

# Wire Mesh

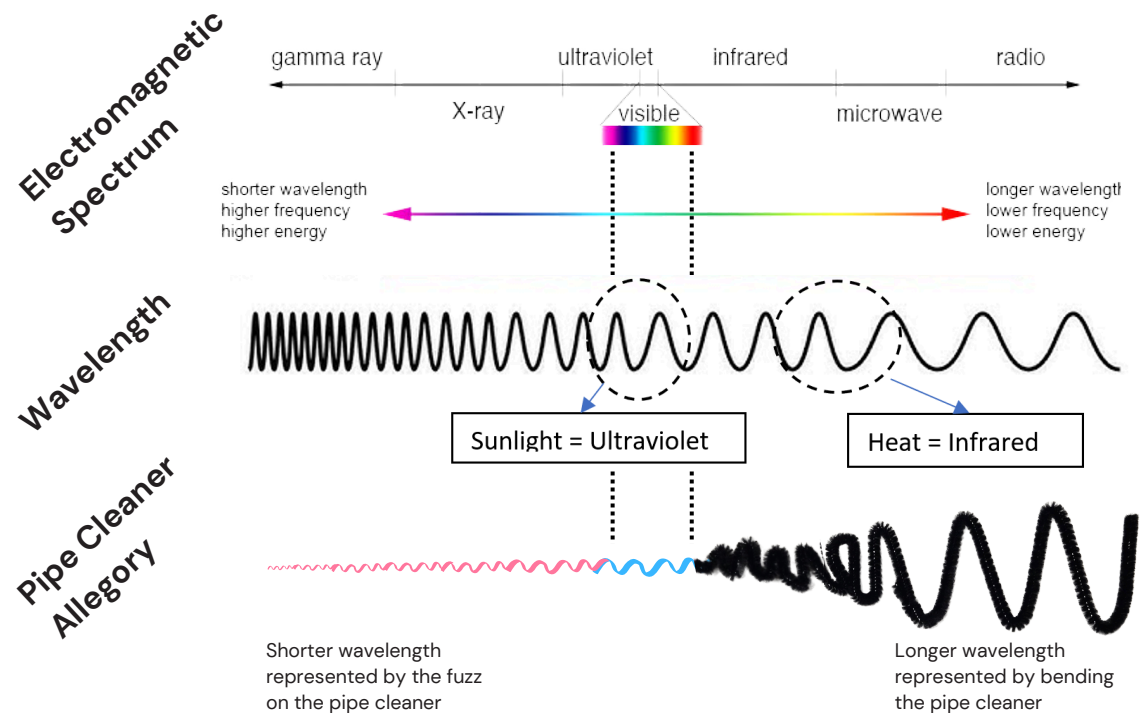
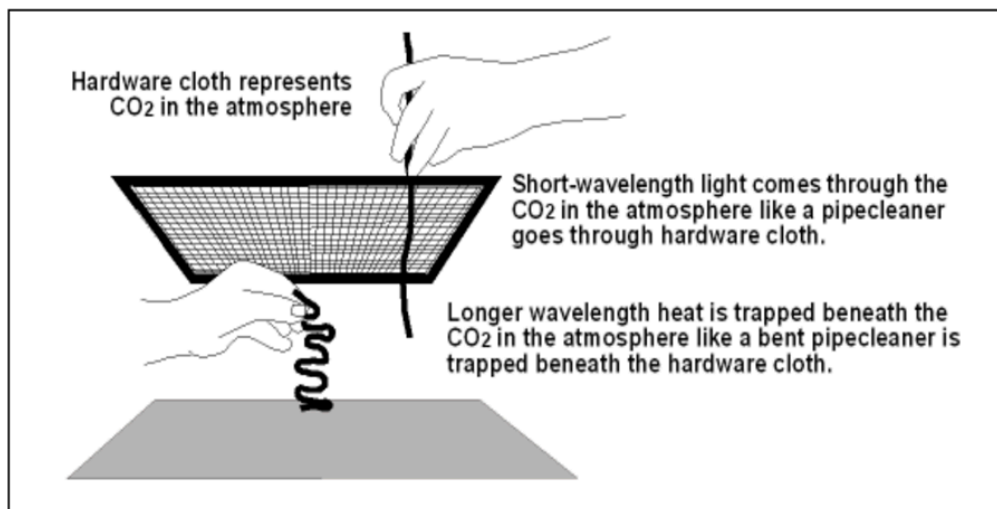
How do invisible gasses in the air (atmosphere) impact temperature on earth?

This visual analogy provides a way to think about atmospheric physics in terms of familiar objects.

## Objectives

This learning activity is designed to demonstrate:

1. An easy visualization of the greenhouse effect
2. How increasing CO<sub>2</sub> in the atmosphere increases global temperature



### Materials Needed:

- Wire Mesh: CO<sub>2</sub> in Atmosphere
- Colored pipe cleaner: ultraviolet light with shorter wavelength
- Black pipe cleaner: heat with longer wavelength

### Procedures for Guided Inquiry Activity:

- The wire mesh helps us imagine how CO<sub>2</sub> in the atmosphere interacts with light and heat energy. Whoosh the wire mesh through the air to show its small resistance to wind—it is because only a little bit of wire is in the wire mesh. It is like CO<sub>2</sub> in the atmosphere in that only a little bit of CO<sub>2</sub> is mixed in with other gasses to make up the Earth's atmosphere.
- A pipe cleaner represents the visible light energy coming from the sun, which has a short wavelength.
- Have a volunteer hold the wire mesh (CO<sub>2</sub> in the atmosphere) horizontally above a table, so that it looks like the atmosphere as seen from space. Push the pipe cleaner through the wire mesh to show how visible light from the sun can easily go through the atmosphere.
- Ask: But what happens to the visible light after it hits the Earth? Does it all reflect back as light into space? Think about the effect of sunshine hitting the ground on a summer day. (Some light is absorbed by objects and the ground and then radiated as heat).
- Heat energy (infrared radiation) has a longer wavelength than visible radiation. The pipe cleaner bent in five or six zigzags can represent this wavelength. Have participants bend the pipe cleaner into a long-wavelength spring.
- Have participants try transmitting this longer-wavelength heat energy through the CO<sub>2</sub> in the atmosphere (wire mesh). It will not go through because the "heat" is trapped and bounces around between the atmosphere and Earth.
- Use a second sheet (or your neighbor's) to layer another sheet of wire mesh over the first to represent more CO<sub>2</sub> in the atmosphere. Ask: Will this make it harder for heat to escape? The CO<sub>2</sub> -rich atmosphere is trapping heat just like the glass roof of a greenhouse does (hence the name greenhouse effect).

### Thinking Questions

- Do you think that society should be concerned about the release of too much CO<sub>2</sub> in the atmosphere? Why?
- What could happen if the earth warms up significantly in the next several decades?