

# WONDERING, WANDERING, AND WINNOWING: THE WWW AND MINERALOGY

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Revisions to this document (as available) will be found at:  
<http://www.geology.wisc.edu/class/g360/wwwlab.htm>

**Students:** Clicking on my email address above will open an email window into which you can type the answers to the questions asked below. If you are not at the University of Wisconsin-Madison PLEASE change the email address in your email document to that of your professor or TA.

## [1] Basic World Wide Web Searching

This first exercise will be old news to many of you but possibly the first time for others. If you are an experienced WWW user, help someone else in the class get started.

Locate and start up the WWW browser on your computer. In most cases this will be some version of Netscape and I will assume from here out that you are, in fact, using Netscape. Other browsers will work as well but the location of buttons and menus will probably differ. I designed this lab using Netscape 2.02 for the Macintosh, it works fine with Netscape 3 and I have checked most of it on a Windows 95 machine running Netscape 3 as well.

Click the 'Net Search' button (or choose Internet Search from the Directory menu) and you will be presented with a field in which you can type search terms, a choice of subjects or categories with which to limit the search, and a choice of search "engines" such as Yahoo, Lycos, Alta Vista or Magellan. To begin, choose Yahoo and click on the hot linked text 'Education'. On the subsequent screen, type "mineralogy" into the input field and then either click the 'Search' button or hit the 'Return' or 'Enter' key on the keyboard - all three actions should have the same effect of submitting your search to the chosen search engine.

When the search returns its results, spend a few minutes following the links that were located. Unless things have changed dramatically since I did this, the number of links returned by the search are few indeed. **Why do you think this is? How would you submit a site so that Yahoo can find it?**

**What happens if you follow the Yahoo links 'Science' and then 'Earth Sciences' and then search for "mineralogy"?**

Backtrack and then repeat the search for the term "mineralogy" using the Lycos search.

**How many hits did you get this time?**

Now that we have wondered, lets wander and winnow. Each class member should spend 10 minutes assessing a different set of 10 hits returned by the search. Let's arbitrarily number the students and have student 1 take hits 1-10, student 2 takes 11-20, and so on. **What is the best site you found? Make a list of these. How many are truly relevant to this course?**

## [2] Major Mineralogy/Geology Sites

Now lets see what the results of many hours of searches like those you just completed could turn up - lets visit some of the most helpful home pages for our subject.

Open up a connection to John Butler's site at the University of Houston:

<http://www.uh.edu/~jbutler/anon/anonfieldtrips.html>

This link has opened several pages below the University of Houston's home page and provides a great place to start our tour. Clicking on the 'Courses by Title' hot text lets you choose Mineralogy and then be presented with 19 choices from around the world.

Choose the Iowa State link to Ken Windom's Mineralogy course:

[http://www.public.iastate.edu/~geology\\_311/homepage.html](http://www.public.iastate.edu/~geology_311/homepage.html)

Ken's course home page provides links to several national and international organizations and agencies. Choose the 'Computer-based Assignments' text and then click on Exercise 3. This simple exercise highlights some of the information readily available from the links provided. **Work through at least 3 of the questions that Ken asks here.** (A caveat: when you do this exercise now, you may well run into some dead ends which presumably weren't there in the fall of 1995 when Ken made this page. For example the link to the Canadian Mineralogist is now <http://www.umanitoba.ca/geoscience/mac/> instead of what is on Ken's page. This is a general lesson in using the WWW for education. Lecture notes can't afford to be static; instructors must continually change and update links.)

Now try the University of Colorado Mineralogy link.

<http://xtl5.colorado.edu/~smyth/syl3010.html>

This syllabus has several lectures available which cover the first couple of weeks of a typical course. You may want to return to this material for an alternative explanation (to that given by your professor) of the arcane subjects of point groups and the like.

Colorado also offers a course in Crystallography and Crystal Chemistry which is aimed at students either one or two years after Mineralogy. Only the syllabus is provided here.

Mickey Gunter at the University of Idaho provides a very rich set of resources for his Mineralogy course which he taught during the Spring 1997.

<http://www.uidaho.edu/~mgunter/geol249/geol249.html>

In addition to the lecture notes and handouts, he provides old tests, lab exercises, links to the rest of the world, and links to local Idaho mineral collecting. It is this last that sets this site apart and provides the student with the "value added" which makes the WWW useful and exciting.

Jack Rice at the University of Oregon clogs up the beginning of his otherwise excellent course home page with a LARGE interlaced GIF file which, while beautiful, is painfully slow to download over a modem or during the busy times of the day.

[http://darkwing.uoregon.edu/~jrice/geol\\_311/geol\\_311.html](http://darkwing.uoregon.edu/~jrice/geol_311/geol_311.html)

His lecture notes are comprehensive for this apparently 10 week course (quarter system?) and all that is lacking are the silicates which must be covered in the next quarter.

And last but certainly not least ;- ) are links to two courses at the Univ. of Wisconsin.

<http://www.geology.wisc.edu/~jill/geo306.html>  
<http://www.geology.wisc.edu/class/g360>

The much more polished course is Jill Banfield's Gems course Geology 306 for which she and I received internal UW funding to help develop a WWW course that could theoretically be taken much like a traditional correspondence course. (Jill was on leave during the 96-97 academic year and in fact taught this course from Japan.) Our Mineralogy course is a team taught effort and a visit to last year's web page shows it to be about 3/4 baked. I will be updating and extending the web presence of this course in the future.

These courses share some very rich resources which again point out the utility of the WWW for content delivery. On the Mineralogy Menu page click on the Crystal Structure Movies hot text. These movies were made with CrystalMaker 1.1.4 and were designed to show specific parts or aspects of each minerals structure. We use these in lecture (using a projection system) and generally talk about these structures as we step through the movie's frames.

The Gems course has quite a number of animations of geological processes leading to the formation of specific minerals and optical effects in gem stones. **What are some major differences between the formation conditions of agates and tourmaline?** See in particular:

<http://www.geology.wisc.edu/~jill/Lect3.html>

### [3] Basic Resources

There are lots of basic science resources being maintained at web sites around the world. Below are some of these with comments.

#### Periodic Tables:

A very comprehensive periodic table site is the WebElements page which originated at the University of Sheffield in England but is mirrored at more than a dozen sites; you will want to use one that gives you maximum performance. Most of the sites have version 1.2.1 while the Sheffield site has a late beta version 2 which takes advantage of frames and has much more information. The response time may well depend on the time of day, the day of the week, and quite possibly the phase of the moon. The Berkeley site, which used to be much faster than the one at Boston College, now defaults to the Sheffield site; try the Illinois site; your mileage may vary.

University of Sheffield: <http://www.shef.ac.uk/~chem/web-elements/>

UC Berkeley: <http://www.cchem.berkeley.edu/Table/index.html>

University of Illinois: <http://bml.med.uiuc.edu:8080/periodic/>

Boston College: <http://chemserv.bc.edu/web-elements/web-elements-home.html>

Another very nice periodic table can be found at Los Alamos National Labs:

<http://mwanal.lanl.gov/CST/imagemap/periodic/periodic.html>

#### Table of Nuclides:

Berkeley National Labs maintains a mirror to a site created in Korea. This may be overkill for introductory mineralogy but keep this for a future geology course.

<http://datwww.dne.bnl.gov/CoN/index.html>

(this site is also known as)

<http://necs01.dne.bnl.gov/CoN/index.html>

### Atomic Radii:

A very nice compendium of data on this subject. **Compare the data on important rock forming elements with the data published inside the covers (or possibly in an appendix) of your text book. What are the largest differences? How can both of these compilations be right?**

<http://www.iumsc.indiana.edu/helps/radii.html>

### Alphabetical Mineral Reference:

The following on-line glossary of mineral names provides basic occurrence information for MANY common and not so common minerals. **What anionic groups are found in the minerals carnotite and purpurite?**

<http://www.geology.wisc.edu/~jill/glossary2.html>

### Mineral Databases:

The ATHENA site also has a very detailed mineralogy database program which is searchable by name, variety, and composition. **Are there more Bromides or Iodides found as minerals? (I would suggest using the Mineral Search function rather than trying to count them from the Halides listing.)**

<http://un2sg1.unige.ch/www/athena/mineral/mineral.html>

The Mineral Gallery is a commercial operation but they sure have a bunch of nice pictures and quite a lot of information about each of their specimens.

[http://mineral.galleries.com/minerals/by\\_name.htm](http://mineral.galleries.com/minerals/by_name.htm)

### Thermodynamic Calculations:

This site at the University of Calgary can be used to perform geothermobarometry calculations directly on the WWW. It is probably more useful for Petrology classes. **Where does the triple point of SiO<sub>2</sub> for the minerals alpha quartz/beta quartz/coesite occur in P-T space? How does the result agree with the plot in your text book?**

<http://ichor.geo.ucalgary.ca/~tmg/Webinveq/rgb95.html>

### [4] Lists of Links

There are lists of links EVERYWHERE on the web - many are only a few items long while others are very comprehensive. I have only mentioned 4 here.

[1] A HUGE resource is that maintained by Phillip Ingram at Macquarie University in Sydney, Australia. A monthly updated FAQ (Frequently Asked Questions) document can be gotten by one of the following two non-WWW mechanisms:

i) send mail to: [mail-server@rtfm.mit.edu](mailto:mail-server@rtfm.mit.edu) with the following line in the body of the message -

[send usenet/news.answers/geology-faq/geosci-resources/part1](mailto:send_usenet/news.answers/geology-faq/geosci-resources/part1)

ii) by anonymous ftp to:

[rtfm.mit.edu/pub/usenet/news.answers/geology-faq/geosci-resources/part1](ftp://rtfm.mit.edu/pub/usenet/news.answers/geology-faq/geosci-resources/part1)

Even more info is available on the 2 WWW pages he maintains at:

The Virtual Earth: [http://atlas.es.mq.edu.au/users/pingram/v\\_earth.html](http://atlas.es.mq.edu.au/users/pingram/v_earth.html)

The Soft Earth: [http://atlas.es.mq.edu.au/users/pingram/s\\_earth.html](http://atlas.es.mq.edu.au/users/pingram/s_earth.html)

[2] The University of Calgary maintains a Virtual Library of Earth Science Resources:

<http://www.geo.ucalgary.ca/VL-EarthSciences.html>

[3] There is a huge list of resources to be found at the ATHENA site in Geneva, Switz.

<http://un2sg1.unige.ch/www/athena/mineral/mineral.html>

[4] Andrea Koziol at the Univ. of Dayton has a new list of links which she updates with some regularity:

<http://www.udayton.edu/~geology/resminpet.html>

#### [5] Optics and Mineralogy

A somewhat brief but polished treatment of optics and minerals is given by Charlotte Gladstone at the University of Bristol in England. This page also provides additional links for more in depth study.

<http://www.bris.ac.uk/Depts/Geol/opmin/mins.html>

Check out the Petrographic Workshop at UCLA. Many minerals are represented and thin section photomicrographs (as jpg images) and basic optical properties are given. This is a major resource. **How would you describe the twinning seen in the mineral microcline as observed in thin section?**

[http://pong.igpp.ucla.edu/pet/pet\\_intro.html](http://pong.igpp.ucla.edu/pet/pet_intro.html)

Mickey Gunter has the beginnings of an optics page at:

[http://www.uidaho.edu/~mgunter/opt\\_min/opt\\_min.html](http://www.uidaho.edu/~mgunter/opt_min/opt_min.html)

Gary Byerly at Louisiana State Univ. has a home page for the optics course that he teaches. This is really only an outline of the course and while it is probably useful for his students, it doesn't provide much value for the outside surfer.

<http://gbyerly.geol.lsu.edu/geology/optics.html>

#### [6] Crystallography

There is LOTS of information on crystallography available on the WWW but a few searches will convince you that most crystallography is done by chemists, engineers, and biologists interested in inorganic and organic substances having nothing to do with geology. Two links which are useful are given below:

Crystallography World-Wide is mirrored around the world - the original reference URL is:

<http://www.iucr.ac.uk/cww-top/crystal.index.html>  
Try the San Diego Site: <http://www.sdsc.edu/Xtal/vl/>

The structures at this next site are VRML and .zip files which need to be viewed on a PC (not Macintosh) computer with a dedicated viewer.

[http://tutor.oc.chemie.th-darmstadt.de/Poly/VRML/silicat\\_e.html](http://tutor.oc.chemie.th-darmstadt.de/Poly/VRML/silicat_e.html)

## [7] Pretty Pictures

Mineral Gallery

<http://mineral.galleries.com/>

Gems and Gemology

<http://www.geology.wisc.edu/~jill/geo306.html>

Smithsonian Gem and Mineral Collection

<http://galaxy.einet.net/images/gems/gems-icons.html>

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## Suggestions to Instructors

The purpose of this laboratory exercise is to introduce the student to Earth Science resources on the World Wide Web (WWW) and in particular provide access to material which can be useful throughout a typical Mineralogy course. One way to use this lab would be during the first week of classes (typically immediately after Labor Day at Wisconsin) prior to having covered enough material in lecture to have a "real" lab. If you don't have access to a computer lab so that all the students in a lab section can work on this at once (singly or in pairs) or if you have some other favorite first lab, one could introduce this exercise and plan to have the students do much of this on their own.

My students using most browsers can click my email address at the top of the exercise and a 'mailto' window will open into which they can type the answers to the questions. When they are done they can email their results to me directly. If you encourage your students to do these exercises and submit the results to you PLEASE MAKE SURE THAT THEY REPLACE MY EMAIL ADDRESS WITH YOURS!

All the WWW URL references are complete paths therefore if you wish to copy the source for this document and put it on your own computers to speed interaction, the links should survive intact. I plan to maintain and update the original on a regular basis.

Submit corrections and suggestions for additions to me. During the testing phase the one comment that I heard several times was that the WWW would be more useful and helpful if specific questions/problems were keyed to individual lectures or subjects. In other words, tailor made weekly exercises should follow from this overview. If you write up such exercises and are willing to share them, I will link them to this page as appropriate.

Comments and Information: [pbrown@geology.wisc.edu](mailto:pbrown@geology.wisc.edu)