

Math with The Beatles

OVERVIEW

ESSENTIAL QUESTION

How can the Beatles' growth in popularity be demonstrated with math?

OVERVIEW

In this lesson, students use arithmetic to calculate how often The Beatles performed during their residency in Hamburg, Germany, and then discuss how this time investment helped them achieve global success.



“A lot of people thought we were an overnight sensation, but they were wrong” - The Beatles' Paul McCartney, *The Beatles: Eight Days a Week - The Touring Years*.

Indeed, though to many fans The Beatles seem to have been a big bang, bursting from Liverpoolian obscurity to international stardom with their 1963 debut album *Please Please Me*, quite the opposite is true. Between 1960-63, The Beatles worked. They were, after all, young men from the working classes of Liverpool, a city still recovering from World War II. They worked to earn money for basic necessities, playing pub sets both day and night and performing lengthy residencies in Hamburg, Germany, one of which included a stretch of 104 consecutive shows. They worked on repertoire, learning dozens of “cover” songs spanning several genres. They worked on their group sound, playing several sets a night and fine tuning the skills that helped them “hold” audiences at the dance floor, even those who may not have come specifically to see them.

The Beatles moved at a frenetic pace in 1961 and 1962, rarely taking a night off. It seems the young Beatles rarely took a moment's rest; amidst all this activity they collected records, learned songs, practiced vocal harmonies and began composing original music. Though the band had been working non-stop for several years when they recorded their debut album *Please Please Me* in February 1963, guitarist George Harrison was not yet 20 years old.

To many, *Please Please Me* sounded radically new, and the “Beatlemania” that followed was unprecedented as a response to popular music. But when one looks at the years just before the world focused its cameras on The Beatles, a story of four young men with talent, passion, an unwavering drive to succeed and a remarkable work ethic is revealed.

OBJECTIVES

Upon completion of this lesson, students will:

1. KNOW (KNOWLEDGE):

- About the work ethic of The Beatles in their early years as a band
- About the Beatles' journey towards becoming a worldwide phenomena
- About the musical environments that helped shape The Beatles' music and image
- How to formulate equations to determine the amount of time The Beatles spent practicing and performing before they became famous

2. MASTERY OBJECTIVE:

- Students will be able to apply mathematical knowledge to create equations that calculate the musical journey and cultural impact of the Beatles.

ACTIVITIES

MOTIVATIONAL ACTIVITY

1. Play **Clip 1, Beatlemania**. Ask students:

- Have you ever heard of The Beatles? Who were they?
- Based on the clip you saw, how might you describe The Beatles? Turn to a partner and think of five words you could use to describe The Beatles.
- How do you think that the Beatles became so popular? What would they have had to do to get so many fans? Remember: the Beatles became popular in the 1960s, before the internet.

PROCEDURE

1. Tell students that today they will be thinking like mathematicians to understand how hard The Beatles worked as a band to achieve their popularity.
2. Pass out **Handout 1 - Introducing Vocabulary** to students, and ask them to work with a partner to answer the vocabulary questions.
3. Play **Clip 2, The Residencies in Hamburg and the Arrival of Ringo Starr**. Then show **Image 1, "Twist and Shout" Map**. Ask students:
 - What two cities are mentioned in this video? Can you find them on the map?
 - What country is Liverpool in? What country is Hamburg in?
 - According to the video, why did The Beatles decide to go to Hamburg? How might they have felt about going to Hamburg?

- Were the Beatles already popular in Liverpool when they left?
 - According to the clip, what was life like for the Beatles in Hamburg? What did they do most of the time?
 - How might have performing in a new city helped The Beatles become better musicians?
4. Ask students to think about something that they have had to really work to become successful at, and share their responses with two partners (*if students need prompting, give them examples of mastering academic skills such as reading or memorizing basic math facts, mastering a sports skill, or learning to play an instrument or become a better artist*).
 5. Show **Image 2, Malcolm Gladwell Quote on The Beatles' Early Years**. Ask students:
 - Do you think that we can come up with some math problems using this type of information on the Beatles' early years?
 6. Distribute **Handout 3 - Beatles Math**. Demonstrate the first problem on the handout for students, sharing your thinking and calculations.
 7. Split students into two groups, and have each group move to opposite sides of the classroom. Assign each group either the second or third word problems on **Handout 2**. Have students work in pairs, then share their work with other group members. Students groups should come to consensus on the correct answer (and you will want to check their work.)
 8. Ask student pairs to share their Word Problems with a student pair from the other side of the room. When students have shared their problems and answers, ask them to illustrate their thinking and problem solving for either problem #2 or #3. Students can then share their illustrated math problems with a partner.
 9. Tell students that anyone who wants to be good at doing something usually has to work really hard for a long time to achieve success. Tell students that they are about to learn more about how hard the Beatles worked to be successful. Play **Clip 3, The Beatles Early Years** video clip. Ask students:
 - In the clip, Paul McCartney says that playing in Hamburg was “a real slog.” What might he mean by this phrase?
 - In the clip, John Lennon says that in the early days The Beatles had to “hold the audience” in the clubs where they were playing. What do you think “hold the audience” means? How might a band succeed at “holding an audience”?
 10. Play **Clip 4, The Beatles on the Ed Sullivan Show**. Ask students:
 - The Ed Sullivan Show was the first time The Beatles performed in America. How might have their work in Hamburg prepared them for their performance on American television?
 11. Distribute **Handout 2 - Timeline of the Beatles' Early Years**, and read the timeline together.
 12. Model the idea of creating some math problems using **Handout 2**. Ask students to look at the entry #9: “August 17 - November 28 1960 - The Beatles perform six to seven sets per show for 98 consecutive nights in Hamburg, Germany.” Ask students:
 - With this information, can you find out about how many sets The Beatles played during those 98 nights in

Hamburg? (If needed, explain that a set is a collection of songs performed back-to-back.)

- Does this problem require addition, subtraction, multiplication, or division?
13. Demonstrate the answer to the problem: 6×98 and 7×98 , for a range of 588-686 sets.
 14. Tell students that now it is time for them to create their own word problems using the information on the Timeline. Let them know that they will be sharing these problems with their classmates later. Students may have the choice of working alone or in pairs to create three to five word problems. If students

have time, they can create illustrations to go with each of their word problems. Students may choose to create word problems using calendars to calculate passage of time in days, weeks, or months.

15. Once students have finished creating their word problems, ask them to share their problems with another student or team in the classroom. Students can take turns solving each other's word problems.
16. As time allows, students may illustrate their word problems to visually demonstrate the problem, calculations, and solution. Use this **Handout 4 - Illustrated Math Page** for student problems and illustrations.

SUMMARY ACTIVITY

1. Tell students that they are ready to learn more about The Beatles music and to create some interesting math problems. Share the Dueling Data Interactive Infographic (<http://duelingdata.blogspot.com/2016/01/the-beatles.html>) and give students time to explore this information.
2. Using **Handout 5 - Illustrated Word Problem**, instruct students to create an Illustrated Word Problem using information about the Beatles. Students may use the information in the Interactive Infographic, the timeline, in other resources in this lesson, or online. Remind students to make their illustrated word problems fun and colorful!

EXTENSION ACTIVITIES

1. Give students three minutes to write as many facts as they can about the Beatles. Afterwards students may share their facts and then add things that they heard from their peers to their own lists.
2. Watch TeachRock Founder Steven Van Zandt talk about The Beatles here: https://teachrock.org/video/steven-van-zandt-the-early-beatles/?_sf_s=beatles&post_types=lesson,people,video,image,article.
3. Learn more about the Beatles at this Kiddle: https://kids.kiddle.co/The_Beatles
4. For more infographics regarding The Beatles, direct students to this feature in *The Guardian*: <https://www.theguardian.com/news/datablog/2012/oct/05/beatles-charts-infographics>

STANDARDS

COMMON CORE STATE STANDARDS

Math Standards

Operations and Algebraic Thinking 3.OA.A.1: Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each.

Operations and Algebraic Thinking 3.OA.A.2: Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.

Operations and Algebraic Thinking 3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Operations and Algebraic Thinking 3.OA.C.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations.

Numbers and Operations in Base 10 3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Numbers and Operations in Base 10 3.NBT.A.3: Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.

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

Reading 1: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

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 Writing (K-12)

Text Types and Purposes 2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

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.

Language 2: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Language 3: Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

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

Speaking and Listening 1: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Speaking and Listening 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.

SOCIAL STUDIES – NATIONAL COUNCIL FOR THE SOCIAL STUDIES (NCSS)

Theme 1: Culture

Theme 2: Time, Continuity, and Change

Theme 3: People, Place, and Environments

Theme 4: Individual Development and Identity

NATIONAL STANDARDS FOR MUSIC EDUCATION

Core Music Standard: Responding

Interpret: Support interpretations of musical works that reflect creators' and/or performers' expressive intent.



Evaluate: Support evaluations of musical works and performances based on analysis, interpretation, and established criteria.

Core Music Standard: Connecting

Connecting 11: Relate musical ideas and works to varied contexts and daily life to deepen understanding.



RESOURCES

VIDEOS

- *The Beatles: Eight Days a Week – The Touring Years: Beatlemania*
- *The Beatles: Eight Days a Week – The Touring Years: The Residencies in Hamburg, Germany and the Arrival of Ringo Starr*
- *The Beatles: Eight Days a Week – The Touring Years: The Beatles' Early Years*
- *The Beatles: Eight Days a Week – The Touring Years: The Beatles on the Ed Sullivan Show*

HANDOUTS

- Handout 1 - Introducing Vocabulary
- Handout 2 - Timeline of the Beatles' Early Years
- Handout 3 - Beatles Math
- Handout 4 - Illustrated Math Page
- Handout 5 - Illustrated Word Problem