



TeachEngineering

Wildfire and Car CO2 Emissions – Student Workbook



Subscribe to our newsletter at TeachEngineering.org to stay up-to-date on everything TE!

Brought to you by





Wildfires and Cars

Do they release CO₂?

Is one worse than the other?

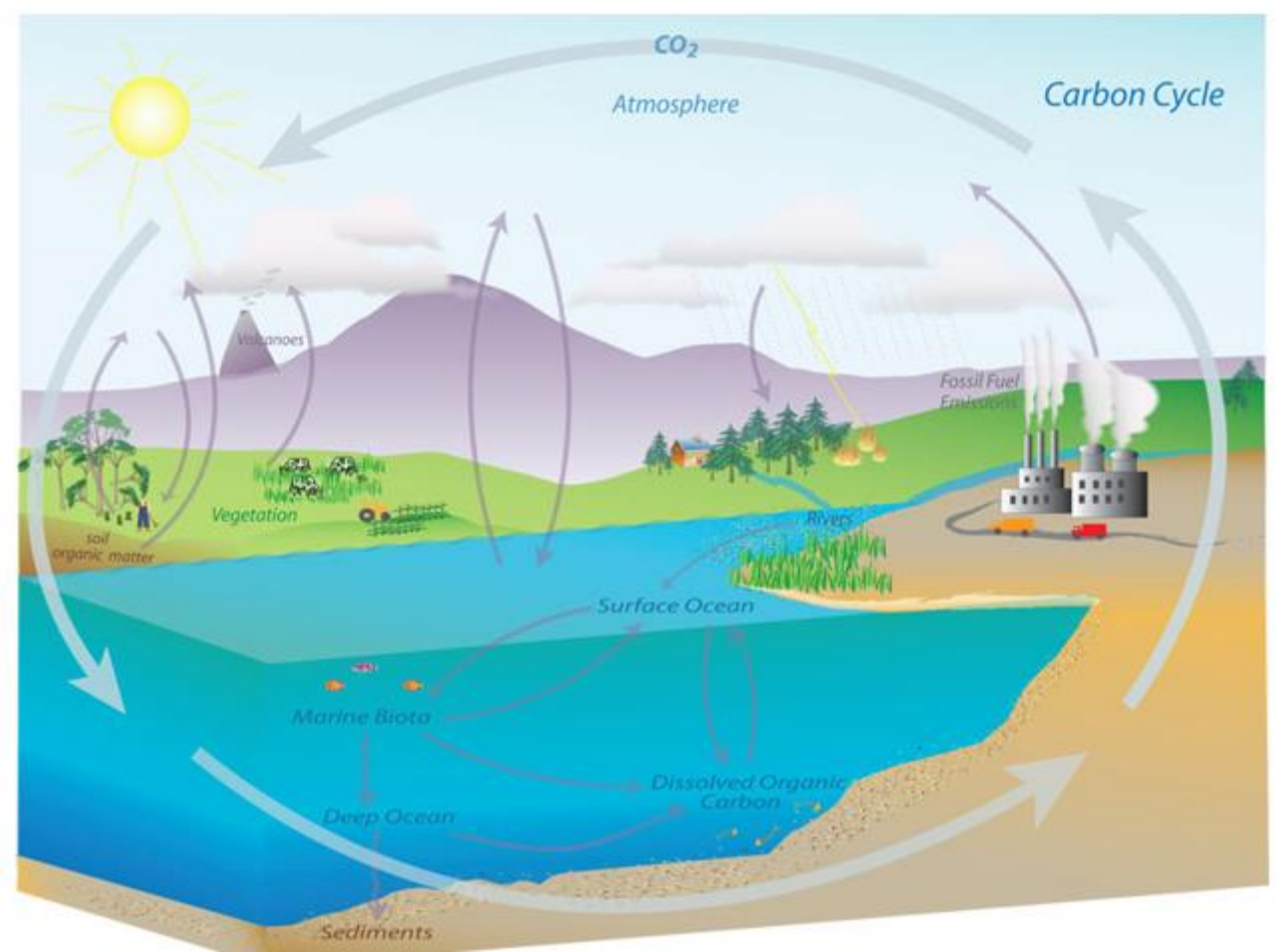


Carbon Cycle Review

- Using the diagram, list how CO₂ is released and absorbed in a cycle.

CO₂ Released

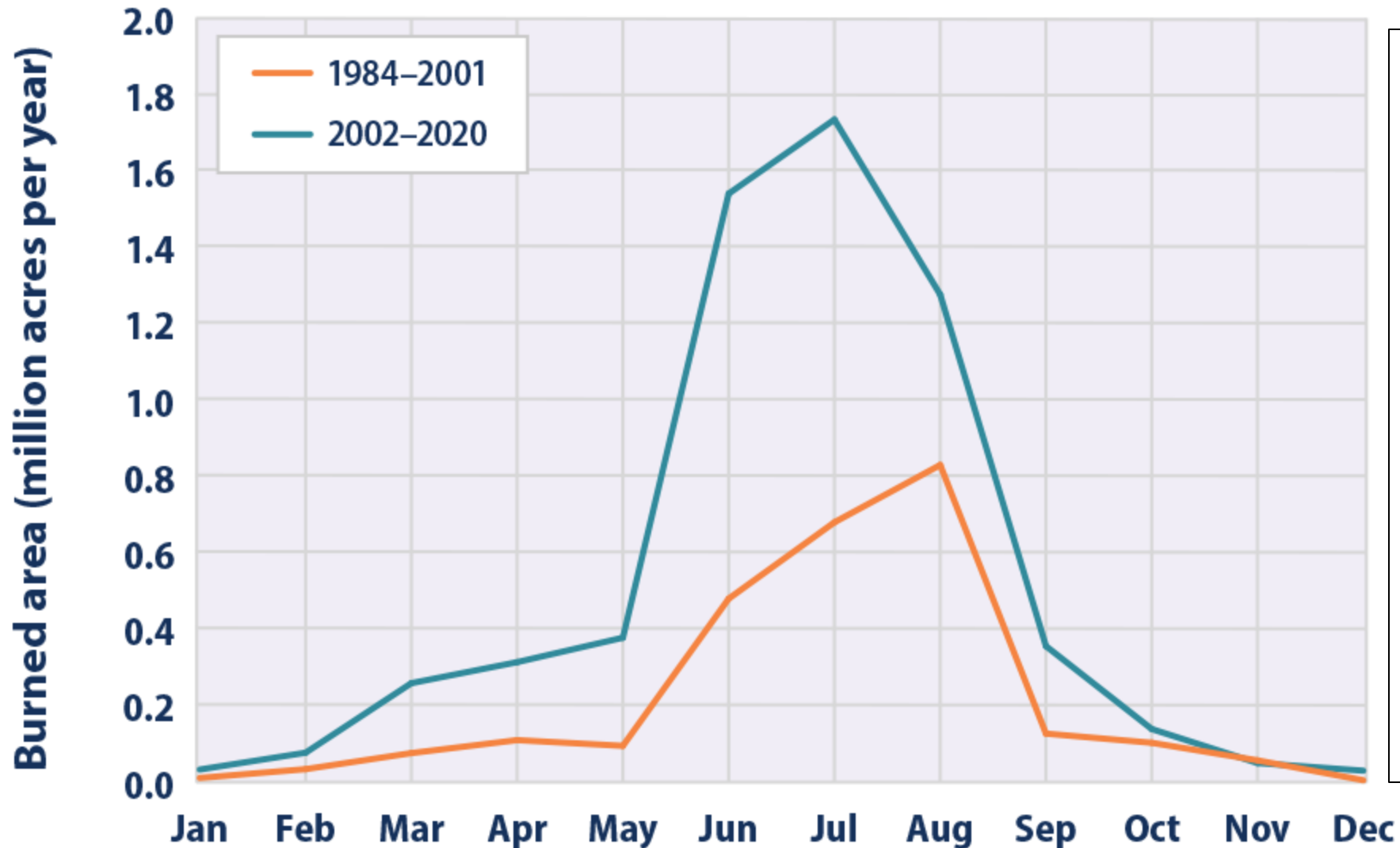
CO₂ Absorbed (Sink)



The carbon cycle. (Image credit: NOAA)

Why is the cycle out of balance? What is the result of an imbalanced cycle?

Comparison of Monthly Burned Area Due to Wildfires in the U.S. between 1984-2001 and 2002-2020



Turn and Talk: Write two conclusions from the graph.

Fire Management

- Not every fire is a wildfire. How is this diagram demonstrating a healthy forest?



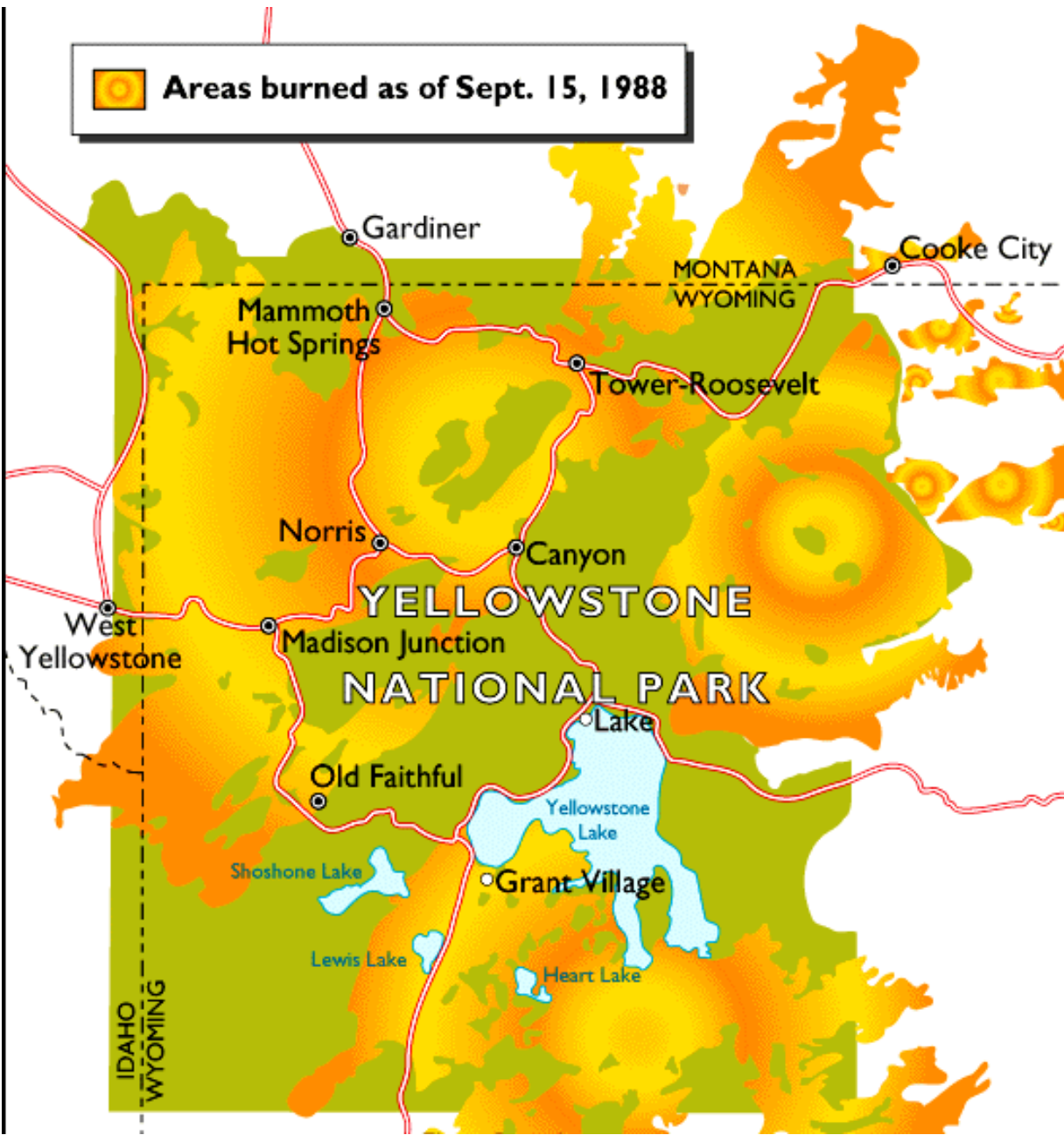
Source: www.openspaceauthority.org

Forest Management: The Story of the 1988 Yellowstone Fire

- Answer the questions while watching the video:

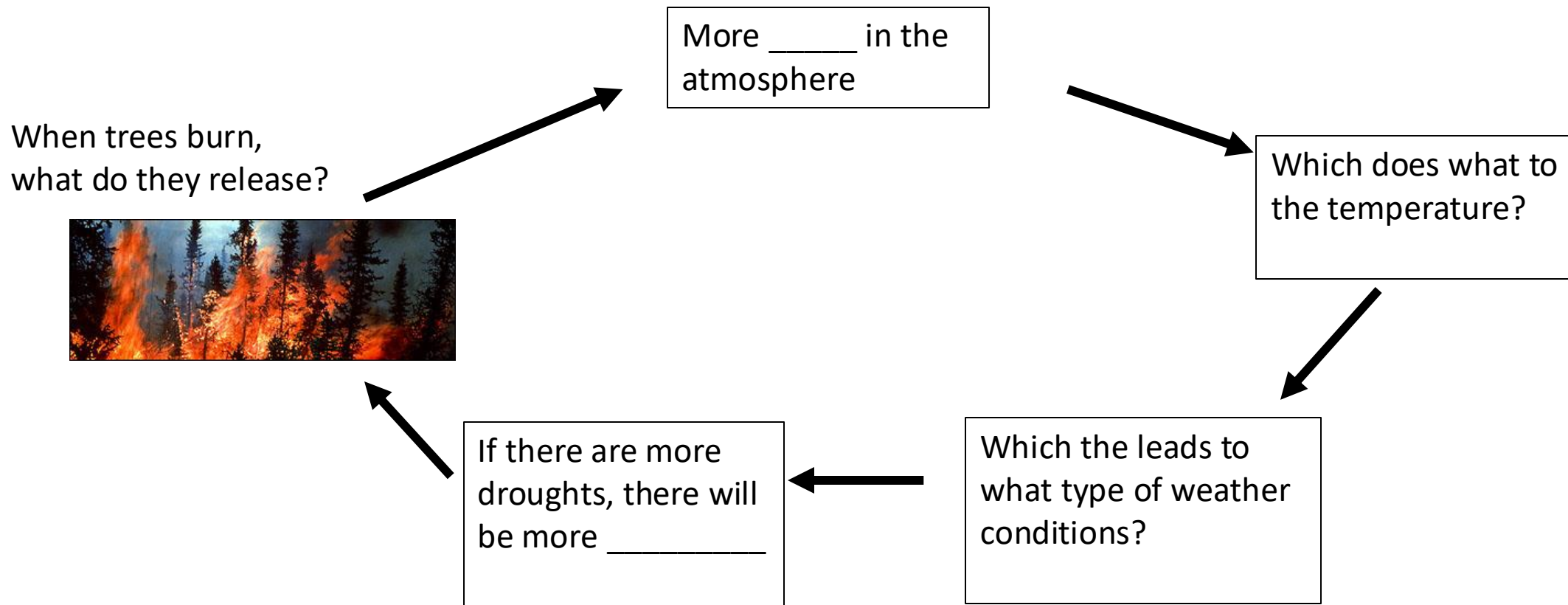
<https://www.youtube.com/watch?v=CAgP9fo3f7s>

1. Why did park officials originally just let the fires burn in Yellowstone?
2. On July 21, 1988, what did park officials decide to do about the fire?
3. What was a result of the hugely popular Smokey the Bear campaign?
4. What finally put out the fires?
5. After the fires, how did the park change?
6. Why is letting some fires burn no longer an option in some places?



Climate Change and Fire (Positive Feedback)

- How does changing the climate impact wildfires?



Wildfire Evacuation

Stop at 7:43 https://www.youtube.com/watch?v=Y9r4hlk1_Zg
*60 Minutes Rewind--Paradise Lost: Inside California's Camp
Fire, 60 Minutes' 2018 report*

- 1. Write five observations about the mass evacuation.
- 2. How did the fire start?
- 3. What factors made the Paradise fire an extreme wildfire in California?
- 4. How many acres were consumed in 12 hours?

A stylized illustration of a black car on the left side of the frame. The car has a red taillight and a white wheel with a black hubcap. To the right of the car is a large white thought bubble containing the chemical formula CO₂. The background is a solid light blue color.

Cars and Exhaust

How do emissions from cars affect our atmosphere?

Picture: <https://www.sustained-quality.com/automotive-industry-criticizes-europes-co2-reduction-target>

Data Source: <https://www.epa.gov/greenvehicles/light-duty-vehicle-emissions>

TWO types of gases released from cars

Greenhouse gas (GHG) emissions

- CO₂, 99% of the GHG released from tailpipe.
- Stays in the atmosphere for 100 years.
- Blankets the earth, causing it to warm, sea levels rise, glaciers melt.
- Changing climate.
- Can adversely affect humans with changing ecosystems.

Smog emissions (air pollution)

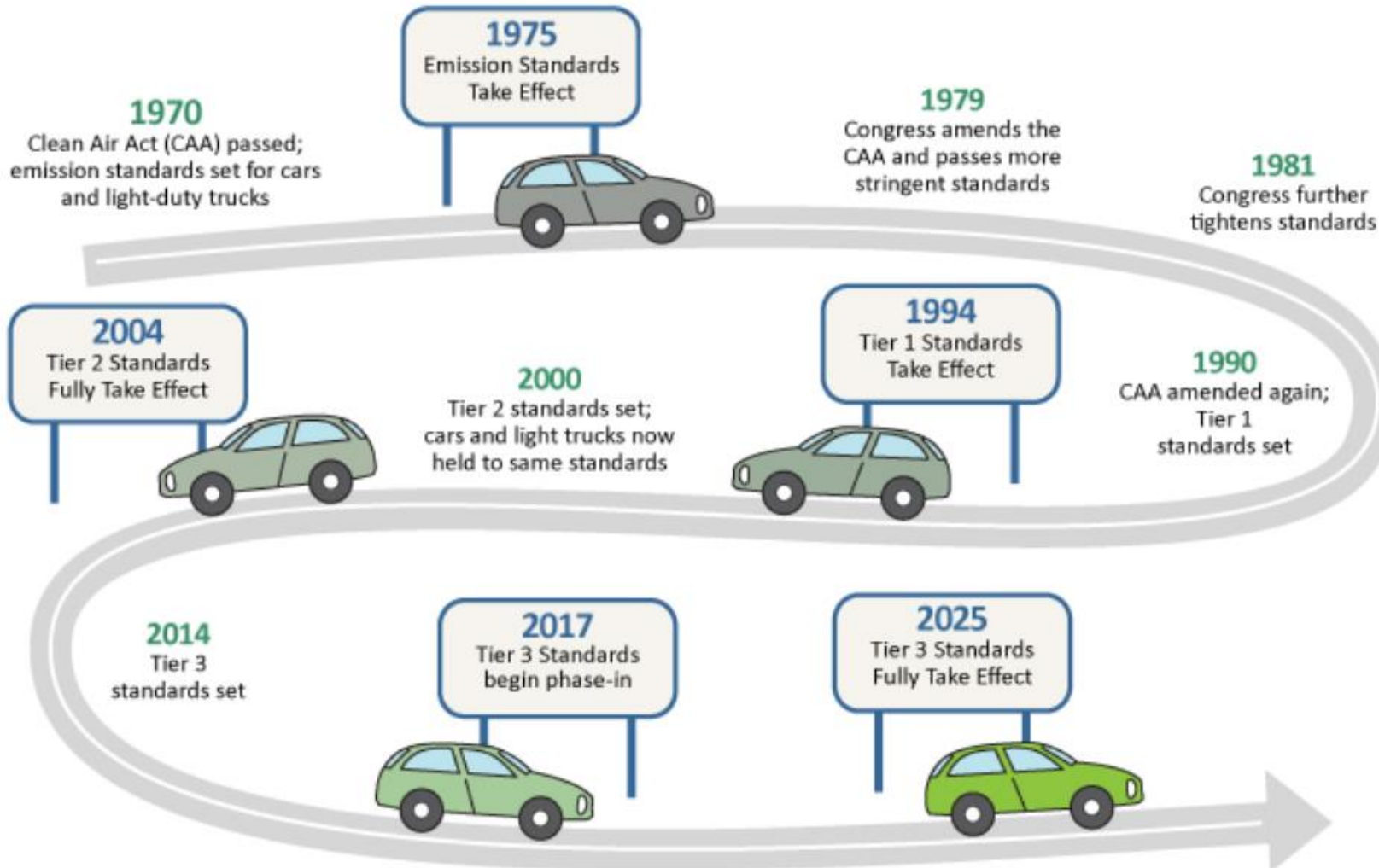
- NO_x (nitrogen oxides), irritates eyes, nose, throat.
- Particulate matter (PM), which can get into your throat or collect on buildings.
- CO (carbon monoxide), colorless, odorless, but poisonous.
- HCHO (formaldehyde), can irritate lungs and is a carcinogen.

When purchasing a vehicle, look for the emissions sticker from the EPA

What information does this emission sticker give you? List five items from the sticker below.



The Road to Cleaner Cars...



Turn and Talk:
What are your wonderings/observations from this diagram?