

How do algorithms work?

June 2025



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Evaluating Information

An essential 21st century skill is learning how to distinguish information that is reliable from disinformation, misinformation and fake news. Information literacy requires an understanding of the media landscape and knowledge about how to use our critical thinking skills in this landscape.

If we understand a little about how algorithms shape the attention economy, it helps us analyze and evaluate the media we are consuming and interacting with.



Algorithms and the Attention Economy

Algorithm

A set of rules or series of steps. Today, algorithms are generally understood as processes run by computers that take inputs and produce outputs.

Attention economy

An online business model in which tech companies compete for people's attention — while also gathering data about them — to serve them personalized ads.

Targeted ads

Ads selected by algorithms to appeal to us based on data gathered from our online activity about our unique interests, shopping habits, beliefs, location and many other factors.



Bubbles, loops, rabbit holes and bias

Filter bubble

When algorithms surround us with online content that is limited to viewpoints we already agree with.

Feedback loop

A cycle in which an algorithm steers you toward content it predicts you'll be interested in and then serves up even more of that content when you engage with it.

Algorithmic bias

When an algorithm produces unfair or distorted outcomes due to some aspect of its design, including flawed or incomplete training data. Algorithmic bias can cause real world harm — for example, by amplifying conspiratorial and extremist content that disproportionately targets vulnerable groups.

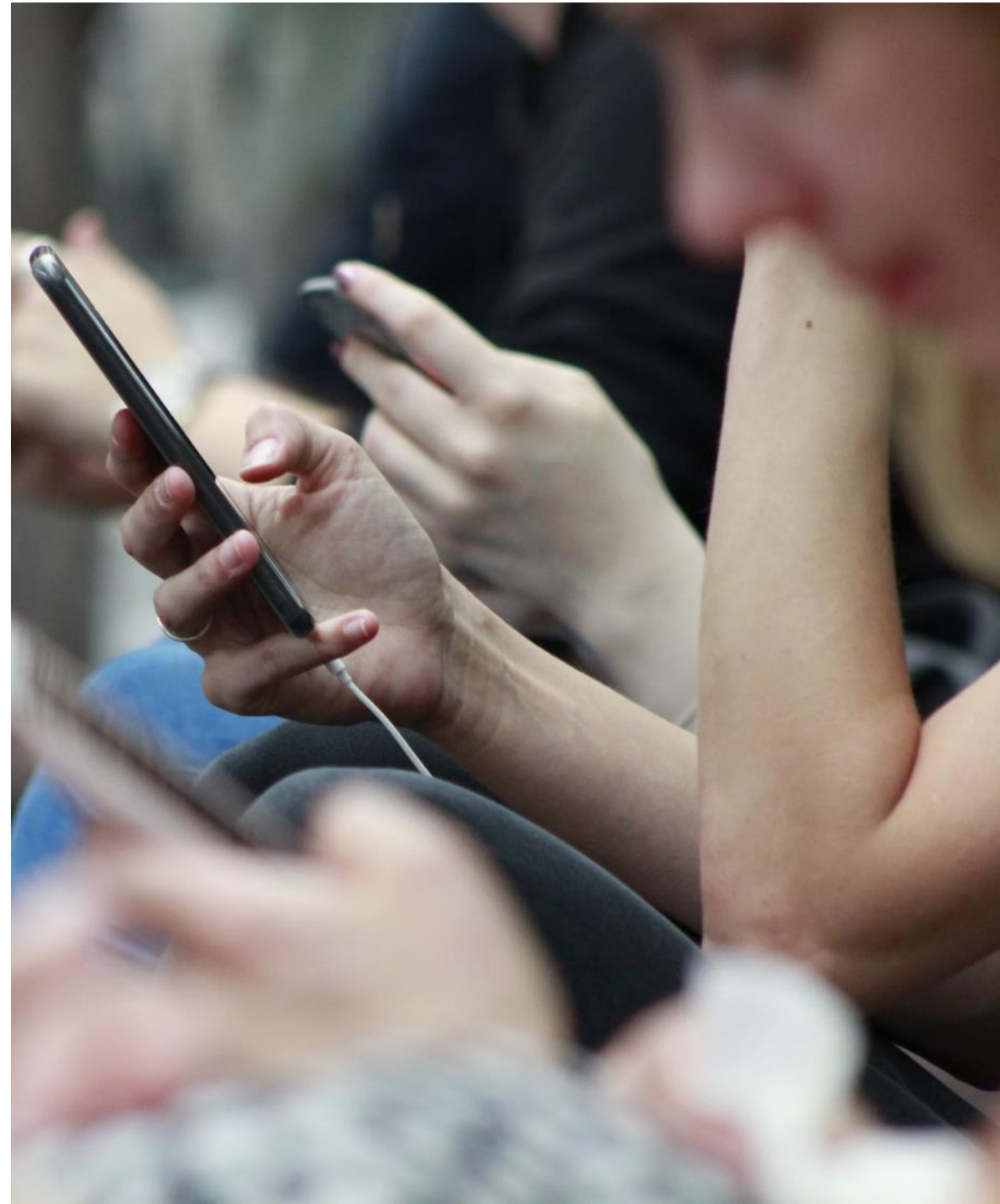
Rabbit hole

When an algorithm picks up on a genuine interest or curiosity and suggests increasingly problematic, conspiratorial or harmful content.



Curriculum Resource

- [CTRL-F](#) is a digital media literacy program that equips students with skills to find and evaluate online information.
- Lessons on 3 main areas: search skills, verification skills and AI literacy.
- The CTRL-F program was developed by [CIVIX](#), a non-profit organization dedicated to civic education.



A photograph of a classroom setting. On the left, there is a tall wooden bookshelf filled with various books. In the center, a light-colored wooden table is surrounded by several white plastic chairs. To the right, a window with a black frame is visible, showing a blurred view of the outside. The overall lighting is soft and natural.

Teacher Resources

Classroom resources includes:

- Lesson plans
- Slide decks
- Videos
- Activities in different formats

Resources

(You need to make an account to access the resources. They do not send you emails.)



Algorithm lesson

Go to the Online Search Skills tab
and choose Lesson 4: Algorithms.

Objectives:

- demonstrate an understanding of algorithms
- explain how Google uses algorithms to provide search results
- analyze how algorithms can be manipulated



Put your learner hat on!

[Algorithm slides](#)

Algorithms



Starter: Google Searches

Search for:

- movies
- events
- video games

Discussion Questions

- How many results did Google find?
- Look at the search results at the top of the page. Why do you think Google decided to show these results first, as opposed to others?
- If you lived somewhere else, how would the results be different?
- How would the results be different if you did the same search last year, instead?

Watch this video: How search engines work



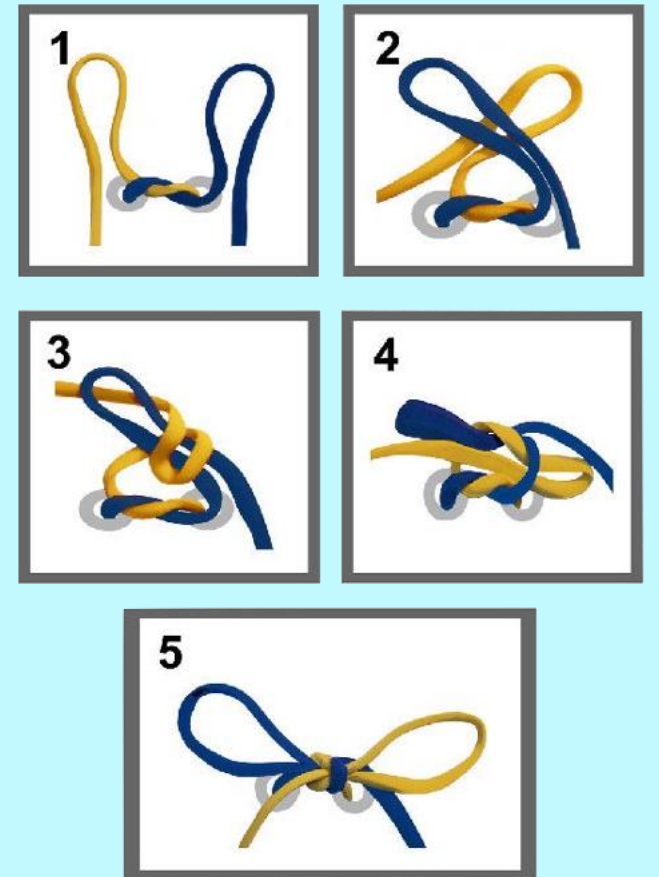
[How search engines work Video](#)

What is an algorithm?

An algorithm is a sequence of steps that can be used to solve a problem

Examples of algorithms in everyday life:

- Steps for tying your shoes
- A recipe for baking a cake
- Directions on how to get to school



Where do we see algorithms online?

- Computers use algorithms to do lots of different things
- Algorithms have a big part in determining what you see online



How do social media sites use algorithms?

- Social media sites use algorithms to recommend what it thinks you will want to look at
- Video streaming services (like Netflix, Amazon Prime, Disney+, YouTube, and others) use algorithms to suggest what to watch next



How do algorithms work?

- Algorithms collect information from people online
- Websites and apps use that information to decide what to show you
- Social media sites show you things it thinks you will like
- Search engines - like Google - try to show you results it thinks are relevant and useful



How does Google use algorithms?

- Google uses many algorithms to decide which links to show you
- It starts with your query to find web pages that have the same words
- It uses information about you - like where you are and when you're searching - to narrow down the websites to show you



What is PageRank?

- How does Google choose which results to put at the top of the results page?
- It uses an algorithm called PageRank
- PageRank chooses which web pages are most popular and relevant by looking at how many other websites link to them



My website

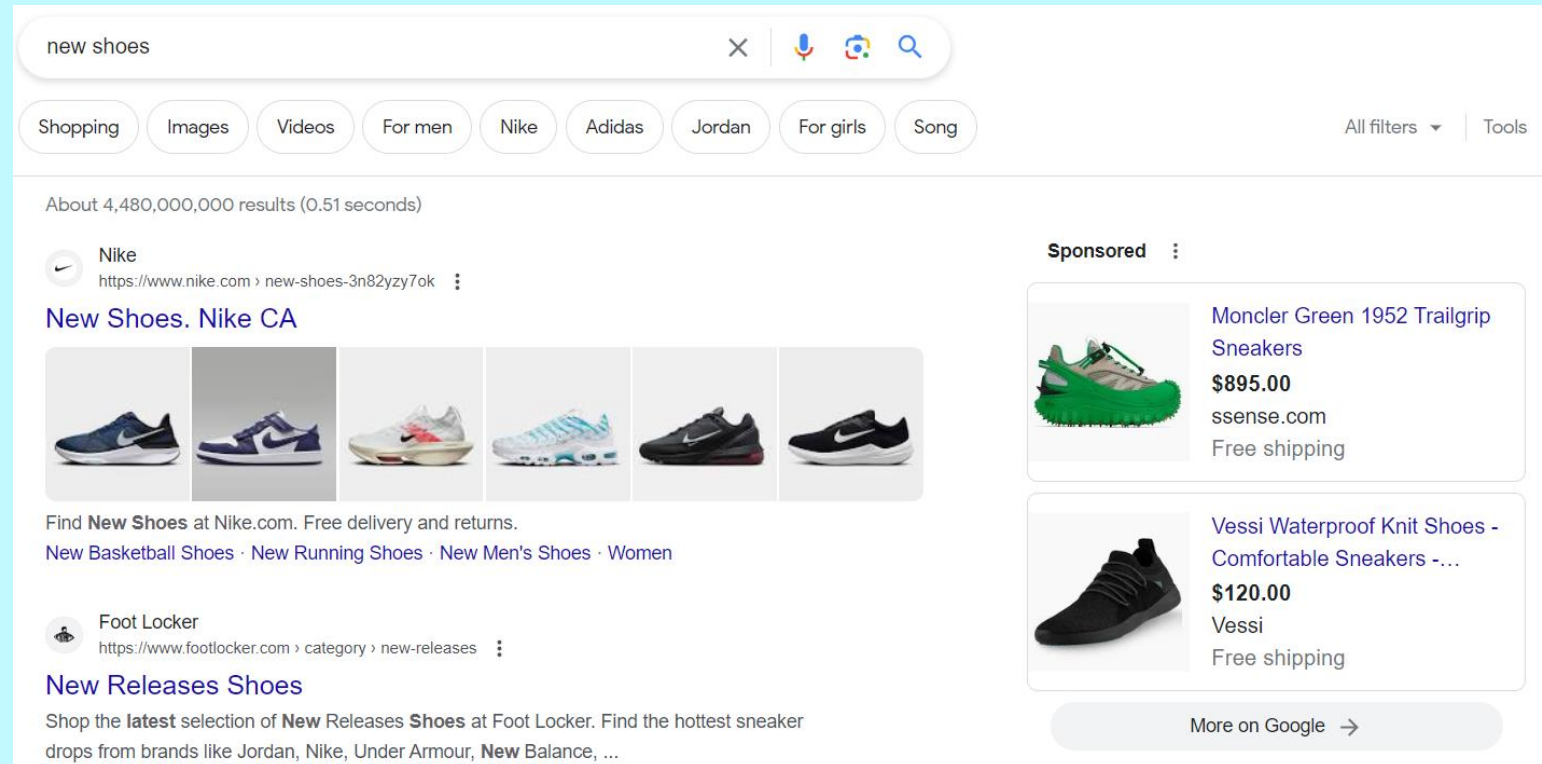


- The more websites link to mine, the more popular it is
- The more popular, the more likely it is to end up at the top of the page



Not all top results are best

- Popular websites and brands may show up first
- Ads and sponsored links also show up at the top
- It's important to look past the first few results!



Click Restraint

- Companies try hard to trick search engines into ranking their webpages higher so more people will click on their page
- Use click restraint: don't just click on the first results you see!



Be the Algorithm

Be the algorithm website list













Be the algorithm activity slide deck

(Log into your Google account to make a copy.)

Example activity:

1. Look at the list of websites.
2. Choose all the websites that are about dinosaurs.
3. Use the information about those websites to Page rank them – put them in an order you might expect at Google.

Website Options

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Rules

You have been given 12 different websites and 5 different search queries. For each search query use the following rules to determine the order they should appear in the search results:

Key words: Narrow down the websites to those that contain the search terms.

Search operators: Follow the rules of any search operators used in the query. You can review how search operators work using Handout 3.1.

Time range: If a time range is specified, eliminate all websites with dates outside of that range.

Popularity score: For all remaining websites, order from highest to lowest popularity score.

Sponsored: If a website says sponsored it should be ranked above the others

Example

Example query: Nintendo -space

Steps:

Key words: Narrow down the websites that contain “Nintendo”

Search operators: Remove any websites that contain the word “space”


Time range: There is no time range.

Popularity score: 3 has a higher popularity than 6

Sponsored: Neither website is sponsored.


Search results order: 3,6



 Game Dogs
https://gamedogs.com 3


Nintendo Doggos: Gaming Fun with Canine Companions
August 22, 2021 - Dive into a world of tail-wagging excitement as adorable pet dogs join you in thrilling Nintendo gaming experiences.
Popularity Score: 7 ★



 Nintendo Treats
https://nintendtreats.com 6


Donut Fun for Nintendo Lovers
November 8, 2022 - Treat yourself to a delicious gaming experience with donut-themed challenges and delightful adventures in the world of Nintendo.
Popularity Score: 3




 Nintendo Cat Adventures
https://nintendocatadventures.com 1

Cat Adventures in Space
June 23, 2023 - Join a whiskered hero on a cosmic journey filled with feline charm and Nintendo gaming excitement.
Popularity Score: 6



 Sponsored
Everything Gaming
https://everygame.com 9


Nintendo's Space Odyssey: Gaming Beyond the Stars
September 2, 2022 - Blast off into a galactic journey of gaming excellence as Nintendo brings the excitement of space exploration to your fingertips.
Popularity Score: 4



Nintendo Cat Adventures
<https://nintendocatadventures.com>

1


Cat Adventures in Space
June 23, 2023 - Join a whiskered hero on a cosmic journey filled with feline charm and Nintendo gaming excitement.
Popularity Score: 6



Sponsored
LeBron's Dino Quest
<https://everythinglebron.com>

2


LeBron's Dino Quest
March 2, 2023 - Explore the prehistoric world with LeBron James as your guide in this epic dinosaur-themed adventure.
Popularity Score: 2



Game Dogs
<https://gamedogs.com>

3

Nintendo Doggos: Gaming Fun with Canine Companions
August 22, 2021 - Dive into a world of tail-wagging excitement as adorable pet dogs join you in thrilling Nintendo gaming experiences.
Popularity Score: 7



Dinosecrets
<https://dinosecrets.com>

4


Science Secrets of Dinosaurs Unveiled
January 3, 2022 - Embark on a scientific journey exploring the fascinating world of dinosaurs and uncovering their ancient secrets.
Popularity Score: 12



Taking Care of Your Cat
<https://catcare.com>

5

Cat Care: The Complete Guide
June 16, 2018 - Learn how to keep your cat in good health with expert advice from vets, and hear from cat lovers from around the world.
Popularity Score: 20



Nintendo Treats
<https://nintendtreats.com>

6


Donut Fun for Nintendo Lovers
November 8, 2022 - Treat yourself to a delicious gaming experience with donut-themed challenges and delightful adventures in the world of Nintendo.
Popularity Score: 3



Robot News
<https://robotnews.com>

7


The Robotic Revolution
July 1, 2023 - Learn about all the latest news in robotics. Hear about the science and learn about the newest developments in robot technology.
Popularity Score: 16



Space Journeys
<https://spacejourneys.com>

8


Space Science Explorers: Journey to the Stars
October 14, 2016 - Embark on a cosmic voyage of discovery, unraveling the wonders of space through engaging science experiments and interactive activities.
Popularity Score: 15



Sponsored
Everything Gaming
<https://everygame.com>

9


Nintendo's Space Odyssey: Gaming Beyond the Stars
September 2, 2022 - Blast off into a galactic journey of gaming excellence as Nintendo brings the excitement of space exploration to your fingertips.
Popularity Score: 4



Sponsored
Eternal Youth
<https://fountainofyouth.com>

10


Eternal Youth Fountain of Life
May 5, 2014 - Uncover the mythical fountain of eternal youth and everlasting health and vitality which has existed on earth since the time of the dinosaurs.
Popularity Score: 1



Nutrition Facts
<https://scienceandnutrition.com>

11

Science-Backed Nutrition Facts
August 1, 2023 - Providing accurate and up-to-date health information based on scientific research to help individuals make informed choices for their dietary needs.
Popularity Score: 18















Basketball News
<https://balldontlie.com>













12

All Basketball, All the Time
July 20, 2023 - The latest news in basketball. Featuring in-depth analysis by experts and players.
Popularity Score: 14













Your search term is Dinosaur. Drag all the website about dinosaurs over to this column and put them in order.

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Your search term is
Science -health.

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Your search term is Nintendo
(since Jan. 1, 2022).

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Your search term is health.

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Your search term is latest news.

Be the Algorithm Activity Debrief

- Did the algorithm always choose the most relevant results to display first?
- What do you think caused some of the less relevant results to be displayed first in some cases?
- The results of the search for “health” seem to have some low-quality results. Why might this be?



Consolidation

What are three pieces of advice would you give to someone conducting an internet search to help them decide which results to click on?



Activity 4.2: Exit Slip

What are three pieces of advice would you give to someone conducting an internet search to help them decide which results to click on?

1

2

3

Put your teacher hat on!

Reflection questions

As a learner:

- What did you learn?
- What worked well for you?

As a teacher:

- What do you think learners in the program would think of the activities from CTRL-F?

See what some teachers thought here:

[Algorithm Padlet](#)



Instructional Supports

Resources

(You need to make an account to access the resources. They do not send you emails.)

Go to the Online Search Skills tab
and choose Lesson 4: Algorithms.

Tools

- **Lesson Plan**
[4. Google Doc](#)
[4. PDF](#)
- **Slide Deck**
[4. Google Slides](#)
[4. PPT](#)
- **Videos**
- “How Search Engines Work: Algorithms”
[Watch »](#)

Activities

- **Activity 4.1: Be the Algorithm**
[4.1 Google Doc](#)
[4.1 PDF](#)
[4.1 PPT](#)
[4.1 Google Slides](#)
- **Handout 4.1: Be the Algorithm Websites**
[Be the Algorithm Websites PDF](#)
[Be the Algorithm Websites Google Doc](#)
- **Activity 4.2: Exit Slip**
[4.2 Google Doc](#)
[4.2 PDF](#)



CTRL-F and Lateral Reading Skills

[Digital Media Literacy Gap](#)

[The Report](#)

CTRL-F improves lateral reading, accuracy, and reasoning.

Find the Facts is a verification skills program that teaches students how to evaluate online information with the same 'lateral reading' techniques professional fact-checkers use. This practice involves conducting simple research to locate key context about sources and claims, as opposed to analyzing the information itself.

Students' use of lateral reading increased sixfold after doing the CTRL-F program. Students read laterally 11% of the time at pretest versus 59% at post test.

Lateral reading helps students get the right answer for the right reasons. Before CTRL-F, students referenced meaningful contextual information 9% of the time in their answers to true/false questions. On post test, this number jumped to 50%.

The CTRL-F skills stick. A delayed post test delivered six weeks following the end of the CTRL-F curriculum showed no erosion in the use of lateral reading strategies.

Some additional content on algorithms from Checkology

Introduction to Algorithms

- [Lesson plan](#)
- [Activities](#)
 - Frame 16 - attention economy
 - Frame 18 - social media and attention economy
 - Frame 24 - filter bubbles and rabbit holes

Teacher questions

What do you think of these resources?

Could you use them in the program where you work?

Who would they work for?

What adaptations would be necessary?

See what some teachers thought here:

[Algorithm2 Padlet](#)



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