits | Comments |
| * pdf
 |  |  |
| * doc
 |  |  |
| * (your choice)
 |  |  |
| * (your choice)
 |  |  |

* 1. Finally, repeat your second search (Part b) on other sites such as science.gov, firstgov.gov, or one of the internet public libraries. If your search yields no hits, try your original search terms. (NCBI will be not yield many results if your search terms are not related to biotechnology. Try some different key-words)

|  |  |  |
| --- | --- | --- |
| Engine: | # of hits | Similarity between engines? |
|  |  |  |
|  |  |  |
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1. Go to <http://www20.wolframalpha.com/examples>, read through the topics, choose some search terms and do a search. List your search terms and summarize the results:

Search terms:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Results:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. In this exercise, you will find a chemical, record some basic information on the chemical, and use this information to search further. The site listed below was chosen to help you select a chemical used in a consumer product of your choice.
	1. Go to <http://hpd.nlm.nih.gov/index.htm> and choose the “products” tab. Choose a product category, category, type, and brand name to select a household product of your choice.

	Product brand name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Scan through the information to see what is given. At the bottom of the page is a list of the ingredients in the product. Choose one for further investigation and record its CAS number/Unique ID. If the number is mostly 9’s it may be a proprietary or unspecified ingredient – please choose another. It is important to choose a unique chemical substance. When recording the CAS number, omit *leading* zeros, but do not omit dashes (000067-63-0 is recorded as 67-63-0). A CAS number (or *Chemical Abstract Service Registry Number*) is assigned to every pure chemical substance to aid searching, identifying, etc.

	Ingredient name and CAS Number:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	3. Select this product by clicking on the name. A page will open that lists some basic chemical information, links to additional information, and a list of other products that contain this chemical. Briefly scan the health studies and toxicity information links. Then select Search ChemID*plus*. A new window will open with the search results.

		1. Browse the information provided by ChemID*plus* by clicking on the various buttons on the page. From the Names and Synonyms tab in the top frame, find the systematic name of the substance and record it here:

		\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		2. Choose the Locator Codes button in the top frame. Now click on any of the data bases listed in the left frame and record the following information – you may have to do some additional searching to find out what the acronym stands for:

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| --- | --- | --- |
| Database acronym | Stands for: | Type of information provided |
|  |  |  |
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|  |  |  |
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* + 1. Using the CAS number recorded above, search Google and Google Images. Not all registry numbers will yield hits; if you get no hits, try a different CAS number.

		How many hits with Google?\_\_\_\_\_\_\_\_
		How many hits with Google Images?\_\_\_\_\_\_\_\_\_\_. Paste one below!
		2. Click on *Advanced Chemical IDplus Search* and paste the CAS number into the search box and search*.* If you have Chime installed, a structural drawing of the chemical will appear in a box on the right side of the window. Click on Enlarge Structure and check the Display 3D Model box. The model that appears can be rotated and manipulated with your mouse. Right-click for more options and spend a few minutes becoming familiar with the options. Note: Gray is carbon, Blue is nitrogen, Red is oxygen. Hydrogen atoms are not shown in this rendering.

		Finally, go to [http://www.sial.com](http://www.sigmaaldrich.com/Area_of_Interest/The_Americas/United_States.html) and search for the chemical either by name or CAS #. Record the requested information below and print the MSDS for this product: If you can’t locate the information on sial.com, find it someplace else.

		Boiling point (BP) \_\_\_\_\_\_\_ Molecular Formula: \_\_\_\_\_\_\_\_

		Melting point (MP) \_\_\_\_\_\_\_ Molecular weight: \_\_\_\_\_\_\_\_\_
1. Go to <https://cameochemicals.noaa.gov/> or <http://dailymed.nlm.nih.gov>; read the instructions to find a chemical or drug of your choice and print a summary of the information you found.
2. Patents contain a wealth of information on chemical processes and products. The information is protected under the patent, but the protection only forbids one to copy and sell the information. Anyone can read, study, and reproduce the invention for research purposes. This exercise will allow you to find patents by several methods and print the information. You may need to install one of the free .tiff viewers for best results.
	1. Go to [www.freepatentsonline.com](http://www.freepatentsonline.com) and click on ‘search patents.’ Choose some interesting search terms and see what kind of patents show up. You will want to open the .pdf file to view the actual patent. Print the first page of the best one you can find.
	2. *Find* a patent number printed on a product you own and enter it into Google in the format Patent 123455. If you do not get a link, go to <http://www.uspto.gov/patft/index.html> and choose Quick Search. Enter your patent number into the field and select patent number from the drop-down menu on the right. Again, print either the first page of the patent or the first page of text to attach to this report.
3. Advanced searching: Advanced searching allows one to limit the results to a specific year, author, field, etc. These searches can be very powerful when searching topics that yield a large number of hits. Many search engines allow advanced searches and it is to your benefit to explore the options.

	1. Go to <https://scholar.google.com/> and search on a topic of your choice.

	Topic:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Select one journal result. List the authors last names and the journal name (in *italics*):

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	\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. Go to the Advanced Search page (drop-down menu to the right of “my citations”) and narrow your search by entering one authors last name into the search field, choosing a narrow range of years to search, and/or focusing your search on specific subject areas. List your advanced criteria here:

	\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

	How many hits did you get?\_\_\_\_\_\_\_\_\_
	4. Request a hard copy (e-file) of one paper through interlibrary loan and include it with your lab report.