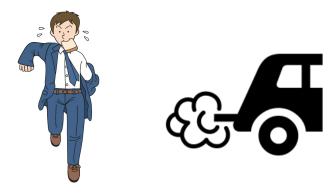# Carl's Carbon Worksheet

Problem:

Carl's running late for work! He just missed the bus and now must get to his office on time so his boss does not fire him. Every day at work, Carl must fill out a **Trip Tracker** to be considered for a bonus. On the **Trip Tracker**, the fewer carbon points Carl has, the better his chances of getting a bonus. Help Carl find the best way to get to work that also helps him get his **Trip Tracker** bonus!

Constraints (limits):

Carl has **20 minutes** to get to his office on time and only **$15** in his wallet, some of which he must save for lunch.

Transportation Trade-offs:

Remember, each mode of transportation comes with a cost! Although driving your car is the fastest, the carbon cost is also the highest. Although walking costs zero money and has the highest health benefit, it also takes the longest time. You should keep these in mind while answering the questions below.

Table 1. Transportation Trade-Offs

Transportation Choice	Travel Time	Travel Cost	Carbon Cost (3=high carbon footprint cost, 0=low carbon footprint cost)	Health Benefits (10=high, 0=low)
Car	5 Minutes	$10	3	0
Bus	10 Minutes	$5	2	5
Bike	15 Minutes	$0	1	10
Walk	20 Minutes	$0	0	10

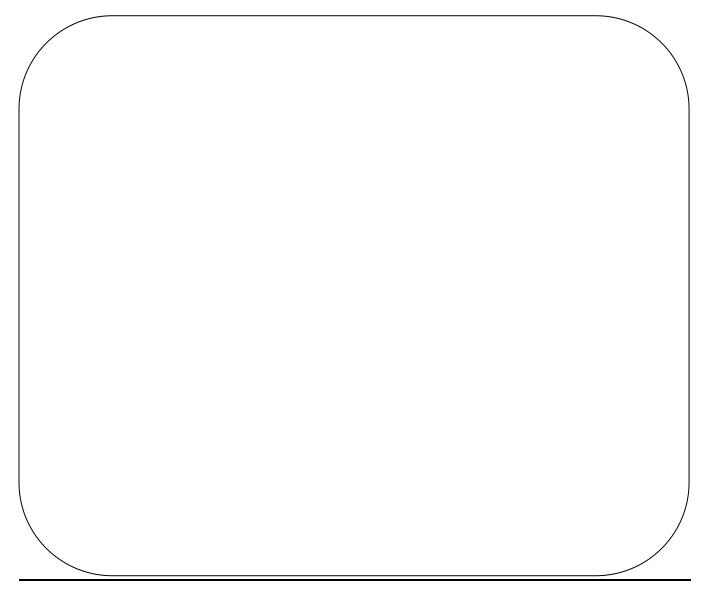**Imagine (brainstorm):** Which mode of transportation do you think is best? Why? Which mode of transportation do you think is worse? Why?

Design a Process (prototype): Carl is running late for work every day this week, he needs your help to decide on the best way to get to work on time depending on each day's travel challenge!

Using the following Table 2 Trip Tracker, work together as a class engineering team to assess the travel challenges and the constraints that Carl faces each day. Then decide on the best travel solution that has the lowest carbon footprint cost to get Carl to get to work on time!

Table 2. Carl's Trip Tracker					
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Travel Challenge	Gas shortage! The price of gas has doubled and so have the travel costs.	It is raining and Carl has to look good for an important meeting!	Carl is running extra late and only has 10 minutes to get to work.	Carl only has $10 in his wallet, and he must save some money for lunch.	Carl's office is offering an extra $10 for people choosing a healthy form of transportation to get to work!
Weather	Sunny	Rainy	Sunny	Sunny	Sunny
Travel Cost	Car - $20 Bus - $10 Bike - $0 Walk - $0	Car - $10 Bus - $5 Bike - $0 Walk - $0	Car - $10 Bus - $5 Bike - $0 Walk - $0	Car - $10 Bus - $5 Bike - $0 Walk - $0	Car - $10 Bus - $5 Bike - $0 Walk - $0
Travel Time to Work	20 minutes	20 minutes	10 minutes	20 minutes	20 minutes
Money in Wallet	$15	$15	$15	$10	$15
Health Bonus	$0 bonus	$0 bonus	$0 bonus	$0 bonus	$10 bonus
Travel Solution & Carbon Footprint Cost: Circle your choice to get Carl to work on time each day.	Car=3 Bus=2 Bike=1 Walk=0	Car=3 Bus=2 Bike=1 Walk=0	Car=3 Bus=2 Bike=1 Walk=0	Car=3 Bus=2 Bike=1 Walk=0	Car=3 Bus=2 Bike=1 Walk=0

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Test (prototype feedback):

- Use the workspace below to add up the total Carbon Cost for getting Carl to work during the week. Circle the answer to determine Carl's "carbon footprint" for his travel choices (a bigger carbon footprint means more carbon cost; a smaller footprint means less cost):
  - 15-11: Carl has a high carbon cost (big carbon footprint)
  - 10-6: Carl is taking steps to reduce his carbon cost.
  - 5 or less: Carl has a low carbon cost (small carbon footprint)

Reflection discussion:

- Which categories (weather, travel cost, travel time, available money, health bonus, carbon cost) are most important in making your travel solution decisions?

- Looking back on your response in the "Imagine" section at the start, did you change your mind on what form of transportation that you think is best? Why or why not?