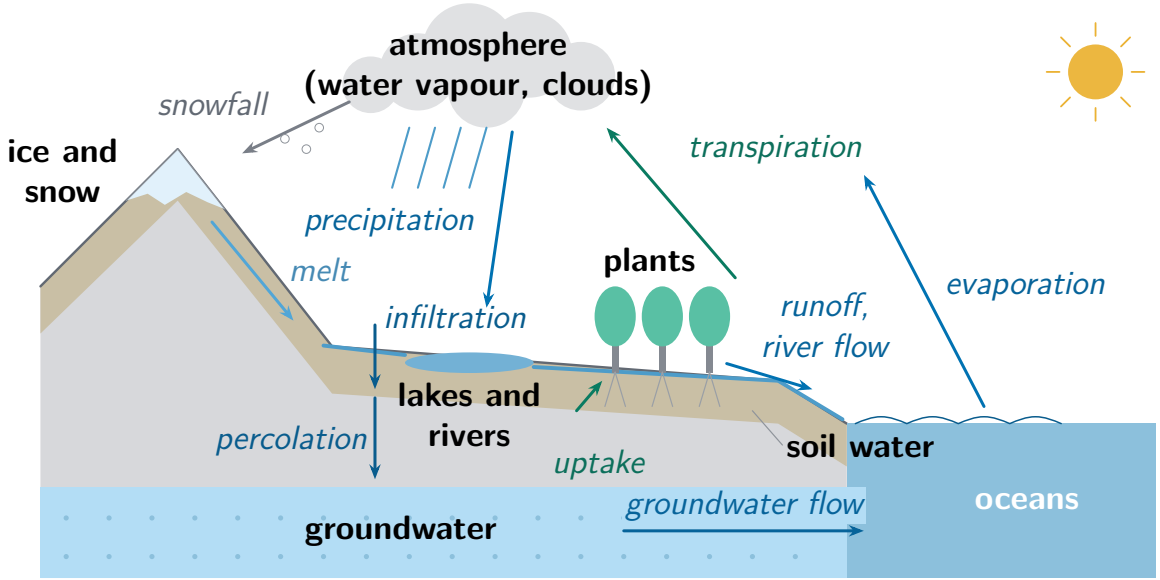
Exercise walk-through

# 4.4
# Water pollution

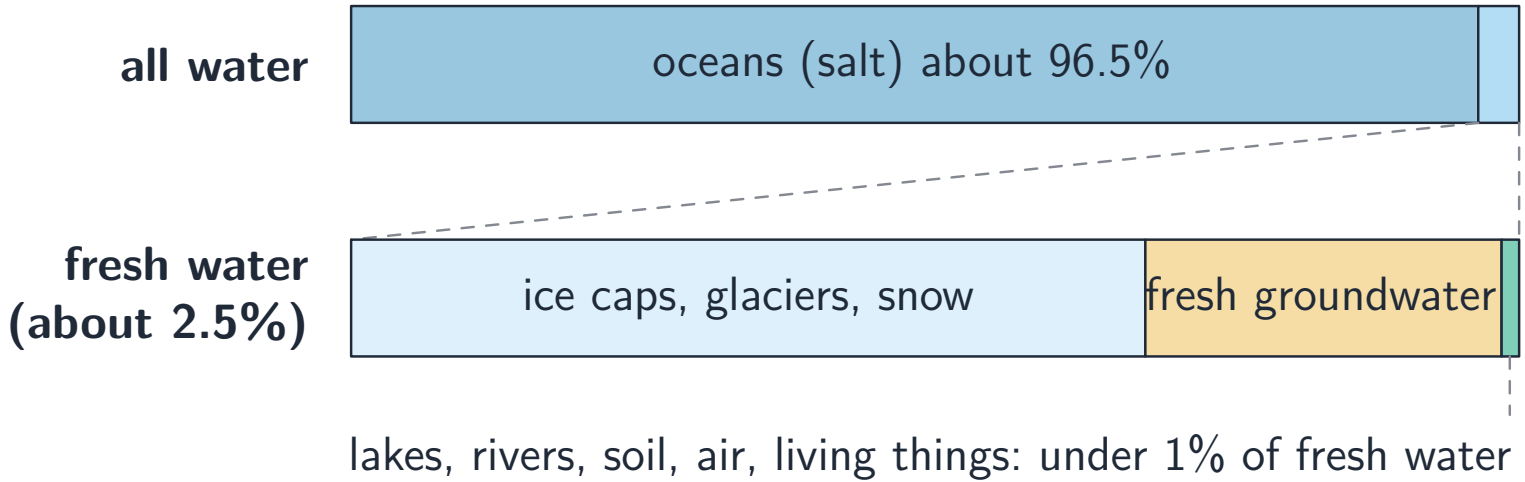
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# The hydrological cycle



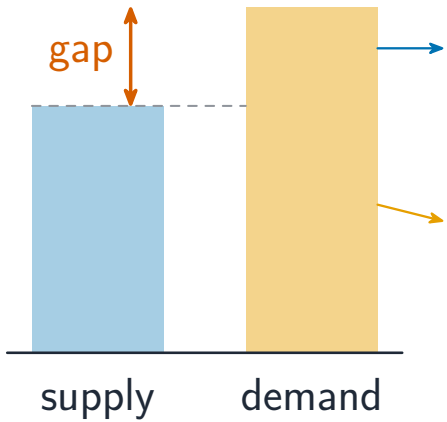

Selected storages and flows: solar energy and gravity drive different processes.

# Where the Earth's water is




Lakes and rivers are under 1% of fresh water

# Closing a water gap



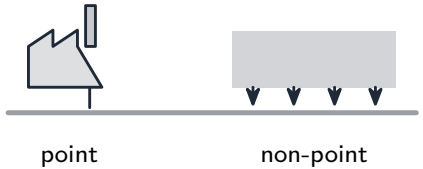

**raise supply**: reservoirs, desalination, rainwater harvesting, recharged groundwater, inter-regional transfer

**cut demand**: drip irrigation, pricing and metering, greywater reuse, fixing leaks

> Either side can close the gap

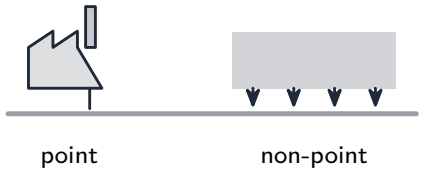
# Exercise 2.1

**2.1** Distinguish between point-source and non-point-source pollution, with **one** example of each. [2]



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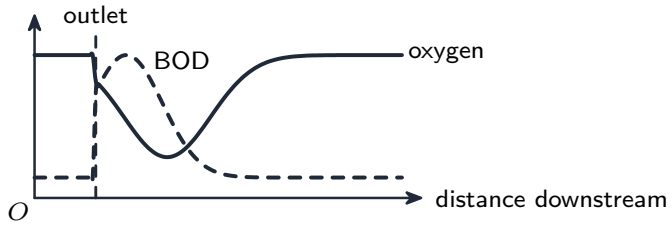



**2.1**

point: from one identifiable place, e.g. a factory outlet pipe; non-point: from many spread-out places, e.g. fertilizer runoff from farmland

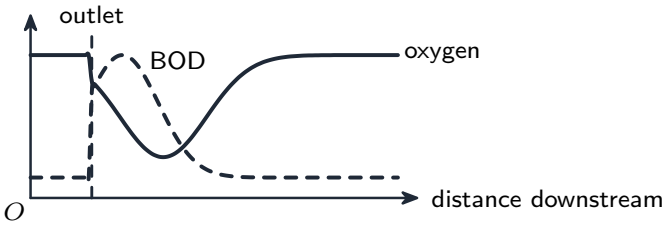
# Exercise 2.2

**2.2** The graph shows dissolved oxygen and BOD downstream of a sewage outlet. Explain the changes in oxygen. [3]



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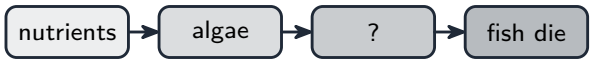
below the outlet, organic matter is decomposed by bacteria, so BOD is high; bacteria use up oxygen, so dissolved oxygen falls; further downstream the organic matter is used up and oxygen dissolves from the air, so oxygen recovers

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# Exercise 3.1 (a)

**3.1** Fertilizer runs off farmland into a lake.

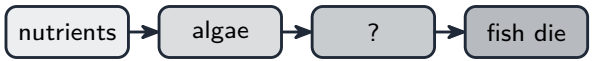
(a) Outline the process of eutrophication. [3]



# Exercise 3.1 (a)

**3.1** Fertilizer runs off farmland into a lake.

(a) Outline the process of eutrophication. [3]




(a) nitrate and phosphate cause rapid growth of algae; algae block light, so plants die; dead matter is decomposed by bacteria; bacteria use up oxygen, so fish and other animals die

# Exercise 3.1 (b)

**3.1** Fertilizer runs off farmland into a lake.

(b) Explain why eutrophication is an example of positive feedback. [1]

# Exercise 3.1 (b)

**3.1** Fertilizer runs off farmland into a lake.

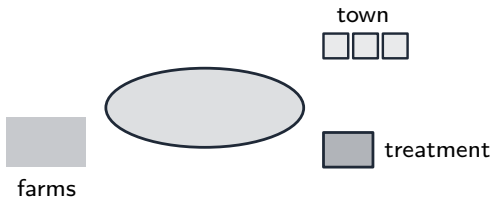
(b) Explain why eutrophication is an example of positive feedback. [1]

(b) the dead animals add more organic matter, so decomposition and oxygen loss increase further

# Exercise 3.2

**3.2** A lake suffers from eutrophication caused by farm runoff and town sewage.

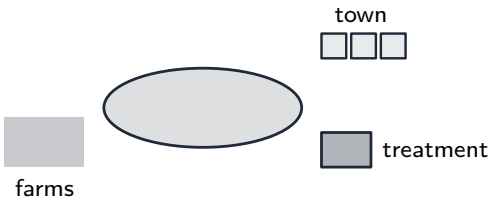
Evaluate strategies at **three** levels to manage the problem. [5]



# Exercise 3.2

**3.2** A lake suffers from eutrophication caused by farm runoff and town sewage.

Evaluate strategies at **three** levels to manage the problem. [5]




## 3.2

award up to [5]: change the activity: use less fertilizer, apply it at the right time, phosphate-free detergents: cheapest in the long term but needs farmer cooperation; control the release: buffer strips and sewage treatment that removes nutrients: effective but costly to build; clean-up: dredge nutrient-rich sediment, aerate water, remove algae: fast effect but expensive and only treats the symptoms; conclusion: prevention at the source is most sustainable, with clean-up for quick relief