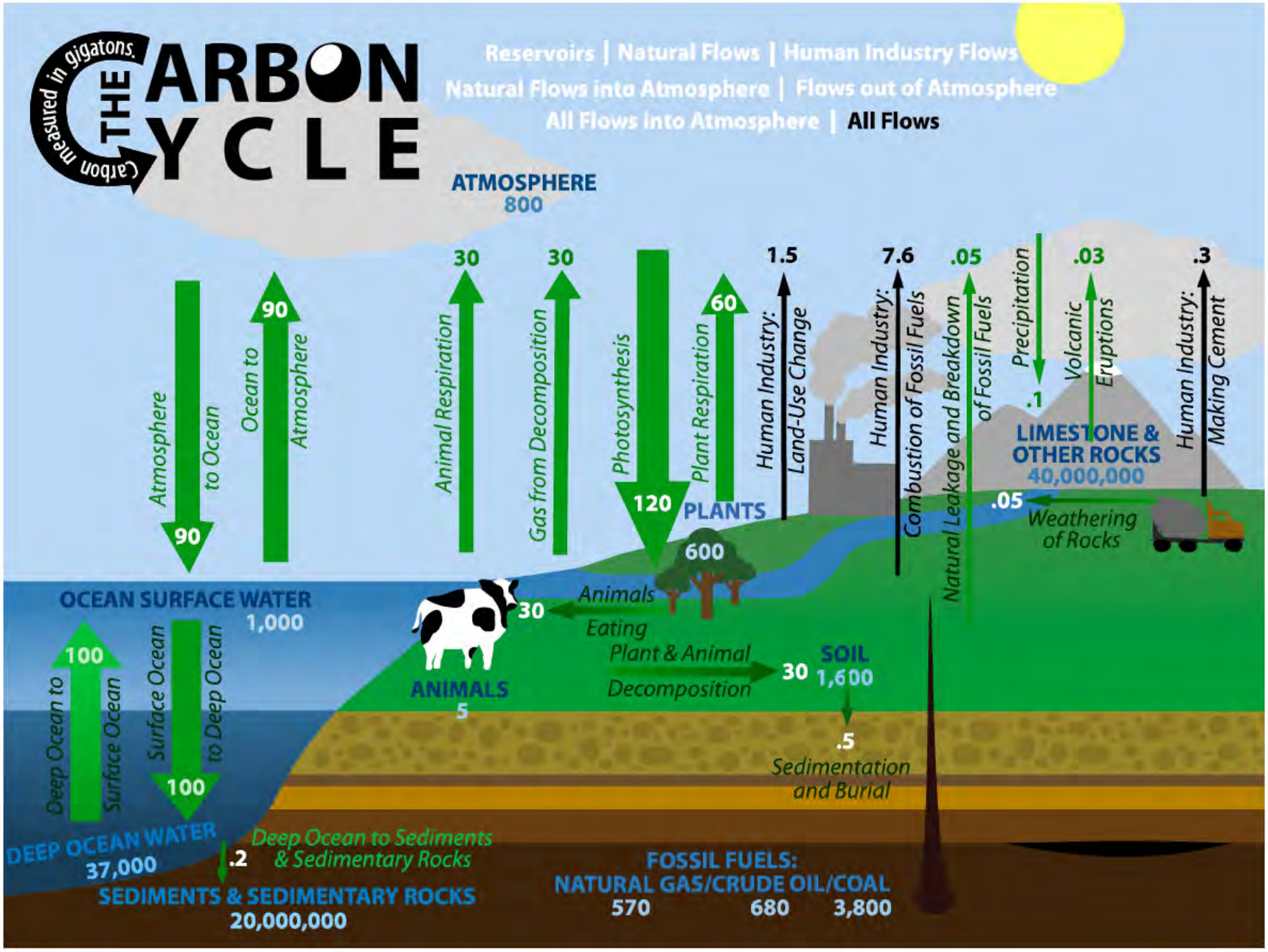
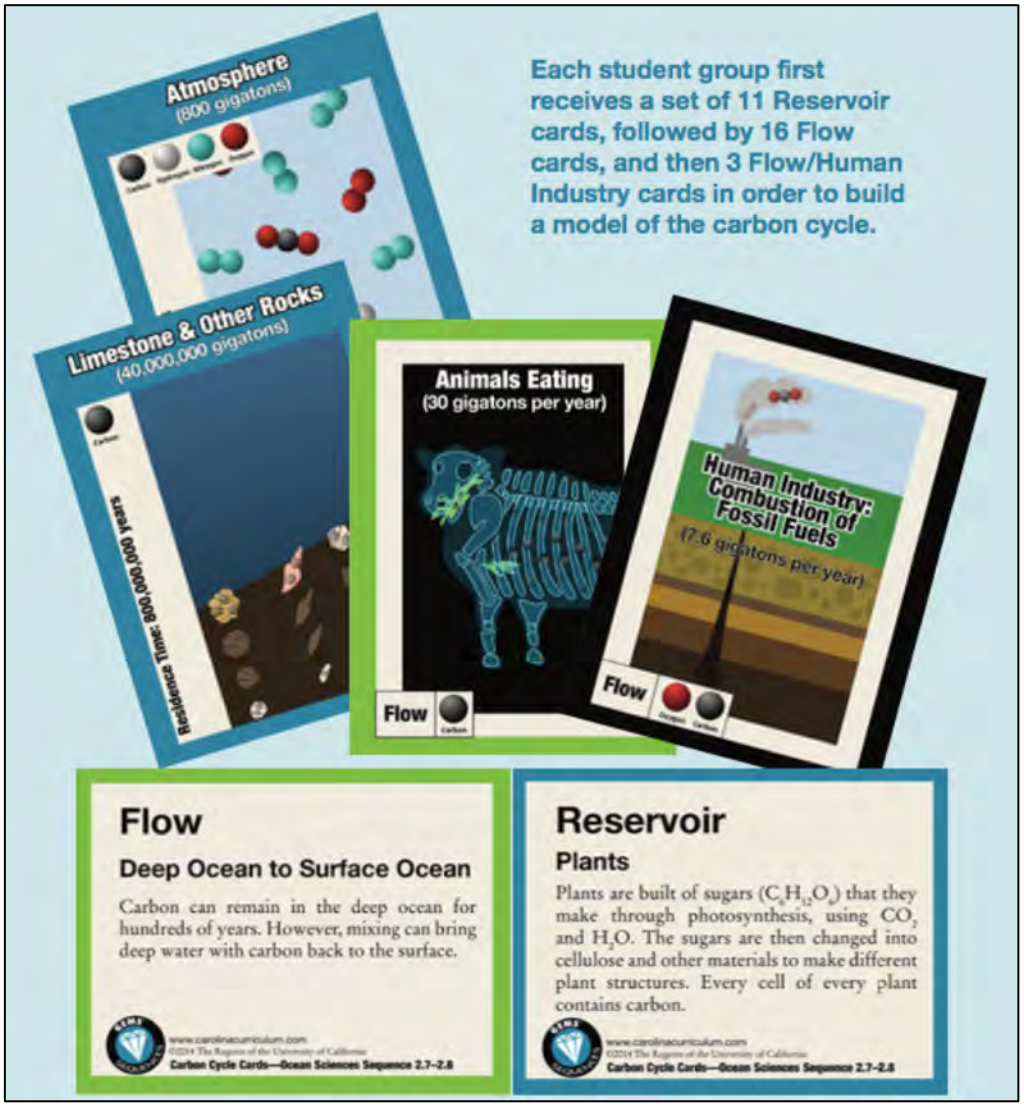
Anthropogenic Effects on Carbon Flows and Reservoirs


THE CARBON CYCLE
Carbon measured in gigatons
Reservoirs | Natural Flows | Human Industry Flows
Natural Flows into Atmosphere | Flows out of Atmosphere
All Flows into Atmosphere | All Flows
ATMOSPHERE
800
Atmosphere to Ocean
90
90
Ocean to Atmosphere
30
Animal Respiration
30
Gas from Decomposition
Photosynthesis
120
60
Plant Respiration
PLANTS
600
1.5
Human Industry: Land-Use Change
7.6
Human Industry: Combustion of Fossil Fuels
.05
Natural Leakage and Breakdown of Fossil Fuels
.1
Precipitation
.03
Volcanic Eruptions
.3
Human Industry: Making Cement
LIMESTONE & OTHER ROCKS
40,000,000
.05
Weathering of Rocks
OCEAN SURFACE WATER
1,000
100
Deep Ocean to Surface Ocean
Surface Ocean to Deep Ocean
100
DEEP OCEAN WATER
37,000
.2
Deep Ocean to Sediments & Sedimentary Rocks
SEDIMENTS & SEDIMENTARY ROCKS
20,000,000
30
Animals Eating Plant & Animal Decomposition
ANIMALS
5
30
SOIL
1,600
.5
Sedimentation and Burial
FOSSIL FUELS:
NATURAL GAS/CRUDE OIL/COAL
570
680
3,800

Reflect on the learning experience as you engage in the activity

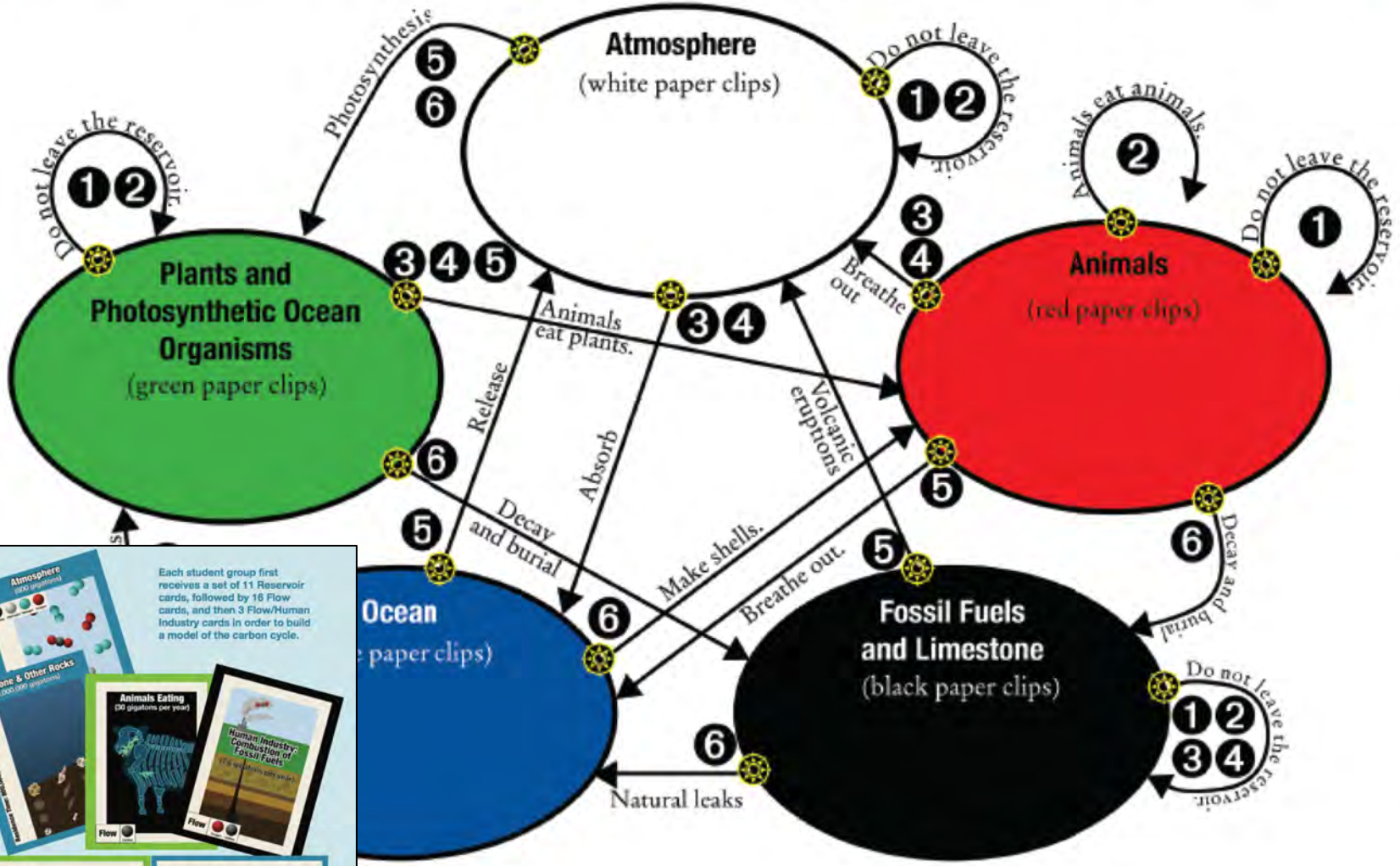
- What do you think the specific content learning goals are for this activity?
- Which of the 5 Foundational Ideas on Learning were addressed?
- What is one piece of science content you are taking away? Were you able to answer some of your questions?
- What additional questions about the content arise for you as you engage in the activity? Record your questions.

Carbon Cycle Cards



Paper Clip Carbon Cycle Model #1

2.7



Revisit carbon cycle in the Sydney Harbor ecosystem

1. Add to your sketch of a coastal ecosystem.
2. Label additional carbon reservoirs & flows you learned about
3. Which of your questions can you answer? Record new questions.

Turn & Talk

- Share your updated drawing and questions with a partner.
- Be ready to share your ideas, answers to questions, and evidence and reasoning with the whole group.

Small Group Reflection: About the learning experience

- How were you engaging with the materials and content in the activity to learn about the carbon cycle?
- Which of the 5 Foundational Ideas on Learning were addressed?
- What did you learn about the carbon cycle? What do you think the content learning goal or purpose was for the activity?

What science concept learning goals might be addressed by this activity?

- This activity was designed to specifically address the common misconception that Earth is getting more carbon.
  - No new carbon is entering the system, but rather it is cycling more quickly between the reservoirs.
- Human activities have taken carbon which was stored long-term in the fossil fuel reservoirs and caused it to flow much more rapidly than it naturally would into the atmosphere and ocean reservoirs.
- Using the carbon cycle cards provided the opportunity to work together to learn more about the carbon cycle, while also enabling learners to realize what they individually know and don’t know about the carbon cycle.

Quick Write: 3-2-1
What I want to remember

- What are **3 things you learned** that you specifically want to remember?
- What are **2 things you did** in the activity that helped you to learn those things?
- What **1 question** are you still wondering about?

Carbon Cycle Simulation