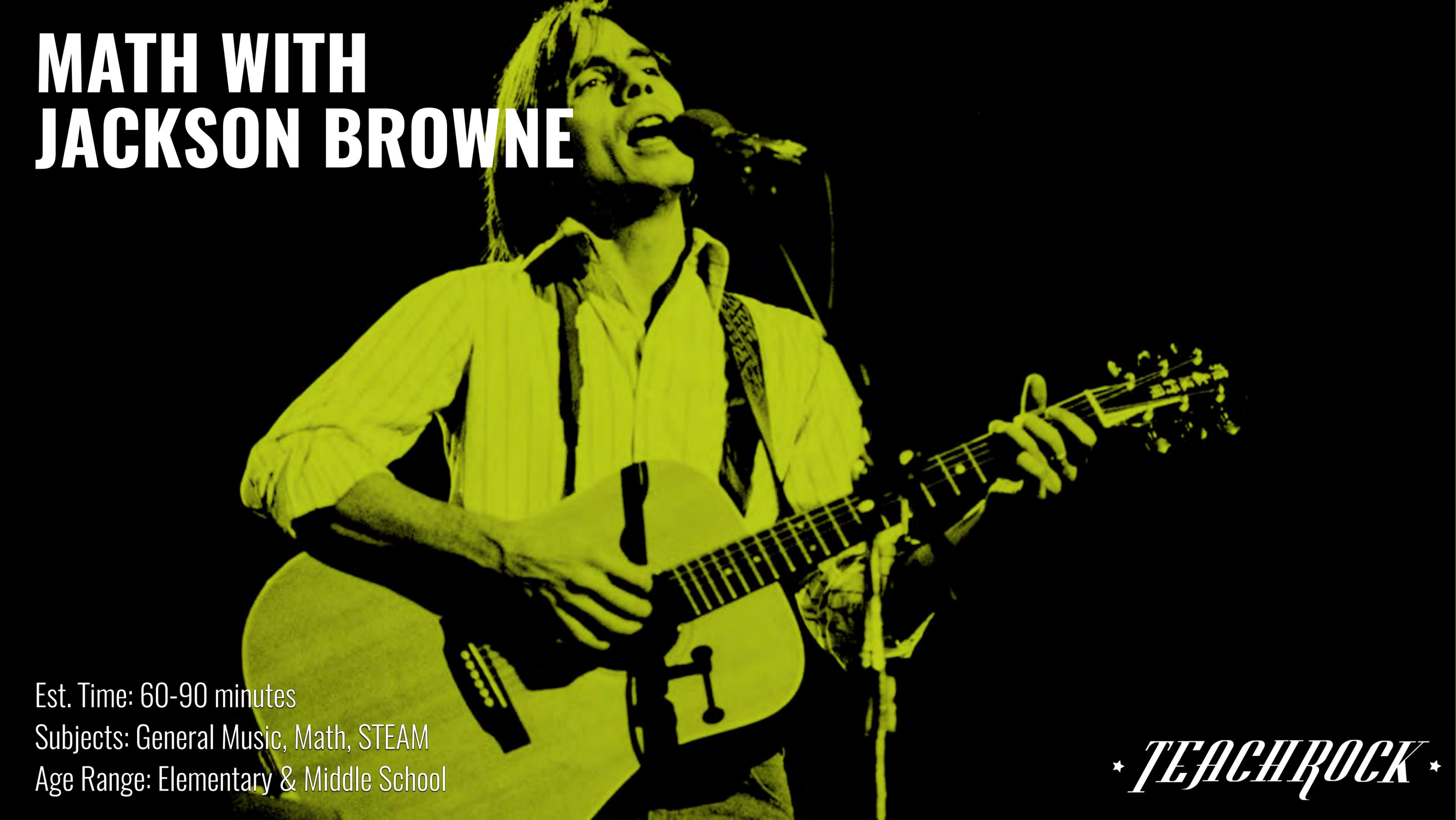


MATH WITH JACKSON BROWNE



Est. Time: 60-90 minutes

Subjects: General Music, Math, STEAM

Age Range: Elementary & Middle School

★ *TEACHROCK* ★

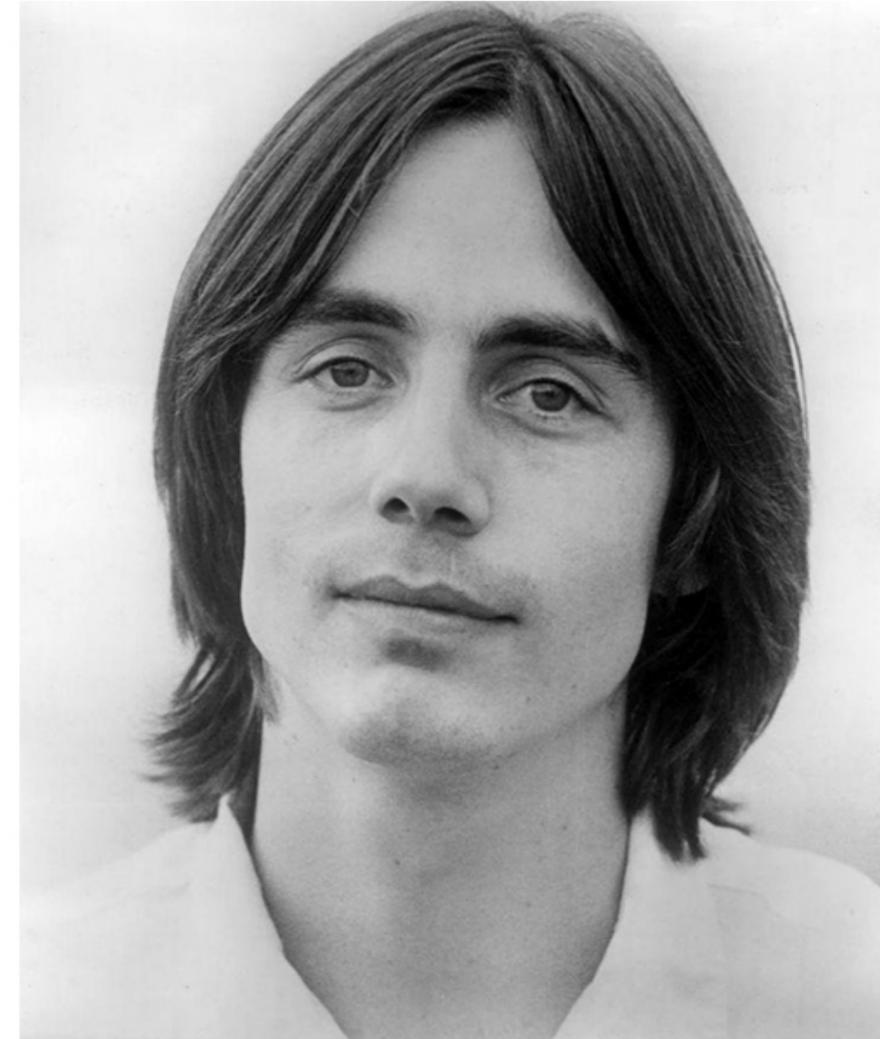


How can math be used to better understand the cost of a musician's tour bus?

In this lesson you will:

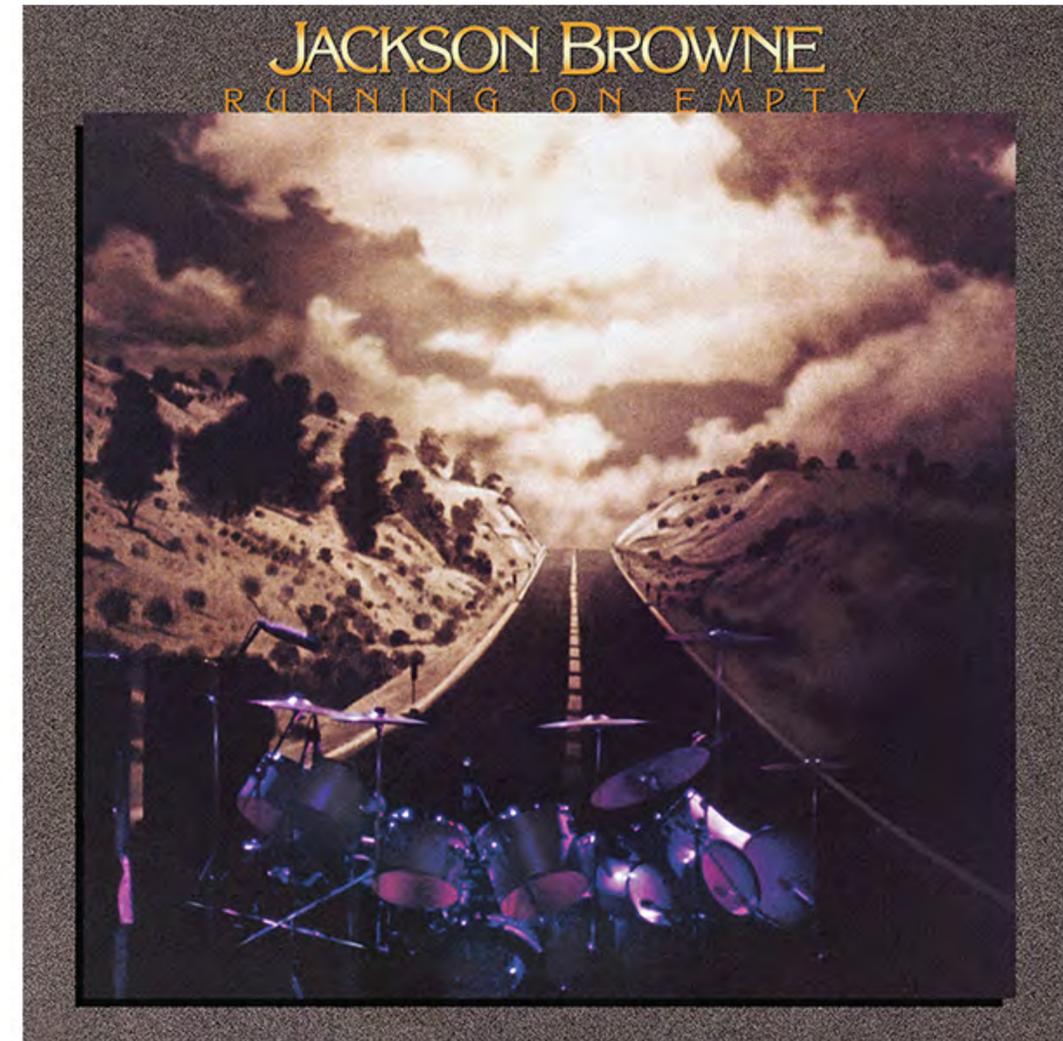
- Discover singer-songwriter Jackson Browne and learn about his popularity
 - Learn about Jackson Browne's album *Running on Empty* and his songs about life on the road
 - Formulate equations using addition, multiplication, and division that relate to numeric information regarding the costs of a tour bus
- 

Jackson Browne is a singer-songwriter who has been performing music since 1966. Browne was raised in Southern California, and his earliest albums are associated with the California Sound of the early 1970s.



Jackson Browne's best-selling album is *Running on Empty*, which was released in 1977. The album was written and recorded while Jackson was on tour, and many of the songs discuss what life is like "on the road."

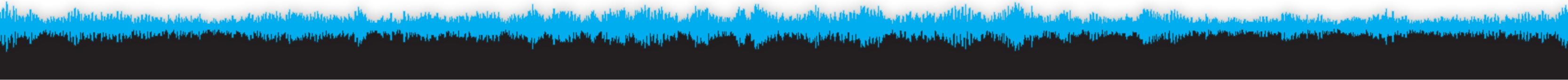
Watch Jackson Browne perform the song "Running on Empty" during his induction ceremony to the Rock and Roll Hall of Fame.





Read the lyrics to “Running on Empty.”

Consider or ask a friend:

- How does this song describe being on the road as a traveling musician?
 - What other journey might Jackson Browne be referring to in these lyrics?
 - How would you describe the mood of this song? How does the upbeat tempo affect your reaction to “Running on Empty”?
 - What do you think the phrase “running on empty” means?
- 



“Running on Empty” can mean driving when the gas tank is close to empty, or it can be a person feeling like they have run out of energy.

Being a touring musician can be expensive and tour bus fuel is a big expense. The stress of having enough money to pay for gas might leave someone feeling physically and emotionally empty.

On the next slide, you will calculate the cost of traveling in a tour bus.



Problem 1:

After his show at Red Rocks Amphitheatre near Morrison, Colorado on August 12th 1977, Jackson Browne and his band traveled to Los Angeles, California to perform at Universal Amphitheatre on August 13th.

On average, a tour bus can travel 6 miles on 1 gallon of gasoline.

The distance between Morrison and Los Angeles is 1,014 miles.

Consider or ask a friend:

- What mathematical function needs to be used for this calculation?
- What is the important information needed to complete this equation?
- How many gallons of gasoline were used to travel between these two places?



Problem 2:

In 1977, the cost of a gallon of gas was 62 cents.

Based on your answer to the question in the previous slide, consider or ask a friend:

- How much money did it cost for Jackson Browne to go from Red Rocks Amphitheatre to Universal Amphitheatre?
 - What mathematical function did you use to arrive at your answer?
- 



See the calculations below. Did you take a similar approach to finding the answers?

- The distance between Morrison and Los Angeles is 1,014 miles
 - A tour bus averages 6 miles per gallon
 - To calculate how many gallons of gas are required to travel between Morrison and Los Angeles, you need to **divide** the total distance by how many miles a tour bus can travel on 1 gallon of gas (**$1,014 \div 6 = 169$ gallons**)
 - The cost of a gallon of gas was 62 cents in 1977
 - To calculate the cost of traveling from Morrison to Los Angeles, you need to **multiply** the total amount of gallons used by the price of gasoline per gallon (**$169 \times \$0.62 = \104.78 of gas to make the trip**)
- 

Problem 3

In 2020, the average cost of gasoline in the United States is \$2.50 a gallon.

Consider or ask a friend:

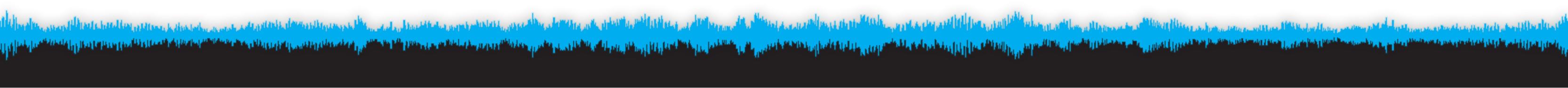
- How much would it cost today to travel from Morrison to Los Angeles in a tour bus?

Remember: the distance between these two locations is 1,014 miles, and tour buses can drive 6 miles per gallon.



Complete the chart in [this handout](#) to calculate the cost of gasoline required for the first leg of Jackson Browne's 1978 Running on Empty Tour. Then, calculate how much this part of the tour would cost today,

See [this video](#) if you need some help with multiplying decimals.





Now add in your calculations the cost of a tour bus driver.

Today, the average Tour Bus Driver earns \$24.75 per hour.

Consider or ask a friend:

- How do you calculate how long it takes a driver to reach a certain destination?
- How do you calculate how much money the driver needs to be paid per trip?
- What would a band today need to pay their driver in total if they were touring along the same route that Jackson Browne and his band traveled back in 1978?

Use this handout to make your calculations.





Jackson Browne is well known for his environmental activism. He was one of the founding members of Musicians United for Safe Energy (MUSE), which opposes nuclear energy.

He is also involved in fighting plastic pollution, and has received a Lifetime Environmental Achievement Award in 2010 for his efforts to make his tours more “green.”





Burning gasoline produces carbon dioxide (CO₂), a greenhouse gas that contributes to global warming. For every gallon of gasoline burned, around 27 pounds of CO₂ are released into the atmosphere.

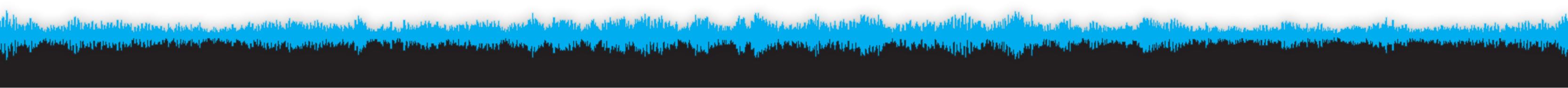
Jackson Browne is known to use a biodiesel bus, which releases around 6 pounds of CO₂ into the atmosphere.

The first leg of Jackson Browne's tour Running on Empty Tour in 1978 was 2,845 miles.





Consider or ask a friend:

- How many pounds of CO₂ would a gasoline-fueled bus release for this portion of the tour?
 - How many pounds of CO₂ would a biodiesel-fueled bus release for this portion of the tour?
 - How many pounds of CO₂ are saved by using a biodiesel bus?
 - What mathematical function did you use to arrive at your answer?
- 



Have you ever thought about what car you might like to drive one day? Understanding the cost of travel is important, even if you are not a touring acclaimed songwriter.

For example, the Toyota Corolla Hybrid gets 52 miles per gallon. This car can travel 500 miles on 9.6 gallons of gasoline. The Bugatti Divo gets 10 miles per gallon. This car would need 50 gallons of gasoline to travel the same distance. This is a difference of 40.4 gallons, or \$101.00 at \$2.50 per gallon of gasoline.



Even with good fuel economy, driving a car still expels more greenhouse gases compared to other forms of transportation.





Consider or ask a friend:

- According to the illustration above, what are the most environmentally-friendly modes of transportation?
 - “Transit” includes buses and trains, which can use more gas than a car. Why then are these modes of transportation considered more environmentally friendly than driving alone?
 - Based on everything you examined, what is the most environmentally-friendly way to travel long distances on a music tour?
- 

SUMMARY

- Jackson Browne is an American singer-songwriter and musician who has sold over 18 million albums in the United States alone
- The album *Running on Empty* was released in 1977, and was recorded on the road and featured songs themed around life on a tour
- Basic arithmetic can be used to determine the costs of travel by tour bus
- Jackson Browne has been a leader in environmental activism since the 1970s and uses more environmentally-friendly biodiesel tour buses
- Numeric equations can be formulated to calculate the cost of gasoline for a tour bus and demonstrate the importance of getting good gas mileage



BE CREATIVE

STEAM ACTIVITY: Imagine that you are a popular music artist who is about to embark on a national tour. Use [this handout](#) to design and sketch your own personalized tour bus, and examine [this site](#) for inspiration.



BE CREATIVE

- Imagine that you are a performing artist who is planning a tour. Use **Google Maps** to plan your route and then calculate the amount of money that you will spend on gasoline for your tour bus, using the information that you learned in this lesson.
- Draw a colorful map of your imaginary tour journey and make some mathematical notes along the way.
- **Create your own** Illustrated TeachRock Tour Bus Word Problem using information in this lesson, and make it colorful and creative!



BE CURIOUS

- Learn more about Jackson Browne [here](#).
- Ever wonder what happened to tour buses when live music performances were cancelled during the 2020 Covid-19 Pandemic? Explore this [Travel + Leisure Article](#) to find out!



CAREER CONNECTIONS

Explore CTE AME Careers associated with this Lesson:

- Professional Music
- Stage Technology
- Multimedia Audio Production
- Film/Video Production
- Multimedia Broadcast Production



CONNECT

Share with us! Either you or an adult in your life can share your Tour Map, Bus Design, or your Illustrated Word Problem with TeachRock on **Instagram** or **Facebook**, email to **info@teachrock.org**, or Tweet it to **@TeachRock**



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