**Finding Scientific Information Tutorial**

**Objectives:**

In this tutorial you will explore:

* How scientific information is published
* How to access relevant scientific databases
* How to search science databases effectively
* How to find original research

**What makes scientific information unique?**

1. Science is evidence-based: Scientific information often includes observations, as well as possible conclusions that can be drawn from those observations.
2. Science is objective: That means scientists try very hard to make observations that are not influenced by their own points of view. Scientific information reflects this objectivity.
3. Science is structured and methodical: So, the creation and publication of scientific information happens in a very structured way.

**There are many types of scientific information. They include:**

* Health issues
* Environmental concerns
* Patents and more!

…and the need for this information to be accurate can be a life or death situation! So how does a person decide what type is needed?

**Join the conversation!**

When you begin looking for scientific information, you are inserting yourself into a kind of conversation among scientists. This conversation is how new ideas are shared and tested.

This conversation isn’t like texting a good friend- it happens in a more formal, **structured** way. If you understand the structure by which scientific information is **created, published and shared**, you’ll be able to find the best type of information to fit your need. Understanding how scientific research is communicated also helps you evaluate what you find.

**The Scientific Information Publishing Cycle:**

1. **Idea:**

* Scientists have an idea for something new.
* They research to find out if anyone else is working on the same idea.
* They may apply for funding to pay for their experiments.
* They may collaborate with other scientists who may have better labs or more student assistants.

1. **Research:**

* The scientists test their idea with a series of bench experiments or clinical studies.
* They decide how large a sample to use; for example, 12 or 1,200 people? 10 or 100 soil samples?
* The scientists collect data and try to make sense of it.
* They decide if the data supports their idea or not.

1. Proposal:

* The scientist sends an abstract (a summary of what they learned during the research process) to a conference or journal to see if they will publish the results.
* This work may appear in preprints in scientific databases or in a poster presentation at a conference.

1. Peer-Review:

* The scientist writes a full report as a journal article and submits it to a publisher.
* The journal editor sends the article to peer-scientists in their discipline to review.
* The peer-review team evaluates the information and determines if the paper makes a contribution to the field and should be published, or if it should be sent back to the authors for revision instead.

1. Published work:

* The article or patent or dissertation is now available online and in print.
* Popular news channels may report the new findings.
* The article can be found in scientific databases.
* Books, textbooks, and other articles may cite the article as a resource within the next year.

**Searching scientific databases - how to get started:**

* Go to the Austin Community College Library Services homepage: <http://library.austincc.edu>
* Find the search box on the homepage and select the link below the search box with the label: **A-Z List of Databases**.
* Look for the list halfway down the page: **Browse the list of databases by subject** to identify the best resources for your scientific research. Categories include: Chemistry, Environmental Science, Health & Medicine, and Sciences. **Let’s choose Chemistry.**
* From this page you can link to any of the library’s Chemistry databases. For example, Access Science or Kirk-Othmer Encyclopedia are both great reference databases.

**Science Reference Databases**

These databases include information from major scientific encyclopedias. They’re the best places to find background information on scientific topics.

* General science reference sources like **Access Science** provide shorter entries on all science topics.
* Specialized science reference sources like **Kirk-Othmer Encyclopedia of Chemical Technology** provide more detailed entries specifically related to chemistry topics.

**Kirk-Othmer Encyclopedia**

Let’s take a closer look at Kirk-Othmer Encyclopedia of Chemical Technology, one of our best reference databases in Chemistry.

Start on the Chemistry resources list that we located before:

* Choose **Kirk-Othmer Encyclopedia of Chemical Technology.**
* Let’s start with a broad keyword search to locate reference articles that contain information about “greenhouse gases.”
* Click the search box at the top of the database page.
* Type: greenhouse gas. Click Search.
* We get 99 search results. But if we scan the first page of results, none of the articles have “greenhouse gas” in the title.
* Don’t worry! This is completely normal for Kirk-Othmer. The comprehensive articles you’ll find here will often have extremely relevant information within the body of the article.
* Our first task is to choose an article that sounds like it might have useful information about greenhouse gases.
* Locate the article called “Air Pollution” in your search results.
* Here’s a great match on the first page of search results! A background article on Air Pollution will likely contain some information about greenhouse gases.
* Click the “Air Pollution” link.
* The entry on “Air Pollution” is quite long. It includes an abstract (summary) followed by fourteen subsections.
* We can use the “Sections” menu above the Abstract to open a table of contents and help us pinpoint relevant material.
* Or we can use the CRTL-F feature built-in to our web browser.
* Clicking CTRL+F opens a text search box on most web browsers.
* Type “greenhouse gas” in the small search box that appears at the bottom of the browser. Click ENTER.
* The browser highlights every occurrence of “greenhouse gas” in the article.
* Click through them one by one to see which passages might be most useful to your research. This page has 9 matches!
* When you find a relevant article you can always download the article PDF to read later. Choose “PDF” from the menu at the top of the article.
* Or just copy and paste the text of the article into an email to yourself.

Kirk-Othmer search tip

Be careful when conducting multiple searches in Kirk-Othmer. Make sure the search box always shows that you’re searching “This Reference Work.” These words should appear to the left of the search box when you type your search terms.

If these words are not present, you may have to hit the BACK button on your browser until you get back to the search box on the Kirk-Othmer welcome page.

Otherwise, your search results may include articles from the Wiley Online Library that you can’t access at ACC.

**Scientific Article Databases**

These databases include articles from scientific journals, industry publications, conference proceedings, and reputable science magazines. They’re the best sources for the most up to date research and information on scientific topics.

**Finding Scientific Articles**

Let’s start with Academic Search Complete.

Searching Multiple Databases:

Academic Search Complete is an excellent source for most research topics, but sometimes you need more! Conveniently you can add additional subject-specific databases to your search directly from the Academic Search Complete search page.

Example: Start with Academic Search Complete, then add other EBSCO databases like CINAHL, Health Source Complete, and Science & Technology Collection.

Try this search:

First locate Academic Search Complete.

* Go to the library homepage: <http://library.austincc.edu>
* Click the link “A-Z List of Databases”
* At the top of the list, below “Titles Beginning with A” choose “Academic Search Complete”

Academic Search Complete is our largest source of articles on any topic, so this is always a good place to start.

Before we enter our keywords, let’s add more databases. We can choose from a complete list of our EBSCO databases.

* Above the search box, click “Choose Databases.”
* We can add any database on the list. Let’s add four databases that will bring in a wide range of results from across the sciences.
* Click the check box beside “Health Source: Nursing/Academic Edition.”
* Scroll down the list.
* Click “CINAHL Complete” in the right-hand column.
* Click “Psychology and Behavioral Sciences Collection” in the left-hand column.
* Click the “Science & Technology Collection” check box in the left-hand column.
* Scroll back to the top of the screen and click OK.

Now, back on the search page, we can always see which databases we’ve added to our search and make any changes.

* Above the search box, click “Show all.”
* The text now notifies us that we are searching Academic Search Complete, plus all four of the additional databases we selected.

Let’s search.

* Let’s start with a broad search just to get a sense of how much is out there.
* In the search box, type: alcohol and diabetes
* Click SEARCH.
* Note: for more help selecting keywords, try our tutorial “Identifying Keywords” located on the library website’s “Online Tutorials” webpage.

Reviewing our results

* We found 6,400+ articles
* Let’s use the Refine Results sidebar to narrow these results by date, source type, or subject.
* Some of the articles we retrieved are too old and out of date!
* In the left-hand menu, the Publication Date slider shows that the range of articles we’ve retrieved extends from 1969 to 2019.
* Let’s adjust this date slider to limit our results to the 5 year range from 2014-2019.
* Type “2014” into the box to the left of Publication Date. Or, drag the left-hand slider to the right, until the date on the left reads “2014.”
* The search results adjust. Now we have 2500 recent articles.

Review a Subset of Articles from a Database

* We can see how many articles we retrieved from each database. Let’s look at the 663 results we found in the nursing and allied health database, CINAHL Complete.
* Scroll down till you get to the bottom of the Refine Results sidebar.
* Under “Database,” click the “CINAHL Complete” check box.
* The search results adjust. Now we see only results from CINAHL Complete.
* Some of the articles don’t pertain to “alcohol drinking” at all, so we’ll have to get more specific.
* For example, article #2 has a long title which includes the words “Alcohol extract,” “diabetes” and “mice.” Even though we have matched some of the words we were looking for, this research study on mice would probably not be the best choice for our research on humans.

Limit by Subject Headings

One powerful way to narrow your focus is to choose a Subject Heading from the menu on the left.

* In the Refine Results sidebar, click the option “Subject: Major Heading.”
* Let’s drill down into our results to find articles that are about diabetes and alcohol drinking.
* Under Subject: Major Heading, click “alcohol drinking.”
* The search results adjust to show a subset of 61 articles.

Now we’ve narrowed our original pool of 6,400 results down to 61 recent articles from CINAHL Complete that also relate to alcohol drinking.

Let’s take a closer look at one of these articles.

Accessing an Article

* Clink the article link, “Association between alcohol consumption and the risk of type 2 diabetes.” (At the time of writing, this is search result #9, but this may change as new articles are added to the database).
* A detailed record for this article opens.
* This is an article from a research journal. We can learn more about the source, American Journal of Clinical Nutrition, by following the link.
* Click “American Journal of Clinical Nutrition”
* A new page of “Publication Details” for this journal opens.
* Review the Publication Type, the Description, and the note beside “Peer Reviewed” on this page.
* This overview confirms that American Journal of Clinical Nutrition is a peer-reviewed academic journal that covers research on human nutrition.
* Click “Back” at the top of the page to return to the Detailed Record of the article.

Full-Text Links

In EBSCO databases, you can access the article itself by locating the “Full Text” link.

In this case, “Linked Full Text” simply means that EBSCO will link us to the full text of the article on the publisher’s website.

* Click “Linked Full Text” at the top of the column on the left.
* A new webpage opens with the header “The American Journal of Clinical Nutrition.”

Now we’re on the publisher’s website and we can download and read the article.

* Click the “PDF” link just below the article title and citation information.
* The full-text of the journal article opens.
* Here’s your article! The PDF is a scan of the entire twelve-page research study as it originally appeared in the journal.

Print, Email, Cite

Let’s take another look at the Detailed Record for this article.

* Return to the browser window that shows the Detailed Record.
* Review the Tools menu on the right side of the page.

The Tools menu in most databases lets you Print, Email, or Cite articles, so you can easily keep track of the sources you find.

* Locate the Cite button, mid-way down the Tools list.
* The Cite button will create a number of common citation styles like APA, MLA, and Chicago,
* But if you need to create a CSE citation, you can select the AMA style, then consult our webpage CSE-Citation Sequence Guide for help adapting it to CSE. Link to Guide: <https://library.austincc.edu/help/CSE/CSE-cs.php>

Consulting Other Source Types

* Let’s return to our list of search results. Click “Result List” at the top of the Detailed Record above the article title.
* The search results page re-opens.

The article we looked at was from an Academic Journal. But you can also find many solid articles from trade publications, which are written for professionals in a field, or science-related magazines, which tend to be less dense and written for a general audience.

Use the Source Types menu to limit your results to Magazines (or Trade Publications).

* In the Refine Results sidebar, locate the Source Types menu.
* Click the check box for “Magazines.”
* The search results adjust.
* Now our results include articles from magazines and newsletters like **Diabetes Forecast** and **Harvard Women’s Health Watch.**

**Finding Original Research in Library Databases:** Let’s looks at a few more tips for finding peer-reviewed original research. You can apply these strategies to many of our databases, not just Academic Search Complete.

* Most databases feature a check box on the New Search page so you can retrieve only articles that are from **peer-reviewed**, academic or scholarly journals. Look for a checkbox for you to request your search results from Scholarly (peer-reviewed) journals only.
* Close to the search box you will see a link to choose **Advanced Search.** When you choose the Advanced Search page, you can set up your search to include specific search results. For example, if you use the nursing and allied health database, CINAHL, you will see options in Advanced Search to see Research studies, Clinical Trials, research on only Male or Female subjects, research on certain age groups (such as newborns) and more.
* **Evaluate what you find:** It’s not always easy to tell if what you’ve found satisfies your information need until you’ve put it to the test…the most important questions to ask are:
* How current is the information?
* Who wrote it?
* Is their research supported by evidence?

For more help, check out the Library’s tutorial: Evaluating information. Follow the link to Online Tutorials on the library homepage. <http://library.austincc.edu> Then select the tutorial, “Evaluating Information and Fake News.”

**Recap:**

In this tutorial you have learned:

* How scientific information is published
* How to access relevant scientific databases
* How to search science databases effectively
* How to find original research

Now let’s test your understanding of these concepts with a short quiz.

**Quiz: Finding Scientific Information**

The following quiz consists of 10 multiple choice questions. Each question is worth 10 points.

Choose the best answer and type the letter for this answer in the blank by each quiz question:

\_\_\_\_ 1. During the peer-review process for scientific information, the peer-review team may:

1. Evaluate the accuracy of the information
2. Decide if the paper will make a contribution to the scientific field
3. Ask the author to revise the article
4. All of the above

\_\_\_\_ 2. One of the most important questions to ask while looking for scientific information is: how current is the information?

1. True
2. False

\_\_\_\_ 3. Science is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:

1. Evidence based, objective, performed only in labs.
2. Evidence based, subjective, structured and methodical.
3. Evidence based, objective, structured and methodical.
4. Subjective, structured and methodical, weird.

\_\_\_\_ 4. After conducting a database search for articles you may sort your results by:

1. Date oldest
2. Date newest
3. Relevance
4. Any of the above

\_\_\_\_ 5. Newsletters about health, journal articles about the environment, books about the human genome, and patents for inventions are all types of:

1. Health information
2. News
3. Government information
4. Scientific information
5. None of these

\_\_\_\_ 6. When scientists publish their research, they are participating in scholarly communication. In what ways could you listen and participate?

1. Read or write published reactions to research studies.
2. Read original research articles in journals.
3. Create an internet meme or story on social media in reaction to a research study.
4. Conduct your own controlled research on a published topic.
5. A, B, and D.

\_\_\_\_ 7. Scientific reference sources, such as scientific encyclopedias provide what type of information?

1. Specific data from an ongoing research study.
2. Background information such as definitions, chemical formulas, basic facts, and statistics.
3. The notes and records of researchers.
4. Reviews of current research in the health sciences.

\_\_\_\_ 8. Most article databases allow you to limit your search to peer-reviewed journals.

1. True
2. False

\_\_\_\_ 9. Examples of databases that provide access to scientific reference sources are:

1. *Science & Technology Collection*
2. *Access Science*
3. *Academic Search Complete*
4. *Kirk-Othmer Encyclopedia of Chemical Technology*
5. A and C
6. B and D

\_\_\_\_ 10. Scientific journal articles are the best places to find:

1. The most up to date research in a scientific field.
2. Biographies of important scientists.
3. Lists of medicine dosage information.
4. Definitions of scientific terms.
5. None of the above.

If you are required to turn in this quiz to your professor, please print by selecting FILE => PRINT. If you are required to email the quiz to your professor or upload it to Blackboard, please choose FILE => SAVE.

Answer Key:

1. D
2. A
3. C
4. D
5. D
6. E
7. B
8. A
9. F
10. A