

PRESENTATION TO CLN

PACIFIC ISLANDS CLIMATE EDUCATION PARTNERSHIP

October 7, 2014

<http://pcep.prel.org>





PCEP is a collaboration of over
60 partners working together toward a
new vision of climate education.

We are schools, colleges, community
organizations, and government agencies.



Pacific Islands
Climate Education Partnership



CNMI
HAWAII'
GUAM
PALAU
FEDERATED STATES OF MICRONESIA
MARSHALL ISLANDS

WE SERVE THE U.S.-AFFILIATED PACIFIC ISLANDS



AMERICAN SĀMOA



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Climate education in the Pacific is about:

- Place
- Projects
- Solutions
- Collective Action



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Climate
Education
Framework

Local
Ecological
Knowledge

Community-
School
Partnership

Learning &
Teaching



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Carbon Dioxide and the Carbon Cycle

Carbon Cycle Reservoirs

CO₂ and the Atmosphere

Temperature and CO₂

Click on the name of each reservoir for more information.

Atmosphere: 840 Gt



Fossil Fuels: 10,000 Gt



Ocean: 41,000 Gt

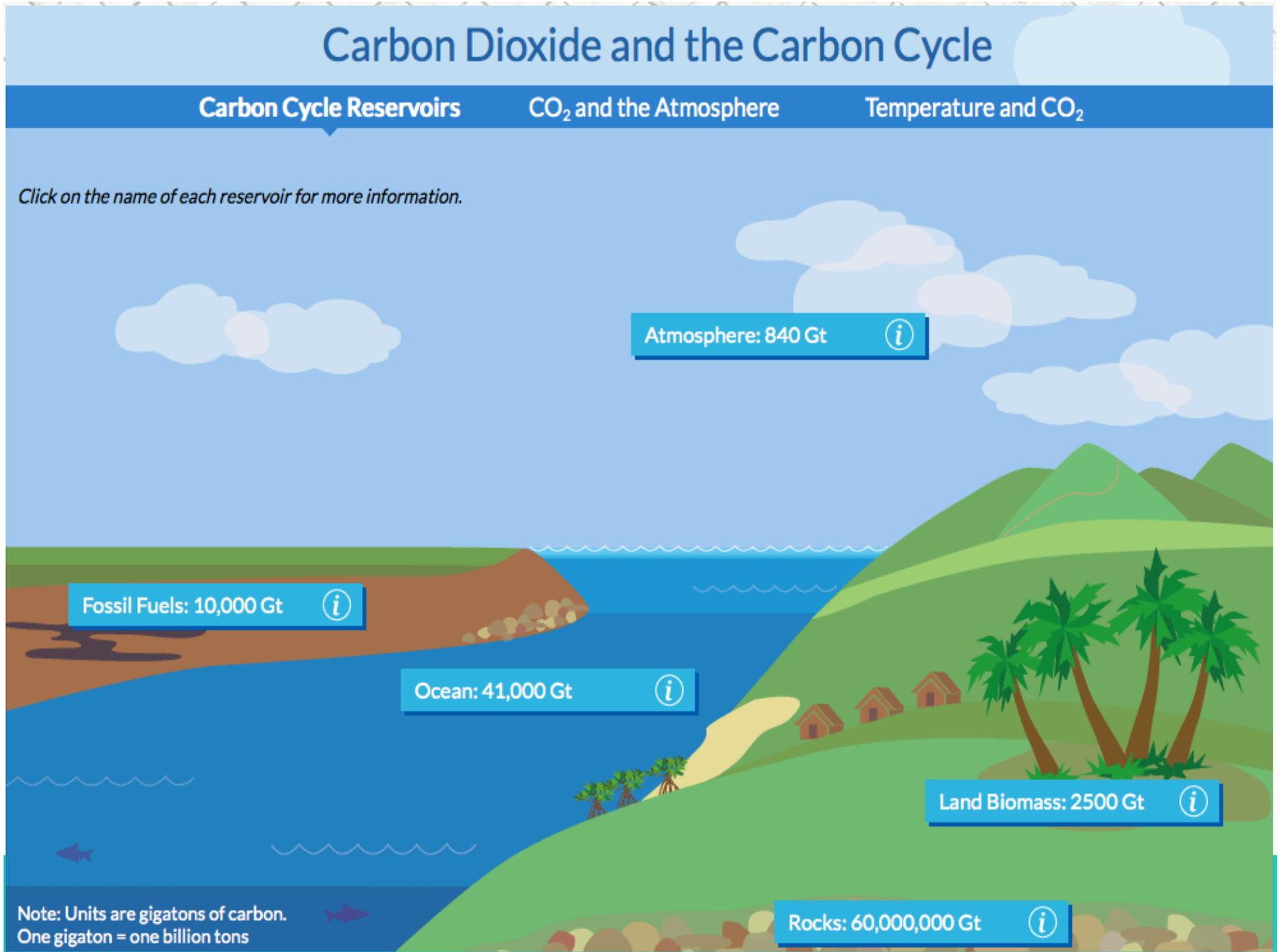


Land Biomass: 2500 Gt



Note: Units are gigatons of carbon.
One gigaton = one billion tons

Rocks: 60,000,000 Gt



Carbon Dioxide and the Carbon Cycle

Carbon Cycle Reservoirs

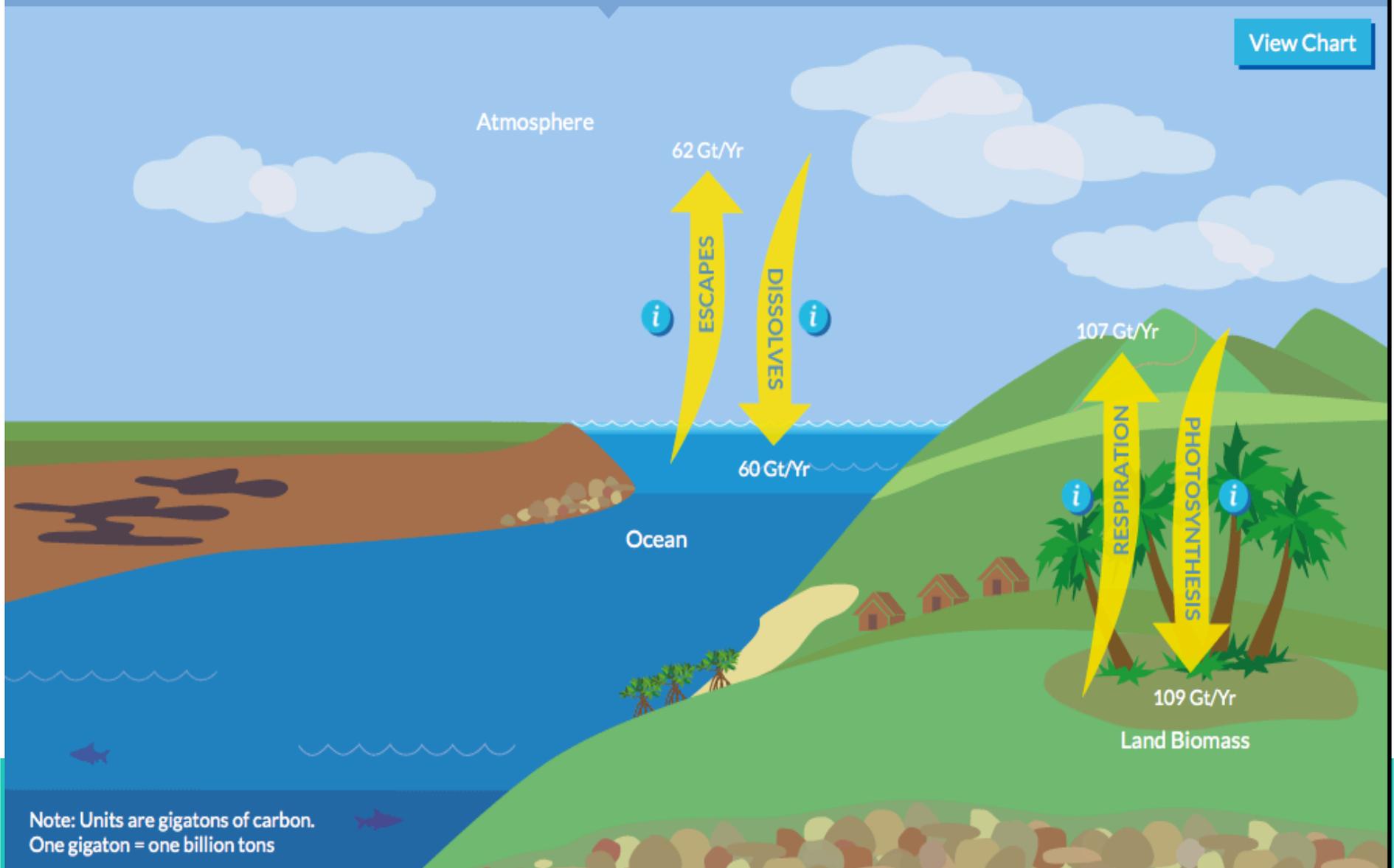
CO₂ and the Atmosphere

Temperature and CO₂

300 Years Ago

Present Day

[View Chart](#)



Note: Units are gigatons of carbon.
One gigaton = one billion tons

Carbon Dioxide and the Carbon Cycle

Carbon Cycle Reservoirs

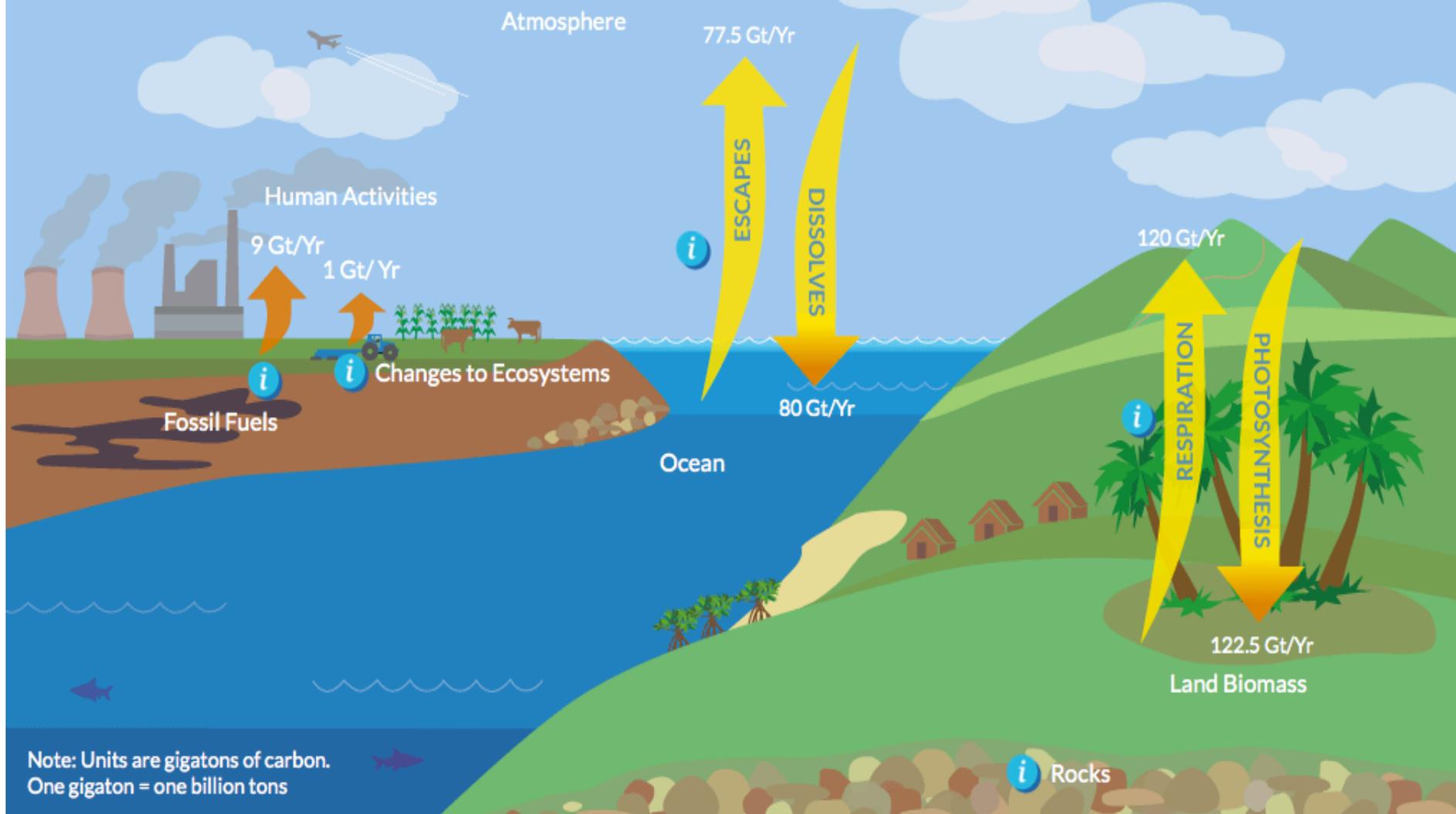
CO₂ and the Atmosphere

Temperature and CO₂

300 Years Ago

Present Day

[View Chart](#)



Carbon Dioxide and the Carbon Cycle

Carbon Cycle Reservoirs

CO₂ and the Atmosphere

Temperature and CO₂

300 Years Ago

Present Day

[View Illustration](#)

Three hundred years ago, the amount of CO₂ flowing into the atmosphere was equal to the amount flowing out of the atmosphere.

It was not affected by human activity.

CO₂ into the Atmosphere



Natural (Not Human-caused)

Escapes from ocean	62 Gt/Yr
Respiration	107 Gt/Yr
Total	169 Gt/Yr



Human Activity

No significant addition of CO ₂ into the air	
Total	0 Gt/Yr

CO₂ out of the Atmosphere



Natural (Not Human-caused)

Dissolves into ocean	60 Gt/Yr
Into plants (photosynthesis)	109 Gt/Yr
Total	169 Gt/Yr



Human Activity

No significant removal of CO ₂ from the air	
Total	0 Gt/Yr

Net Change to Atmosphere 0 Gt/Yr

Note: Units are gigatons of carbon.
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Carbon Dioxide and the Carbon Cycle

Carbon Cycle Reservoirs

CO₂ and the Atmosphere

Temperature and CO₂

300 Years Ago

Present Day

[View Illustration](#)

Today more CO₂ is going into the atmosphere than is coming out of the atmosphere.

The amount of CO₂ in the atmosphere is increasing.

It would increase even more, except that the ocean and plants currently absorb about half of the CO₂ from human activities.

CO₂ into the Atmosphere

Natural (Not Human-caused)	
Escapes from ocean	77.5 Gt/Yr
Respiration	120 Gt/Yr
Total	197.5 Gt/Yr

Human Activity	
Fossil fuels	9 Gt/Yr
Ecosystem changes	1 Gt/Yr
Total	10 Gt/Yr

CO₂ out of the Atmosphere

Natural (Not Human-caused)	
Dissolves into ocean	80 Gt/Yr
Into plants (photosynthesis)	122.5 Gt/Yr
Total	202.5 Gt/Yr

Human Activity	
No significant removal of CO ₂ from the air	
Total	0 Gt/Yr

Net Change to Atmosphere +5 Gt/Yr

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Carbon Dioxide and the Carbon Cycle

Carbon Cycle Reservoirs

CO₂ and the Atmosphere

Temperature and CO₂

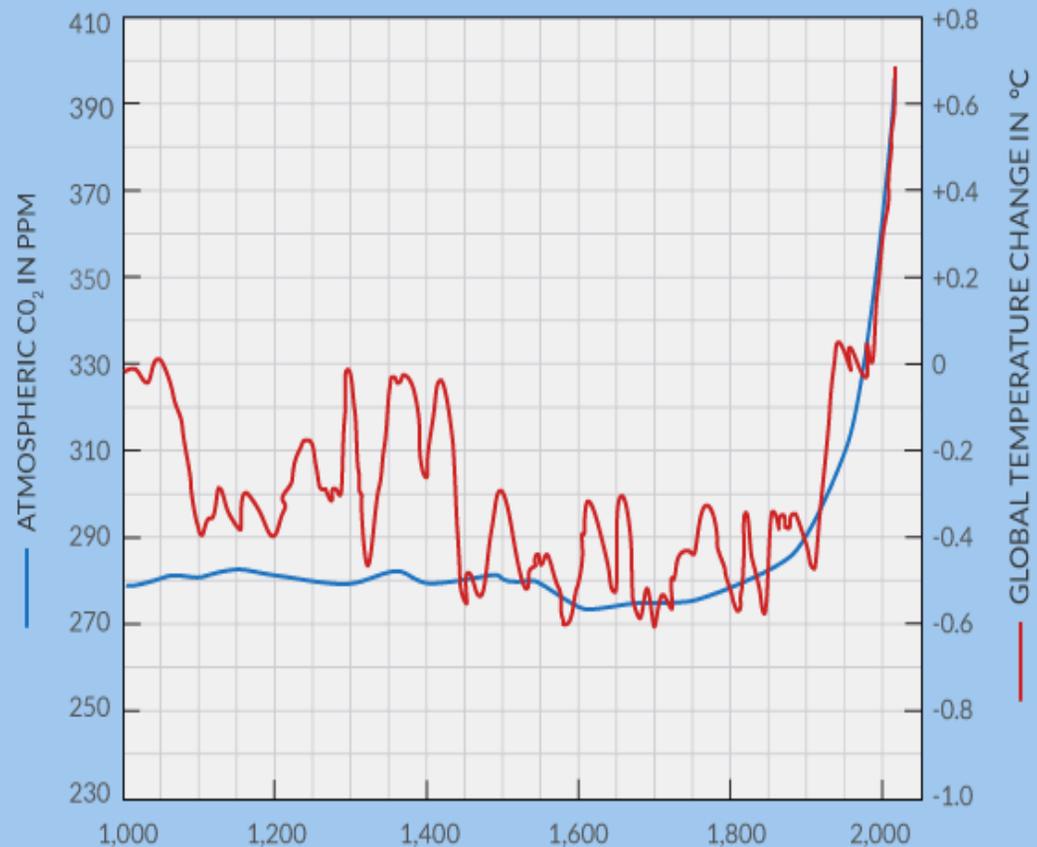
Graph Information



Temperature and CO₂ over the Past 1,000 Years

Starting around the year 1800, human activities, especially the burning of fossil fuels, have increased the amount of CO₂ in the atmosphere. The amount is increasing rapidly and is now higher than it has been at any time in the past million or more years.

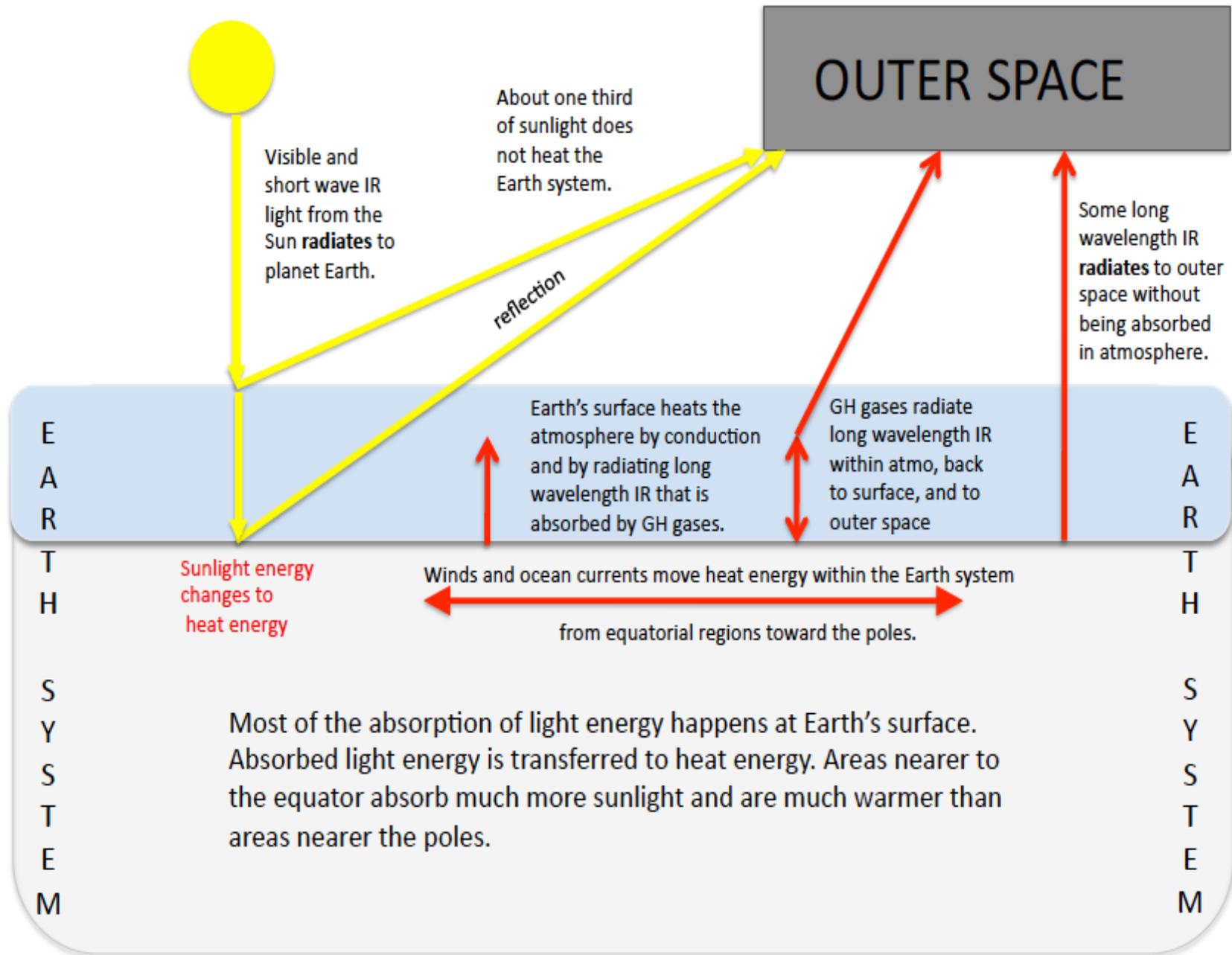
Since 1980, the global temperature has increased rapidly. Earth is now significantly warmer than it has been in the past 1,000 years. The CO₂ released into the air by human activities is the major cause of this global warming.



Turn on/off:

Temperature

ENERGY FLOWS AND THE EARTH SYSTEM



Our Story: Webs of Sustainability

Science **benchmarks** on
human + climate impacts
and climate adaptation



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Grade(s)	3-5	Approximate Length of Unit	1 class
		Approximate Number of Minutes Weekly	45 minutes
Theme/Topics	Insack Lasr: Insack Fin Acn Kosrae (Our Mangroves: Mangroves of Kosrae)		
Essential Questions	Why are mangroves important? <ul style="list-style-type: none"> What do humans and other living things get from mangrove ecosystems? What kinds of things can harm mangrove ecosystems? 		
Benchmarks	Sci.4.4.3 Recognize factors that cause or contribute to rapid changes in the environment and describe the impact of such rapid changes on animal and plant life		
Goals <i>What should learners know and be able to do by the end of the lesson?</i>	Students will be able to: <ul style="list-style-type: none"> Explain importance of mangroves to themselves and their families Explain how certain things and actions can harm mangrove ecosystem Share new learning on mangrove ecosystem with others 		
Summative Assessment	Poster of a favorite mangrove area with responses to questions about how we benefit from the mangroves and how people may be harming the mangroves.		
Formative Assessment Tools	<ul style="list-style-type: none"> Student drawings of mangrove environments "Temperature check" questions 		
Focused Language Features: Kosraean + English			
Language Functions	Related Sentence Structures / Patterns (Examples)	Vocabulary	
Describe characteristics, uses, or physical features	Mwet uh orekmakihn insack uh nuhke _____. <i>People use mangroves for _____.</i>	ma wo <i>benefit</i>	
	Sucu luhk ah orekmakihn insack uh nuhke _____. <i>My family uses mangroves for _____.</i>	eklac <i>change</i>	
Explain importance of mangroves/how things and actions can cause harm (cause + effect)	Mwet uh _____, suc ahkkolukye insack uh. <i>People are _____, which harms the mangroves.</i>	insack <i>mangrove</i>	
	Mwet uh akihlen / liye lah _____. <i>People are noticing _____.</i>	ahkkolukye <i>harm</i>	
Ask and answer questions about mangroves	Who/What/When/Where/Why questions (samples from videos)		
State information to others (e.g., location, activity, relationship)	Nga luhngse _____ ke acn se inge. <i>I like to _____ in this place.</i>		
	Nga kuh in _____ <i>I can _____.</i>		

Lesson sets focus on benchmarks and essential questions

Guidance for bilingual instruction with focused language features

MANGROVES
LIFE ON THE EDGE A school resource book for the Pacific Islands

Our Story: Webs of Sustainability

Science **benchmarks** on
human + climate impacts
and climate adaptation



LEK through elder interviews



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According to our elders, the mangrove clams become plentiful during breadfruit season.



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Our Story: Webs of Sustainability

Science **benchmarks** on human + climate impacts and climate adaptation

LEK through elder interviews

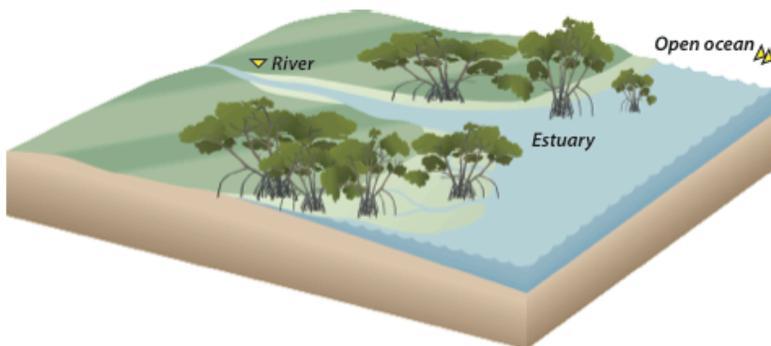
New resources and lessons to support **learning & teaching**



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BAYS AND ESTUARIES

Other places sheltered from waves include **bays** (places where the shoreline curves and partly encloses a body of water) and **estuaries** (places where rivers reach the ocean and their fresh water mixes with seawater). The mixing of waters and plenty of mud found in the estuaries makes them very suitable places for mangrove growth. That is why we see many mangroves in the lower reaches of rivers.



▼ Mangroves growing along river banks in an estuary.



Scientific text with key **vocabulary**

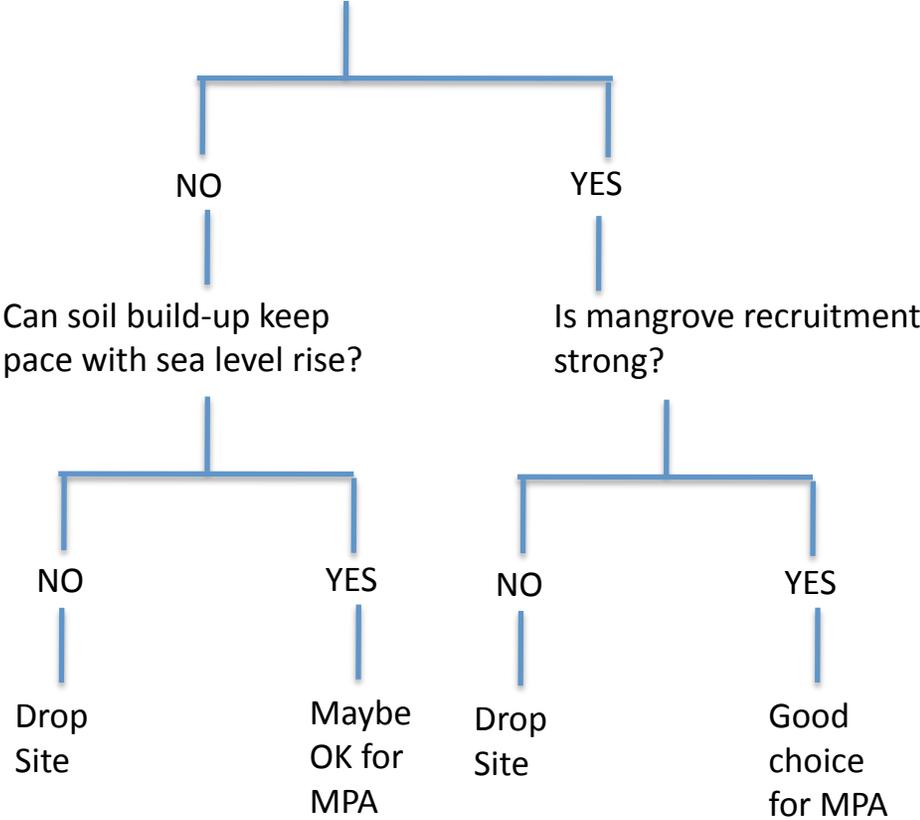
Highly **visual** with photos and illustrations

MANGROVES
LIFE ON THE EDGE A school resource book
for the Pacific Islands





Is Landward Migration Possible?



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Our Story: Webs of Sustainability

Science **benchmarks** on human + climate impacts and climate adaptation

LEK through elder interviews

New resources and lessons to support **learning & teaching**

Resources developed in **partnership** with the Local Professional Learning Community



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Partnership supports success



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Search for PCEP carbon cycle

