

Benefits of Biking

Reduction in Carbon Emissions

The following formula was used to estimate the reduction in carbon emissions due to biking.

$$8.89 \times 10^{-3} \frac{(\text{CO}_2 \text{ emissions per gallon of gasoline})^2 \times 8 \text{ (VMT per day)}}{22 \text{ (MPG)}} \times 8 \text{ (VMT per day)}$$

The formula for determining the CO₂ emissions, comes from The Environmental Protection Agency (EPA). The formula is based on the assumption listed, and provides an estimate of CO₂ emissions per vehicle per day.

- The average vehicle produces 0.00889 metric tons of CO₂ per gallon of gasoline
- Students are not eligible to take a bus unless they are more than 2 miles from the school, therefore it is assumed that each drop-off/pick-up includes a 4 mile round trip for a total of 8 vehicle miles traveled (VMT) per day
- The average vehicle gets 22 miles per gallon (MPG)
- CO₂ is the only contributor to carbon emissions.

Estimate of CO₂ emissions per vehicle per time length:

- 0.0032 tons of CO₂ emissions per vehicle per day
- 0.016 tons of CO₂ emissions per vehicle per week
- 0.064 tons of CO₂ emissions per vehicle per month

Health Benefits

Health benefits of biking include, reduced stress, calmer thinking, reduced anxiety, increases self esteem, and it even combats depression. Aerobic exercise like cycling releases cortisol which helps lower stress endorphins which give the biker a feel good mood which reduces anxiety. Due to the focus needed for biking it allows for calmer thinking, which is important for staff and students. Biking can also help with mild to moderate cases of depression since exercise you enjoy is known to increase your mood. Lastly biking and exercise in general helps increase your self esteem since you

can see yourself become fitter and there is sense of accomplishment from completing a workout.

Reduction in Traffic Congestion

As for traffic benefits from an increase of biking, will mean less cars on the roads resulting in less congestion and reduced risks of accidents. In 2010, the Newton 2040 document was drafted documenting the problems in Newton, one of these problems included too many traffic tie-ups. The city also discovered that for many residents, the primary form of travel is by car. One of the ways to reduce traffic congestion is to promote other modes of transportation like biking. This would include, the construction of bicycle shelters, and the addition of bike lanes and signage so that bikes and cars can easily navigate the streets together.

Sources

- EPA (2017). [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015. Chapter 3 \(Energy\), Tables 3-12, 3-13, and 3-14. Environmental Protection Agency, Washington, D.C. EPA #430-P-17-001 \(PDF\) \(633 pp, 15 MB About PDF\)](#)
- [Highway Statistics 2015. Office of Highway Policy Information, Federal Highway Administration. Table VM-1. About PDF\)](#)
- <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>
- <http://www.newtonma.gov/gov/executive/newtonleads2040.asp>
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