Science 14

Unit B: Energy transfer technologies

Convection and climate

A dye spiral in a convection tank

- Warm water rises from a heater and cooler water sinks to take its place.
- A drop of dye draws that loop so the current can be seen.

Particle speed and convection

- A higher temperature means the particles move faster on average.
- Convection is a current: warm fluid rises and cooler fluid sinks.

Key terms

temperature

A measure of the average motion energy of the particles in a sample.

thermal energy

The total energy of the random particle motion in a sample.

Brownian motion

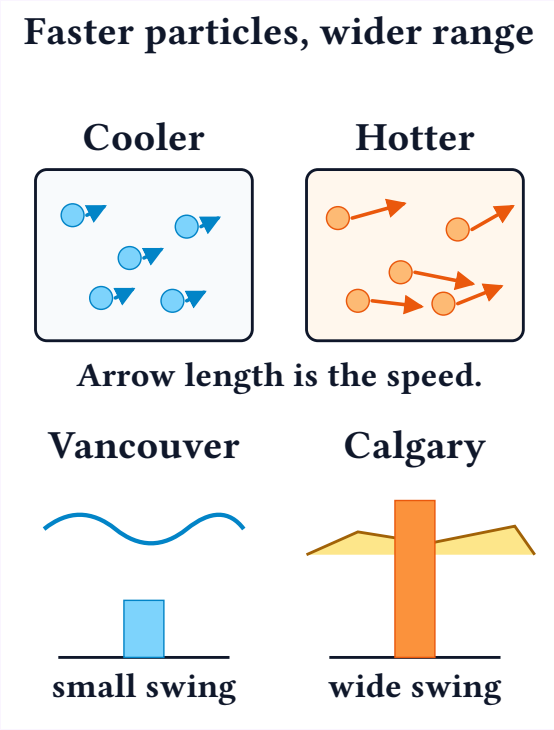
The visible jitter of tiny grains as invisible particles collide with them.

moderating influence

The effect of a large body of water that keeps nearby air from swinging to extreme temperatures.

Convection currents and coastal climate

- Higher temperature means a higher average speed of the particles.
- Vancouver's ocean keeps seasonal temperatures milder than Calgary's prairie air.



Dye in a tank

- Warm water rises from the heater.
- The dye draws the loop as cooler water sinks.

A metal bench in January

- Metal particles pass heat quickly to your hand.
- The bench and the air can share a temperature while the metal feels colder.

Vancouver and Calgary

- Vancouver has a large body of water nearby, so seasons stay milder.
- Calgary's prairie air allows a wider temperature swing.

Convection loops and cities

- A dye loop and a coastline loop are the same convection idea at two sizes.
- Vancouver and Calgary make the water-moderation comparison concrete.