



Using Ratios to Identify Social Media Engagement

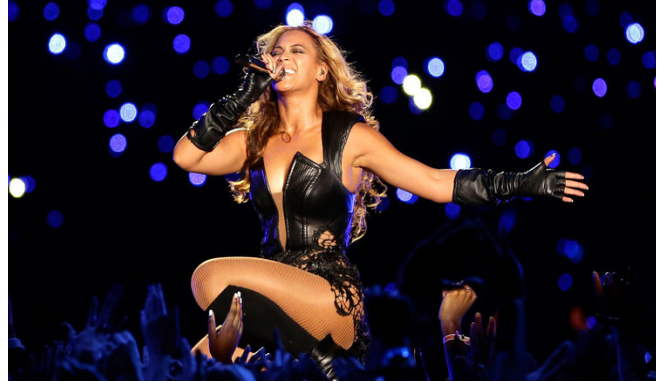
OVERVIEW

ESSENTIAL QUESTION

How can ratios be used to identify a music artist's social media audience engagement?

OVERVIEW

In this lesson, students will analyze the data of a music artist's social media account to assess audience engagement. Using Beyoncé's social network as a case study, students survey the total platforms in her network and identify her preferred platform, Instagram. Students then practice calculating ratios using the data from Beyoncé's Instagram account to assess audience engagement. Next, students continue their practice with ratios and assessing audience engagement by comparing and contrasting Beyoncé's Instagram account with another highly popular Instagram account. The lesson concludes with summary activities that discuss predicted audience growth trends for the analyzed accounts and the estimated monetary value of audience engagement on Beyoncé's Instagram account.



A social network can be essential for a music artist. The network provides an artist with a digital ecosystem to publicize events, promote their content, and connect with their fanbase. It is a direct connection between the artist and their audience, without an intermediary such as a record label or publicity agency. The network consists of a variety of websites and apps, including many social media platforms, such as TikTok and Instagram. Networks also provide data about the size of an artist's audience and identify how the audience is engaging with the artist's various platforms.

The music artist Beyoncé's social media network contains platforms that have an audience in the hundreds of millions. Her preferred platform is Instagram and her posts have set records for the number of Likes they have received. Her Instagram account is consistently one of the most followed. Monetary estimates on the value of one of her posts is about \$1 million. But the actual percentage of her Instagram audience directly engaging with her posts is unclear without an analysis of the account's data. Algebraic ratios provide an excellent way to analyze the numbers and identify the depth of her audience's engagement with her Instagram account.

OBJECTIVES

Upon completion of this lesson, students will:

1. KNOW (KNOWLEDGE):

- How ratios can be used to identify social media audience engagement
- The percentage of audience engagement for Beyoncé's Instagram account
- How Beyoncé's Instagram account compares to other Instagram accounts
- The work of singer, songwriter, entertainer, and businesswoman Beyoncé

2. MASTERY OBJECTIVE:

- Students will be able write and analyze ratios by identifying social media audience engagement using data from social media accounts.

ACTIVITIES

MOTIVATIONAL ACTIVITY

1. Show students **Image 1, Social Network Definition**. Ask students:

- What is a social network? What do you think is the purpose of the network?
- Do you have a social network? If so, what platforms do you use to engage with social media (Facebook, Instagram, TikTok, Twitter, etc.)? Is there one that you prefer to use? Why?
- Why might a music artist have a social network? How might they benefit from having a social network?

PROCEDURE:

1. Inform students that they will be exploring how mathematics can be used to analyze a social media audience. Specifically, explain that ratios are used to identify the social media audience engagement rate for social media accounts.
2. Show **Image 2, Writing Ratios**. Explain to students that ratios are used to compare two things and can be written in a variety of ways. The social media industry often uses two types of ratio formulas for calculating and identifying an account's audience engagement rate: the Classic

formula and the Advanced formula. Ask students:

- Why might someone want to identify the audience engagement rate for their social network?
 - Why might the audience engagement rate of a music artist's social media accounts be particularly important?
3. Show **Image 3, Classic and Advanced Social Media Engagement Ratio Formulas**. Explain to students that the Classic Formula and Advanced Formula are used as social

network benchmark tools for calculating and identifying the depth of a social media account's audience engagement.

4. Work through a sample calculation with the class using the Classic Formula, assuming a social media account receives around 200 likes per post and has 2000 followers. ($200/2000=0.1$; $0.1 \cdot 100=10\%$ engagement rate.)
5. Explain to students that typically, only a fraction of an account's Followers see posts (about 10% - 30%). With the Classic Formula, inactive followers (followers who were not reached by the platform's algorithm, etc.) are being included in the answer. So, the Classic Formula is not as accurate of an assessment of audience engagement as it could be. The Advanced Formula can give a much more accurate understanding of engagement, because it solely analyzes account Followers who are directly interacting with the social media account's posts.
6. Work through a sample calculation with the class using the Advanced Formula, assuming a social media account receives around 200 likes per post and 8 comments per post. ($8/200=.04$; $.04 \cdot 100=4\%$ engagement rate.)
7. Inform students that for this lesson they will practice writing and solving ratios to determine the audience engagement rate for a music artist's social media account.
8. Show **Image 4, Beyoncé**. Ask students:
 - Have you heard of Beyoncé? Do you know any of her songs?
9. Show **Image 5, Beyoncé's Social Network**. Ask students:
 - Which platforms make up Beyoncé's social network?
 - Looking at the activity and numbers of those platforms, which platform might have the most engagement?
10. Distribute **Handout - Social Network Math** to students. Demonstrate "Problem #1 - Beyoncé Ratios" for students, sharing your thinking and calculations. (*Note to teacher: static data is provided on the **Teacher's Guide** so that the lesson is accessible to all classrooms regardless of internet and device availability. Considering the dynamic nature of the information being analyzed, you can access the most current data available by visiting this social media auditing site like <https://www.speakrj.com/audit/>.*)
11. Organize students into pairs. Assign each pair the remainder on the handout to complete. Ask them to gather data on a social media auditing site, or provide them the data within the **Teacher's Guide**. Instruct students to show their work. Once completed, have students share their work with other pairs.



SUMMARY ACTIVITY

1. Organize the class together as a large group and discuss and demonstrate the paired activities. Ask students:
 - According to the ratios you calculated, which account has the highest percentage of Likes to Followers? Which account has the highest percentage of Comments to Likes?
 - Did the audience engagement ratio for an account vary depending on the depth of interaction being measured?
 - Which ratio percentage determines deeper audience engagement? Why?

EXTENSION ACTIVITIES

1. Beyoncé's Instagram account is estimated to grow by +161,615 followers per day. With that estimation, what would be the ratio formula for determining how many new followers her page receives per hour?
2. Each post by Beyoncé on Instagram has an estimated worth of \$1 million. With that estimation, what would be the most accurate ratio formula for determining the dollar value per Like and per Comment for one of her posts? (Hint: use the numbers of Likes and Comments from the handout to plug in the numbers for the formula.)
3. The current record for most Likes on Instagram is the image of an egg: <https://www.instagram.com/p/BsOGulcndj-/>. Research that post and utilize the Classic and Advanced formulas for determining the depth of engagement for the post.

STANDARDS

COMMON CORE STATE STANDARDS

Ratios and Proportional Relationships

CCSS/Math.Content.6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”

CCSS/Math.Content.6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

CCSS/Math.Content.6.RP.A.3 Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

College and Career Readiness Anchor Standards for Reading (K-12)

Craft and Structure 4: Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

Integration of Knowledge and Ideas 7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

College and Career Readiness Anchor Standards for Speaking and Listening (K-12)

Comprehension & Collaboration 2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Presentation of Knowledge 4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

College and Career Readiness Anchor Standards for Language (K-12)

Language 1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Vocabulary Acquisition and Use 6: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.



RESOURCES

HANDOUTS

- Handout - Social Network Math
- Handout - Social Network Math (Teacher's Guide)