

Science Reference on the Web

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Introduction

It is the purpose of this session to help librarians find scientific and technical information for differing levels of users, children through sophisticated scientists. The government supplies a wealth of information resources. How do you know which one to use when, for what type of question? We are going to try to ask some typical questions encountered at a reference desk and go through the process of finding the right tools to answer those questions. Each of us may approach this in different ways, knowing there is usually not one right way. We will also try to provide you with some tips on using the resources we have selected to discuss.

Most of us have attended sessions or workshops on how to use specific databases. For the most part, these are presented from the point of view of the database creator or vendor and not the point of view of the librarian. While most of us garner useful information from these sessions, they do not always relate to the reality of how we must answer questions from our users. Within the last month I attended such a vendor session and our biggest criticism was the trainer did not relate to a university audience but to a high school or public library audience.

Like a trainer who should adjust to an audience, librarians must also adjust to the person they are helping. In this room, there are librarians all of whom must find answers to questions asked of them by a variety of users; and they shift gears automatically, from user to user. Science questions are invariably among those questions. Whether at a small public library or a large university library, the questions will vary from simple to complex. The government has always been outstanding in providing scientific and

technical information, whether in paper or microfiche. Bibliographic access was often a problem for many who could not afford their indexes or did not have the room nor demand to warrant selecting the indexes or publications.

The web and the vast amount of information available via the web have changed the nature of how we as librarians can provide assistance to our users seeking scientific information. Our agreement as depository librarians has always been to provide access and assistance to our users. Science and technology resources are no different than political and social resources in many respects. So don't panic with a science question, rise to the challenge.

Normal reference interview processes still apply

Some things never change. No matter what the question, we still have to ask questions and evaluate the replies and the person asking for help. You will note that as I go through the process of explaining how I would answer the example questions, I will be asking those normal reference interview questions outlined below.

- What is the age level of the student to be taught or the person asking the question? It is obvious a 3rd grader does not need detailed technical reports.
- What type of class assignment/job assignment/research has brought the user to the desk? Try to find out the real questions in order to answer the real question and not waste time. In my mind, when a person asks for a specific publication it should always bring the question: are you finding the information

you need or can I assist you in finding more? What is the real question?

- Would this person understand complex research? Or, does s/he just need a simple answer?
- How is the user going to use this information? Class assignment? Speech? Dissertation? Legal case?
- How do I know government information will answer questions?

Sample Reference Questions

Below are some sample, generic reference questions. Following that list are some possible resources and methods one might employ to answer them.

1. "I am a teacher (of specific grade level) and would like help with 2 things: sample lesson plans for me and web resources for my students to use. The topic is ' .'"
2. "I am a college level student looking for basic information to use in a paper on ' .'"
3. "I am doing my paper in web format and want web documents to which I can link as resources within my paper. My topic is ' .'"
4. "I must have this specific technical report and I am not sure of the author/title/date/publisher."
5. "I am doing an in-depth research paper on a topic and I need to gather articles and publications on that topic."
6. "How do I locate the publications cited in these government databases?"
7. "The government has issued standards/regulations/test methods, etc. on this chemical in the air. Can you help me find it?"

Answering Those Reference Questions

1. **"I am a teacher (of specific grade level) and would like help with 2 things: sample lesson plans for me and web resources for my students to use. The topic is energy conservation and alternative energy sources."**

By now, most depository librarians know about [Ben's Guide to U. S. Government for Kids](#), which is linked off [GPO Access](#). It was created to help with questions from teachers and students. I tend to go right to it. And this is typical of how many experienced documents librarians answer reference questions. We have learned by experience. We just know about a resource or what agency is most likely to have related information. But we must also be prepared to show our colleagues and our users how they could find this and similar resources without us. How would I do it?

Personally, I would go to [INFOMINE](#) and search the government section. If I knew I wanted *Ben's Guide*, I would put in those terms. If I want kid pages or curriculum guides in a specific topic, I would try some searches on those key words and make sure the stemming button was clicked. In fact, Ben's Guide is best used for political resources, but they do have links to various agencies that have science for kids and teachers. (Lynne Reasoner will provide a detailed discussion on INFOMINE and other search engines.) I might also try [Google Uncle Sam](#) or [Yahoo's Government or Science](#) sections. If I found too many I might try to limit by age level. [Ben's Guide](#) does that for you at the beginning. Other resources may not make it quite so easy. Using [AskERIC](#), or [ERIC/AE Full Text](#), it is possible to limit bibliographic searches to ages and or grades.

By using these resources it is possible to find web pages or publications by agencies you did not originally think about. Energy is a perfect example of this. The U.S.

[Department of Energy](#) is an obvious source for energy publications, but there are also state energy offices and resources. Other Federal agencies such as the [Environmental Protection Agency](#) are involved, as is the [Department of the Interior](#), with all their separate Bureaus, the [Nuclear Regulatory Commission](#), the [Tennessee Valley Authority](#), etc. They usually have a kids's page or the equivalent with links to even more web pages. What they provide is on the web, and free.

2. **“I am a college level student looking for basic information to use in a paper on ____.” (Typical topics are pollution, wildlife, endangered species, energy issues, water supply, land management of some type: wetlands, grazing, urban development, roads, space, etc. These types of questions also come from older high school students.)**

This question could lead to searches somewhat like the one described above. If the student does not have the basic knowledge or vocabulary they might need, some of the upper level kids pages could help with that, assuming you can get a college student to use a kids page. Serving the same purpose and not carrying the baggage of the “kids” issue, those agencies with a mission that includes science have included basic information on their homepages. With some agencies, that is easy to find, for example, [DOE](#), [NASA](#), [Forest Service](#). So, use [INFOMINE](#), [FirstGov](#), [Google Uncle Sam](#) or your own knowledge to get your user to basic scientific information.

It would not be unusual for many librarians to search their own library catalog to identify useful sources of information. Keyword searches often work well in this context and are often an alert that scientific titles are available within the government collection. The difficulty with this can be that normal cataloging subject terms may be too broad or limited to be useful. Your colleagues will often try the catalog first. Help them become aware of other tools and to know that with

basic scientific topics there are often very useful publications from the government which are not listed in the catalog. Use this as an opportunity to show them how they might find such publications, either in your collection or on the web.

Commercial databases would be another resource your colleagues might go to first. Many will cover the needed science topics very well. Some of them index major government publications. Many do not. If you have them available, they can be very useful. But if you are looking for government resources, some of the databases and resources supplied by the agencies are more productive for your user because they index titles either you have available or can obtain via interlibrary loan from your regional or a nearby depository. A more detailed discussion of the databases is in the questions below.

3. **“I am doing my paper in web format and want web documents to which I can link as resources within my paper. My topic is ____.”**

The government excels in supplying full-text web documents. First of all, most of them are not copyrighted or limited in some way. While a student might find many full-text documents on the many commercial web databases available to them, they usually cannot link directly to an article or document. The documents they find do not have a stable URL but are identified as part of a search. Thus, they must be quoted like any other copyrighted, printed publication. For the most part, government titles allow a user to link directly to a title.

To find government web publications, search engines and directories such as [INFOMINE](#), [FirstGov](#), [Google Uncle Sam](#), and [Yahoo](#) *government or science* might prove useful to get started. Your personal government information librarian's knowledge of agencies and full-text document resources could be very useful. In the sciences, the [DOE Information Bridge](#) (Also linked off of

GPO Access) comes readily to mind because of its interdisciplinary nature. While many of the titles it includes are very technical, some more general resources are also included. They can be linked to the URL provided with the abstract.

Agency web pages are a natural for containing full-text publications. The problem, sometimes, is finding the information you know is available on a specific web site. [EPA's web](#) site is most often cited in this regard but they are not alone and they have made improvements. For the general user, employing the lists, browse list and A-Z features provided on many web pages solves the problem. Using the "Search" feature can too often provide a huge list of resources. In some instances, however, it may be the only way to find what is needed.

The biggest problem for people wanting to cite a web link in a paper or report is a link to a publication may disappear at some point in time. Agencies change their pages and may not retain older documents. Or policy issues dictate that some pages be removed. Anyone wanting a good project could monitor web pages during this time following the September 11 disaster. Web pages deemed sensitive have been removed. Pipeline maps, biological and chemical warfare topics are gone. I have not been able to get into the Nuclear Regulatory Commission web site for the last few days. In denying access to terrorists, what important access is being denied citizens with a legitimate need? Whole task forces will be monitoring and re-evaluating the concept of a citizen's right to know as weighed against the uses a terrorist might make of the information. September 11 is having an impact on more than the economy and New York City.

Up to this point in the search for scientific and technical information, no real in-depth knowledge of the scientific field itself was required. The questions were general and asking for background and basic information. We are now entering depths where a little

more knowledge is required to be successful. Specific terminology is often used. Hopefully, either you have some concept of the topics or your user can supply terms relevant to their search. If not, then it is necessary to find terms that apply from a variety of sources. The most obvious is the evaluation of searches that have been successful. We all look for keywords, subjects, descriptors or concepts we can glean from relevant citations or full-text resources. I have been known to use the upper level kids pages, dictionaries, encyclopedias, newspaper articles, anything that may provide the terms needed to find resources. There are a growing number of dictionaries and thesauri on the web. [CancerLit](#) is a good example of this. Personal experience is a great help and sometimes so are other librarians. In my case, I have a scientist for a husband who can be invaluable as my last resort when trying to find terms and understand concepts.

4. "I must have this specific government technical report and I am not sure of the author/title/date/publisher."

It is only with good luck that a user has a full citation and knows where they got the information they currently have. Even so, as with other questions, try the easy sources first.

- Your catalog of publications, if it is a monograph and not a journal citation.
- A major university online catalog. For me that is usually the University of California [Melvyl](#) Catalog. Many technical reports from the government have never been given full, regular cataloging either, so do not be surprised if you do not find your report in some catalog.
- Then progress on to the more difficult solutions like searching the right databases to again find the citation to verify. At this point you pray that at least the information the user does have is correct and enough.

At this point, the quandary for many becomes how to identify databases which might prove fruitful in a search. To help in that process, Lynne and I have created a web site which will soon be available via the University of California, California Digital Library ([CDL](#)) web site. It is currently available and constantly being updated on [this web page](#). A separate page has a listing of just the [scientific databases](#). (Your comments and suggestions are always encouraged.) The listing is divided into subjects and provides lists and links to the most important databases with a search strategy for how to identify other databases. When selecting databases to search, there are key features you need to look for:

- Subject coverage. Many are multidisciplinary and do not cover just one subject, but many. Others are more focused.
- Dates of publications likely to be found there. Some begin in the 1990's, while others go back to the 1940's.
- Publication types may vary. Some include only technical reports ([NTIS](#)) while others include journal articles and more general publications ([PubScience](#))

It should go without saying, but check the search help screens and examples. Some of them are not as straightforward as they might seem. NASA and NACA, for example, use initials for a name search, but it is best to either put the last name, comma, first initial and then put the whole thing in quotes or do the last name with ADJ followed by the initial: ("Buck, A" or "Buck ADJ A").

But instructions about this are not easily found. Do some searches and look at all the results to get a clue as to how they format their citations. Do they use a period after the initials or not? Then try to use the search

instructions that are provided to meet your needs.

DOE Information Bridge uses initials only as well, but allows some variation in the search using those initials: They also provide good instructions.

"Smith"
"Smith, J."
"Smith, J.D."
"Smith, J*"

Other helpful hints:

- NTIS does NOT include all of the government's technical reports, contrary to popular belief. It is best to search the specific databases for energy and NASA/NACA reports, etc. There is some overlap for more recent years, but you may not be able to count on it.
- Searching the free NTIS database can often bring very different results than searching the one to which we might subscribe. You get a more focused search on the subscription database and you get to view more detailed results, such as abstracts.
- Portal searches, while very helpful and sometimes productive, often provide differing results from a focused search of an individual database covered by the portal search. Each database has individual search features which can render more precise search results. The author search is a perfect example how differing results might result from a portal search and a specific database search.
- Be prepared, web sites change overnight. More is added. Parts are taken down. In this unsettled time following September 11, 2001 and the subsequent military and governmental activities, things are

changing. Security, financial and political reasons could change many web sites we have come to depend on even more than usual.

5. “I am doing an in-depth research paper on a topic and I need to gather articles and publications on that topic.”

This type of question, no matter what the topic, requires the use of many resources to fulfill the request. There is usually not just one resource that will answer the question. Government web pages and databases may be just some of the resources required to help the user. As a government information specialist, it is your job to learn how to guide them to at least the government resources available to further that research. Practice and experience are very helpful. Some subject expertise is very valuable. But for the inexperienced, new web pages can now guide you, your library users and other staff members to the right databases. Then using your skills as a librarian can help, even in subject areas where you have no expertise. Your biggest piece of luck is having the person who is seeking your help be able to express their needs in ways that help you understand their subject as well as provide some of the subject terms that will prove fruitful in selecting and searching database. Helping them with search strategies and terminology can be a real challenge, especially when it is not your subject field. Different databases might use different terminology for the same concept. You often need to use common names and/or scientific names, whether it is biology or chemistry. Some products have acronyms and/or many names, whether chemical or product name. The [NIOSH Guide to Hazardous Chemicals](#) is useful when trying to identify a chemical, its various names, CAS number, and major facts and words to describe the chemical. Different spellings, especially with foreign languages and translations, have proven challenging to all of us. Be prepared, if you are serious about helping your users, for results eluding you and the user at first. But if you help each other and use your skills in doing searches,

soon you will find the process somewhat easier. You just need to build your skills and have a network to help with the tough ones.

Questions 1-4 have already outlined various search strategies that can be employed in finding relevant citations:

- Search your catalog and other major library catalogs. This is most useful when searching for monographs, books, and documents.
- Identify and search relevant databases for reports and articles. Some of these databases may not be free, but commercial. Use the ones at your disposal and be ready to suggest other resources to the user. Other libraries or fee-based searching are the usual such resources.
- Search agency web pages for both full-text web publications and citations to relevant publications.
- Search [INFOMINE](#), [Google Uncle Sam](#) and similar sites to identify where to search for more databases or publications.
- Occasionally what you may need is on an agency CD-ROM. A search of INFOMINE or an appropriate catalog might help identify which one.
- Portals and Gateways can be very useful in identifying where a search might prove successful. The [Energy Portal](#), [NASA portal](#), and [NTIS SciTech Resources](#) and can prove very useful in selecting a database to search in more detail. Portal searches are very general. It is best to go to the full database and search that more completely and in greater detail if your portal search did not yield what you needed. So in addition to the portal searches across databases, guides to databases help with the

initial choice of databases to search in detail. The [UC Indexes and Abstracts Databases](#) and the [GPO Agency Publications Indexes](#) are further starting places.

- [Patents](#) on the web can prove more fruitful in a search for information than I would have first believed. As an example, in assisting a professor search for information, we found an adequate amount in normal sources. As he read through some of the sources we found, he kept seeing mention of a patent which he wanted to see. We went to the Patent web page, pulled up the patent full text and found information not found in other searches:
 - New bibliographic citations
 - Detailed descriptions of the processes and science of the topic
 - Links to related patents
 - New terms we could use in further searching

6. “How do I locate the publications cited in these government databases?”

Actually getting copies of the publications cited in the databases can be a challenging part of the process. Databases like NTIS sell most of the products they cite. Many students cannot afford to purchase these publications and many libraries only purchase them selectively. Through the depository system, many libraries have selected various series of government technical reports over the years. Those that have been cataloged by GPO have records available, especially after that magic year 1976. Some libraries have utilized the serial nature of monographic series to shortcut the method of cataloging these publications. They do not catalogue each monographic title, but at least track by series number. For instance, our library kept track of what NASA CR numbers we had in our collection, though we did not always have cataloging records. Thus, if we use a bibliographic database and get a full citation

that includes report numbers, we can locate a technical report. And we are not alone in utilizing this system. That helps us as librarians who know how to use the system to find individual publications, but it may not help the library user or people searching our catalogs find them. Lack of cataloging funds for GPO and others has made tracking some of these publications difficult--unless you have developed that knowledge built up over years of experience.

So, after checking your own collection, what should you do? Here are a few suggestions:

- Search some major online catalogs such as [MELVYL](#). In this case, because Monographs and Serials are in separate catalogs (at least for now), check the Melvyl Catalog for monographic titles and the California Periodicals for the series, just in case the monographs were not individually cataloged but only their series was traced. You may be able to identify a library likely to have the publication. Then use interlibrary loan.
- Check with your Regional Depository Library. For those titles and series sent through the depository system, this has proven to be a very helpful source.
- Use the Item Lister to see who selects specific item numbers for the technical reports you want. It is like a union list and can be a pointer to some possibilities. If the library you contact does not have what you need, often they can tell you who does.
- Some of the web pages provided by agencies include what is in their libraries and available for loan. [EPA](#) is a good example.
- A growing number of technical reports are available full text on the web page of the agency. Search and see.

- The CD-ROMS issued by agencies and sent to selecting depository libraries have selected technical reports included on them. Some, like those from USGS, have a CD-ROM that is just one title. The user must then use the CD-ROM to either download the report or view it. EPA and others have disks with major publications included.
- [DTIC](#) (Defense Technical Information Center) has many Defense Department and other unique technical reports available for sale. Their database can help identify them, but the library must then purchase them. You MUST be a registered library to purchase any reports from DTIC. If you have a government contract of some type, you are eligible to purchase their documents, and most large universities meet that requirement. But as many of us have seen from their demonstrations here at Depository Conferences, a growing number are available on the DTIC web site for free. Watch for changes and improvements to this database system.

7. **“The government has issued standards/regulations/test methods, etc. on this chemical in the air (as an example). Can you help me find it?”**

Both the *Code of Federal Regulations* and the *Federal Register* (on [GPO Access](#)) are sources for technical information. As regulations are being proposed and discussed, what is placed in the *Federal Register* many times contains either the text of a report or makes reference to it. Many users must have the right test method or the current standard and how agency experts arrived at this standard. I never cease to be surprised what I find in these 2 sources. [How](#) I find them is another matter. It often takes a combination of resources to finally gain what I want.

- Though full text of both the *Federal Register* and *Code of Federal Regulations* is available online, sometimes that is not as readily

productive as one might think. Here, terminology is very important. It helps to know when searching for allowable limits on a specific chemical that you may be looking for a PEL. That knowledge, combined with the name of the chemical and the agency issuing the regulations, might help a good deal in either pinpointing the title and section or narrowing the search for the right one.

- The paper index to the *Code of Federal Regulations* issued by CIS (now LEXIS/NEXIS) is often the most useful guide to finding what is needed. By browsing the index, the proper terminology may become obvious. Or the agency or agencies and their CFR title numbers most likely to be useful will become evident. The more specifically you can narrow your search, the better results you get.
- With some idea of where to look within the *Code of Federal Regulations*, browsing the publication can be more productive than using the online version, in many cases. Or it can supply the terms which make searching the web version more productive.
- Checking the *Federal Register* citations provided in the *CFR* can often yield technical reports or information. Both of them may provide citations to the information your user needs and start you looking for that resource.

Summary

Thus you can see that while looking for scientific and technical information may not be simple, there are many methods you can employ to at least begin searching for answers. While being an expert may be useful, it is not always necessary. If you establish good search tools,

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build up experience, and know where to go for help, you too can become known as a competent searcher for scientific information.