Solutions

Each answer shows the steps, then the **result**.

2.1

- No – they are hydrophobic

2.2

- A polar (hydrophilic) head and two nonpolar (hydrophobic) tails

2.3

- Fats (triglycerides)

2.4

- cholesterol sits between phospholipids in the membrane and keeps it stable
- for example: steroid hormones such as testosterone and oestrogen regulate growth and development; cortisol regulates energy metabolism and homeostasis

3.1 B

- two nonpolar tails

3.2

(a)

- The polar heads face the water on both surfaces; the nonpolar tails point inward, away from water

(b)

- The hydrophobic tails are excluded from water and cluster together, while the hydrophilic heads interact with water, so the bilayer self-assembles

3.3

- Fats store more energy per gram than carbohydrates and are hydrophobic (stored without water), making them a compact, efficient long-term store

3.4

(a)

- Y, because it has a carbon–carbon double bond

(b)

- the double bond in Y puts a kink in the tail, so the tails cannot pack closely together
- weaker attractions between the loosely packed molecules mean a lower melting point, so oil is liquid; the straight saturated tails in butter pack tightly, so it is solid

(c)

- energy storage and insulation against cold water