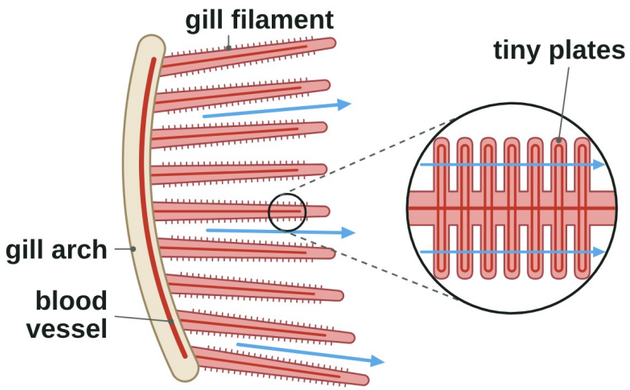
B1 L10 Alternative worksheet: Active transport and exchange surfaces

Name: _____ Class: _____

Key facts

- An **exchange surface** is a surface specialised for substances to move into or out of an organism. A fish's **gills** are one.
- Each gill has a bony **gill arch** holding many thin **gill filaments**. Real gills are deep red: they are full of blood.
- **Diffusion** and **osmosis** need no energy. Osmosis moves water only.
- **Active transport** moves substances from a **lower** to a **higher** concentration (against a concentration gradient). It needs **energy** from respiration.
- Root hair cells take in **mineral ions** by active transport, and water by osmosis.
- Respiration in the **mitochondria** releases the energy.
- A small object has a **large** surface area to volume ratio. A big object has a **small** one.
- Good exchange surfaces have a **large surface area** and are **thin**. In animals they have a good **blood** supply. Plants have no blood.





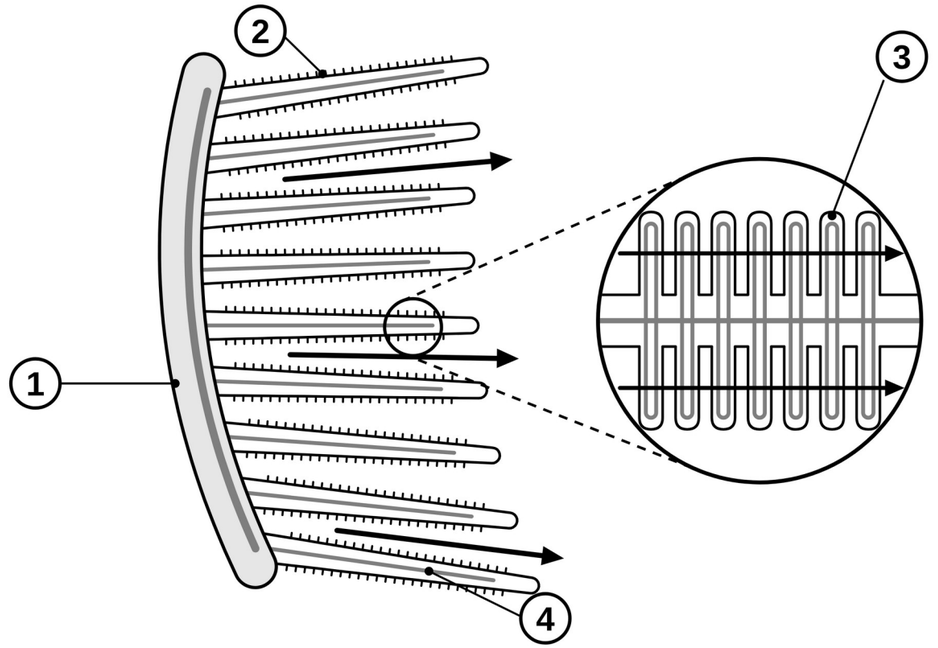
A real gill (left) and a diagram (right).

A. Label the gill

Help: online screens 1 and 2 [4]

Write a name from the box next to each number.

blood vessel	gill arch	gill filament	tiny plates



1 _____ 3 _____

2 _____ 4 _____

Tip: the circle shows part of one filament, made bigger.

B1 L10 Alternative worksheet: Active transport and exchange surfaces

Name: _____ Class: _____

B. Match up

Help: online screens 1, 3 and 7 [5]

Draw a line from each word to what it means.

gills	the total area of the outside of an object.
exchange surface	the organs a fish uses to take in oxygen from water and get rid of carbon dioxide.
surface area	the structures in the cytoplasm where aerobic respiration happens, releasing energy for the cell.
mineral ions	substances from the soil, such as nitrate, that a plant needs to stay healthy.
mitochondria	a surface specialised for substances to move into or out of an organism, such as the alveoli or the gills.

C. Fill in the gaps

Help: online screens 3, 9, 10 and 11 [5]

Use the words in the box. Use each word once.

blood	**energy**	**mineral ions**	**small**	**thin**

1. Active transport needs _____ from respiration.
2. Root hair cells take in _____ by active transport.
3. A big animal has a _____ surface area to volume ratio.
4. Gill filaments are _____, so oxygen only diffuses a short way.
5. Gills have a good _____ supply. Plants do not.

D. True or false?

Help: online screens 2, 3, 6, 7 and 11 [6]

Write true or false after each sentence.

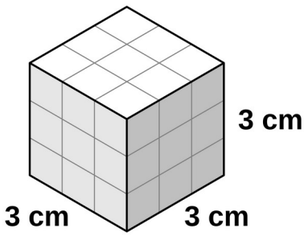
1. Real gills are pale pink, like the diagram. _____
2. Active transport needs energy from respiration. _____
3. Diffusion moves particles from a lower to a higher concentration. _____
4. Water enters root hair cells by osmosis. _____
5. A 1 cm cube has a larger surface area to volume ratio than a 3 cm cube. _____
6. Leaves have a good blood supply. _____

E. A cube with 3 cm sides

Help: online screens 7 and 9 [6]

Follow the steps. Fill in the gaps, or circle the right answer.

1. A cube has _____ faces.
2. Each face is 3 cm × 3 cm = _____ cm².
3. Surface area = 6 × 9 = _____ cm².
4. Volume = 3 × 3 × 3 = _____ cm³.



5. The 3 cm cube has a ratio of 2 : 1. A 1 cm cube has a ratio of 6 : 1. Circle the cube with the larger ratio: **1 cm cube** / **3 cm cube**
6. Circle the right word: a bigger cube has a **larger** / **smaller** surface area to volume ratio.