

Chemistry, Energy, and YOU

By

Dr. Steve
(Doctor of Chemistry)

The logo for Brookhaven National Laboratory features a stylized grey orbital path with a red dot at its center, positioned behind the text.

BROOKHAVEN
NATIONAL LABORATORY

Eisenhower School
December 10, 2015

HOW DID YOU GET TO SCHOOL TODAY?



HOW DID YOU GET TO
SCHOOL TODAY?



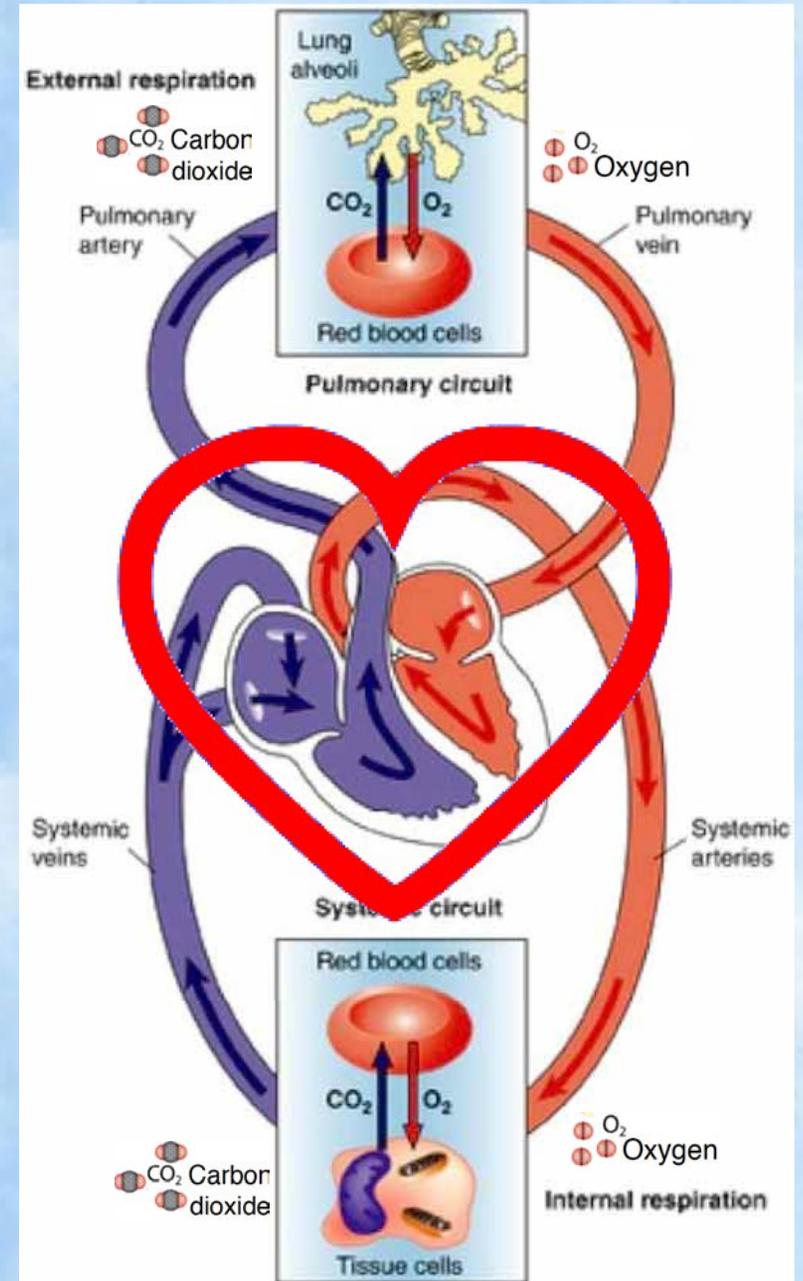
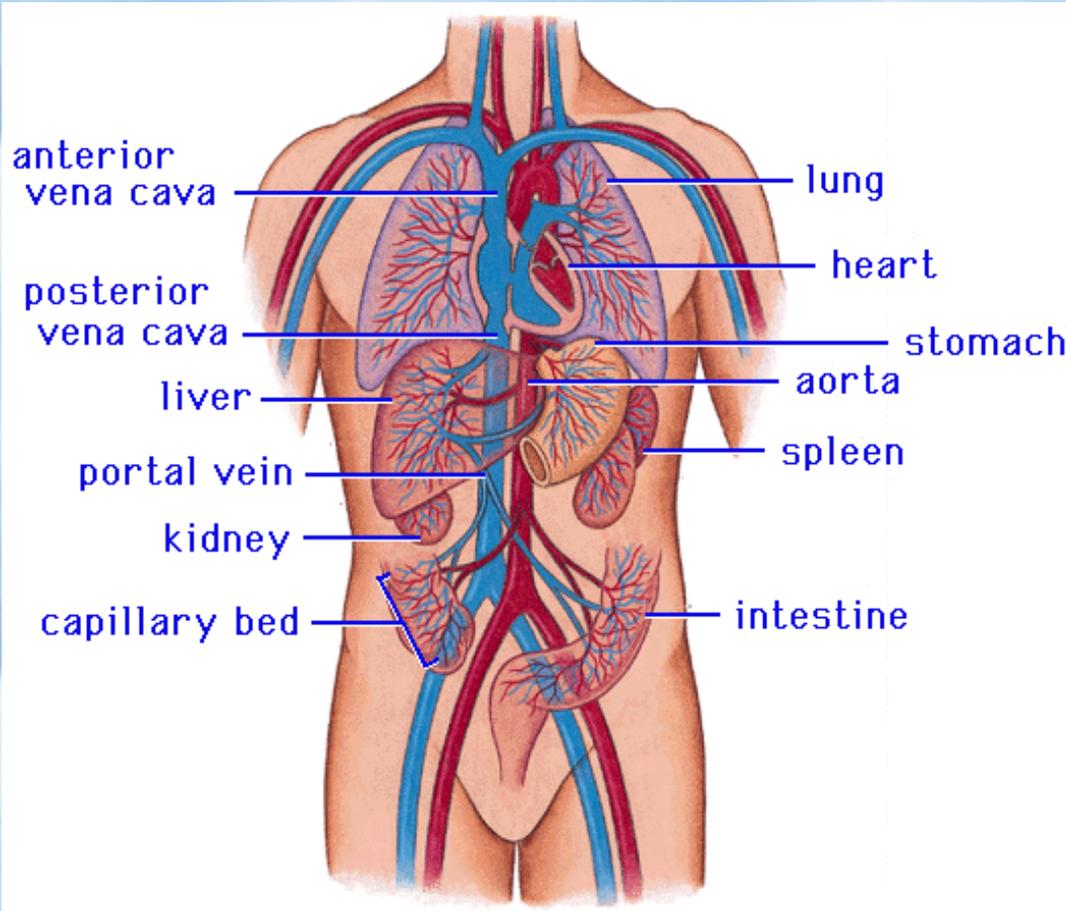
HOW DID YOU GET TO
SCHOOL TODAY?



HOW DID YOU GET TO
SCHOOL TODAY?



HOW DO ENERGY (AND OXYGEN) GET TO YOUR MUSCLES?



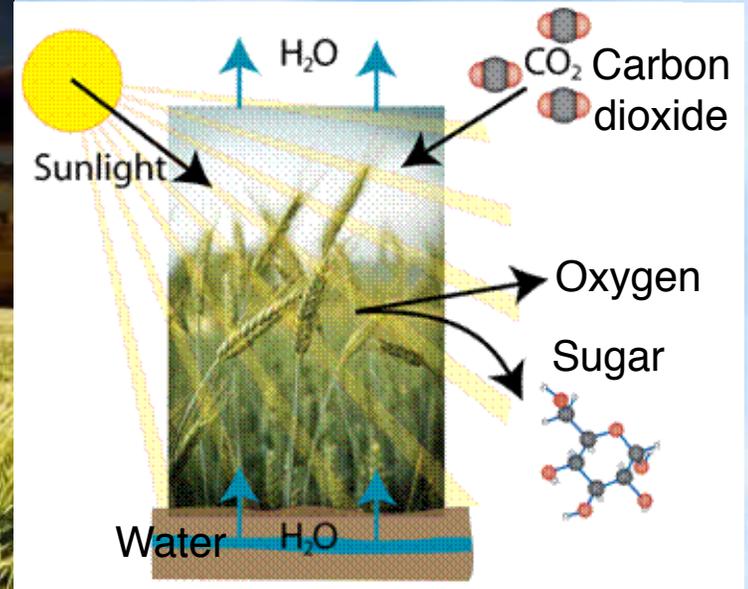
<http://library.thinkquest.org/5777/cir1.htm>

<http://newstt.com/how-is-circulatory-system-and-the-digestive-system-related/>

WHERE DOES YOUR FOOD GET ITS ENERGY?



www.desktopwallpaperhd.com



www.ems.psu.edu/~pisupati/ACSO Outreach/Petroleum_1.html

Food is stored solar energy.

HOW MUCH ENERGY
IS IN YOUR FOOD?

CALCULATE CALORIES PER GRAM



Nutrition Facts

Serving Size 1 serving (30 g)

Per Serving

Calories 90

Calories from Fat 0

Total Fat 0g

Sodium 80mg

Potassium 5mg

Carbohydrates 70g

Sugars 53.3g

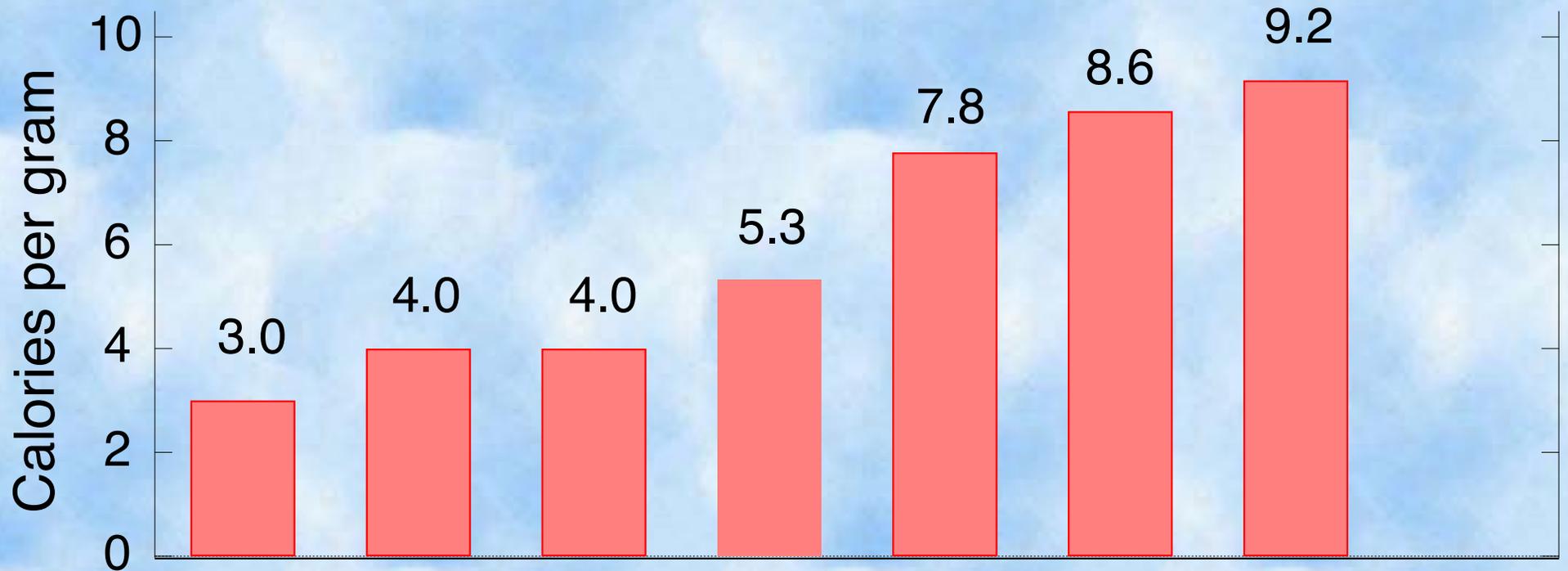
Protein 3.3g

90 Calories in 30 grams
(about 1 ounce)

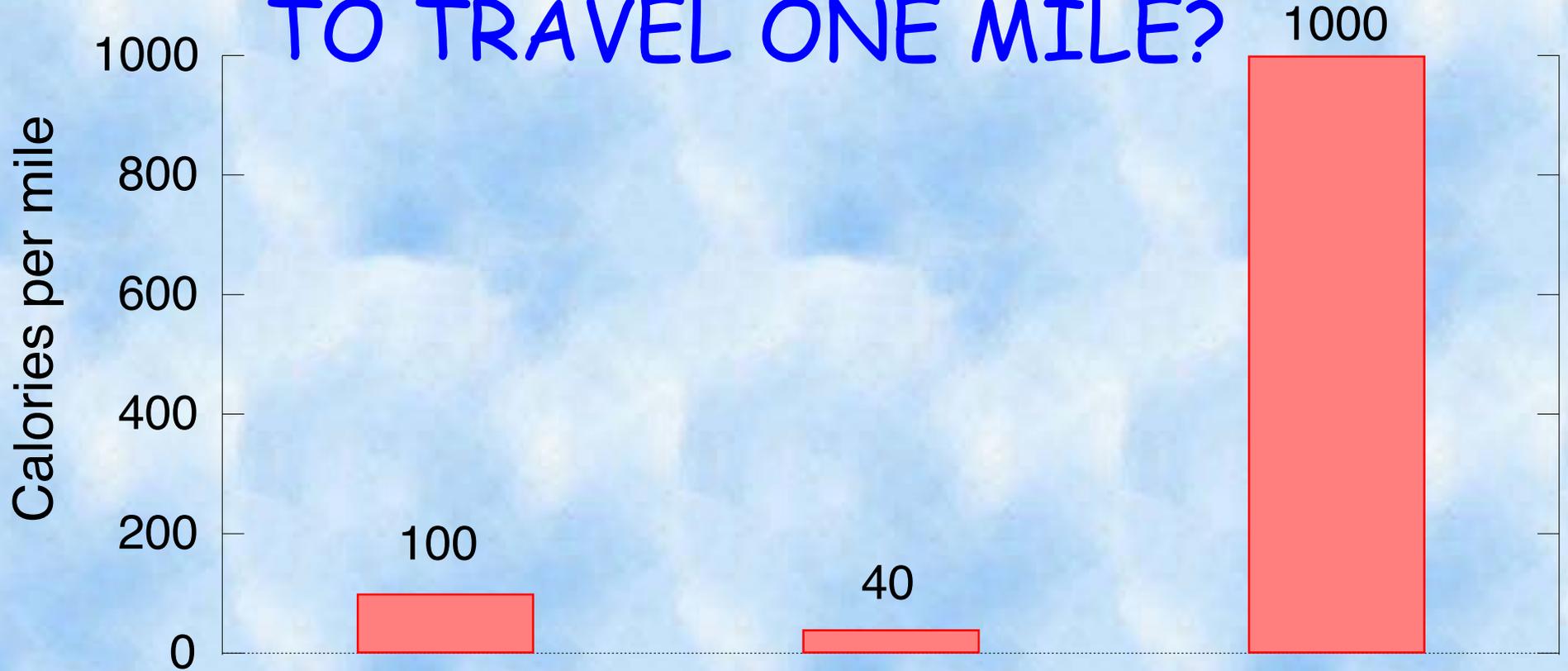
$$90 \div 30 = 3$$

3 Calories in one gram
(3 Calories per gram)

CALORIE CONTENT OF ENERGY FOODS



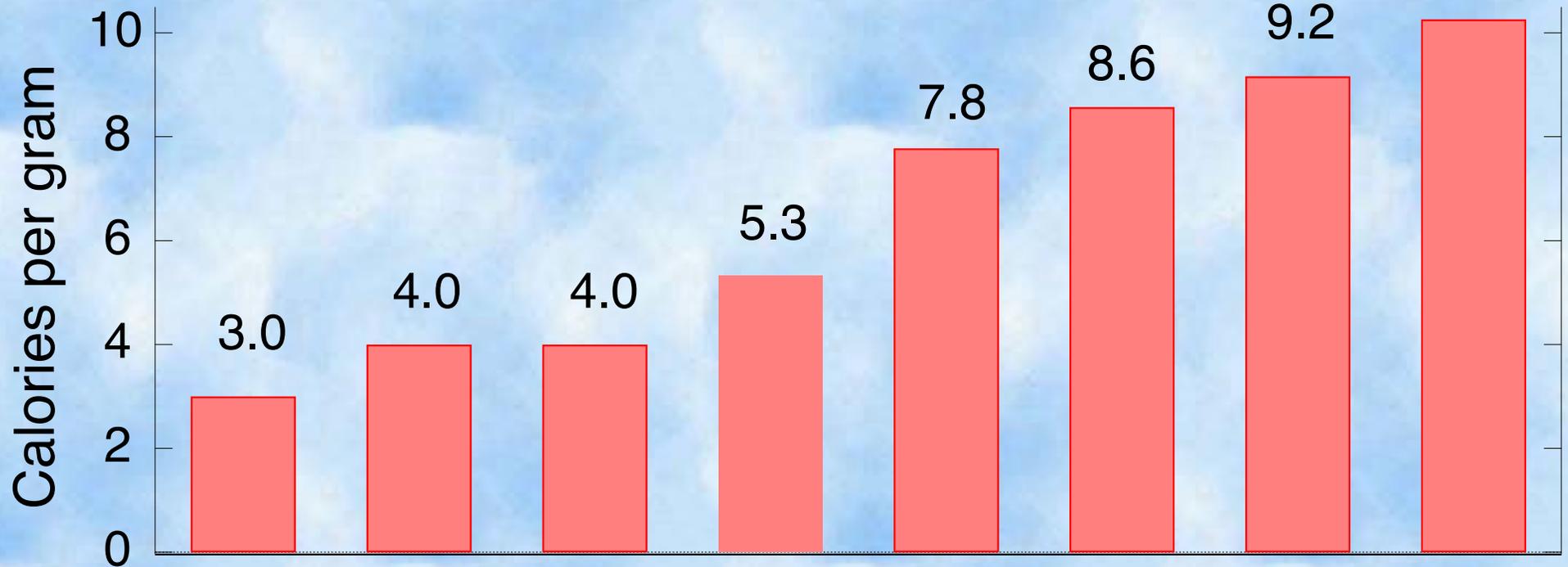
HOW MUCH ENERGY DOES IT TAKE TO TRAVEL ONE MILE?



WHERE DOES YOUR CAR GET ITS ENERGY?

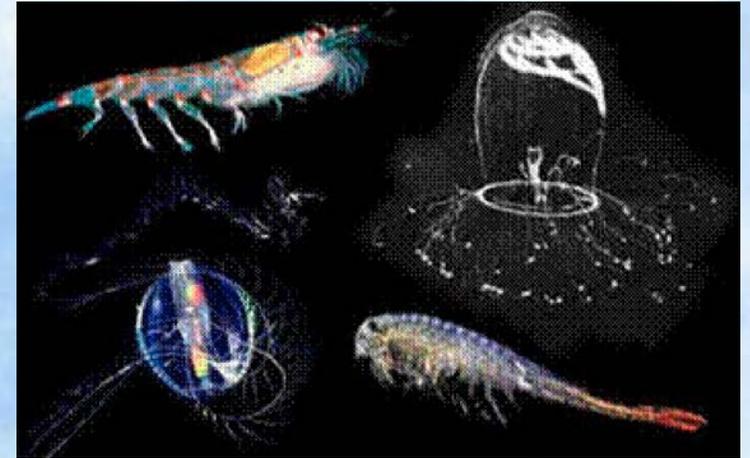
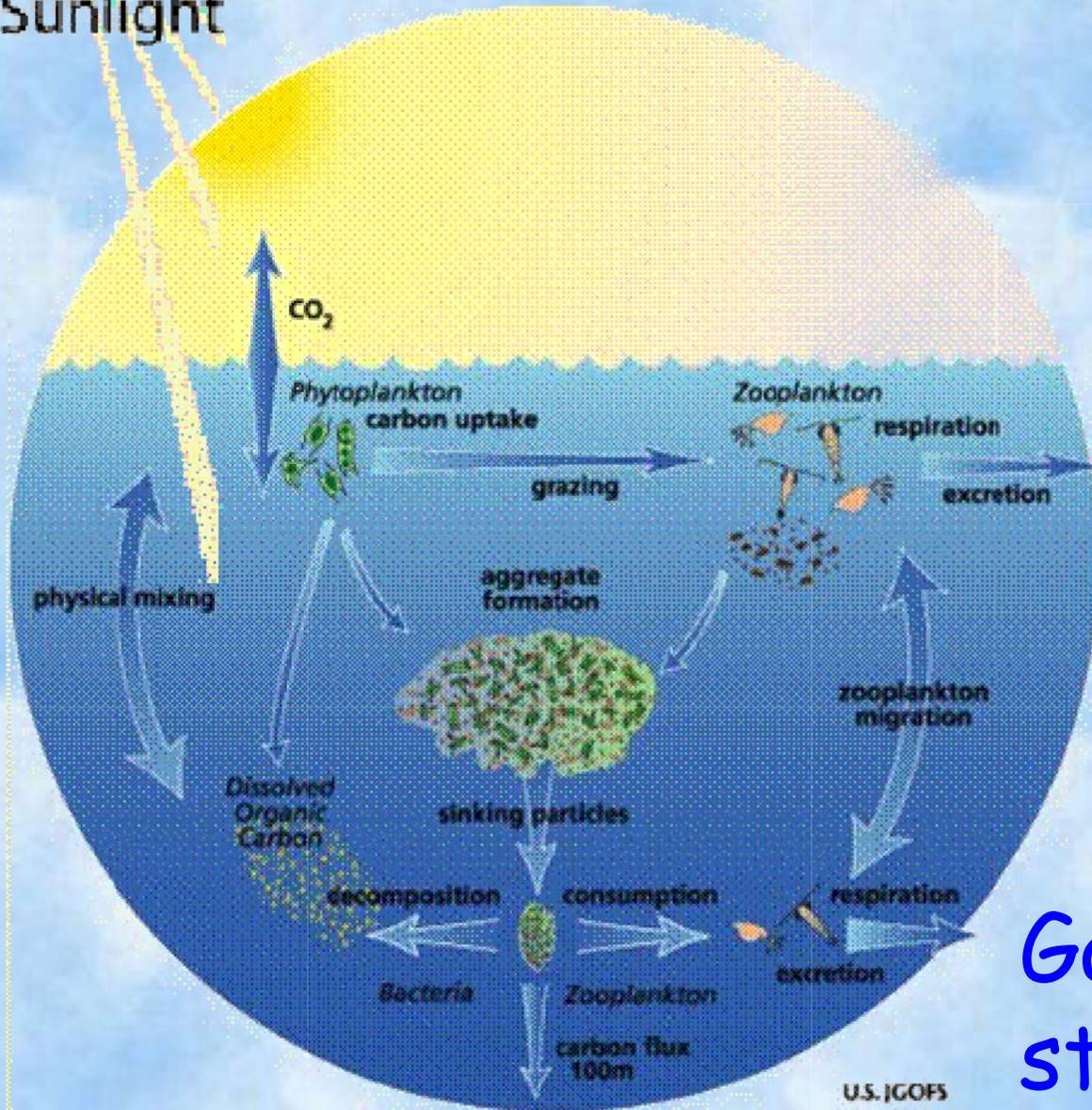


CALORIE CONTENT OF ENERGY FOODS AND GASOLINE





WHERE DOES GASOLINE GET ITS ENERGY?



Gasoline is also stored solar energy.

Stored for millions of years!

We burn fossil carbon fuels to . . .



Generate electric power

Heat our homes



Move goods and people from here to there



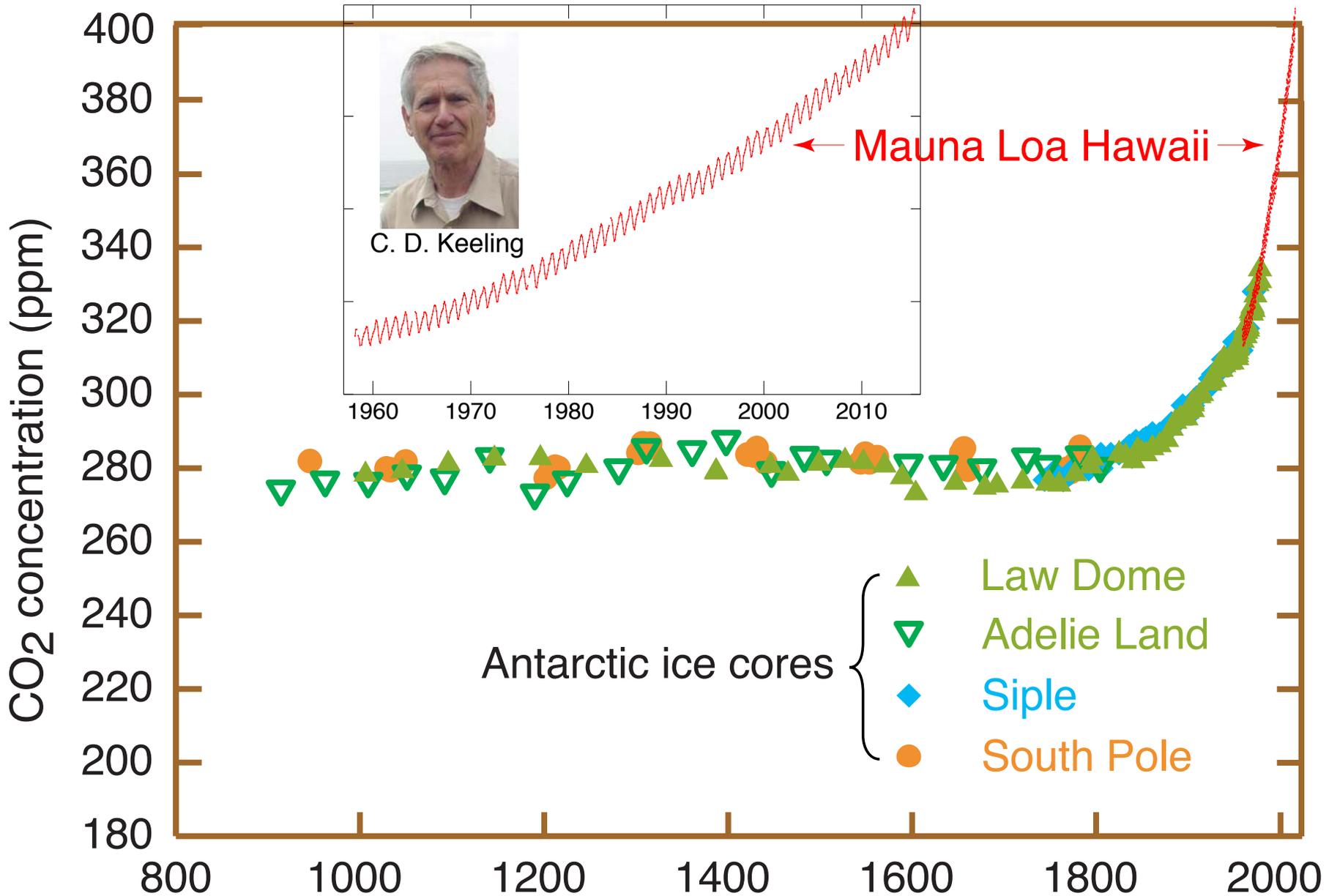
GLACIERS ARE OUR TIME MACHINE



New York Times, July 2, 2012

Lonnie Thompson, Ohio State University glaciologist, studies Earth's climate history by the ice archive.

ATMOSPHERIC CARBON DIOXIDE IS INCREASING



Global carbon dioxide concentration over the last thousand years

***WHERE IS ALL
THIS CO₂
COMING FROM?***

***WHO IS
RESPONSIBLE?***



HOW MUCH CARBON IS IN A GALLON OF GASOLINE?



1 lb?

2 lbs?

3 lbs!?



5 lbs!?!?

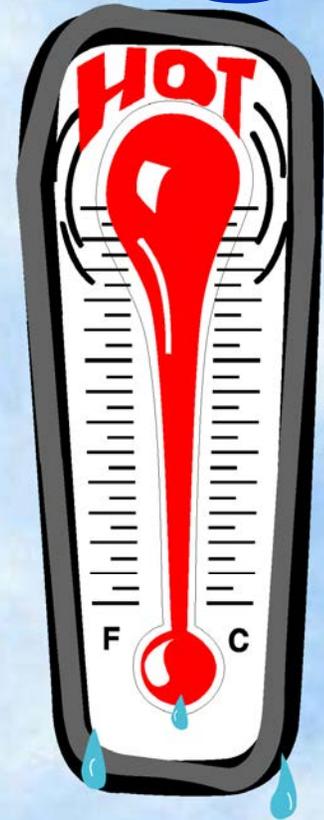
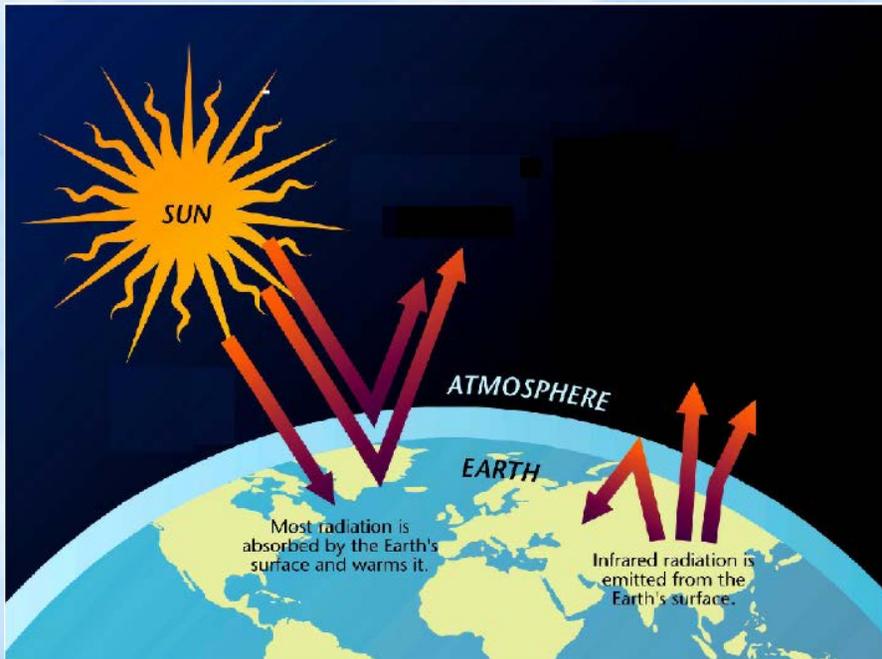


All of this carbon goes into the atmosphere as carbon dioxide when you burn the gasoline in your car.

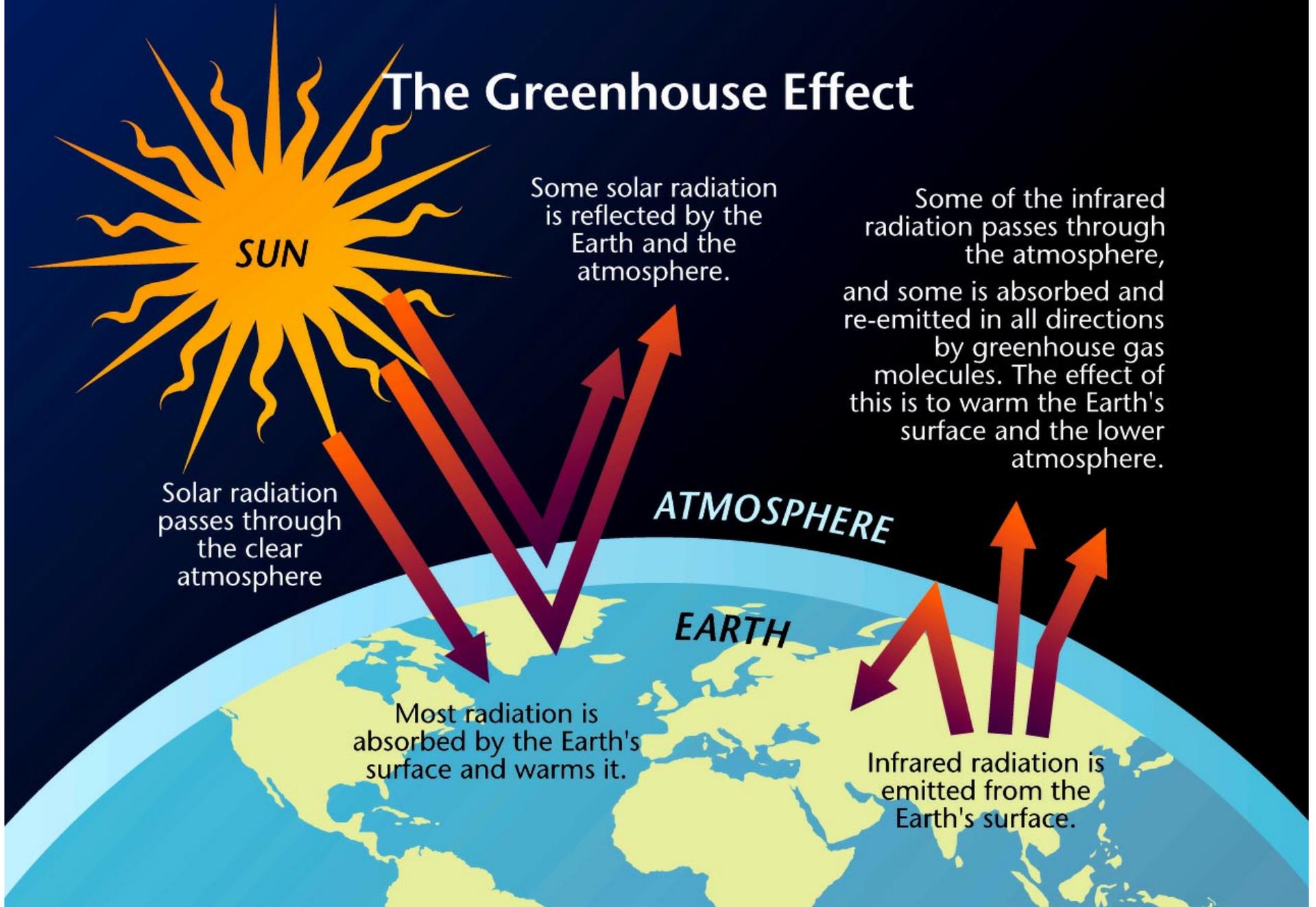


Climate change

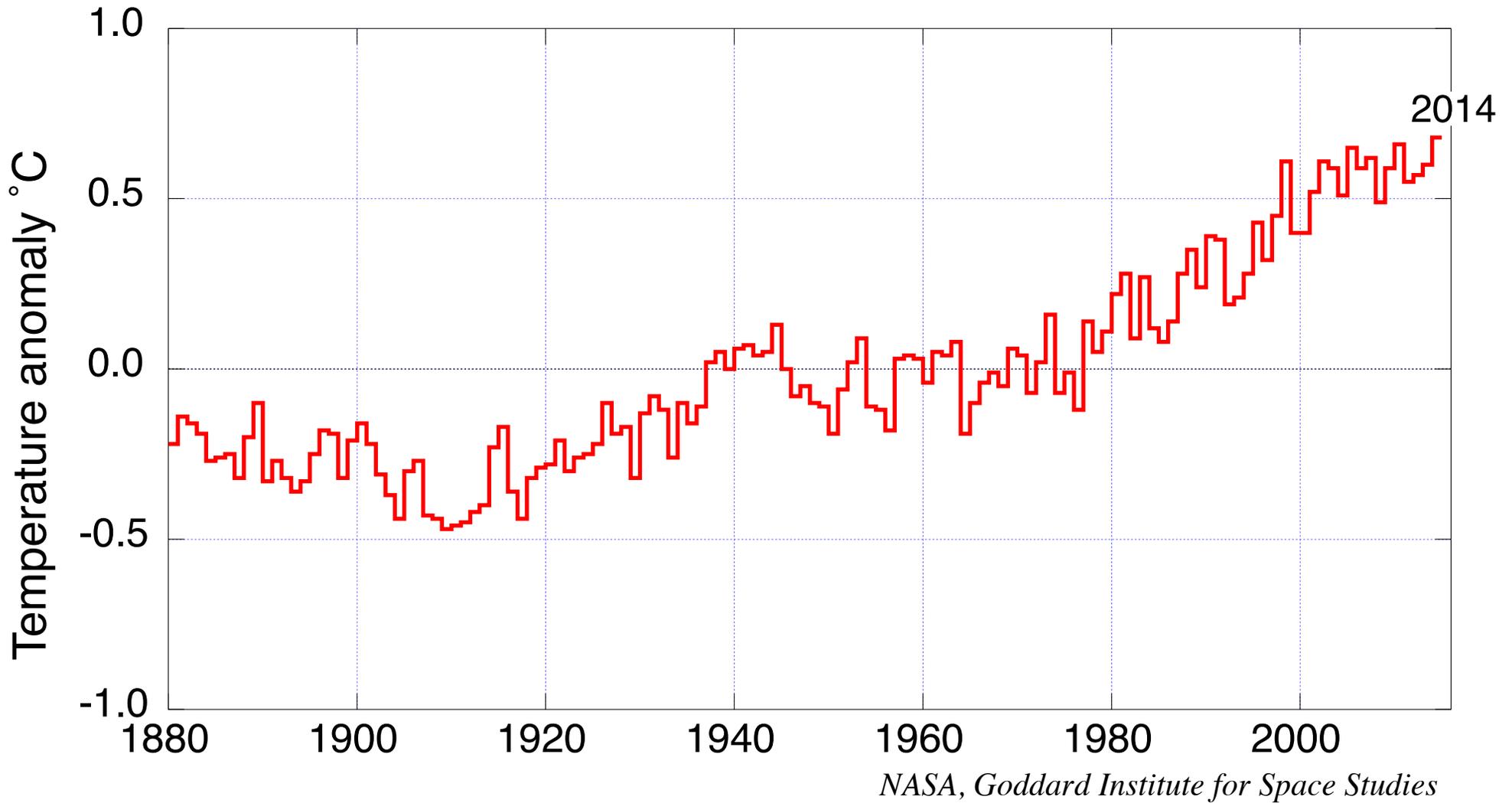
The Greenhouse Effect



The Greenhouse Effect



GLOBAL TEMPERATURE CHANGE SINCE 1880

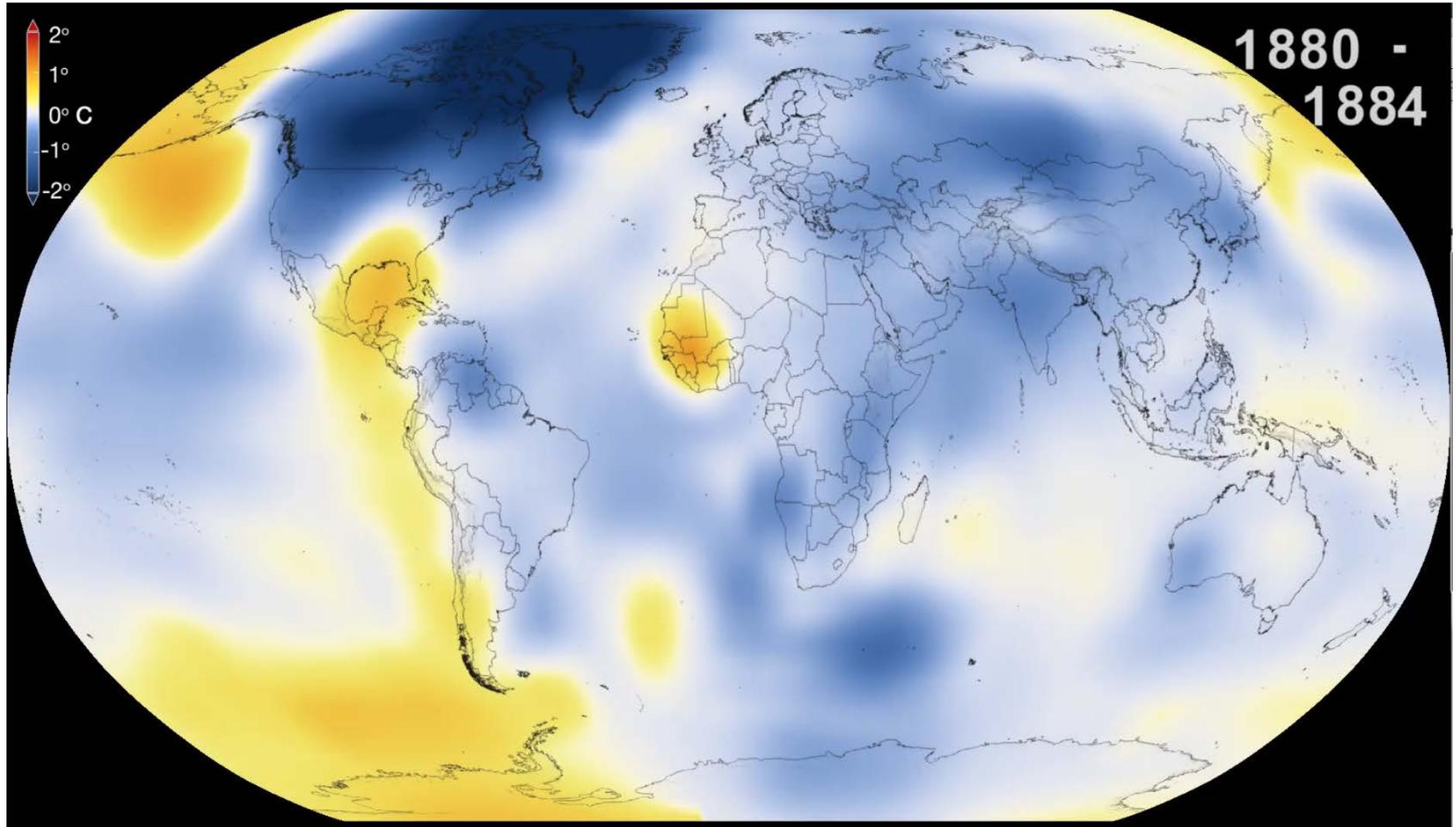


2014 was the hottest year on record.

14 of the hottest 15 years have been since 2000.

THE WARMING PLANET

Five-Year-Average Temperature Anomalies Relative to Mid 20th Century



NASA Goddard Institute for Space Studies

<http://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=4252>

IS THERE
ANYTHING
WE CAN DO?

***WHERE IS THIS CARBON DIOXIDE COMING FROM?
WE ARE ALL RESPONSIBLE.***



Burning a gallon of gasoline in your car puts 5 pounds of carbon in the atmosphere as carbon dioxide (CO₂), and it will stay there for decades — maybe a century!

Other sources are home heating and electric power production.



POWER YOUR CAR WITH ELECTRIC ENERGY



POWER YOUR CAR WITH SOLAR ELECTRIC ENERGY, FOR FREE



THANK YOU!

Dr. Steve

