



# Greenhouse Gases

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OZOBOT EVO EDITION

**Explore:** Design a Natural Greenhouse Effect model for Ozobot Evo.

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1. Using the *Natural Greenhouse Gas Explore and Explain* handout, collaborate with a partner to design a rough draft working model for an Ozobot Evo to demonstrate your ideas on what happens when the sun's rays get to Earth.
2. The rough draft design should include labels, and an explanation on why each aspect of the design was chosen. This will involve computational thinking.
3. Use the Ozobot Line Codes, Ozobot Evo App, textbook, internet, and the *Video Introduction* handout as resources for this task.

# Ozobot Line Codes



## SPEED →



SNAIL DOSE



SLOW



CRUISE



FAST

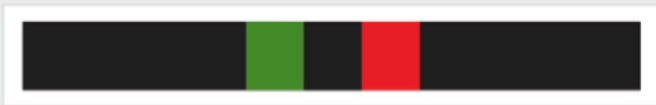


TURBO



NITRO BOOST

## DIRECTION →



GO LEFT



GO STRAIGHT



GO RIGHT



LINE JUMP LEFT



LINE JUMP STRAIGHT



LINE JUMP RIGHT

## COOL MOVES →



BACKWALK



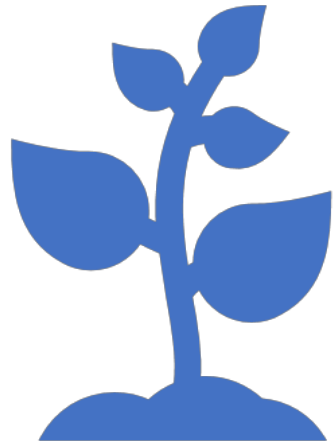
SPIN



ZIGZAG



TORNADO



# Natural Greenhouse Gases

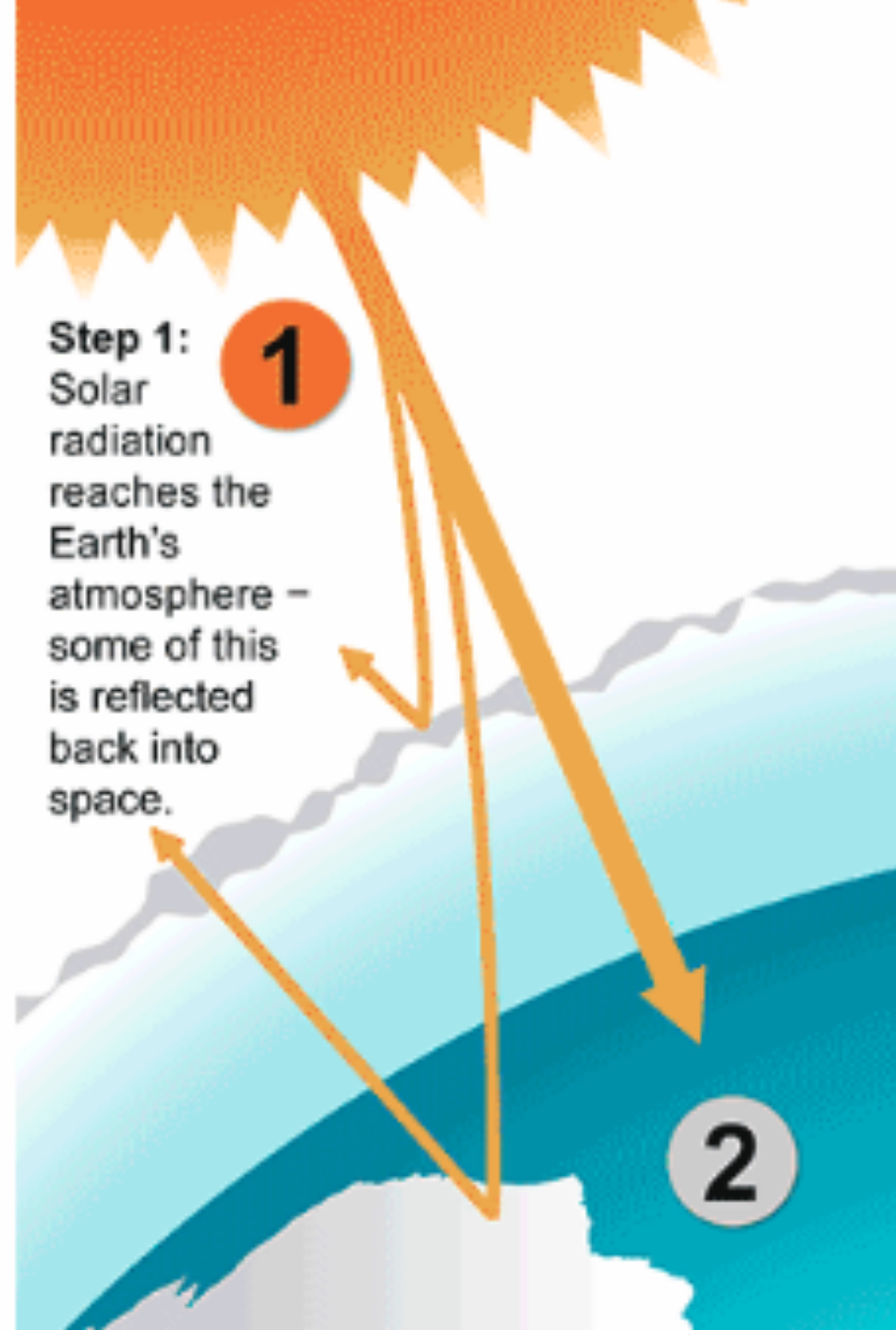
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OZOBOT EVO EDITION

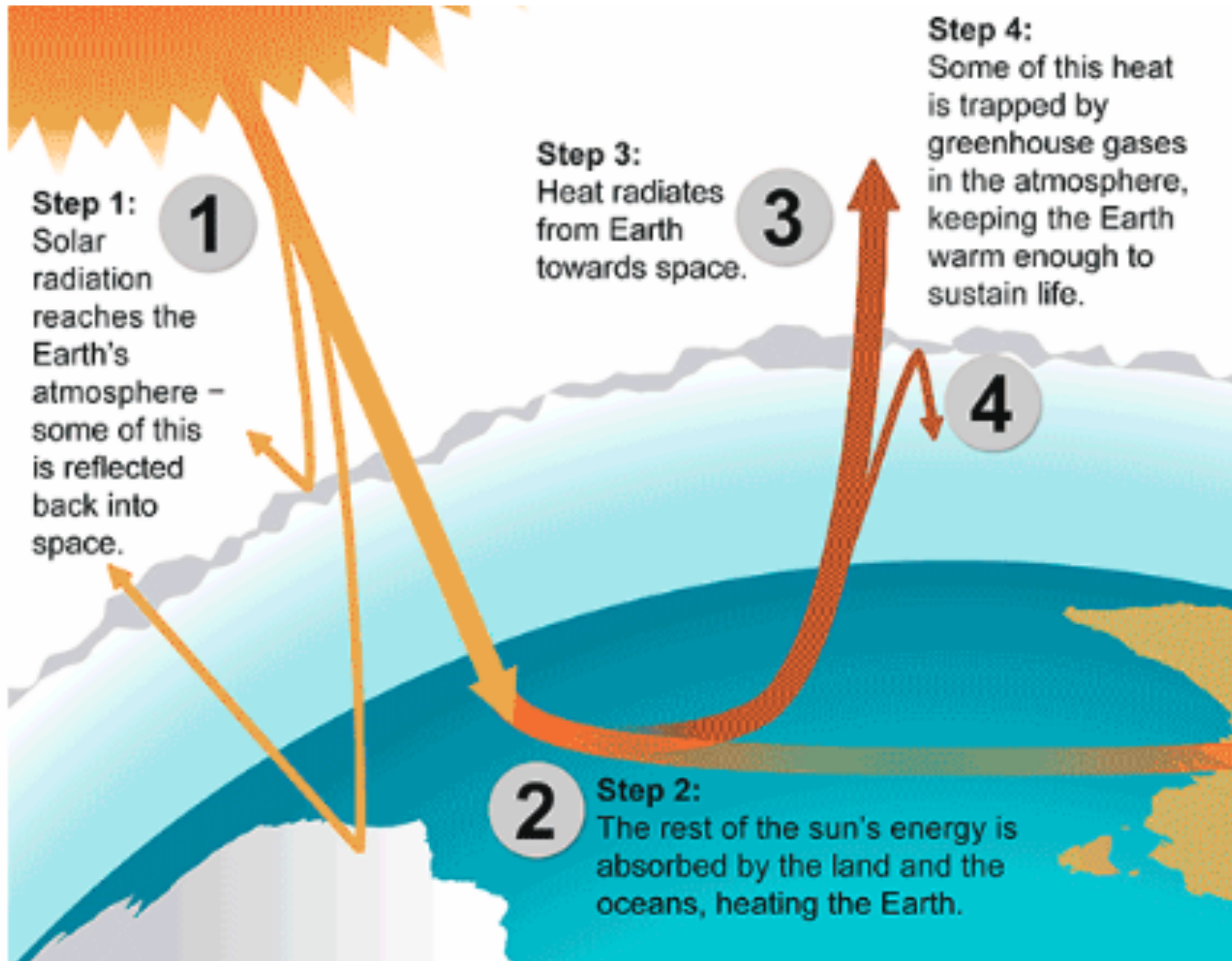
# Explain

The natural greenhouse effect is a natural process that warms the Earth's surface.

1. When the sun's energy reaches the Earth's atmosphere, some of the energy is reflected back to space



## Explain



2. The rest of the sun's energy is absorbed by the land and the oceans, heating the Earth.

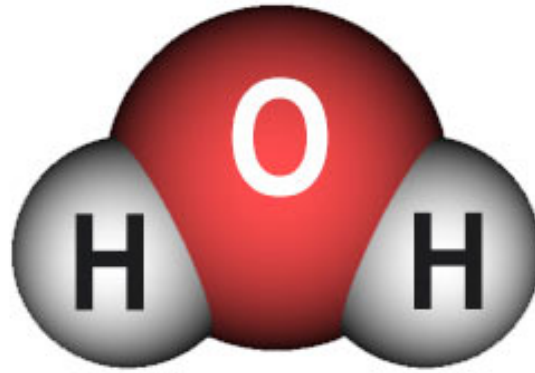
3. Heat radiates from the Earth towards space.

4. Some of this radiated heat is trapped and re-radiated by the greenhouse gases in the atmosphere, keeping the Earth warm enough to sustain life!

# Explain

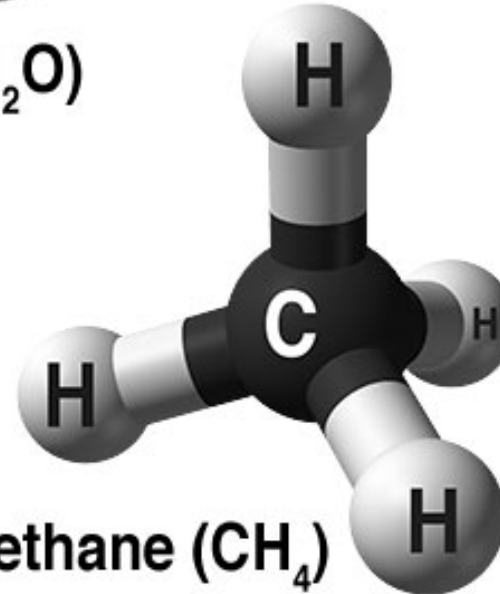
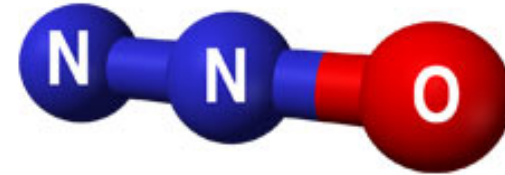
Greenhouse gases include water vapour, carbon dioxide, methane, and nitrous oxide.

The absorbed energy warms the atmosphere and surface of the Earth. This process maintains the Earth's temperature at around 33 degrees Celsius warmer than it would without the greenhouse gases, allowing life on Earth to exist!

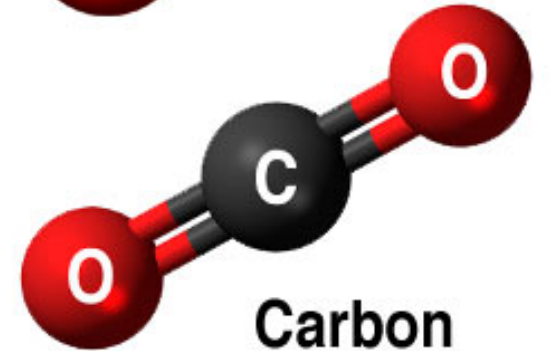


Water vapor ( $\text{H}_2\text{O}$ )

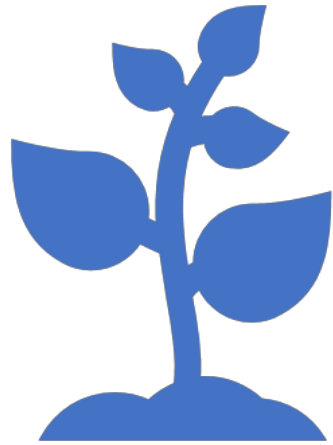
Nitrous oxide ( $\text{N}_2\text{O}$ )



Methane ( $\text{CH}_4$ )



Carbon dioxide ( $\text{CO}_2$ )



# Anthropogenic Greenhouse Gases

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OZOBOT EVO EDITION



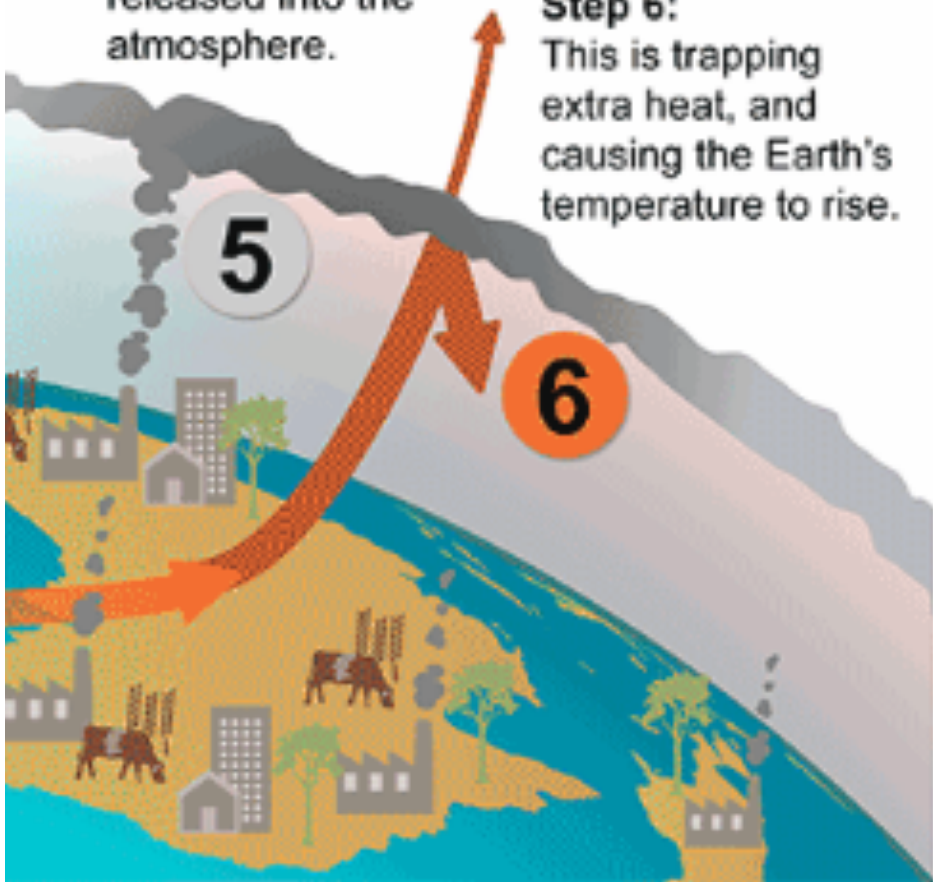
# Anthropogenic Greenhouse Effect

## Step 5:

Human activities such as burning fossil fuels, agriculture and land clearing are increasing the amount of greenhouse gases released into the atmosphere.

## Step 6:

This is trapping extra heat, and causing the Earth's temperature to rise.



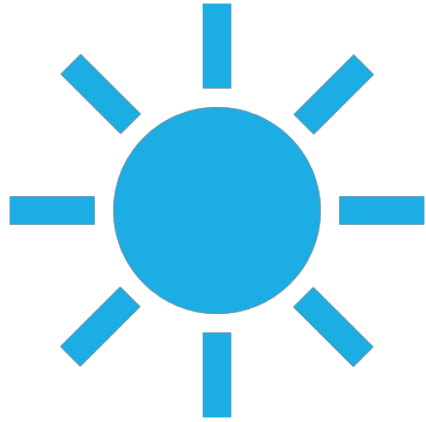
5. Anthropogenic greenhouse effect is an enhance greenhouse effect resulting from human activities – particularly burning fossil fuels (coal, oil, and natural gas) agriculture and land clearing – are increasing the concentrations of greenhouse gases.

6. The anthropogenic greenhouse effect is trapping extra heat, contributing to the warming of the Earth.

Many scientists now agree that humans have changed Earth's atmosphere in dramatic ways over the past two centuries, resulting in global warming.

# Natural and Anthropogenic Greenhouse Effect

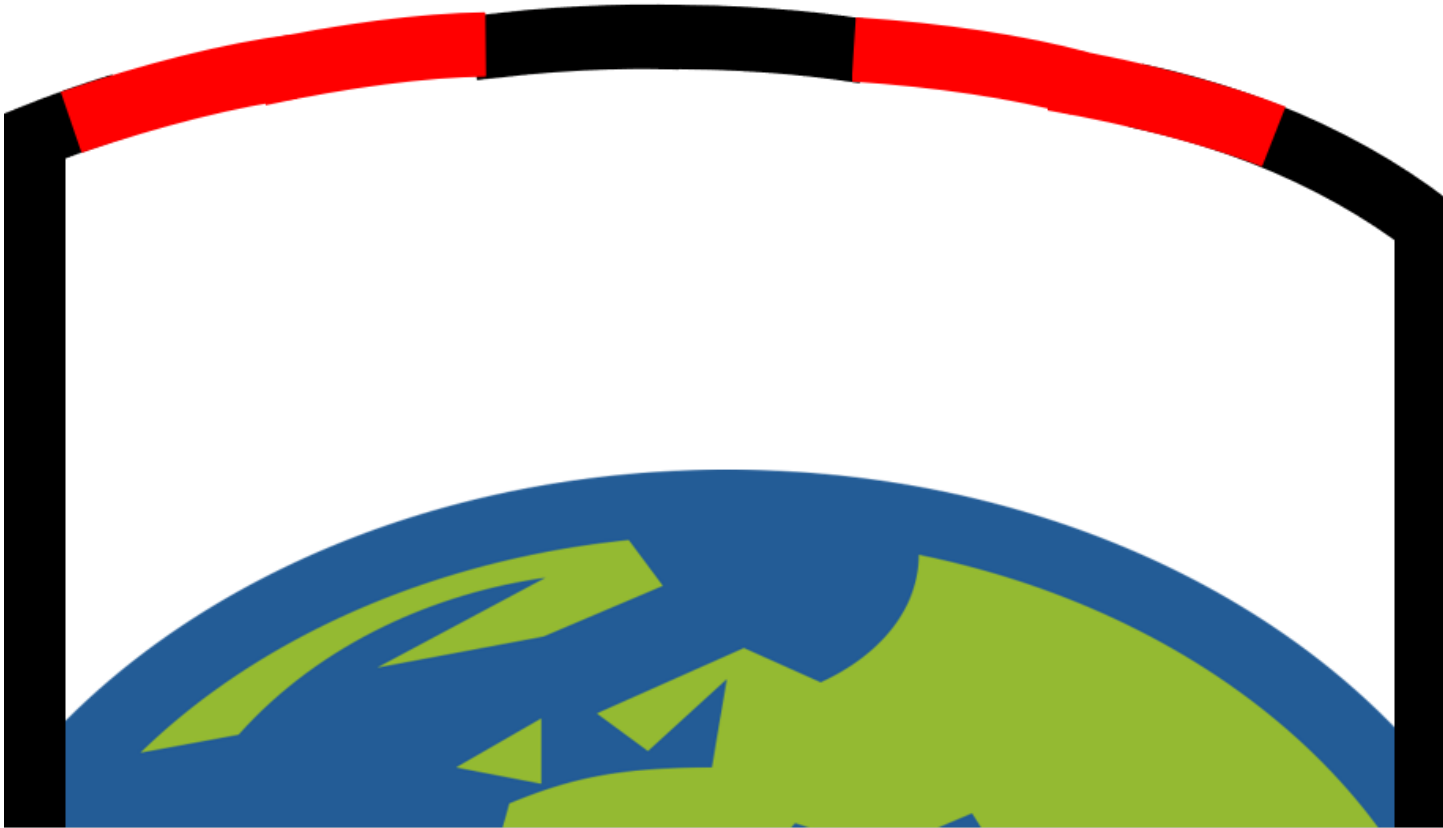




# Greenhouse Gases

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OZOBOT EVO EDITION



## Elaborate

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Program a code for the Ozobot Evo with the Ozobot Evo App to illustrate the process of natural greenhouse effect.

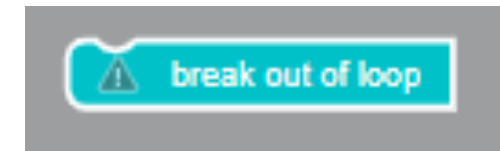
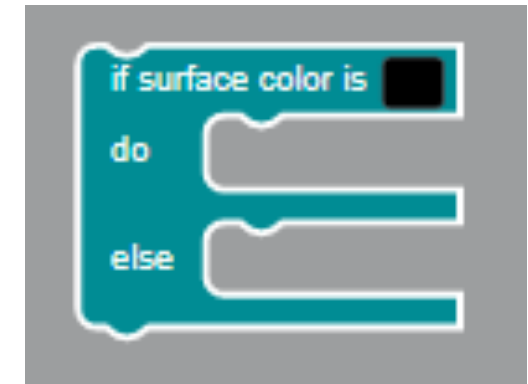
Include labels for the different aspects of the diagram, either provided to you or designed by you.

Helpful Resource: *Natural Greenhouse Gas Explore and Explain* handout.

## Hint 1

Use the Ozoblocks on the right.

- One Ozoblock will begin the code
- One Ozoblock will be used multiple times
- One Ozoblock will be used closer to the end of the code.

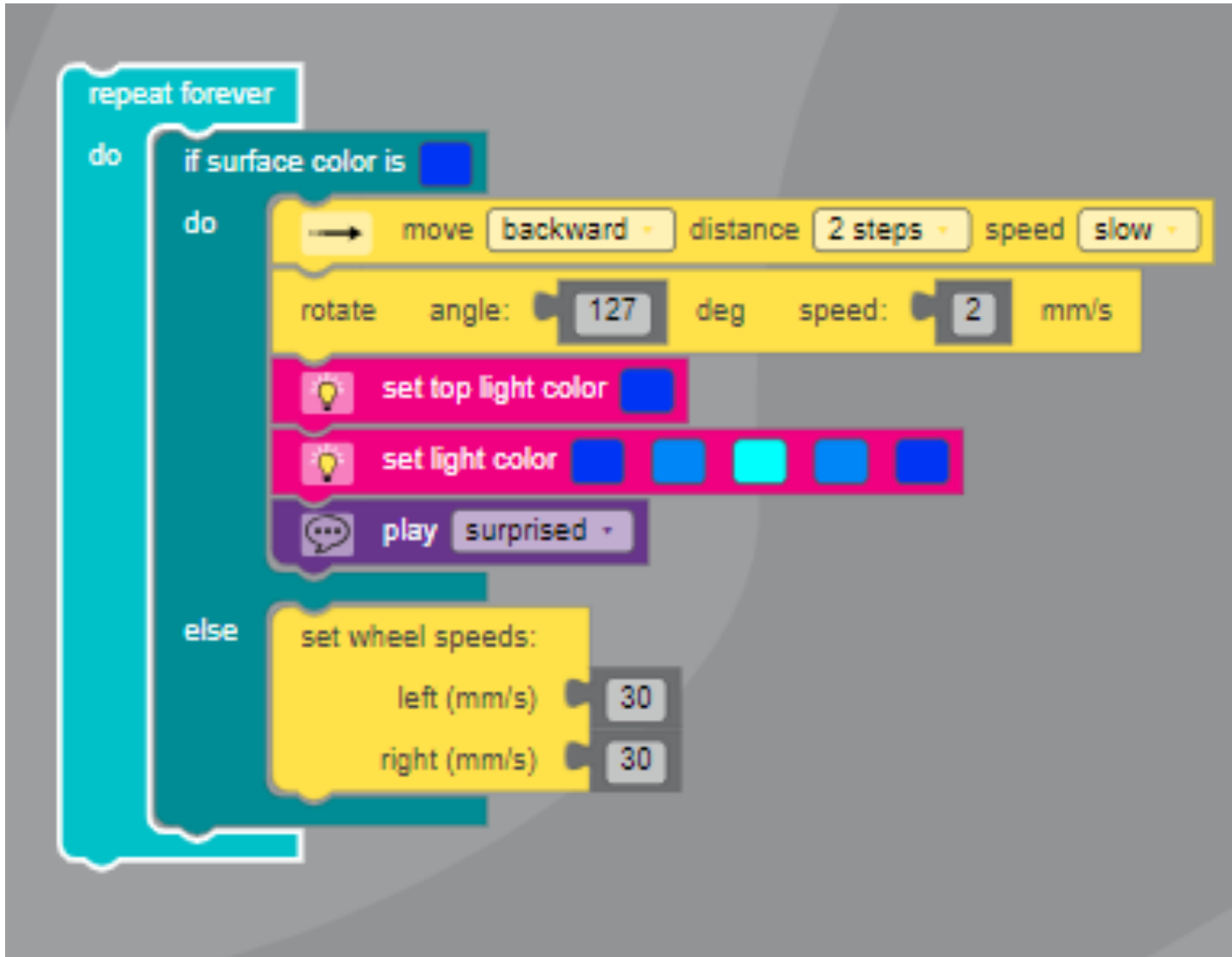


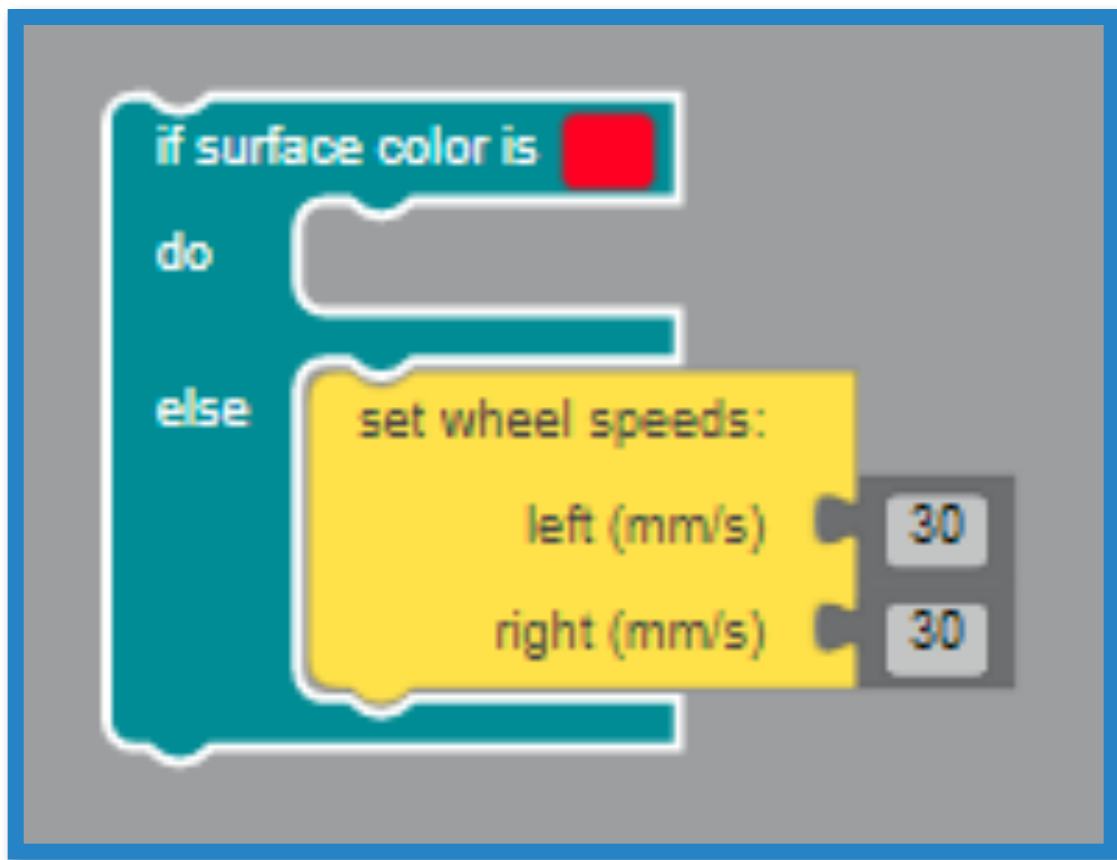
## Hint 2

Include an If Else action for the Ozobot to complete after it senses a certain surface colour.

You may require multiple surface colour sensors.

**\*\*Remember to have some fun with the Ozobot! Include code for audio and lights!**





# Hint 3

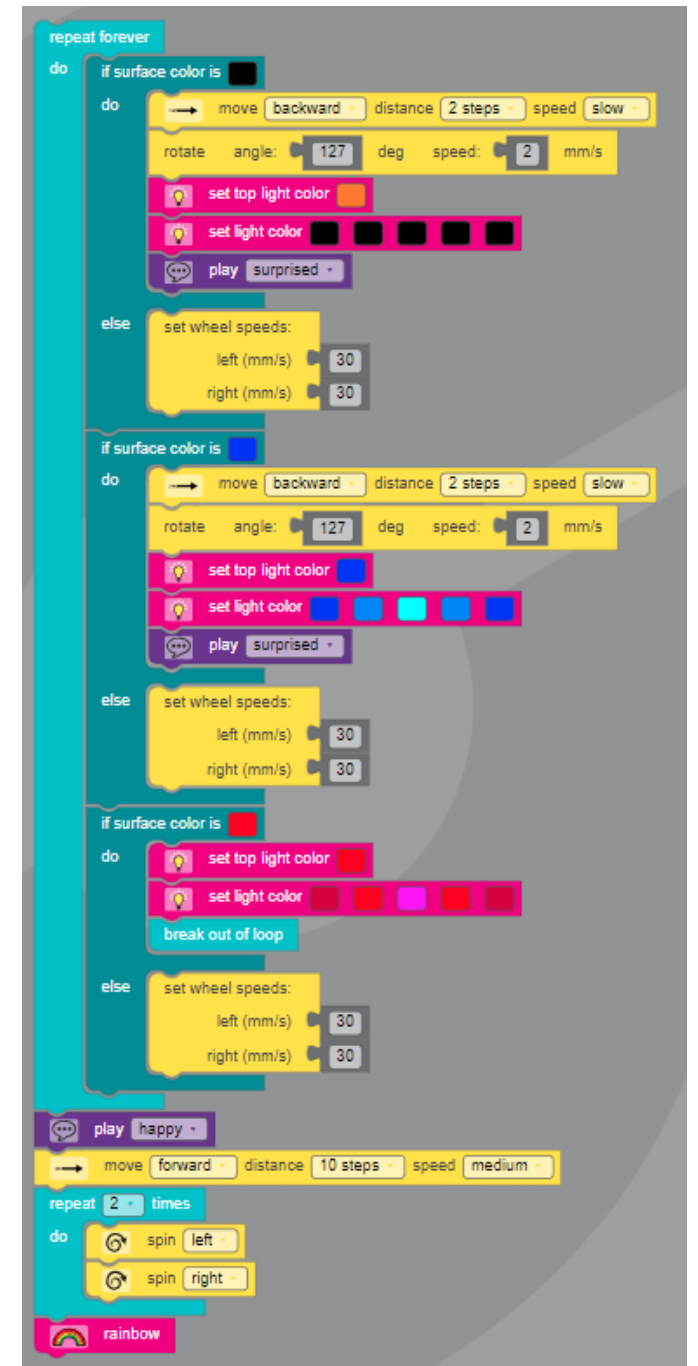
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WHAT OZOBLOCK CODE SHOULD BE INCLUDED WHEN THE OZOBOT SENSES THE COLOUR RED?

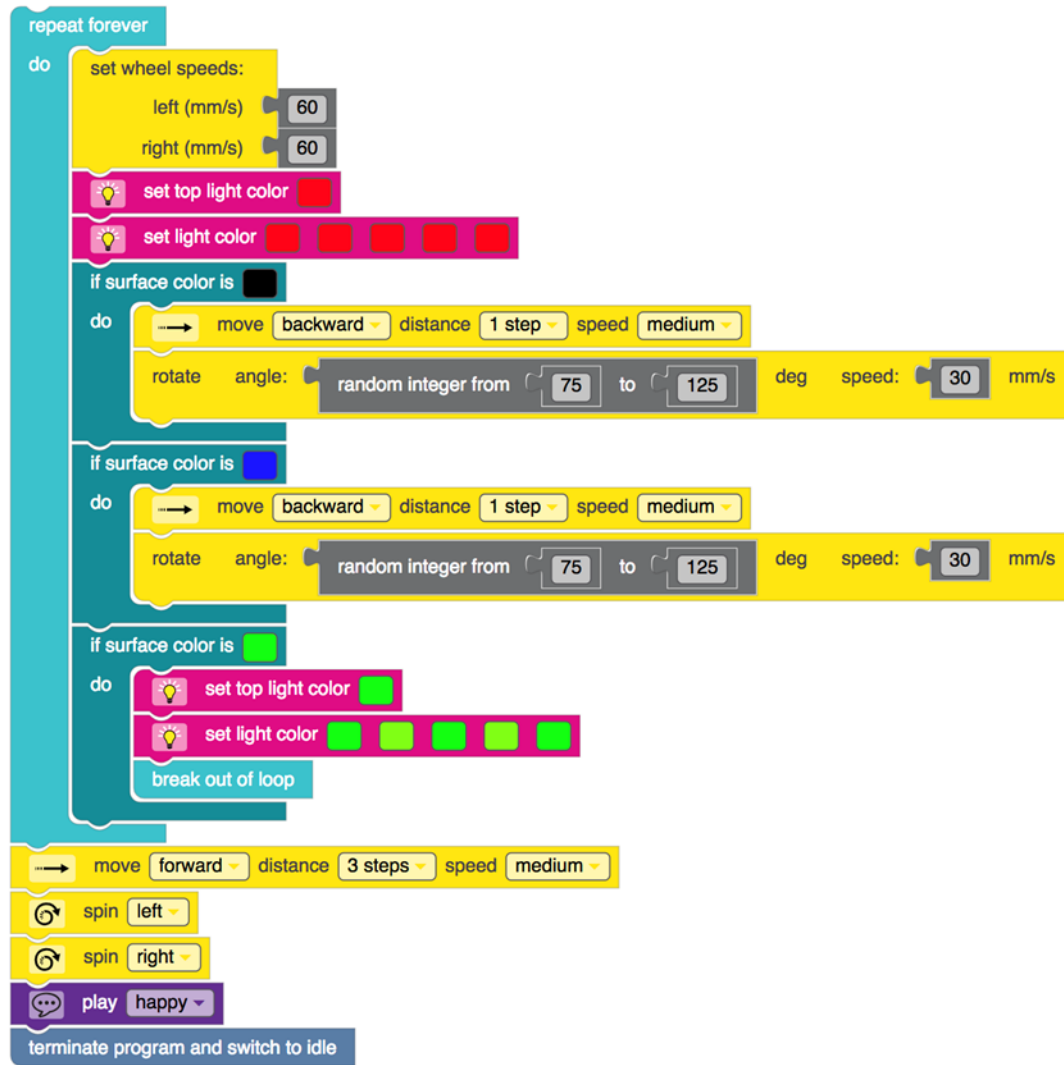
## Solution Option

Complete the Ozobot demonstration of Natural Greenhouse Effect by breaking the loop when the heat escapes Earth's atmosphere.

Can we make this code more efficient??







## Solution Option

This is an even more efficient code that will run the same program!

Have some fun with your Ozobot by finishing the code with a celebration of your own design!