

Carbon cycle game – materials

Education in Chemistry

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Use this class game to consolidate students' understanding of the carbon cycle

Teacher notes

In this game, students take on the role of a carbon atom and move around different stations placed around the classroom to simulate the carbon cycle. Alternatively, the instructions can be laid out on a desk and the students move counters around.

This document contains teacher and student instructions, plus a carbon cycle passport template and station cards to print.

You will need

To play as a whole class around the room:

- One copy of each cycle station card: Atmosphere, Sea, Plant leaf, Animals, Fossil fuels. (These can be laminated for reuse.)
- One copy of the carbon cycle passport per student
- Two coins per student/team

To play in groups on desks:

- One copy of each cycle station card per group
- One copy of the carbon cycle passport per student
- Two coins per group
- One counter per student

Instructions

1. Distribute the station cards around the room and give a copy of the passport worksheet to each student for them to record their journey.
2. Distribute students/teams across the stations to start and give two coins to each student/team.
3. To move around the cycle, students must flip their two coins and follow the instructions at each station depending on what combination of heads (H) or tails (T) they get:

HH = 2 heads

TT = 2 tails

HT = 1 heads/1 tails

They should make note of what happens to them each time on their passport. For example, from the Atmosphere, a student may be absorbed into the leaf of a plant and move to the Plant station, dissolve into the sea and move to the Sea, or not be absorbed and stay in the Atmosphere.

4. Continue this for 10–15 minutes or until a number of students have become 'locked up'.

The next page contains the students' instructions.

Carbon cycle game

You are a carbon atom moving through the carbon cycle. Move around the different stations and record your journey!

How to play

There are five stations:



At each station you must flip two coins and then, depending on what combination of heads (H) or tails (T) you get, follow the instructions on the station card.

Take your carbon cycle passport with you and record your journey!

You will need

- The carbon cycle passport
- A pen
- Two coins

Instructions

1. Make sure you have a copy of the carbon cycle passport.
2. Pick a station to start at.
3. To move around, you must flip two coins and follow the instructions at each station depending on what combination of heads (H) or tails (T) you get:

HH = 2 heads

TT = 2 tails

HT = 1 heads/1 tails

4. Make a note of what happens to you as a carbon atom in your passport each time you throw the coins.
5. Keep going until you get locked up!

THE ATMOSPHERE – CO₂ molecule

Flip two coins:

TT	You have not been absorbed. Stay in the atmosphere for another round.
HT	You have been absorbed into the leaf of a plant. Move to the plant.
HH	You have dissolved into the sea. Move to the sea.

FOSSIL FUELS – hydrocarbons

Flip two coins:

TT	You have not been mined. Stay at fossil fuels for another round.
HT	You have been mined, and have been burnt as a fuel, releasing CO ₂ . Return to the atmosphere.
HH	

THE SEA

STAGE 1: Seawater (dissolved CO₂ (aq))

Flip two coins:

TT	You have been re-released to the atmosphere. Move to the atmosphere.
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HT	Over many thousands of years, you have become incorporated into the shells of sea creatures as calcium carbonate. Move to Stage 2.
HH	

STAGE 2: Sea creatures

Flip two coins:

TT	The sea creature has respired. The carbon dioxide produced is released into the atmosphere. Move to the atmosphere.
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HT	The sea creature has lived a long life and has died. After many thousands of years, the creature has decayed and been buried deep into the ground. It has been locked in as sedimentary rock!
HH	

A PLANT

STAGE 1: The leaf

Flip two coins:

TT	There is no sunlight. Photosynthesis cannot occur. The plant still respire – you must return back to the atmosphere as CO ₂ .
HT	Sunlight is present. Photosynthesis can occur, and you have been incorporated into a sugar molecule. Progress to the next stage.
HH	

STAGE 2: Glucose (sugar)

Flip two coins:

TT	The sugar molecule has been used in respiration. Return to the atmosphere as CO ₂ .
HT	The sugar molecule is incorporated into the tissue of the plant. Progress to the next stage.
HH	

STAGE 3: Carbohydrates

Flip two coins:

TT	The plant has been eaten by an animal. Move to the animal.
HT	The plant has lived a long life and has died. After many thousands of years, the plant has decayed and been buried deep into the ground. It has been locked in as a fossil fuel! Move to the fossil fuels.
HH	

ANIMALS

STAGE 1: **Herbivore**

Flip two coins:

TT	Respiration has occurred. You have been released into the atmosphere as CO ₂ . Move to the atmosphere.
HT	You have been incorporated into the tissue of the animal. Progress to stage two.
HH	You have been eaten by a larger animal. Progress to the carnivore stage.

STAGE 2: **Herbivore**

Flip two coins:

TT	Respiration has occurred. You have been released into the atmosphere as CO ₂ . Move to the atmosphere.
HT	The animal has lived a long life and has died. After many thousands of years, the animal has decayed and been buried deep into the ground. It has been locked in as a fossil fuel! Move to the fossil fuels.
HH	You have been eaten by a larger animal. Progress to the carnivore stage.

STAGE 3: **Carnivore**

Flip two coins:

TT	Respiration has occurred. You have been released into the atmosphere as CO ₂ . Move to the atmosphere.
HT	The animal has lived a long life and has died. After many thousands of years, the animal has decayed and been buried deep into the ground. It has been locked up as a fossil fuel! Move to the fossil fuels.
HH	The animal has been eaten by a larger animal. Stay for another turn.