

# Finding and Organizing Internet Resources



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## Questions

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Please note that the World Wide Web is volatile and constantly changing. The URLs provided were accurate as of the date of publication.

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# Purpose of the Module

The Internet has opened a whole new world of information to both teachers and students. School and public library holdings are no longer the only places to find information. The World Wide Web provides students and teachers with up-to-the-minute digital information. Clicking the mouse yields videos, sounds, photographs, text and more. The Web can serve as a fantastic resource for education, but it does present a new problem: finding relevant information and validating the accuracy and completeness of the information. This module presents strategies and tools to make Internet searching both effective and efficient. It addresses the challenge of locating Internet resources that meet diverse student needs and will also help teachers develop age-appropriate information location and organization skills with their students. Internet searches will be revisited later this year during the *Evaluating and Using Internet Resources* session, which will offer strategies and tools for authenticating information found on the World Wide Web.

## Expected Outcomes

- Students have access to Internet resources (pre-selected on a webpage or through search engines and directories) that meet diverse learner needs.
- Students and teachers effectively and efficiently locate and organize Internet resources.
- Teachers value Internet resource location and organization skills as important for lifelong learning.

## ISTE NETS-T

### Meets the following standards:

#### 1. Facilitate and Inspire Student Learning and Creativity

- a. Teachers promote, support and model creative and innovative thinking and inventiveness.
- b. Teachers engage students in exploring real-world issues and solving authentic problems using digital tools and resources.

#### 2. Design and Develop Digital-Age Learning Experiences and Assessments

- a. Teachers design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity.
- c. Teachers customize and personalize learning activities to address students' diverse learning styles, working strategies and abilities using digital tools and resources.

### 3. Model Digital-Age Work and Learning

- a. Teachers demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations.
- d. Teachers model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate and use information resources to support research and learning.

### 4. Promote and Model Digital Citizenship and Responsibility

- a. Teachers advocate, model and teach safe, legal and ethical use of digital information and technology, including respect for copyright, intellectual property and the appropriate documentation of sources.

## Supports the following standards:

### 3. Model Digital-Age Work and Learning

- c. Teachers communicate relevant information and ideas effectively to students, parents and peers using a variety of digital-age media and formats.

## Essential Question

How does technology affect change?

## Session Question

How do individuals find information that meets a variety of needs?

SAMPLE

# Information Literacy

Typically, education models are a reflection of a society's worker needs. This concept is explored in a report titled *A New Model for Education*, published by the National Academy of Sciences (NAS). The report reviews historical information about worker skill needs and education. The authors point out that the pre-Civil War era was dominated by an agricultural society in which workers needed only basic reading, writing and elementary mathematics skills to succeed. Schools prepared students for this type of work by teaching basic skills in one-room schoolhouses. By the late 1800s, however, many people were settling into cities and working in factories. To meet worker needs, the factory model of education was developed.

To teach students the basic skills and simple facts they needed for industrial jobs, the first great revolution in schooling took place: the factory school model appeared. Large buildings enclosed labyrinths of classrooms where students sat in neat rows with the teacher in front. Schools sought to be an efficient social institution that could turn out identical products. Students learned enough to work at jobs that they would probably keep for much of their lives (NAS, 1995).

Skills needed for jobs in the 21<sup>st</sup> century are significantly different from those required in the late 1800s. To help identify these differences, the U.S. Department of Labor created the Secretary's Commission on Achieving Necessary Skills (SCANS). The commission issued its first report in the 1990s. Titled *What Work Requires of Schools: A SCANS Report for America 2000*, the report noted that one set of skills employers said they desire in workers is the ability to productively use information. This encompasses acquiring and evaluating data, organizing and maintaining files, interpreting and communicating information and using computers to process information. The Partnership for 21<sup>st</sup> Century Skills, a public-private organization that includes the U.S. Department of Education as a key partner, identified information and communication skills as one of the top "skill sets" students must acquire to succeed in the 21<sup>st</sup> century.

If the goal of education is to prepare students to be lifelong learners, creative and critical thinkers, problem-solvers and decision-makers in the 21<sup>st</sup> century workplace, educators must equip students with the skills they need to succeed in these tasks. These skills are often referred to as "21<sup>st</sup> century skills." To address the challenge of developing each student's 21<sup>st</sup> century skills, various organizations, education leaders and education boards have included information-literacy skills in their standards. For example, information-literacy skills are included in the National Educational Technology Standards for Students (NETS-S) developed by the International Society for Technology in Education. The American Association of School Librarians and the Association for Educational Communications and Technology developed information-literacy standards to provide "a conceptual framework and broad guidelines for describing the information-literate student" (1998). Many states include information-literacy skills in their curriculum standards.

In one of its reports, the American Library Association Presidential Committee on Information Literacy explained it this way: "To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information" (1989). This generalized statement outlines four basic categories of information skills. The list below details some of the basic information skills categories and various standards that reference these information skills. This list is not extensive or all-inclusive but serves as an example for how information-literacy skills are included in current standards.

- Identify a need for information determined by a problem, making a decision, answering a question and so forth.
  - *Missouri Show-Me Standards*; Goal 3: Students in Missouri public schools will acquire the knowledge and skills to recognize and solve problems.
- Locate information
  - *ISTE NETS-S*; Standard 5 - Technology Research Tools: Students use technology to locate, evaluate and collect information from a variety of sources.
  - *American Association of School Librarians*; Standard 1: The student who is information literate accesses information efficiently and effectively.
  - *Missouri Show-Me Standards*; Goal 1: Students in Missouri public schools will acquire the knowledge and skills to gather, analyze and apply information and ideas.
- Evaluate information for accuracy, validity, reliability and so forth.
  - *ISTE NETS-S*; Standard 5 - Technology Research Tools: Students use technology to locate, evaluate and collect information from a variety of sources.
  - *American Association of School Librarians*; Standard 2: The student who is information literate evaluates information critically and competently.
- Use the information to solve a problem, make a decision, conduct an analysis, think critically and/or create a product with technology where it is appropriate.
  - *ISTE NETS-S*; Standard 4 - Technology Communication Tools: Students use a variety of media formats to communicate information and ideas effectively to multiple audiences.
  - *ISTE NETS-S*; Standard 5 - Technology Research Tools: Students use technology tools to process data and report results.
  - *ISTE NETS-S*; Standard 6 - Technology Problem-Solving and Decision-Making Tools: Students use technology resources for solving problems and making informed decisions.
  - *American Association of School Librarians*; Standard 3: The student who is information literate uses information accurately and creatively.
  - *Missouri Show-Me Standards*; Goal 1: Students in Missouri public schools will acquire the knowledge and skills to gather, analyze and apply information and ideas.

## Locating and Accessing Information

In the past, accessing information required a person to physically go to a library or bookstore to locate print information sources. Before a print source is published, it goes through an editing and/or review process. Today, a large quantity of information can be accessed quickly from almost anywhere through the Internet. Information can

be posted—a form of publishing—without going through a review or editing process. As a result, a vast store of information is available to anyone who has access to the Internet, though not all sources are reliable. The challenge lies in locating accurate information that meets a particular need.

### Productive and Efficient Searches

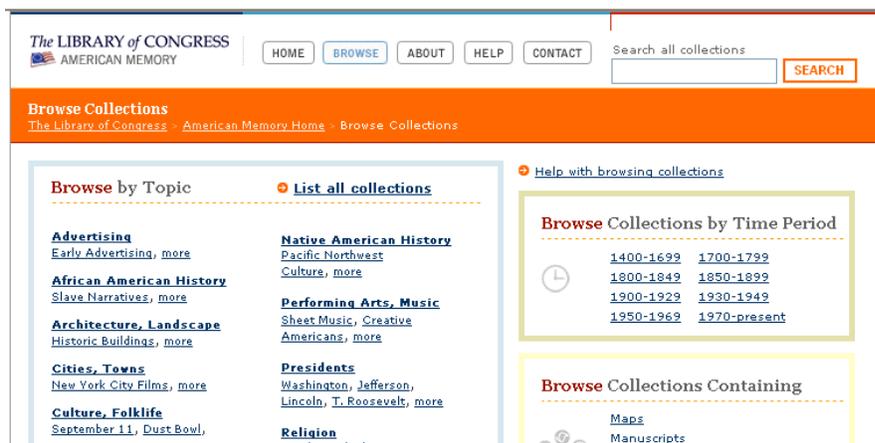
Locating information that meets a particular need requires the development of processes and skills that enable an individual or group of individuals to effectively locate relevant information in a relatively short amount of time. The first step in the process of locating information is determining where to begin the search. Searching for information can occur on the Internet for electronic sources as well as in a library for print sources. The information in this module will address searching for electronic information on the Internet.

## Directories, Search Engines and Metasearch Engines

Three types of tools are available for locating information on the Internet. Each type is designed to access a specific set of information. When beginning a search for information, consider each tool type and its purpose.

### Directories or Indexes

Directories or indexes are databases created around topics. In most cases, the information sources included in a directory or index were selected for inclusion by a human. When using a directory or index, the user navigates to the directory or index homepage. Upon arriving at the homepage, the user will either conduct a topic search in the directory database or will drill down to the topic by selecting related headings. For example, when an individual navigates to the Library of Congress American Memory directory, the individual is presented with a list of main headings as shown below. In addition, the user has the option of conducting a search of information included in the database by typing a search word in the search box.



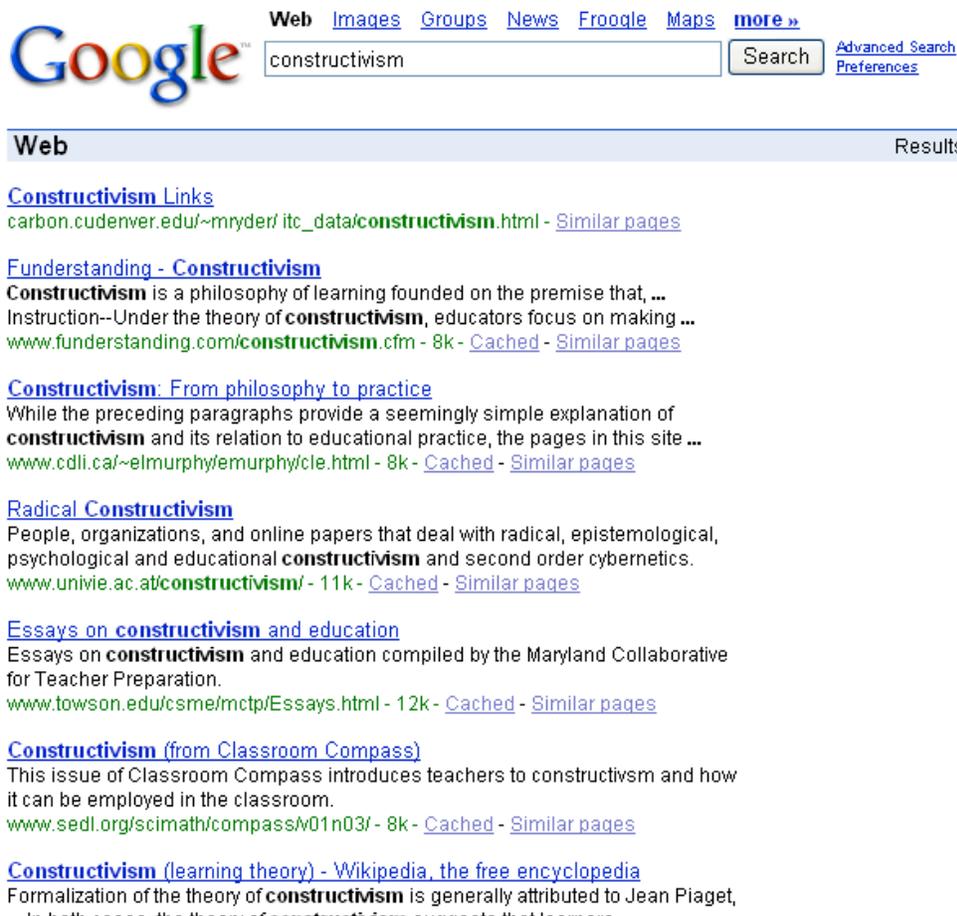
Conducting a search in a directory or index will only reveal sources that were selected by individuals to be included in the directory or index database.

## Search Engines

Search engines are programs designed to search for documents and webpages on the Internet based on the input of keywords. The program uses automated software to index billions of files online into a database. When an individual types keywords into a search engine a list of results, based on the keywords, will be presented to the individual. The effectiveness of a search engine producing relevant results is based on the individual's selection of keywords. The advantage of using a search engine over a directory or index is that since a search engine database is created by automation, it has a much larger database due to its ability to index webpages based on titles, text and other information buried within a webpage. Search engine databases, therefore, are more comprehensive than human-created databases. The disadvantage is that search engines are so comprehensive that unless a user is skilled at inputting keywords, the results can be so broad they produce irrelevant results.

### Google™

Google™ is one of the Web's most popular search engines. The popularity is due to some of the intuitiveness of the search engine, which makes it easier for users to produce the results they are looking for. To use Google, a user types keywords into the search box and clicks the search button. Results are displayed with up to 10 items per screen page as shown in the example below.



The image shows a screenshot of a Google search interface. At the top left is the Google logo. To its right are navigation links: Web, Images, Groups, News, Froogle, Maps, and more. Below these is a search box containing the text 'constructivism' and a 'Search' button. To the right of the search box are links for 'Advanced Search' and 'Preferences'. On the far right of the page, the letters 'LE' are displayed in a large, light gray font. Below the search box, a horizontal bar separates the search area from the results. The word 'Web' is on the left and 'Results' is on the right. The first result is titled 'Constructivism Links' and includes the URL 'carbon.cudenver.edu/~mryder/itc\_data/constructivism.html' and a link to 'Similar pages'. The second result is titled 'Funderstanding - Constructivism' and includes a snippet: 'Constructivism is a philosophy of learning founded on the premise that, ... Instruction--Under the theory of constructivism, educators focus on making ...' and the URL 'www.funderstanding.com/constructivism.cfm' with '8k - Cached - Similar pages'. The third result is titled 'Constructivism: From philosophy to practice' and includes a snippet: 'While the preceding paragraphs provide a seemingly simple explanation of constructivism and its relation to educational practice, the pages in this site ...' and the URL 'www.cdli.ca/~elmurphy/emurphy/cle.html' with '8k - Cached - Similar pages'. The fourth result is titled 'Radical Constructivism' and includes a snippet: 'People, organizations, and online papers that deal with radical, epistemological, psychological and educational constructivism and second order cybernetics.' and the URL 'www.univie.ac.at/constructivism/' with '11k - Cached - Similar pages'. The fifth result is titled 'Essays on constructivism and education' and includes a snippet: 'Essays on constructivism and education compiled by the Maryland Collaborative for Teacher Preparation.' and the URL 'www.towson.edu/csme/mctp/Essays.html' with '12k - Cached - Similar pages'. The sixth result is titled 'Constructivism (from Classroom Compass)' and includes a snippet: 'This issue of Classroom Compass introduces teachers to constructivism and how it can be employed in the classroom.' and the URL 'www.sedl.org/scimath/compass/v01n03/' with '8k - Cached - Similar pages'. The seventh result is titled 'Constructivism (learning theory) - Wikipedia, the free encyclopedia' and includes a snippet: 'Formalization of the theory of constructivism is generally attributed to Jean Piaget, ...'.

## Metasearch Engines

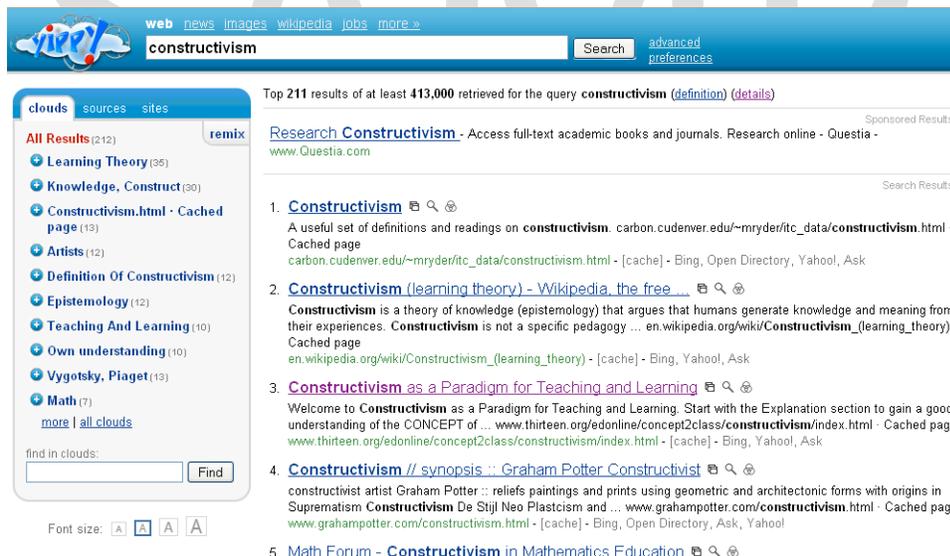
A metasearch engine is a program that conducts user-specified keyword searches in several search engines to produce a list of results. These are helpful when conducting broad searches for information. Each search engine is unique in the way that it indexes its database. A metasearch engine capitalizes on the unique qualities of several search engines; however, as is the case with using a search engine, the results of a metasearch will depend on the keyword input.

### Yippy

An example of a metasearch engine is Yippy. A unique feature of Yippy is the method in which results are displayed. Rather than listing 10 to 20 webpages on a screen, Yippy clusters results in tree-like subcategories.



The example below demonstrates the clustering of subcategories for a metasearch on the keyword constructivism.

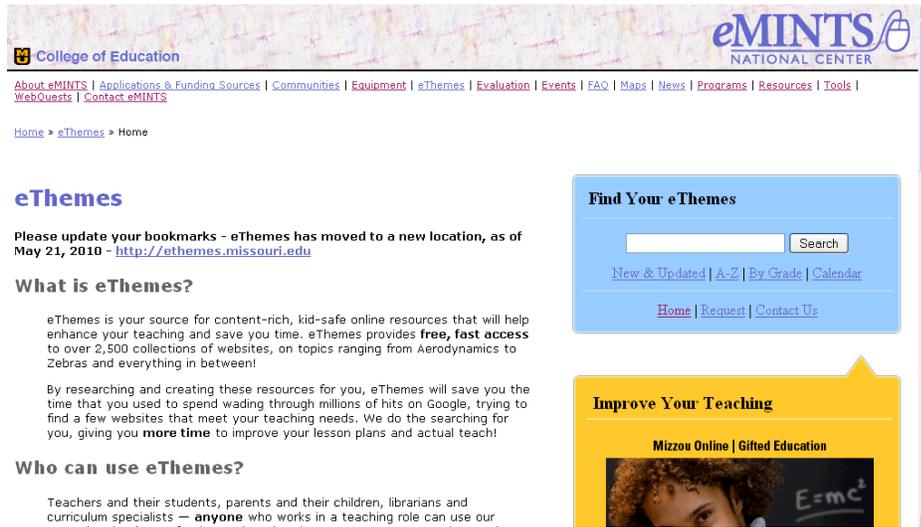


## eThemes

Many teachers find that locating helpful Internet resources is time-consuming and frustrating. To solve this problem, eMINTS created an online resource called eThemes.

eThemes catalogs websites according to topical requests from eMINTS teachers and organizes them around state standards. eThemes resource scouts receive requests and search for appropriate websites based on the criteria set by the requesting teacher. Resource scouts look at each site for age appropriateness, reading level,

safety of external links and accuracy of information. After filling the request, the resource scout sends the teacher an e-mail notification that the resource has been posted on the eThemes site: <http://ethemes.missouri.edu>.



At the eThemes website, select one of three options to locate a list of resources:

1. **Current information** – See recent eThemes requests that have been posted and an eThemes resource calendar.
2. **Find existing eThemes** – Search through all topics listed alphabetically, by all topics for a specific grade level, or by entering a topic in the search box.
3. **Request new resources** – Use this feature when a search does not locate an existing resource. Give the resource scouts at least a week to find the information.

The ability to use eThemes is one of the greatest advantages of being an eMINTS teacher. eThemes resource scouts do the work of researching and evaluating websites. Only eMINTS teachers may make eThemes requests, but any teacher can search the database of existing resources. eThemes is designed as a teacher resource—not a student resource. Teachers should review all resources listed on an eThemes page and post the appropriate links for their students through methods such as a classroom website or a Word resource list.

## Conducting Efficient Searches

The Internet consists of nearly a billion individual websites. Locating information on this vast network would be nearly impossible without search engines. Although search engines are useful, they cannot locate close to 40 percent of all webpages. Without an exact Web address, no tool available can precisely locate a specific webpage. Although search engines are becoming more intuitive, results that number in the thousands still require a significant amount of time to sort through. In addition, broad word searches can produce irrelevant results. The key to effective and efficient use of any search engine is the keyword used to conduct the search and becoming familiar with the advanced search features of a search engine.

The eMINTS staff intends the search engine information presented here to be used by teachers and secondary students only. Having elementary students search the Internet is risky and wastes class time. Even children’s search engines like Yahoo Kids and Ask Kids (formerly Ask Jeeves for Kids) do not keep students safe from inappropriate material. Elementary teachers should select sites ahead of time and present them to students for a safer, more effective instructional strategy.

### Identify Keywords and Synonyms

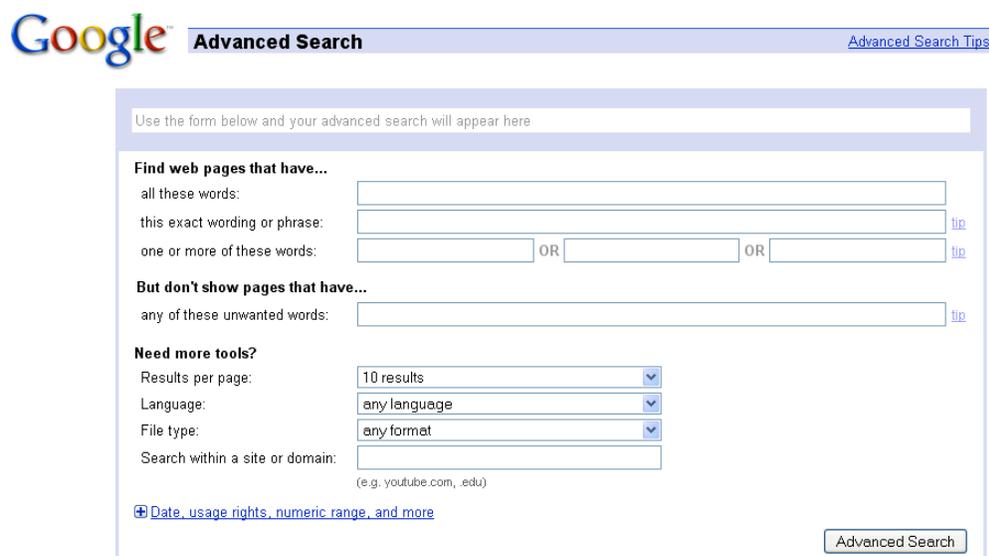
When conducting an Internet search, the use of broad topics as keywords will most likely result in a list of millions of webpages. The first step in conducting an efficient search is to identify keywords. Nouns and objects are the best choices for query keywords because many search engines ignore verbs, modifiers and conjunctions—or, if used, they will produce irrelevant results because they are too common. In addition, when developing a list of keywords, consider topic synonyms to locate webpages that contain relevant information but are indexed with synonymous terms (Taylor, 2003; Bergman, 2004; Chamberlain, 2005).

### Be Specific

When listing keywords make them specific and place the most important keyword first. Listing one word in a search is not specific and can yield extensive results. Listing three to six keywords refines the search and makes it more specific (Taylor, 2003; Bergman, 2004; Chamberlain, 2005).

### Advanced Searching

Most search engines provide an option titled “Advanced Search.” Selecting this option provides the user with a form to complete that helps refine the search. By using the advanced search feature the user does not need to include Boolean operators, phrases, parentheses and other search features to refine a search; however, understanding how these various search features work enables a user to employ the advanced search features more effectively. The example below displays the advanced search option in Google™.



The following techniques can be applied to searches automatically when using the advanced search feature of a search engine. Alternatively, a user may apply these techniques manually by typing them into the search box.

**Phrases (Advanced Search Option: Exact Phrase)**

Phrases are sets of keywords that an individual would expect to find side-by-side on a webpage. Identify search phrases by placing the words in quotes. Phrases that contain verbs, modifiers and conjunctions can be used as a search phrase and will not be discarded by the search engine. The use of quotes around groups of words will narrow the search and produce richer results. For example, typing the word *bear* into a search engine may produce more than 400 million results. Enclosing descriptive keywords in quotes, such as "brown bear" or "black bear," narrows the results to approximately 400,000 (Taylor, 2003; Chamberlain, 2005).

**Boolean Operators—to Widen, Narrow and Omit (Advanced Search Option: At Least One Word, Without the Words, All of the Words)**

Boolean operators – AND, OR, NOT – can be used to widen or narrow a search. Some search engines, such as Google™, automatically apply the AND Boolean. The plus sign (+) is used in some search engines as an alternate for the word AND. The word OR can be used to narrow the search when using synonymous words. The word NOT can be added to the search to omit words. Alternatively, the minus sign (-) is recognized by some search engines as an alternative to the word NOT. Boolean operators should be typed in capital letters so the search engine will recognize the words as Boolean operators rather than as keywords (Taylor, 2003; Bergman, 2004; Chamberlain, 2005).

**Filters (Advanced Search Option: Occurrences, Domain, Language, File Format, Date, Numeric Range)**

When looking for information that meets general criteria such as a domain or title, filters can be included in the search. Filters are applied by typing the filter name followed by a colon. For example, if the search should be narrowed to include only webpages from .edu domains, a domain filter is included in the search. A search for information on constructivism located on just the San Diego State University website would appear as follows: `site:sdsu AND constructivism`. A useful filter when looking for information that defines concepts or terms is the define filter. Type `define:term`, replacing the word "term" with the appropriate keyword. Be aware that not all search engines use the same filters. To take advantage of filters, users must know which filters each search engine recognizes (Taylor, 2003).

**Plurals**

If a plural version of a word is used as a search term, singular forms of the word will not be listed in the results. To produce results that include various forms of a word, include various forms of the word (discover, discovers, discovering) in the search. Some search engines will return multiple forms of a word if a user truncates the word to its stem (discover) and includes the asterisk as a wildcard at the end of the word (discover\*). For example, a user would type in `discover*` to get results that include the words discover, discovers and discovering. To find out whether the search engine

recognizes the asterisk as a wildcard, check the search engine's advanced tips or search guides.

### **Synonyms**

Some search engines use a symbol such as the tilde (~) in front of a word as a method for including synonyms of the word in the search. For example, typing the word *Missouri ~regions* in the search field produces results that include Missouri regions, Missouri divisions and Missouri areas.

### **Parentheses**

Parentheses are used to identify or nest concepts. By using parentheses, Boolean operators can be used to connect the concepts. For example, if an individual is searching for information related to wildlife and urban development, the following keywords could be nested to produce refined results: ("black bear" OR "brown bear") AND ("urban development" OR "urban sprawl"). Using parentheses forces the order of processing. In other words, the search engine will process the related terms (those in parentheses) first before connecting the search items (Taylor, 2003; Bergman, 2004).

### **Capitalization**

Not all search engines are case-sensitive. Some search engines ignore capitalization, while others do not. Typically, search words typed in lowercase will produce both capitalized and lowercase versions of the word in the list of results. Capitalized search words, however, generally produce only capitalized versions of the word (Scuderi, 1998; Taylor, 2003; Bergman, 2004).

### **Similar Pages**

Search engines often include a link next to each webpage in the search results titled "similar pages," "find similar pages" or "related pages." If a webpage listed in the search results is an exact match to the needed information, click on the similar pages link. The search engine will refine the search results to include only webpages that are similar to the selected example (Taylor, 2003).

### **Proximity Operators**

Proximity operators direct search engines to look for keywords based on their proximity to each other. Proximity operators include the following words: FOLLOWED BY, ADJ (adjacent to) and NEAR. For example, typing the proximity operator NEAR between keywords means that the two words will be located within a certain number of words of each other. The number of words between the two keywords varies with search engines (Taylor, 2003).

### **Browser Find Feature**

When selecting a webpage produced by a search engine it is sometimes not apparent where the search terms are located on the webpage. The "find" feature of the browser becomes a useful tool for locating information on a webpage. The find feature is typically located under one of the menu items at the top of the browser. To use the find tool, select it from the menu item list. Type keywords in the search field of the find tool and click the search button. The browser will highlight the keyword in the browser document (Taylor, 2003; Chamberlain, 2005).

## Affirming Diversity through Resource Selection

Many classrooms are comprised of students with diverse cultural backgrounds. Positive affirmation of diversity means that resources used in the classroom should provide for the diverse learning needs of the students and depict the diverse cultures represented in classrooms across the nation and around the world. As a first step in meeting the learning needs of students, conduct searches that produce results reflective of the linguistic, cultural and academic needs of the students in the classroom. After locating the resources, select the most appropriate materials to meet student learning needs.

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