

AP Biology

Name: _____ Score: _____

1. An **organelle** is...

- ☐ a small structure inside a cell with a specific job
- ☐ a whole organ, like the heart
- ☐ a type of cell
- ☐ a molecule of DNA

2. Why must most cells stay very small?

- ☐ A small cell has a high surface-area-to-volume ratio for fast exchange
- ☐ Small cells weigh less
- ☐ Small cells have more DNA
- ☐ Big cells cannot hold water

3. The plasma membrane is built mainly from a...

- ☐ phospholipid bilayer
- ☐ single layer of protein
- ☐ sheet of DNA
- ☐ solid wall of cellulose

4. In **diffusion**, particles move...

- ☐ from high concentration to low concentration
- ☐ from low concentration to high concentration
- ☐ only upward
- ☐ only if pushed by a pump

5. **Passive transport** moves substances...

- ☐ down the gradient, using no energy
- ☐ up the gradient, using ATP
- ☐ only into the cell
- ☐ only when the cell is dead

6. As a cell gets bigger, its surface-area-to-volume ratio falls.

- ☐ True
- ☐ False

7. The model of the membrane, with proteins floating in a moving lipid sheet, is the _____ mosaic model.

8. Diffusion is **passive** — it needs no energy from the cell.

☐ True ☐ False

9. The organelle that stores DNA and controls the cell is the _____.

10. A cube of side 2 has surface area 24 and volume 8. What is its SA:V ratio (surface $\div$ volume)?

AP Biology

1. a small structure inside a cell with a specific job

An **organelle** is a specialised structure inside a cell — like the nucleus or a mitochondrion — each doing a specific job.

2. A small cell has a high surface-area-to-volume ratio for fast exchange

A small cell has a large **surface area** relative to its **volume**, so materials diffuse in and out fast enough.

3. phospholipid bilayer

The membrane is a **phospholipid bilayer** — two layers of phospholipids with proteins embedded in them.

4. from high concentration to low concentration

Diffusion is the net movement of particles down their **concentration gradient** — high to low.

5. down the gradient, using no energy

Passive transport goes down the concentration gradient and costs the cell no energy.

6. True

Volume grows faster than surface area, so the **SA:V ratio** falls as size increases.

7. fluid

In the **fluid mosaic** model the lipids move like a fluid, and proteins are scattered through them like a mosaic.

8. True

Diffusion is **passive**: particles move on their own random motion, so the cell spends no ATP.

9. nucleus

The **nucleus** holds the DNA and directs everything the cell does.

10. 3

$24 \div 8 = 3$. A smaller cube (side 1) would give $6 \div 1 = 6$ — a higher ratio.