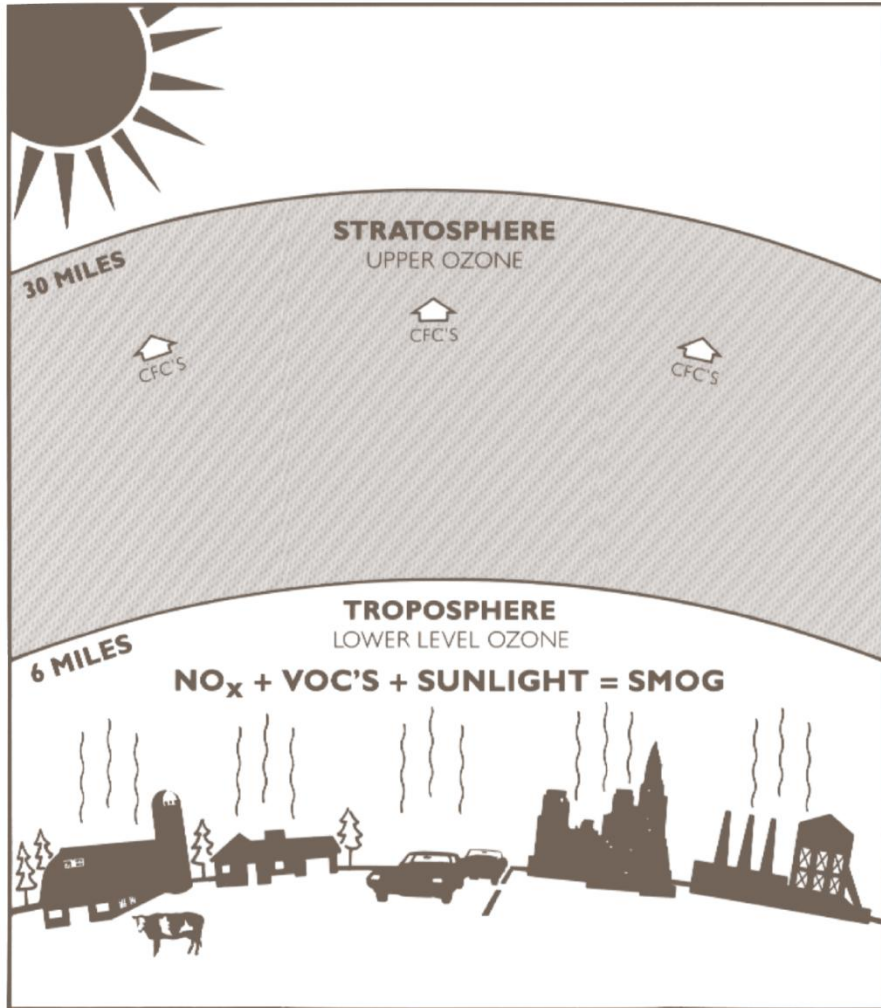


5.7 Urban air pollution

C.C. p. 293 & 294

“To Do” p.295 Q1-5

Tropospheric Ozone



- As we know, ozone in the stratosphere protects the earth and its inhabitants.
- But ground level tropospheric ozone is unhealthy for people and the environment
- it's known as photochemical "smog"

5.7.1 State the source and outline the effect of tropospheric ozone.

Source of Tropospheric Ozone

Three ingredients:

1) nitrogen oxides

Sources: mainly anthropogenic (man-made) - such automobile exhaust and power plants

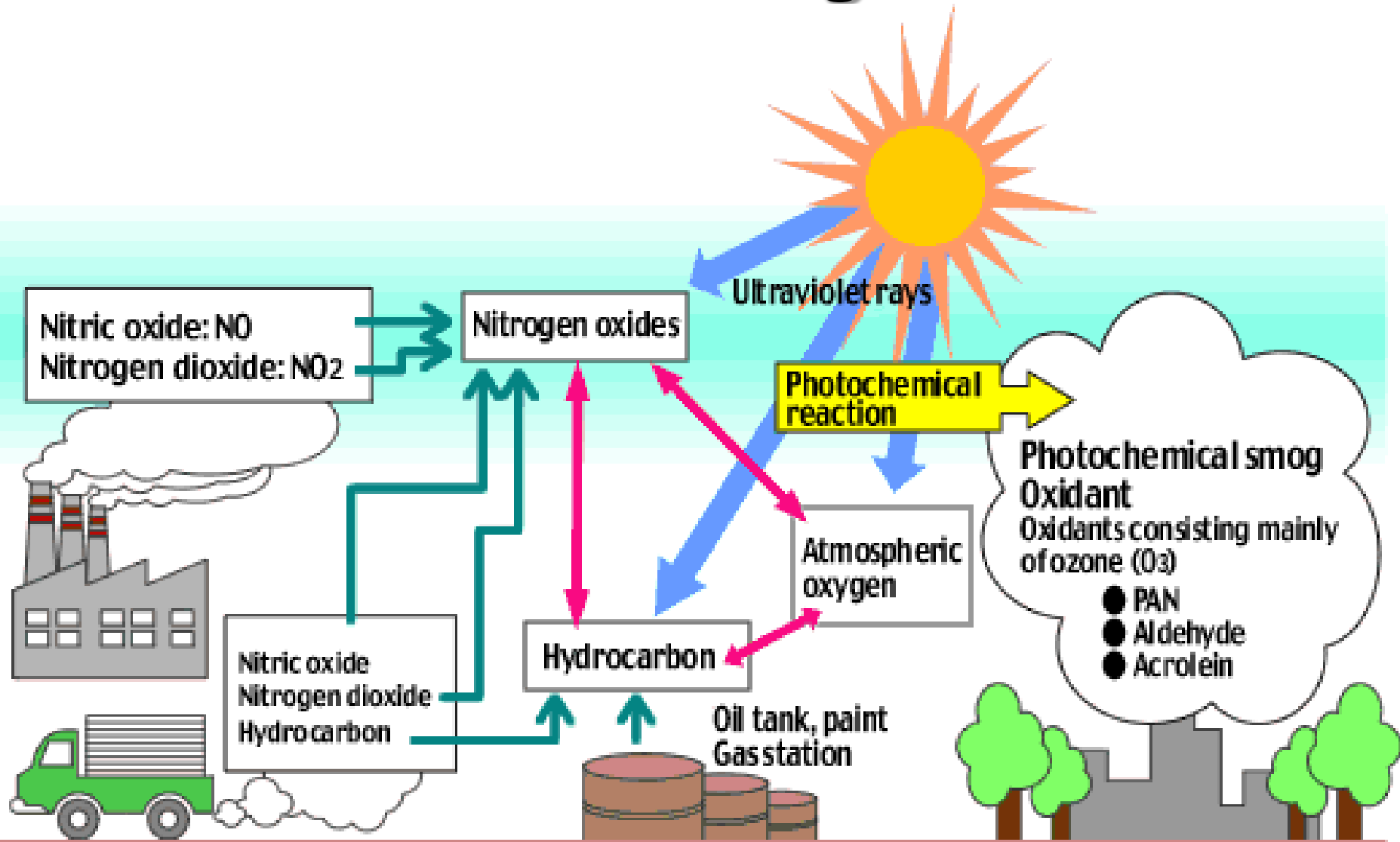
2) sunlight

3) volatile organic compounds (VOCs)

sources: both naturally occurring and man-made.

5.7.2 Outline the formation of photochemical smog.

Photochemical Smog Formation



Photochemical Smog Formation

1. When fossil fuels are burned, two of the pollutants emitted are hydrocarbons (from unburned fuel) and nitrogen monoxide (nitric oxide, NO).
2. Nitrogen monoxide reacts with oxygen to form nitrogen dioxide (NO₂), a brown gas that contributes to urban haze.
3. Nitrogen dioxide can also absorb sunlight and break up to release oxygen atoms that combine with oxygen in the air to form ozone.

Photochemical Smog Formation

Animation shows process of smog formation
U.S. Environmental Protection Agency

<http://www.airinfonow.org/html/makingozone/o3play.htm>

Requires Macromedia Flash Player

5.7.1 State the source and outline the effect of tropospheric ozone.

The effects on human health

Lung Attack

Animation of smog's effects
on the human respiratory system

U.S. Environmental Protection Agency

<http://www.airinfonow.org/html/lungattack/lungplay.htm>

Requires Macromedia Flash Player

Also read “epa-smog-hurts (pdf)”

5.7.3 Describe and evaluate pollution management strategies for urban air pollution.

Course Companion p.298

See Table 15.7 (it relates also to acid rain)

Simulation Activity

Smog City

Interactive simulation of ground-level ozone formation

Sacramento Metropolitan Air Quality Management District

<http://www.smogcity.com/>

Use with activity sheet