

Essential Unit Guiding Question:

How can I narrow my search to get the best results?



Advanced Lesson 3:

How do I use operators to fix a search gone wrong?

LESSON OVERVIEW: In the last lesson, students learned several new search strategies and explained how they used one strategy in their own lives. In this lesson, students are challenged to compare sets of screen shots and discover how various operators function. They then compare and contrast the options on the Advanced Web Search page with the narrowing tools available from the operators and filters they have learned. The lesson culminates when students apply these options to deepen their queries for their research projects, and with an optional exploration of personal preference for search styles. In the next lesson, students explore a variety of Google tools that support new ways to think about research.

STANDARDS:

- *K-12 College and Career Readiness (CCR) Anchor Standards for **Writing 1***: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient **evidence**.
- *K-12 College and Career Readiness (CCR) Anchor Standards for **Writing 2***: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective **selection**, organization, and analysis of content.
- *K-12 College and Career Readiness (CCR) Anchor Standards for **Writing 8***: **Gather relevant information** from multiple print and **digital sources**, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

Grade Specific Writing Standards

- **W.9-10.8** Gather relevant information from multiple authoritative print and digital sources, **using advanced searches effectively**; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
- **W.11-12.8** Gather relevant information from multiple authoritative print and digital sources, **using advanced searches effectively**; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

RESOURCES/MATERIALS:

- [Advanced 'Narrowing a search to get the best results' presentation](#) (individual slides linked within lesson)
- Internet access (optional, but recommended)
- Handout: ["What was that band?"](#) (provided)
- Teacher resource: [Google operators quick-guide](#) (provided)
- ["Advanced Search" handout](#) (provided)
- ["What is in Advanced Search?" handout](#) (provided)

ESTIMATED TIMING:

- approximately two 50-minute lessons

NOTE TO TEACHER: Throughout this lesson, there are opportunities to click links for search results if you have live Internet access. These links are expressed within most query brackets (e.g., [[constitution](#)]). If you do not have Internet access in your classroom, click the links for slides (e.g., Slide 7) prior to class and print out screen shots to show on a document camera to your students, on an overhead, or through hard copies. In some lesson points, there are slides only as an instructional tool. Also please note that the actual square brackets around each query should not be typed into Google. They represent what words and phrases should be actually typed into the search box.

LESSON DETAILS:

1. Set the stage.

- In the last lesson, students thought about applying different search strategies to help meet their research needs. When looking for a very specific piece of information, it can be helpful to be able to write very specific searches, and Google provides operators to make that possible. Review the notion that, when you type a query into a search tool like Google, the tool matches your terms to the sources it knows, and gives you pages that match your terms.
- Remind students that search tools are not independently intelligent. They cannot understand what you type in, only match it. Sometimes, there are multiple types of meanings that match a query, so a savvy searcher uses special symbols or words, designated by the particular search tool in use at the time, to express more clearly to the search tool what he or she wants. These special symbols are called **operators**, and Google has a number of them. Explain that today you will be learning a few of the most useful Google operators.

2. Pre-assess the students. Conduct a formative assessment by distributing the handout entitled “What was that band?”

3. Observe automatic synonyms.

- This activity is for classes where most students did not complete the Intermediate Level lessons.
- Ask students to examine the results for a query such as [every year children die from malnutrition] ([Slide 2](#)), [pottery Song Dynasty] ([Slide 3](#)), or [wind power] ([Slide 4](#)), or one appropriate to your curriculum. How the search terms are showing up on the page?
- Examine how Google responds when you run a search such as [every year children die from malnutrition], [pottery Song Dynasty], or [wind power]. Students should observe these results pages very closely. They may notice that the bolded terms in the results (indicating the terms for which Google searched) are not always precisely what they typed in. Rather, in some instances Google is looking for several forms of a word (e.g., children/child, dies/dies, Song/Sung) or also searching for closely related terms (e.g., malnutrition/health/diet, power/energy/turbines, pottery/ceramics). It is always worth running your search and carefully observing what Google auto-searches as related terms. However, this automatic process will not find everything you need.

4. Discovering operators through observational experience.

- Give students a series of grouped screenshots—a picture of one search results screen where the query did not work as expected, and the other that employs a single operator to solve that problem. Use the [provided examples](#), or create a set in the context of your subject.
- Working independently, in pairs, or in small groups, students look at one pair of screenshots at a time.

Ask students to read the scenario in which the searches were carried out and answer the following questions:

- What is the difference between the two queries?
- Which query did the student do first, which one was second?
- What operators are used in the second query?
- What is different about the search results?
- What impact do the operators have that narrowed the search?
- On an easel or whiteboard, create a glossary of operators. Include three columns: *operator*, *usage*, and *example*. Discuss each set of screenshots in turn, and as students make observations about the impact of the operators, fill in the glossary.
- Students may also create their own glossary at their desks as the conversation progresses. For these purposes, it is less important that students come up with a working example than that they feature one that makes sense when you look at it, even out of context. The idea is to practice the concept so that they will remember the strategy if ever they do encounter such a problem.

Optional: Instead, you may choose to simply walk students through the operators with context-appropriate examples and then ask them to create their own guide to the operators you have discussed, based upon a subject of their interest.

Note: Several of the operators used in this activity were introduced in the Beginner and Intermediate level lessons: OR, phrase searching (" "), elimination (-), related terms (~), and site: searching. Feel free to refer back to descriptions in those lessons. The operators are included here so that students can once again see them in action and witness how they work. The next several steps are teacher resources to describe how the newly introduced operators work, but are offered in a format that will work for class instruction, if desired.

5. **Introduce “filling in the blank” with an asterisk (*).**

- Use [Slide 5](#) or make your own example. You might ask: “If I want to know about annual mortality from AIDS, I might think that it would be normal for information like that to appear in a sentence that goes something like: ‘Each year, N people die of AIDS.’ How would I search for that, if I don’t know the value of N?”
- Students may notice that an **asterisk (*)** is making a flexible “fill-in-the-blank” space in the search: [[“each year * people die of AIDS”](#)].

6. **Searching between two numbers with number range search (..).**

- Consider one of the following problems, or your own example:
 - You need a battery that is between 6 and 12 volts, and that is between 100 and 150 ah. How can you efficiently locate your options?
 - You are interested in learning more about tombs from Egypt’s Early Dynastic Period, running from 2686-3050 BCE: [[Egypt Dynastic tombs 2686..3050](#)]. [Slide 6](#).
- As students observe the before and after searches, they may need to look very closely to understand what the .. operator is doing, but someone might notice that *the two dots make Google look for every number in between (and including) the numbers on either side of the dots*. So, searching for 1900..2000 will find pages with the number 1900 or 1901 or 1902, and so on...all the way up to 2000.

7. **Specify with filetype: searching.** *You have been having some difficulty using the microscopes in class, and think that a tutorial might help you work through the problems. You don’t think a text description will be much help, and you usually use video for “how to” assistance, but aren’t sure it will help much with microscopes. Finally, you decide to look for a flash file. How do you do that?*

Students may observe that *using the filetype: operator with a file extension (e.g, pdf, xls, swf, etc.) finds just examples of that filetype:* [[parts of a microscope filetype:swf](#)]. [Slide 7](#).

Please note:

- The site: operator should be written all in lower case:
 - Right: [filetype:kmz]
 - Wrong: [Filetype:kmz]
- When using the site: operator, there should be no space between the operator and the specified domain or address:
 - Right: [filetype:kmz]
 - Wrong: [filetype: kmz]

8. **Investigating Advanced Search**. Google offers an **Advanced Search** page, a form searchers can fill out to achieve many of the same types of narrowing that are possible with operators. In this step, students will take a close look at Advanced Search to see how it may help them focus challenging searches correctly.

Guide students to the Advanced Search page:

- After running a simple search, look in the upper right-hand corner of the screen for the cog icon. Click on the cog. [Slide 49](#).
- A menu will drop down. Click on the [Advanced search](#) link.

Ask students to observe what happens when they type in the various blanks in the form. They may notice that a query is constructed as they go in the top line of the form.

Have students go to the Advanced search page in Google, or distribute the [Advanced Search handout](#).

Ask students to look at the advanced search page and determine which of the options match narrowing functions they have seen elsewhere (such as in the operators or the filters) and which are new. If desired, use the [“What is in Advanced Search?” handout](#) for students to record their responses.

They may observe:

Operators	Filters in the left-hand panel
<ul style="list-style-type: none"> ● All these words (same as just typing in words) ● This exact wording or phrase (" ") ● One or more of these words (OR) ● Any of these unwanted words (-) ● File type (filetype:, but limited options in Advanced search) ● Search within a site or domain (site:) ● Numeric range 	<ul style="list-style-type: none"> ● <i>Reading level</i> ● <i>Date (Any time and alternatives)</i>
Only in Advanced Search	
<ul style="list-style-type: none"> ● Results per page ● Language (this is different than <i>Translated foreign pages</i> in the left-hand panel—you have to enter search terms in the language you want to find, so it is useful for finding information on <i>détente</i> on pages actually written in French.) ● Usage rights (finds items marked with a Creative Commons license) ● Where your keywords show up ● Region (from which the page comes) ● SafeSearch ● Find pages similar to the page ● Find pages related to the page 	

Allow students some time to experiment with the outcomes of using the Advanced search method for constructing more complex queries in Step 9 below.

9. **Give it a try.** Students can identify instances in their ongoing research project in which operators would be of use, such as looking though a website they found useful for more information on their topic, making use of the site: search. Give them time to try out both the Advanced search input method and the use of operators in the basic (standard) search box.

Optional: Students have now completed a wide range of tasks related to using online search tools like Google to find information more effectively. In the next lesson, students will delve into Google Scholar and other Google tools that provide opportunities for new kinds of research. Before moving on, encourage students to discuss the personal preferences they have developed around searching—including whether they prefer using Advanced Search or typing in operators and selecting filters by hand. Remind them that a lot of the art of finding information with electronic tools depends on personal preference, and therefore thinking about what methods work best for them can help them make successful choices when searching.

EXTENSION: This lesson is designed to investigate Google’s operators, but you can extend it to a comparison to operators in other search tools at your students’ disposal, such as any article databases to which your school library subscribes.

ASSESSMENTS:

- Answers to questions about screen shots.
- Participation in discussion.
- **Optional:** glossary of operators.
- ["What is in Advanced Search?" handout](#)

What Was That Band?

Pre-assessment by Trent Maverick

We've all been there -- the radio clicks off in the middle of a song, the guy onstage mumbles the last few words of his awesome band name but doesn't quite get it out, a cute girl grabs your attention right when your friend says you definitely have to get your hands on this record... and of course, when you sit down to search for it, you get stuck. What was it? How do you find it? Will you ever figure it out? When intuitive searches don't do it for you, here are some tips to amp up your Google-fu.

Directions: These text searches as they stand turn up a bunch of junk. Add symbol operators to the searches below to find the stuff you're looking for.

1. My little brother keeps babbling about some band with "Elvises" in the name. The first word is a color, like red or blue or green. I'm pretty sure it's one of those three, but I can't remember which one.

Modify this: [red blue green elvises]

2. Remember the cowbell skit on SNL with Blue Oyster Cult? When I showed it to my girlfriend, she told me she'd heard about another band with Oyster Cult in the name, but it wasn't Blue Oyster Cult. I think she's making it up.

Modify this: [blue oyster cult]

3. My vinyl junkie roommate left his turntable on all day, and it's been skipping over the same line for hours. It just goes *Listen to my heart slam* over and over. If I must be subjected to this, don't I deserve to know what song this is? But when I try to look it up, I don't get a line of lyrics, I get stuff like: ***My heart beat a mile a minute while I listened for that door to slam.*** What can I do?

Modify this: [listen to my heart slam]

4. I went into Record Rev to buy an old LP, and the guy at the counter told me I should really get into this other band, Black... Banner? It was something like 'banner', anyway. Ribbon? Streamer? At least I remember the 'Black' part.

Modify this: [black banner]

5. I found this group I really liked in this Indie Rock Playlists Database at indierock.x10.mx. I don't remember the name of the group, exactly, but it had the word *Hawaii* in it. How can I search the site to see any bands with *Hawaii* in the name?

Modify this: [indierock.x10.mx hawaii]

Pre-assessment answers

1. [red OR blue OR green elvises]
2. [-blue oyster cult]
3. [“listen to my heart slam”]
4. [black ~banner]
5. [site:indierock.x10.mx hawaii]

Discovering Operators

Directions: In the accompanying slides you will see search scenarios followed by sets of search results. In each set, one of the searches didn't quite achieve what was intended by the student, while the other got tighter results. Read the description of what the searcher wanted to do, and look at both results in the slides:

- What is the difference between the queries on the two results pages?
- What operators are used in the second query?
- What is different about the search results?
- What impact do the operators have that narrowed the search?

1) I am supposed to write a reflection on a piece of poetry that speaks to me personally. Lately, I've been watching my best friend's boyfriend, and keep having this one line run through my head: *Like black tape he is stuck to me*. I can't remember the poem though, so I am trying to search for it. [Slides 8-11](#).

2) So, I have to get a bunch of definitions for vocabulary from my Chemistry class, and I have to document that I used several sources to do it. I am not so happy with the results of my search, and I think that there are a whole bunch of synonyms for *vocabulary*. I could type them all in, but thought there was a faster way to try, first....4) Studying for a history test on the Revolutionary War, you think it would be easiest to take some kind of tour or look at a map of various battlegrounds and important places. At first, your results are a bit off, but then you wonder whether someone has put together a Google Earth tour you can use. [Slides 12-15](#).

3) Studying for a history test on the Revolutionary War, you think it would be easiest to take some kind of tour or look at a map of various battlegrounds and important places. At first, your results are a bit off, but then you wonder whether someone has put together a Google Earth tour you can use. [Slides 16-19](#).

4) I was reading about Jackie Robinson on the Major League Baseball website—did you know they have a section dedicated to baseball history? Well, I saw a reference to a woman named Effa Manley, who was the only female owner of a team in the history of the Negro Leagues. I'd like to find all the information about her within the MLB site, and then just within the history section of the website, specifically. Then, I'd like to see what sources the government has. [Slides 20-24](#).

5) So, you need a little break from your homework. You were trying to remember some song your friends were talking about by Katy Perry and ... someone. With whom has she sung songs? You want to search for a phrase like: "Katy Perry and _____ sing..." But how do you leave a blank for Google to fill in? [Slides 25-28](#).

6) I'm researching the use of satire-type humor in political cartoons. My teachers say to remember to use synonyms, and since those kinds of comedy can fall into one of several categories, I want to search a bunch of related terms. That will help me assure that I cover my bases and find everything. [Slides 29-32](#).

7) Today you read, "The coup is the most frequently attempted method of changing government, and the most successful," in a description of Edward Luttwak's *Coup d'État: A Practical Handbook*. It made you wonder what kind of coups there had been, say, between 1900 and 2000. [Slides 33-36](#).

8) I need to identify hybrid cars that get over 50 miles per gallon. [Slides 37-40](#).

9) I picked this research question for math from a [list of possibilities](#): "Study the golden mean, its appearance in art, architecture, biology, and geometry, and its connection with continued fractions, fibonacci numbers. What else can you find out? What is the Golden Mean?" The thing is, there are all these ways of saying *golden mean*, and all these different subjects to which I have to relate it. The search just did not work right—all the results are

so general! [Slides 41-44](#).

10) I'm reading up on the Apollo 13 mission. But this is for school, so I don't want all that stuff about the movie, just the actual historical event! [Slides 45-48](#).

Advanced Search

Use the form below and your advanced search will appear here

Find web pages that have...

all these words:

this exact wording or phrase: [tip](#)

one or more of these words: OR OR [tip](#)

But don't show pages that have...

any of these unwanted words: [tip](#)

Need more tools?

Reading level:

Results per page: This option does not apply in [Google Instant](#).

Language:

File type:

Search within a site or domain:
(e.g. youtube.com, .edu)

[Date, usage rights, region, and more](#)

Date: (how recent the page is)

[Usage rights:](#)

Where your keywords show up:

Region:

Numeric range: **
(e.g. \$1500..\$3000)

[SafeSearch:](#) Off On

Advanced Search

Page-specific tools:

Find pages similar to the page:

Find pages that link to the page:

What is in Advanced Search?

Operators	Filters in the left-hand panel	Only in Advanced Search