

Exercise walk-through

7.3

Thermal Inversion

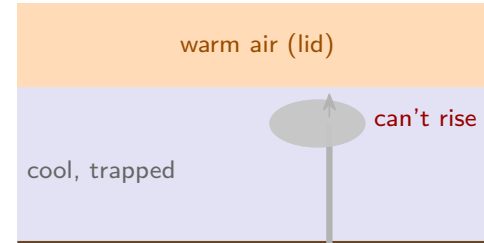
AP Environmental Science

Thermal inversion

Normally warm air rises and carries pollution up. A **thermal inversion** puts a warm layer *on top*, like a lid.

- cool air below cannot rise
- pollution cannot **disperse**

A valley or basin traps it longer – deadly smog events build over days.



Exercises 2.1-2.3

2.1 In normal air, how does temperature change with height near the ground? [1]

2.2 What is the arrangement of air in a thermal inversion? [1]

2.3 Why does an inversion worsen pollution? [1]

Exercises 2.1-2.3

2.1 In normal air, how does temperature change with height near the ground? [1]

2.1

- It gets cooler with height (warmest near the ground)
-

2.2 What is the arrangement of air in a thermal inversion? [1]

2.2

- Warm air sits above cooler air near the ground
-

2.3 Why does an inversion worsen pollution? [1]

2.3

- The trapped surface air cannot rise, so pollutants accumulate near the ground

Exercise 3.1

3.1 A thermal inversion traps pollutants because warm air

[1]

☐

A below cool air lets pollution rise

B above cool air stops the surface air from rising

C removes all pollution

D cools the ground

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3.1 A thermal inversion traps pollutants because warm air

[1]

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A below cool air lets pollution rise

B above cool air stops the surface air from rising

C removes all pollution

D cools the ground

3.1 B

- above cool air stops the surface air from rising

Exercise 3.2 (a)

3.2 A city in a valley experiences a thermal inversion.

(a) Explain why pollution builds up near the ground.

[2]

Exercise 3.2 (a)

3.2 A city in a valley experiences a thermal inversion.

(a) Explain why pollution builds up near the ground. [2]

(a)

- The warm layer above traps the cool surface air, which cannot rise, so pollutants accumulate near the ground

Exercise 3.2 (b)

3.2 A city in a valley experiences a thermal inversion.

(b) State one condition that could break the inversion.

[1]

Exercise 3.2 (b)

3.2 A city in a valley experiences a thermal inversion.

(b) State one condition that could break the inversion.

[1]

(b)

- Wind (or the ground heating to break the inversion)

Exercise 3.3

3.3 Explain why thermal inversions are common in valleys.

[2]

Exercise 3.3

3.3 Explain why thermal inversions are common in valleys.

[2]

3.3

- Cool, dense air sinks and pools at the valley floor while warmer air sits above it, creating the inversion layer, especially on calm clear nights