LESSON PLAN

Level:	Grades 9 to 12
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Duration:	75 minutes (game only); 2 ½ hours (including assessment activity)

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#ForYou: The Algorithm Game

This lesson is part of USE, UNDERSTAND & ENGAGE: A Digital Media Literacy Framework for Canadian Schools: http://mediasmarts.ca/teacher-resources/digital-literacy-framework.

Overview

In this lesson, students play the educational card game *#ForYou: A Game About Algorithms* and use it as a prompt to learn about and discuss the role that algorithms, data collection, and machine learning play in their lives. After playing, they analyze the game as an example of a *serious game* and then design their own serious game to communicate some of what they have learned in the lesson.

Learning Outcomes

Students will:

- Learn how sorting and recommendation algorithms work
- Learn how their personal information is used to customize their online experiences
- Understand the impacts of their personal information on algorithmic content delivery, and the impacts of algorithms on their privacy
- Discuss the social and political implications of algorithmic content delivery, the collection and use of personal information, and machine learning
- Analyze the codes and conventions of games
- Communicate their learning through game design

Knowledge and Skills Outcomes under the International Conference of Privacy and Data Protection Commissioners' Personal Data Protection Competency Framework for School Students:

Personal data

- I understand what is involved in the concept of personal data, defined as any data—whether or not it was made public—about an identifiable individual;

- I know some technical data can assist in the identification of individuals; that scanned documents and images have embedded metadata that describe their contents and that online activity may leave traces (cookies, browsing history, etc.) which can contain personal data

Understanding the digital environment – technical aspects

- I know the difference between hardware, software and applications; I understand how software and hardware components make up computer systems;
- I know what the internet and its services are (social networks, mobile applications, the cloud, etc.);
- I understand how digital space is structured (physical networks, browser, IP addresses and URLs, search engines, etc.);
- I am aware of the concept of information architecture, and the collection, structure and processing of information;
- I assess my practices and develop problem-solving and learning reflexes—namely about security—by identifying resources (user communities and forums, tutorials, etc.)

Understanding the digital environment - economic aspects

- I know who the key players in the digital economy are (e.g., ISPs, service providers, developers, curators, etc.);
- I understand the systems used to market products and offer free services (loyalty cards, targeted advertising via cookies, setting up user accounts, subscribing to newsletters, etc.), for the purpose of establishing personalized user profiles;
- I understand that the majority of such offers of services entail collecting and using personal data as well as storing this information in a database;
- I know what data are collected and stored when I use the Internet, a social network or a service;
- I can give examples of the types of technical data likely to be collected when I am online (e.g., browser type, contacts list, geolocation data, private messages, etc.);
- I can give examples of digital services whose economic model involves—or does not involve—the collection of personal data

Managing my data: Learning to protect myself online

- I understand the terms and conditions of use relative to online services (allow or refuse geolocation, allow or refuse applications access to my contacts, photos, etc.);
- I know that I can manage the settings of the online applications and services that I use
- I can manage the security and privacy settings of the accounts, profiles and devices that I use; I regularly check these settings and adjust them

The digital world: Becoming a digital citizen

- I am able to foster positive outcomes (complaints likely to influence major Internet players, mediation to ensure that inappropriate behaviour stops, development of codes of conduct, etc.)

Preparation and Materials

Print or purchase at least one set of *#ForYou: A Game About Algorithms* game cards (see "Special Note: Gameplay Options" below)

Review the handout *ForYou: Rules for Quick Play*

Watch and prepare to project the video *#ForYou: Gameplay Demonstration:* https://www.youtube.com/watch?v=te-EQKxG5mA

If you would prefer to present the content of the video yourself, you can access it on Google Slides here: https://docs.google.com/presentation/d/1EJJztWy8Af3iGLAso-NaVYIKrirUE-JQ/edit#slide=id.p1

Review and prepare to distribute the following handouts:

- *#ForYou: Rules for Quick Play*
- *Algorithms Glossary*
- *Take Control over the Role of Algorithms*
- *Protecting Your Privacy*

Optional:

Review the teacher backgrounder *Algorithms: What We (Don't) Know*

Arrange for a document camera to project gameplay onto a screen or digital whiteboard

If you are doing the extension activity, prepare to distribute the handouts *Game Analysis Worksheet* and *Algorithm Games Assignment Sheet* and, if possible, bring (or have students) bring tabletop board or card games for the Game Analysis activity

To deliver this lesson as a fully online activity, see additional instructions here: https://mediasmarts.ca/digital-media-literacy/educational-games/foryou-game-about-algorithms

Procedure

Introducing Algorithms (5 minutes)

Start by telling the class that you are going to play a quick word game : you are going to write one letter at a time, and they are going to try to guess what word you are writing.

Write the letter H on the board and ask students to guess what word you are writing. (Don't tell them if they are right or wrong, just take a few guesses.) Next write the letter I and ask them to guess again; then write the letter P and ask them to guess once more.

Write a second letter P (you will now have written H-I-P-P) and ask them to guess one more time. Someone will almost certainly correctly guess the word "hippo" (or "hippopotamus"); if not, add the letter O.

Ask students: How did they guess what word you were writing? When you had only written "HI", why might they have thought that "history" or "him" were more likely than "hippo"? (Both are much more common words.) What might have been some extra information that could have helped them guess that you were writing "hippo" and not one of those other words? (For example, if they knew you liked hippos, or if they knew you were writing the name of an animal.)

Now ask students whether they have ever used a device or an online tool (such as a search engine) that made similar "guesses" with *autocomplete*. Do they think autocomplete guesses work in the same way they do? In what ways might autocomplete's method for guessing be different? (For now, just take suggestions without giving feedback.)

Introducing Algorithms (5 minutes)

Explain to students that autocomplete is an example of a *predictive algorithm* – a computer program that tries to predict or guess something. Distribute the *Algorithms Glossary* and make sure that students understand this definition:

> An algorithm is basically a series of steps or instructions for doing something. Algorithms *sort* data in order to find *patterns* and make *predictions* and *recommendations*. A recipe and an airplane flight pre-check are both examples of algorithms, but more often today we encounter algorithms that are computer programs.

Tell students that like autocomplete, a *recommendation algorithm* makes a guess – but in this case it guesses what you are going to like or find useful. Ask students if they can think of any recommendation algorithms that they encounter frequently.

Make sure the following examples come up:

- A social network feed (which sorts posts based on how interesting it thinks you'll find them)
- A search engine (which gives you results based on how useful or relevant it thinks you'll find them)
- A video site's "Up Next" or "For You" page (which recommends the next video to watch based on how interesting it thinks you'll find them)

Now ask if they have any idea *how* those algorithms sort items or make predictions. What might lead a search engine, for instance, to know you were probably typing "hippo" and not "hip hop" or "hip bone" when you had typed H-I-P?

Following a few minutes of discussion, make sure students understand two ideas: first, that they make guesses based on *general* patterns (for instance, making "hippo" the first suggestion if more people search for "hippo" than "hip hop" or "hip bone") but also based on *specific* information about you, such as your past searches. This means that two different people typing H-I-P might get different suggestions: someone who had done searches for hippos, or even other animals, might be prompted with "hippo" while someone who had done searches relating to medicine or anatomy might be shown "hip bone".

Ask students how they feel about the idea that their personal information (what an algorithm knows, or thinks it knows, about them) influences what they see online. Would they prefer to use a search engine that took their past search history and other personal information into account (like Google) or one that only based its results on each specific search (like DuckDuckGo)? Let students discuss this question for a few minutes, but don't require them to reach any sort of consensus.

Introducing #ForYou (5 minutes)

Now tell students that you are going to play another game about algorithms. In this game, called #ForYou, they are going to pretend to be video makers on VidYou, a platform similar to TikTok or YouTube, who are trying to make their videos as popular as they can – and make as much money from them as possible. To do this, they will need to make guesses about what VidYou's algorithm is looking for – as well as drawing on data collected about users and using certain tricks and strategies to "game" the algorithm.

Distribute the handout *#ForYou: Rules for Quick Play*.

Show students the first three parts of the *#ForYou: Gameplay Demonstration* video, ("Overview," "Optimizing Algorithms" and "Popularity Phase"; from 0 to 14:30) and then briefly go over the "Popularity Phase" section of the *Rules for Quick Play* handout.

Phase One: Popularity (20 minutes)

Select eight students to play as video makers in the first phase, and pair the students into four teams. If possible, use a document camera, a phone or a tablet to film the gameplay and project it on the screen. If not, bring the players to the centre of the classroom and have the rest of the students stand around so they can see the gameplay.

Choose one Optimization card and show it to the class. Explain that you will be designing the VidYou algorithm to try to achieve that goal.

Choose three Algorithm cards that you think would help to reach the Optimization goal: for instance, if your Optimization card is Daily Use you might select videos first based on Freshness (so there's always new content to come back to), then Shares (because people will want to know what videos their friends are sharing) and then Views (because people won't want to miss out on something that's popular.)

Lay your Algorithm cards face-down, with the top-ranked at your far left and the bottom-ranked one to far right.

Draw a Video card and show it to the students. Point out that each Video card matches two Algorithm cards. If the Video card has Views and Likes, for example, that means the algorithm will score it more highly if it is looking for either of those, and even more highly if it is looking for both.

Shuffle that card back into the deck and then deal each player five Video cards.

Play through the first turn of the Popularity phase, where each student plays a single card. (It must be a Video card, not a Boost card.) Tell them the score for each Video card, based on how well they match the Audience cards you've chosen, but leave the Audience cards face down and do not tell students what they are.

When scoring the first turn, make sure students understand that the scores each video received are clues to which algorithm cards you played. Point out that this is exactly what video makers on platforms like YouTube or TikTok do to try to get their videos recommended, and encourage players to discuss with their partners which algorithm cards you played based on how the four Video cards were scored. (Students who are watching can also make their own guesses and write them down.)

In the second turn, tell students to choose the two cards they think are closest to what the VidYou algorithm is “looking for.” Encourage them to play any eligible Boost cards. When scoring the second turn, point out any Boost cards that were played and read the text out to the students.

Turn the Algorithm cards over, show them to the class, and then score each Video card based on how well it (and any Boost cards played on it) matched the Algorithm cards: three points for a match with the top Algorithm card, two for the second, and one for the third. After the second turn has been scored, ask students:

- Do the choices made in designing the algorithm affect things such as how much time we spend on a platform, or whether we "surf" it (viewing recommendations or promoted posts) instead of searching?
- Remind players that when an algorithm shows something to one audience, it is hiding other content: what are we seeing or not seeing because of algorithmic recommendations?
- How might content creators change what they make based on their understanding of platforms' algorithms? Do they think this changes the quality of the content when it is focused on factors favored by the algorithm rather than accuracy or quality?
- How might matching topics lead to a " recommendation spiral" where users see a narrower range of videos? Liking a video also makes the algorithm recommend more videos like it, and you Like those videos too, which leads to you being shown even more, so the videos you're recommended will get more and more alike.
    - To help students understand this idea, ask them to imagine an algorithm that was watching what they ate and using that data to decide what your next meal should be. If you eat all of your ice cream but only some of your broccoli, at the next meal it will give you more ice cream and less broccoli; if you again eat all the ice cream but only some broccoli, the next meal will have more ice cream and less broccoli, and so on until there is only ice cream and no broccoli. You might enjoy that, but would it be good for you?
- How might the ways of manipulating algorithms represented by the Boost cards affect the platform's VidYou app's goals? How might this affect the experiences of people using these platforms? Does learning about these ways of manipulating algorithms change your views about the platforms?

Phase Two: Monetization (15 minutes)

Show the fourth part of the *#ForYou Gameplay Video*, “Monetization Phase,” (from 14:30 to 22:00) and then briefly go over the “Monetization Phase” section of the *Rules for Quick Play* handout.

Choose eight new students to play as four teams in the second round. Remind them that in this phase, there are no Optimization cards or Algorithm cards. Instead, you will choose three Audience cards that stand for what’s important about the audience you want to reach.

Explain that just with algorithms, audience sorting is weighted, with some factors being more important than others. Draw three Audience cards and place them face-down in front of you, in a row from left to right. As with the Popularity phase, the one at far left will be the top-ranked, the middle one ranked second, and the one at far right will be ranked third, but this time you don’t have to follow any particular logic in the order.

Draw an Ad card and show it to the students. Point out how each Ad card matches two Audience cards, just like in the first phase each Video card matched two Algorithm cards.

Shuffle the Ad card back into the deck. Deal each participant five Ad cards and play the first turn.

Deal four Ad cards to each student and play through the first turn, having students each play one card and scoring it based on how well it matches the Audience cards you played. Tell them the score for each Ad card based on how well they match the Audience cards you played, but leave the Audience cards face-down and do not tell students what they are.

When scoring the first turn, make sure the students understand that as in the first phase, they can use the scores they and other players' ads got to figure out what the algorithm is "looking for." But unlike video makers, advertisers don't rely just on those deductions to target their ads. They also can use data that was collected about users to get a better match between ads and viewers.

Draw a Data card and show it to the students. Explain that each Data card represents a source of personal information about users (such as their search history, their interactions on the platform, their IP address, and so on) that tells the advertisers something about them. For example, your search history can tell them about your brand loyalty (since searching for a brand probably means you have an interest in it.)

Show students the different Data cards and ask students where they think an algorithm might get that information:

- *Profile:* A social media profile, or an account you make on an app or website
- *Views:* What videos you have watched in the past
- *Cookies:* Files that are saved by your browser when you visit a website. When you go back to the same website, the cookies tell it what was recorded on your last visit.
- *Search history:* What you have looked for (not just search engine searches but any time you've used a search box, like on a video or e-commerce site)
- *GPS:* Mobile devices send global positioning system data unless you switch it off.
- *Shopping history:* E-commerce sites record what you browse and buy.
- *Interactions:* Any site or app that lets you Like, share or reply to posts or videos records when you do it.
- *IP address:* Your device automatically sends its Internet Protocol address (a label assigned to each device connected to a computer network) any time it connects with a website or app.
- *Loyalty program:* If you sign up for a loyalty program, you're asking it to track what you buy.
- *Other sites:* What you've done on other apps or websites is another source of personal information.

Point out that like the Boost cards in the first phase, each Data card matches one Audience card and can be played on any ad that matches the same card (so search history, which targets brand loyalty, could be played on any ad that also targets brand loyalty.)

Now ask students how they feel about a video site having access to personal information like their search history, their shopping history and what they've done on websites. Does it feel like an invasion of privacy? If so, how so? How do they feel about their personal information being used to target them with ads?

Shuffle the Data card back into the deck and deal each player four Data cards. Students can now play two Ad cards and as many as two Data cards: Data cards can only be played on top of Ad cards, and must match one of the Audiences on that card.

Turn the Audience cards over, show them to the class, and then score each Ad card based on how well it (and any Data cards played on it) matched the Audience cards: three points for a match with the top Audience card, two for the second, and one for the third. After the second turn has been scored, ask students:

- Why do you think behavioral and demographic data (based on data collected about you) are seen as more valuable than contextual data (based on what you're doing or have just done - for example, showing ads linked to your most recent search, purchase or videos similar to the one you just watched)?
- How accurate a picture do you think platforms have about you? Can you think of any cases where you were shown a video or ad that was clearly not meant for you?
- Is it fair to base a recommendation on what the algorithm thinks it knows about you personally?
- Is it fair for a platform to use what it knows about you (your data profile) to target content to your friends, and vice versa?

Platforms don't just target users with data they collected themselves: they also buy profiles from data brokers, scrape publicly available information, and acquire data from other social networks if you use those to sign up for your account. An app or website's Privacy Policy explains what the company will do with personal information it collects about you; look for references to "third parties" to see if they sell it to data brokers. You can look up the privacy policy at https://tosdr.org/ to get a plain-language explanation.

As well, many different platforms – such as Facebook and Instagram, or Google and YouTube – are owned by the same company and share data across the platforms within the same company, and some platforms such as Facebook sell access to their data profiles without selling the data itself. Is it fair that what you do in one place might affect what you're shown on other platforms?

Phase Three: Machine Learning (25 minutes)

Show the final part of the *#ForYou Gameplay Video*, "Machine Learning Phase," (from 22:00 to 26:55) and then briefly go over the "Machine Learning Phase" section of the *Rules for Quick Play* handout.

Re-shuffle the Audience, Ad and Data decks and select eight new students to play the third phase.

Like in the Monetization phase, draw three Audience cards and place them face-down in front of you, in a row from left to right.

Deal four Ad cards to each student and play through the first turn, having students each play one card and scoring it based on how well it matches the Audience cards you played. Tell them the score for each Ad card based on how well they match the Audience cards you played, but leave the Audience cards face-down and do not tell students what they are.

Now deal each student four Data cards. Remind students how the video explained that machine learning works a bit differently from the way you've been talking about algorithms: instead of being programmed by their designers, they are trained on sets of existing data - so a video site might look at all of the people who liked or shared a video, identify what they have in common (called *proxy data*) and promote the next video based on that. To reflect that, in this phase players can play more than two Data cards if they can match the proxy data on the sides.

They also can trade Data cards with each other to reflect how *data brokers* buy and sell personal information that's been collected about people.

Encourage students to trade cards with one another, then have each one play two Ad cards and as many Data cards as they are able to play on those and any additional ones they are able to add by linking proxy test.

Turn the Audience cards over, show them to the class, and then score each Ad card based on how well it (and any Data cards played on it) matched the Audience cards. Give points for each Data card that matches one of your Audience cards, even if the Ad card it was played on did not match it. Compare the scores in this round to those in the second turn of the Monetization phase and point out how advertisers are able to target you more accurately the more they know about you.

After the third turn has been scored, ask the students:

- How do you feel about linking ads through Proxies such as sexual orientation, race or disability?
    - Point out that some jurisdictions and platforms don't allow you to target some kinds of ads (such as job or housing ads), or sometimes all ads, based on some characteristics (for example, job ads cannot be restricted by age, gender, or race in many countries, including Canada). However, sometimes videos or ads are targeted based on these traits anyway -- intentionally or unintentionally -- as a result of targeting the Proxies that players learned about in the most recent phase.
- Point out that machine learning algorithms are trained on existing data sets, and often reproduce biases in those sets, sometimes in ways that the algorithm's makers could not predict.
    - For example, one algorithm designed to scan resumes concluded that people were most likely to be hired if they were named Jared and played high school lacrosse – both proxies of being male and, to a lesser extent, white. How do students feel about that?
- How does machine learning make it harder to manage your privacy online? What can we do about that?
    - (For example, you might be careful not to let data brokers know you have a health condition such as diabetes, but your shopping history might be used as a proxy for it if you have bought test strips or other things connected to diabetes.) That makes it especially important to manage the things that connect the different parts of your online activity, like your IP address.

Optional: Second Round

If you wish, you can let students play the game a second time to further explore the ideas in it. If you do not have enough copies of the game for every student to play, you can choose to do one of the following:

Teams: Divide the class into four teams. Each team will act as a single "player" in the game. It is up to you (and them) whether to have one member of each team represent them in each turn, or have the whole team decide what cards to play together.

Special teams: To make smaller groups, you can create additional teams with different responsibilities.

- Have one team act as Referee, watching to make sure that plays are legal (for instance, the Boost cards are only played on matching Video cards) scoring the cards that are played.

- In the Popularity phase, create an extra Dirty Tricks team. Sort the Boost cards out of the Video deck and give them to the Dirty Tricks team. Have this team watch for ways they can play their cards on the other teams' Video cards.
- In the Monetization phase, create an extra Ad Targeting team. Deal 12-16 of the Data cards to the Ad Targeting team (4 cards for each other team playing). Have this team watch for ways they can play their cards.
- In the Machine Learning phase, create an extra Data Brokering team. Deal the Data cards to the other teams as usual, but then have the Data Brokering team look for connections and negotiate trades rather than have each team doing it themselves.

You can rotate teams during each phase, so that a different team is the Referee or special team each time.

Assessment: Take Control Over the Role of Algorithms

Distribute the handouts *Protecting Your Privacy* and *Take Control over the Role of Algorithms* and explain that there are three main things that we can do about the role algorithms play in our lives: *educate* ourselves about how algorithms work and how they're used; *act* to limit the ways that algorithms affect them; and *advocate* as citizens and consumers for fair and transparent algorithms.

Read through the seven questions in Part A with students and ask them to answer **two** in paragraph form for homework. Encourage them to draw on what they learned in the game and your discussions in class to help develop and find evidence for their arguments.

In Part B, students will consider how the VidYou algorithm (and by extension recommendation algorithms in general) could be changed to make it more equitable and to handle personal information more responsibly. Depending on the time available, you may choose to either take up the Part A questions before assigning the Part B assignment or have students complete it at the same time. You may choose to have students either submit the Part B assignment in writing, present it to the class, or both.

Extension Activity: Analyzing and Designing Serious Games (75 minutes)

Game Analysis

Explain to students that #ForYou is an example of a *serious game* (sometimes called a *persuasive game*), which means that it is designed to make a point or to get you thinking about a serious issue. Ask students if they can think of any other examples of serious games (of any kind – board games, card games, video games, etc.). If any students have, ask them to name the game and briefly explain what the topic was and how it was explored or communicated.

Tell students that in the most effective serious games, the theme or topic is embedded in the basic *elements* of the game. Distribute the handout *Game Analysis Worksheet* and go through the first page, asking students to analyze these aspects of the #ForYou game. (Refer to the *Teacher's Version* for the right answers.)

Ask students to name other games they're familiar with, then write the names of those games on the board. (These do not have to be serious games, and can be any format – board games, card games, dice games, etc. You can choose to allow or exclude video games as you wish, but in either case ask whether it is possible to win the game.)

Place students in groups and have each group choose a game they are all familiar with. This can be a game from the list (make sure that only one group chooses each game) or another one all members know well enough to analyze.

Have them use the second page of the *Game Analysis Worksheet* to analyze the game, then share their analysis with the class.

***Assessment: Designing a Serious Game* (40 minutes, plus time out of class)**

Distribute the assignment sheet *Designing a Serious Game* and have students design a game in the format of their choice that explores some of the content raised in the lesson. In particular, you can suggest designing a game that explores or communicates ways in which people can Act, Educate, or Advocate to take control of the role of algorithms. Unless you have time and materials to create full games, tell students that they will only be *designing* the game (and, if you choose, explaining it to the class.)

Protecting Your Privacy

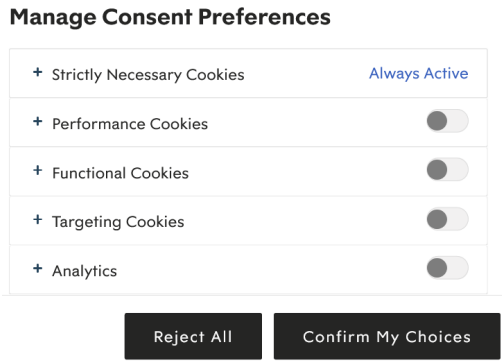
App permissions: During installation, verify that the permissions being sought by the app match not only what the privacy policy says but also what you would expect the app to require. (Permissions within mobile apps allow the app access to your device's data and capabilities in order to run. These permissions could include location, identity, email and contacts.) Also pay attention to the app description in the app store as well as any "in-app" notices which may explain the app's collection and use of personal information.

Ask questions: Get in the habit of reading privacy policies associated with the websites and apps you use. Companies should be able to answer any questions you have about what personal information they are collecting, and how your information will be used and protected. If they can't, or you don't like what you hear, this should raise red flags. You can look up the privacy policy at https://tosdr.org/ to get a plain-language explanation of apps' privacy policies. If there is no privacy policy or you think it is unfair, look into making a complaint to the Privacy Commissioner: https://www.priv.gc.ca/en/report-a-concern/file-a-formal-privacy-complaint/file-a-complaint-about-a-business/

Choose apps, tools and platforms that don't track you or target you algorithmically. Some platforms, like the search engine DuckDuckGo, don't track you at all, and don't use algorithms to decide what to show you. Others track less than their competitors. Keep data collection in mind when you're choosing search engines, shopping sites, social networks, and so on. You can also use them in ways the don't rely on what algorithms have chosen for you, like searching for specific videos or channels instead of just choosing from the Up Next bar or For You page.

Do Not Track: Some browsers allow you to send a message to websites asking them not to track your activities while you're using them. This is usually found in the "Privacy" section of the "Settings" menu (sometimes you have to click on "Advanced Settings".) You can also visit the http://donottrack.us website for more information on how you can prevent tracking. Keep in mind that this is a partial solution, since not all third parties respect the "do not track" header.

Privacy settings: Mobile devices, browsers, sites/apps and other web-enabled items such as video games and cameras often have adjustable privacy settings. For devices, this may include the ability to control everything from location tracking to screen locks. For browsers, users can often control things like cookies and pop-ups, while apps and websites such as social media sites generally allow users to control what personal information others can see about them. Be sure to review and adjust privacy settings regularly and never rely on default settings. Many websites now also ask you which cookies they can use to track you with. This is usually a pop-up window that appears when you first open the page. This option will be called "Cookies settings," "Manage my choices" or something similar. Always choose "Reject all" or "Strictly necessary only."

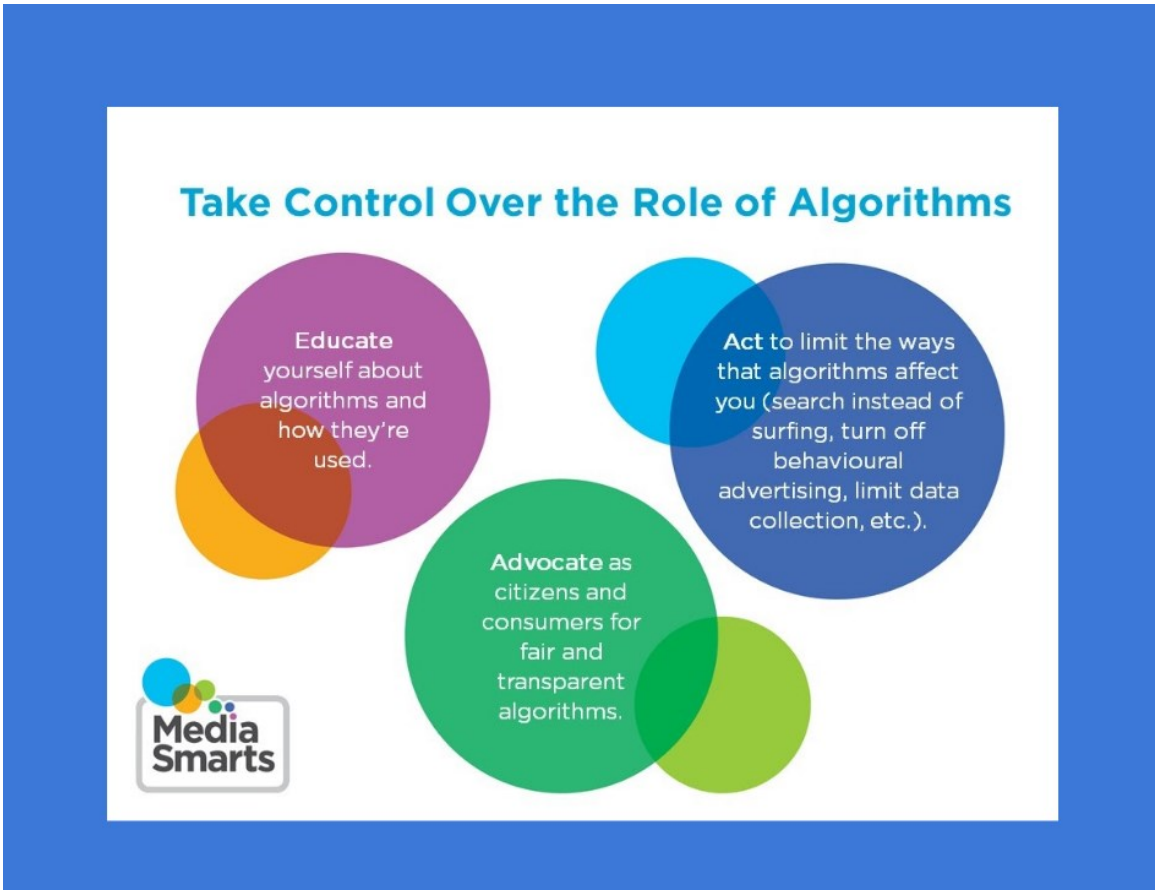


Tracking blockers. Tracking blockers like Privacy Badger (a browser plugin) and Do Not Track (an app) stop websites and apps from collecting information about you.

Turn off GPS when you don't need it: A lot of apps collect your GPS (global positioning system) information, which shows where you are, and it's also automatically included in photos you take with your phone. You can avoid this by turning off GPS when you're not using it. You can also go into your device's settings and turn off "Geotagging", which means photos (but not other apps) don't have your location info.

Use a VPN. VNPs (Virtual Private Networks) like Hotspot Shield allow you to hide or change your Internet Protocol (IP) address. Your IP address is the information you send to any app or website about which device you are using and where you are, and it's one of the things that is used to connect different parts of your online identity. Most VPNs have a free version but charge money if you use a certain amount of data, so you might want to only use them for some things (like shopping and using search engines) and not for things that use a lot of data, like watching videos.

Take Control over the Role of Algorithms



Part A

Answer **two** of the questions below in paragraph form. Make sure to back up your opinion with specific examples drawn from the game, class discussion and your own personal experience.

1) All kinds of algorithms, but especially machine learning algorithms, are made to recognize and reinforce patterns. What should be done if the pattern is unfair/biased?

2) What obligations should platforms have to make sure their algorithms do no harm? How can platforms fulfil this obligation if, in many cases, they themselves do not fully know how their algorithms work?

3) Do you think there should be laws or regulations that are more specifically about how algorithms work? If so, what should they be? If not, why is it better not to regulate algorithms?

4) Why might unhealthy or dangerous content (stunts and challenges, hate content, misinformation, etc.) be promoted by an algorithm? What responsibility do platforms have to moderate content like this?

5) What are some steps can you take to prevent your personal data from being collected?

6) Do you think it is fair for your personal information to be shared within a company, or sold by data brokers, and used to customize your online experience? Explain why or why not.

7) In some parts of the world, people have a right to get an explanation of how an algorithm made a decision. (For instance, how VidYou decided which videos to recommend and which ads to show you.) Do you think Canada should have a similar law? Why or why not?

Part B

Now that you have learned and thought about algorithms, write a short essay (2-4 paragraphs) that explains how you think the VidYou algorithm could be changed so that its outcomes would be more fair and it would handle personal information more responsibly.

While you do not have to change every element of the algorithm, make sure to consider:

- The purposes it can be optimized for
- The algorithm factors it considers and how they are weighed
- The manipulation techniques represented by the Boost cards
- How audiences are targeted for particular ads
- How personal information is collected and used to target ads
- The role of data brokers
- The use of machine learning
- Users' choices and control over how the algorithm works for them

Game Analysis Worksheet

Elements of Games:

Goal:

- *What* are players trying to do?
- What do you have to do to win?
- Is there more than one way to win?

Players:

- *Who* do the players represent?
- How many players can the game have?
- Do they all play the same role or do some (or all) have different roles?

Core Dynamic:

- *How* do players try to achieve their goal?
- What do players have to do to win?

  Examples: Race to the finish (e.g. *Snakes and Ladders*); Eliminate the opponent (e.g. *Checkers*); Control spaces (e.g. *Risk*); Collect items or resources (e.g. *Monopoly*); Make a pattern (e.g. *Tic Tac Toe*); Force the opponent to make an illegal move (e.g. *Chess)*; Make a match (e.g. *Clue*).

Mechanics:

- What actions are players able to do in the game to achieve their goal?
- What choices do they get to make?
- Which actions are required and which are optional?

  Examples: Randomizer (e.g. dice or cards); Move pieces; Compare values; Collect game components; Guess; Collect and/or spend resources.

Rules:

- How simple or complex are the game mechanics?
- Are some of them combined? (For instance, Move pieces plus Collect components equals “Pick an item up and deliver it somewhere else.”)
- How do you find out what happens when players do different actions?
- Are some actions possible in some situations but not in others?
- Do players take turns or act at the same time?
- How many actions do players get per round?

- What can players do to each other?
- What can players do *with* each other?

Components:

- Does the game have a board?
  - If so, how is it navigated or controlled?
  - Does it change over the course of the game?
- Does it have pieces?
  - Are they all the same, or do some do different things?
- Does it have other components (cards, tokens, etc.)?
  - If so, what do they do?
- Do all players get the same components?

Game analysis

Game title:

Goal:

Players:

Core Dynamic:

Game Mechanics:

Rules:

Components:

Game Analysis Worksheet *(teacher's version)*

Elements of Games: **(answer for #ForYou are in bold)**

Goal:

- *What* are players trying to do? **Get views and make money**
- What do you have to do to win? **Get the most points in each round**
- Is there more than one way to win? **No**

Players:

- *Who* do the players represent? **VidYou and creators for it**
- How many players can the game have? **3-5**
- Do they all play the same role or do some (or all) have different roles? **One player plays as VidYou, the others all play as creators**

Core Dynamic:

- *How* do players try to achieve their goal? **Guess and "game" the VidYou algorithm**
- What do players have to do to win? **Matching their cards to the VidYou player's cards**

  Examples: Race to the finish; Eliminate the opponent; Control spaces; Collect items; Make a pattern; Paint into a corner; **Make a match**.

Mechanics:

- *What* actions are players able to do in the game to achieve their goal? **Play Video, Boost, Ad and Data cards to collect points; link Data cards for extra points; trade Data cards with other players to link more cards**
- What *choices* do they get to make? **Which cards to play; whether to trade Data cards; how to link Data cards**
- Which actions are *required* and which are *optional?* **Players *must* play two Video or Ad cards in each phase; they *may* play Boost or Data cards on top of them**

  Examples: Randomizer (e.g. dice or cards); Move pieces; **Compare values**; Collect game components; Guess; Collect and/or **spend resources**.

Rules:

- How simple or complex are the game mechanics? **First round is always simple (play one Video or Ad card); more complex options added in second round.**
- Are some of them combined? (For instance, Move pieces plus Collect components equals "Pick an item up and deliver it somewhere else.")

- How do you find out what happens when players do different actions? **Compare text on different cards**
- Are some actions possible in some situations but not in others? **Linking Data cards by proxies is only possible in the third phase**
- Do players take turns or act at the same time? **At the same time**
- How many actions do players get per round? **Two in the Popularity and Monetization phases; three in the Machine learning phase (trading is added)**
- What can players do to each other? **Nothing**
- What can players do *with* each other? **Trade cards**

Components:

- Does the game have a board? **No**
- Does it have pieces? **No**
- Does it have other components (cards, tokens, etc.)? **Cards**
    - If so, what do they do? **The players choose from the cards in their hands to try to match the Algorithm and Audience cards VidYou played**
- Do all players get the same components? **No, players get the same number of each type of card but the cards are dealt randomly**

Assignment Sheet: Designing a Serious Game

For this assignment, you will design a game that either *teaches* players something about algorithms or prompts them to *discuss* or *think about* algorithms. The game can be in any format you like (card game, board game, etc.)

Use the *Take Control Over the Role of Algorithms* handout to start thinking about your game's theme or content.

Then use the worksheet below to plan your game (write your answers on a separate piece of paper).

Topic:

- What is your game about?

Content:

- Is your game teaching players how to do something or prompting them to think about or discuss something?

Goal:

- *What* are players trying to do?
- What do you have to do to win?
- Is there more than one way to win?

Players:

- *Who* do the players represent?
- How many players can the game have?
- Do they all play the same role or do some (or all) have different roles?

Core Dynamic:

- *How* do players try to achieve their goal?
- What do players have to do to win?

  Examples: Race to the finish (e.g. *Snakes and Ladders*); Eliminate the opponent (e.g. *Checkers*); Control spaces (e.g. *Risk*); Collect items or resources (e.g. *Monopoly*); Make a pattern (e.g. *Tic Tac Toe*); Force the opponent to make an illegal move (e.g. *Chess)*; Make a match (e.g. *Clue*).

Mechanics:

- *What* actions are players able to do in the game to achieve their goal?
- What *choices* do they get to make?
- Which actions are *required* and which are *optional?*

  Examples: Randomizer (e.g. dice or cards); Move pieces; Compare values; Collect game components; Guess; Collect and/or spend resources.

Rules:

- How simple or complex are the game mechanics?
    - Are some of them combined? (For instance, Move pieces plus Collect components equals “Pick an item up and deliver it somewhere else.”)
- How do you find out what happens when players do different actions?
- Are some actions possible in some situations but not in others?
- Do players take turns or act at the same time?
- How many actions do players get per round?
- What can players do to each other?
- What can players do *with* each other?

Components:

- Does the game have a board?
    - If so, how is it navigated or controlled?
    - Does it change over the course of the game?
- Does it have pieces?
    - Are they all the same, or do some do different things?
- Does it have other components (cards, tokens, etc.)?
    - If so, what do they do?
- Do all players get the same components?

Assessment Task Rubric

Category	*Learning Expectations*	*Achievement*
Use	*Making and Remixing* create draft works in preparation for creating a media work (for example, creating a storyboard before making a film; doing a mockup before creating a website) create a media work that makes effective use of codes and conventions of the medium and genre create media works that communicate your learning	Needs improvement (N) Beginning (1) Developing (2) Competent (3) Confident (4)
Understand	*Reading Media* show an understanding of how networked tools such as search engines and sorting algorithms affect how content is created, distributed and selected *Community Engagement* demonstrate an understanding of the impact of your actions with networked tools on yourself and others *Making and Remixing* demonstrate understanding that media products and digital tools are made by creators and that their content is the result of their creators' choices, assumptions, identities, experiences and beliefs demonstrate understanding of how different media and genres communicate meaning through codes and conventions identify how elements of medium and genre are used to communicate meaning *Consumer Awareness* analyze the impact of commercial purposes and pressures on the meaning and influence of a media product	Needs improvement (N) Beginning (1) Developing (2) Competent (3) Confident (4)
Engage	*Community Engagement* make a positive contribution to one's online or offline community *Making and Remixing* create media works for civic engagement	Needs improvement (N) Beginning (1) Developing (2) Competent (3)

GLOSSARY

Algorithm: A set of step-by-step instructions for solving a problem or completing a mathematical or computational task. Algorithms sort data in order to find patterns and make predictions or recommendations. The term is most often used to refer specifically to computer programs that have been designed or trained do this.

Artificial intelligence: Refers to the simulation of human intelligence (for example: learning or problem solving) in machines that are programmed to think like humans and mimic their actions. Most applications described as "artificial intelligence" are examples of *machine learning*.

Autocomplete: A feature that predicts and suggests the rest of a word or phrase a user is typing into a search engine, text, or other application, based on what they or other users have typed in that situation in the past. An example of a prediction and suggestion algorithm.

Behavioural advertising: A technique used by online advertisers to present targeted ads to consumers by collecting information about their browsing behaviour and using a sorting and recommendation algorithm to match ads with consumers who are most likely to respond to them. Behavioural advertising means that two people who look at the same video or website may see completely different ads based on their *data profile.*

Bias: In this context, bias means when an algorithm delivers a result that is unfair or that is based on assumptions that are not accurate. This can come as a result of the designer's decisions: for example, an algorithm used to guess the final grades of students unable to finish the semester based its conclusions partly on how well students from their school typically did. Because students from schools in poor communities typically got lower grades, the algorithm lowered the grades of students in those schools. effectively punishing them for being poor. Bias can also occur when a *machine learning* algorithm is trained on biased data: an algorithm that decides whether or not to grant mortgages that is based on past mortgage applications would, unless specifically corrected, be *biased* by the past racist practice of "redlining," or denying mortgages to Black people.

Behavioural data: Information about a user's past behaviour that is used to inform behavioural advertising, such as: the pages browsed on a website or the time spent on a website, app, or game. For example, a user who has watched many videos about games in the past would be more likely to be shown an ad for games.

Contextual advertising: A technique used by online advertisers to present targeted ads to consumers based on what they are currently *doing* or have *recently done*, such as what videos they are currently watching or the search they have just done. Because it does not draw on the user's data profile or behavioural data it is generally considered less intrusive than behavioural advertising. For instance, a search engine that recommended ads based on *contextual* data would show you ads based on what you just searched for, while one that used *behavioural data* would show you ads based on all of your past searches.

Data broker: Companies or entities that buy or otherwise collect information (data) about users and sell that information to interested companies, individuals or other data brokers for the purpose of establishing data profiles on people. Some data brokers also provide services which allow them to collect data (such as search engines or video sites) while others simply buy information collected by others.

Data profile: Your online data profile is the sum of all of the personal data a platform or data broker has collected about you. This profile is typically used to inform algorithmic decision-making, which may range from a platform's decision about what content to show or recommend to you, to an employer's decision about whether to interview or hire you.

Data scraping: Also known as web scraping, the process of collecting publicly available data from across the internet so it can be added to a data profile for research or marketing purposes. Data scraping requires the use of software or bots.

Demographic data: Information about the characteristics of a population such as age, gender, income, race, marital status, education level, or employment status.

Engagement: Features such as *likes*, *comments*, and *shares* measure engagement with a specific piece of content (video, image, article) online. Most recommendation algorithms are *optimized* to favour highly engaging content.

Infer: To guess something based on other information. For instance, a search engine might be able to infer your language, your interests or your gender based on things you have searched. Inferences are not always correct!

IP address: Or Internet Protocol address, is a numerical label assigned to each device connected to a computer network. This identifying number allows the computer to send and receive information.

Machine learning: An application of artificial intelligence that provides systems the ability to automatically learn and improve from experience. Instead of being designed to do a particular task, machine learning algorithms are given a goal and then *trained* on large amounts of data to find patterns in them. When more data is added, the algorithm continues to evolve. While this can be faster and less expensive than engineered algorithms, there is also a large potential for *bias* that is not visible even to the designers if the data it is trained on is biased. For example, an algorithm trained on fifty years of job applications might notice that men's were more successful than women's and sort them accordingly—with men's applications being considered first.

Monetization: Earning money from online content, such as a video or social network post. Most often this is done through advertising before, during, after or on top of the content. Advertisers will usually pay more if they believe their ads are going to be shown to people who are more likely to respond to them.

Optimization: The goals or priorities of an algorithm. These goals can sometimes be in conflict: for example, a search engine's algorithm might be optimized both to deliver accurate results and to deliver relevant ads. Optimization can lead to unintended results: for example, optimizing for engagement can lead to offensive or shocking videos being recommended. Algorithms can also be "gamed" or manipulated by content creators who have deduced how they are optimized: producing many short videos if the algorithm is optimized for clicks, for example, or longer ones if it's optimized for watch time.

Personal data: Any information that relates to an identified or identifiable living individual, such as: name, phone number, address, social insurance number, credit card number, license plate, etc.

Platform: Any environment in which a piece of software is executed, such as: an operating system, a web browser, a social media website, or an application.

Preference bubble: Preference bubbles, or filter bubbles, refer to situations where the algorithm shows users only what it thinks the user will like and filters out anything it thinks the user dislikes.

Proxy data: Information about a user that can be inferred from other data. For example, a user's search history can be a proxy for age based on known patterns of what users search for at different ages. Proxy data can allow recommendation algorithms to deliver content in ways that can be particularly intrusive or, in some cases, even prohibited by law (for example, selecting job ads based on a user's race.) *Machine learning* algorithms work primarily by finding proxy data that human developers would not be able to see: one resume-scanning algorithm found that the best proxies for whether an applicant would be successful were if their name was Jared and if they played lacrosse in high school. (A human, but not an algorithm, would recognize that both of these are very likely *proxies* for being male.)

Recommendation algorithm: Also called recommendation systems, these algorithms filter and prioritize data to provide users with personalized content and services.

Recommendation spiral: A cycle where engaging with something online (such as by watching or Liking a video) makes the algorithm recommend similar content, which leads to you engaging with the new content, which leads to the algorithm recommending even more of that content, so that you're shown more and more of that content and less and less of anything else.

Retweet room: Private spaces on Twitter (or other platforms) that allow users to coordinate messages and retweet each other. Because many recommendation algorithms are optimized to favour content that is quickly becoming popular (such as "trending topics"), rather than the content that is most popular overall, retweet rooms can manipulate the algorithms into recommending their content.

Search history: A record of what terms a user has searched for on search engines such as Google. Many search engines record users' search history as part of the user's data profile. Other forms of user behaviour that contribute to their data profile include their viewing history, their browsing history (which websites they have visited), their shopping history, etc.

Training set: In machine learning, algorithms rely on multiple data sets, or training data, that help make predictions and strengthen recommendations. For example, an algorithm designed to predict how likely someone convicted of a crime was to re-offend would be trained on the records of other convicts who had been paroled, in order to find patterns that were associated with re-offending.

Virality: The tendency of an image, video, or piece of information to be circulated rapidly and widely from one internet user to another.

#ForYou:

Rules for Quick Play

AGES:
13 and up

PLAYERS:
3-5

PLAYING TIME:
Around 1 hour

#ForYou:
Rules for Quick Play

Want to see it in action? Check out the gameplay video at
www.bit.ly/ForYouRules
Or you can read this and then come back to watch it.

AGES: 13 and up
PLAYERS: 3-5
PLAYING TIME: Around 1 hour

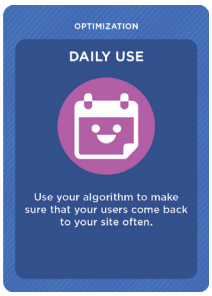
Summary

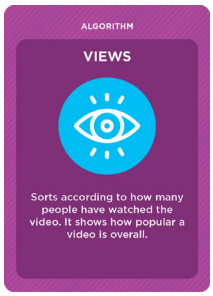
You and all but one of your fellow players are creators for VidYou, a fictional video site similar to TikTok or YouTube. One of you will play as VidYou.

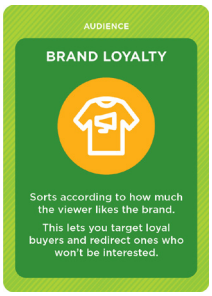
The creators want to make videos that lots of people see, and to make lots of money from the ads that run before, during or after the videos. To do that, you will have to try to figure out the algorithm that VidYou is using to decide who sees which ads and videos and which ones are recommended to which people.

VidYou also wants to make money! It does that by deciding how to optimize the algorithm and deciding which audience it wants to target with the player's ads.

There are three card decks that only the VidYou player uses: the Optimization, Algorithm and Audience cards.





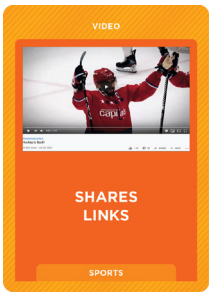


Optimization cards give the VidYou player an idea of what they want the algorithm to do, and give the other players a hint about that algorithm.

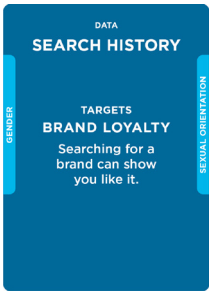
Algorithm and Audience cards decide how successful each video and ad is. That means the closer the players get to guessing what Algorithm and Audience cards that VidYou played, and in what order, the more views they get and the more money they make.

There are three decks that the players use: the Video cards, Ad cards and Data cards.

Video cards are used in the Popularity round. Each one has a topic like “Sports” and “Comedy” and matches two Algorithm cards. The Video deck also include six **Boost** cards. Each of these matches one Algorithm card and can be played on top of any Video card that matches the same one.



Ad cards are used in the Monetization and Machine Learning rounds. Each one matches two Audience cards.



Data cards are used in the Monetization and Machine Learning rounds. Each one also has one or two inferences that can be used to link it with other Data cards during the Machine Learning round.

There are three rounds of play: the Popularity round, the Monetization round and the Machine Learning round.

In each round, the VidYou player programs an algorithm of three cards. The players then try to figure out what cards were played and in what order, and play cards that match as many of the cards in the algorithm as possible.

In the Popularity round, players play Video cards and try to get their videos seen by as many people as possible. They can also use Boost cards to “game” the algorithm in different ways.

In the Monetization round, players play Ad cards to try to show ads to the audience that VidYou wants to reach. They also play Data cards to target those ads more accurately. In the Machine learning round, players once again play Ad and Data cards but can play extra Data cards by linking them through proxies.

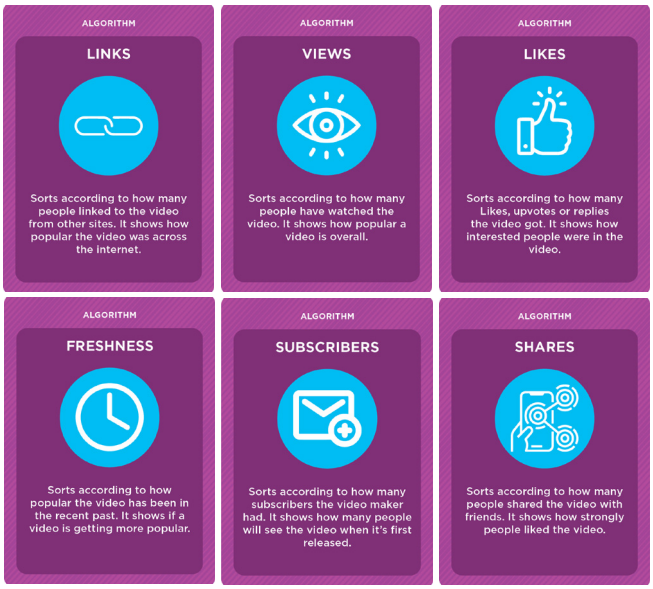
Quickstart

Separate the decks and shuffle the Video, Ad and Data cards. Make sure the Boost cards are shuffled in with the Video cards.

Popularity Round

The Popularity round is about getting your videos seen by as many people as possible.

At the beginning of the Popularity round the VidYou player draws an Optimization card and places it face-up, so the players can see it. They then draw three Algorithm cards of their choice to try to accomplish the goal on the Optimization card. They play the three Algorithm cards face-down, sorting them from left to right from the one that's most important in meeting the goal to the least important. Example: The VidYou player draws Virality from the Optimization deck. That means the algorithm will favour videos that users are likely to spread widely. To do that, the VidYou player chooses three Algorithm cards. They might choose these three:

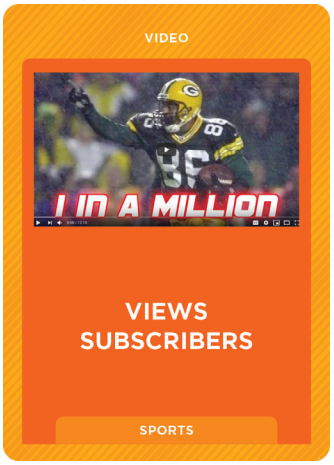


- Links (to recommend videos that people are already sharing)
- Shares (so that videos that users are sharing with one another will be more likely to be recommended)
- Subscribers (so that videos that have already been seen by many people will be recommended)

(They might choose other Algorithm cards for the same purpose, or sort them in a different order.)

First Turn: Testing the Algorithm

Next, the VidYou player deals five Video cards to each player. Each Player then plays one Video card of their choice. (Players should not play Boost cards in the first turn.)



Now the VidYou player uses the Score tokens to score the Video cards according to the algorithm factors on each card:

- If the card matches the top-ranked algorithm card, it scores three points.
- If it matches the second-ranked card, it scores two points.
- If it matches the third-ranked card, it scores one point.

In this example, the first Video card matches the top-ranked and second-ranked Algorithm cards, Links and Shares, so it scores a total of five points (three for the top-ranked card and two for the second-ranked card.) The second Video card matches only the third-ranked Algorithm card, Subscribers, so it scores one point.

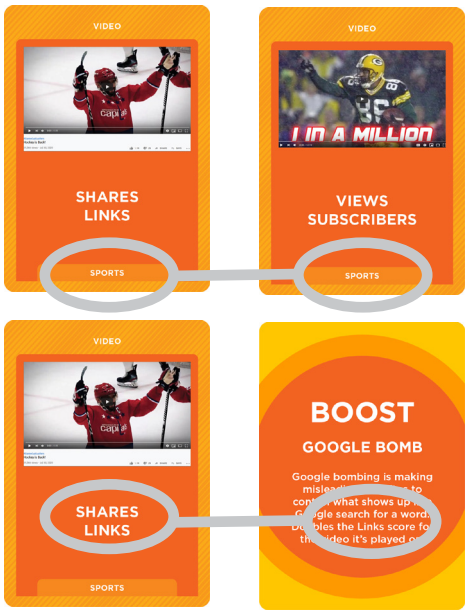
The VidYou player does not yet turn over the Algorithm cards or tell players how they scored each video – only the total score each Video card got.

Based on that, the players try to figure out which Algorithm cards that VidYou played and in what order. In the example above, for instance, they could figure out that either Shares was the top-ranked Algorithm card and Links was second or vice-versa, and that either Views or Subscribers was ranked third.

All of the scores are visible to all of the players, but it is up to the players whether they want to try to work together to figure out the algorithm or each try to do it on their own.

Second Turn: Gaming the Algorithm

In the second turn, each player now plays two of their remaining Video cards. They choose based on which ones best match the Algorithm cards they think that VidYou has played.



Each player can also play up to two extra Video cards if they have one or more with a matching topic. The topic is listed at the bottom of each Video card. Here, for example, playing the hockey video allows them to play another video with a Sports topic. Only one extra card can be played per topic.

Some players may also have gotten Boost cards mixed in with their Video cards. Each Boost card matches one Algorithm card and can only be played on top of a card that matches the same Algorithm card. It doubles the value of that match: for example, if Links were the top-ranked Algorithm card this Video card would be worth six points instead of three.

(With matching topics and Boost cards, each player can play anywhere between two and five cards.)

When all cards have been played, the VidYou player turns over the Algorithm cards and calculates the score for each Video card. These scores can be recorded if players are playing competitively but don't have to be displayed with Score tokens.

When the second turn is over, you can either play the Popularity Round again or move on to the Monetization round.

Monetization Round

Advertising isn't just about reaching the most people: it's about reaching the right people who are likely to respond to your ads. The Monetization round is about getting your ads seen by the people that VidYou wants to reach.

Play is similar to the first round, except with Ad cards instead of Video cards and Audience cards instead of Algorithm cards.

At the beginning of the Monetization round the VidYou player draws three Audience cards of their choice. Each card stands for something about the audience that the platform wants the ads to reach: how old they are, where they live, their interests. VidYou plays the three Audience cards face-down, sorting them from most to least important.

First Turn: Finding the Audience

Next, the VidYou player deals five Ad cards to each player. Each Player then plays one Ad card of their choice.

Now the VidYou player uses the Score tokens to score the Ad cards according to the Audience factors on each card:

- If the card matches the top-ranked Audience card, it scores three points.
- If it matches the second-ranked card, it scores two points.
- If it matches the third-ranked card, it scores one point.

In this example, the Ad card matches the first and third Audience cards, so it scores a total of four points (three for the first card and one for the third.)

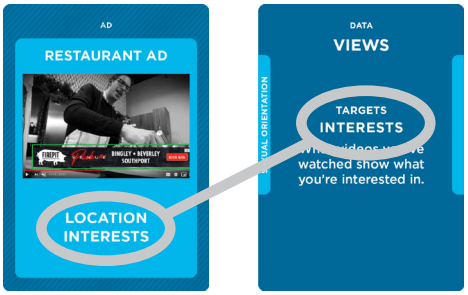
The VidYou player does not yet turn over the Audience cards or tell players how they scored each ad – only the total score each Ad card got.

Based on that, the players try to figure out which Audience cards that VidYou played and in what order. In the example above, for instance, they can deduce that either Location is the top card and Interests the third, or vice-versa, since only those two combinations could score four points.

All of the scores are visible to all of the players, but it is up to the players whether they want to try to work together to figure out which audience that VidYou wants to reach or each try to do it on their own.

Second Turn: Targeting the Audience

Next, the VidYou player deals each player four Data cards. Data cards stand for information that's been collected about users that will help you target the ads. They work like the Boost cards in the Popularity round: you can play one on top of any Ad card that matches the same Audience card.



Each player now plays two of their remaining Ad cards and up to two Data cards. They choose based on which ones best match the Audience cards they think VidYou has played.

When all cards have been played, the VidYou player turns over the Audience cards and calculates the score for each Ad card. These scores can be recorded if players are playing competitively but don't have to be displayed with Score tokens.

When the second turn is over, you can either play the Monetization Round again or move on to the Machine Learning round.

Machine Learning Round

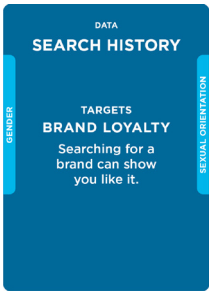
Algorithms don't rely just on data they've collected about you: they use that data to infer other things through machine learning, or "artificial intelligence." The Machine Learning round is about getting new ways of targeting users by finding unexpected connections in their data.

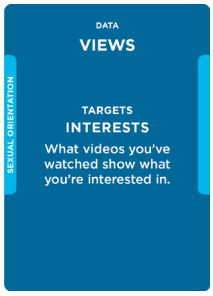
First Turn: Finding the Audience

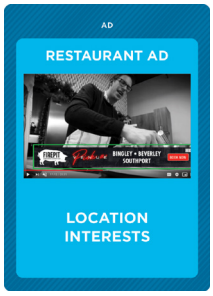
Play is the same as the first turn of the Monetization round: the VidYou player draws three Audience cards of their choice and plays them face-down, sorting them from most to least important. They then deal each player five Ad cards. Each player plays one Ad card and the VidYou player scores it based on how well it matched the Audience cards.

Interlude: Data Brokerage

Once again, the VidYou player deals four Data cards to the players. However, in this round players can play more than one Data card on each Ad card by linking them together. To link two Data cards together, they must have matching Proxies. Proxies are something that the algorithm guesses about a user and they are marked on the sides of the cards.

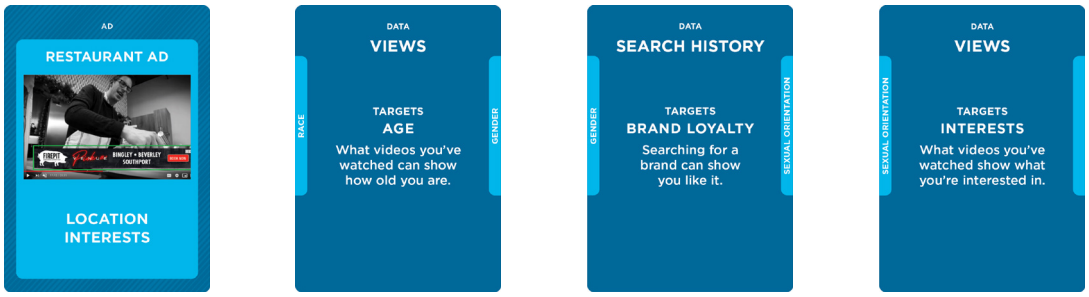






The **first** Data card still has to match the Ad card it's played on, but the ones linked to that first Data card do not. Proxy text on the left side of a card has to match with the same text on the right side of another card, and vice-versa.

If a Data card has Proxy text on both sides, players can link another one to the other side. This chain can include as many cards as the player is able to match.



Before playing their Ad and Data cards, players have a chance to act as data brokers and trade Data cards with one another. Because Proxies have to match on facing sides it is likely that most players will have a Data card that another player will be able to use to match a Proxy.

It is up to the players whether they wish to trade collaboratively or competitively.

Second Turn: Targeting the Audience

Players now place down two Ad cards and as many Data cards as they are able to link together. The VidYou player then scores each Ad card depending on how well it and the Data cards played on it match the Audience cards. **The Data cards in a chain are counted even if the Ad card they were played on does not match any of the Audience cards**. In the example above, for instance, if VidYou had played Age as the first priority and Brand Loyalty as the second, the Ad card would score five points (3+2) even though the original ad didn't target either Age or Brand Loyalty.

These scores can be recorded if players are playing competitively but don't have to be displayed with Score tokens. When the second turn is over, you can either play the Machine Learning Round again, start another game with the Popularity Round, or tally total scores to see which video maker reached the largest audience and made the most money.