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Complete the work below either in the booklet or on Teams – hand any printed copies to your Tutor on Friday.

English Watch the video clips and make notes: The Structure of Comedy (thenational.academy) and Rule and Order (thenational.academy)	**Maths** Sparx Maths – Complete the extra Home Learning that has been set. If you do not know your password, go to the Sparx site, and request a password reset.
Science Read through the information and answer the questions. 1) Cell models 2) Speed	**Spanish** Use the revision books you have been given to revise for next week's assessment.
Geography Complete the work on Volcanoes in USA. Lesson 3 4- 11th May Volcanic landscapes Yel.pptx	**History** The Museum of the World Using this interactive resource, explore the galleries and artefacts in the British Museum. Create a 'must see' guide to the museum including your top **5** artefacts. Museum of the World (britishmuseum.withgoogle.com)

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English

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Science

Task

1. Read through info sheet beneath to help
2. Answer the questions

Questions

1. Describe the relationship between size of an animal and its surface area:volume ratio.

2. Explain why simple organisms only need to rely on diffusion.

3. State what larger organisms need to transport substances like oxygen around their body.

4. How are exchange surface generally adapted to their function.

5. Explain why cacti have spines instead of leaves.

6. List the four factors which affect rate of diffusion.

7. State how leaves are adapted to their function.

8. Name the structure where gas exchange occurs in the lungs.

9. Explain why this structure increases the rate of exchange.

10. State an additional adaptation that animals have in order to increase the rate of exchange.

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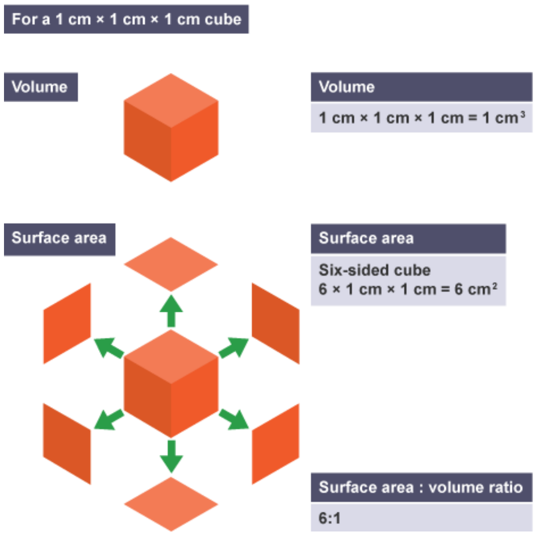
Cell models

It's straightforward to model cells using cubes.



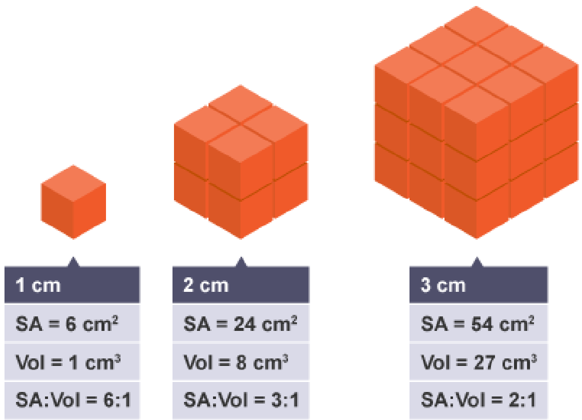
Unicellular organisms, such as bacteria, have a very high surface area:volume ratio. Substances can diffuse in and out at a high rate and easily reach all parts of the cell.

Because of their smaller surface area: volume ratio, larger organisms need transport systems to move substances, such as oxygen, around the body to where they are needed. In many animals, this is the bloodstream. They also need specialised exchange surfaces where substances can enter and leave the transport system by diffusion. An example is the lungs in mammals. Exchange surfaces are adapted to increase their surface area to maximise the rate of diffusion.

Organisms living in harsh environmental conditions may reduce their surface area, eg cacti have spines instead of leaves, to reduce loss of water through their leaves.

Factors which affect the rate of diffusion

1. Surface area
2. Concentration gradient
3. Temperature
4. Diffusion distance



Adaptations of effective exchange surfaces in all organisms

In multicellular organisms, surfaces and body organs are specialised for exchanging materials.

The effectiveness of exchange surfaces in plants and animals is increased by having:
A large surface area:

- the flattened shape of structures such as leaves
- the alveoli in the lungs
- the villi in the digestive system.

A short distance required for diffusion:

- the flattened shape of structures such as leaves
- the walls of blood capillaries are one cell thick (very thin)
- the epithelia of alveoli in the respiratory system and the villi in the small intestine are only one cell thick

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Large, flat leaves like this green taro leaf have an effective exchange surface

Animals have additional adaptations to ensure effective exchange surfaces

An efficient blood supply to transport molecules to and from the exchange surface increases effective exchange. Examples of this include:

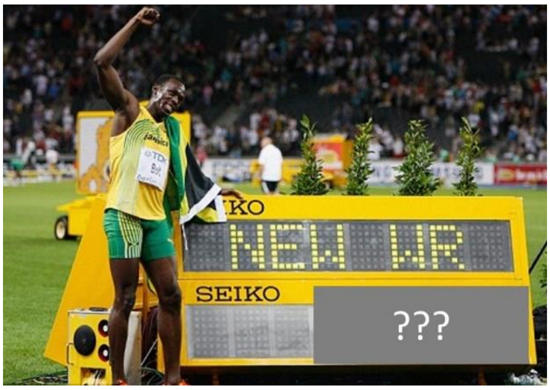
- the network of blood capillaries that surrounds each alveolus in the lungs
- the network of blood capillaries in each villus in the small intestine

In the lungs, the process of breathing, or ventilation, brings air to, and removes air from the exchange surface - the alveoli.

The moving blood and ventilated surfaces mean that a steep concentration gradient can be maintained.

Speed

Speed is a measure of how far an object has moved in a certain time. Speed is a **scalar**, while velocity is a **vector**.



They both can be calculated using the equation:
Speed = distance ÷ time
v = s ÷ t
where **v** is the velocity or speed (in m/s)
s is the distance (in m)
t is the time (in s)
This equation can be re-arranged to
Time = distance ÷ speed

Distance = speed x time

Example
Calculate speed if an objects travels 20m in 5 seconds

Distance is 20m. Time is 5 seconds. Speed is ?
- **Speed = distance ÷ time.**
- **Speed = 20m ÷ 5s**
- **Speed = 4m/s**

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Example question: Usain Bolt ran his 100m world record at an average speed of 10.44 m/s. How long did it take for him to finish the race?
Step 1: Write the equation. Rearrange if necessary.
t = s ÷ v
Step 2: Write down the variables
s = 100 m
v = 10.44 m/s
Step 3: Calculate the answer
t = 100 ÷ 10.44 = 9.58 s

The average person **walks** at a speed of 1.5 m/s, **runs** at a speed of 3 m/s and **cycles** at a speed of 6 m/s. The speed of **sound** in air is 330 m/s.
Speed can also be measured in units of kilometres per hour (km/h) or miles per hours (mph).

Questions

Q1 Work out the **speed** of a car travelling on a straight track for:

a) 100 m in 10 s =10m/s e) 1000 m in 200 s
b) 320 m in 16 s f) 300 m in 20 s
c) 1500 m in 180 s g) 50 m in 4 s
d) 700 m in 35 s h) 450 m in 22 s

Q2 **How far** does a bus move if it's travelling at:

a) 10 m/s for 30 s e) 15 m/s for 28 s
b) 15 m/s for 20 s f) 20 m/s for 20 s
c) 12 m/s for 180 s g) 100 m/s for 300 s
d) 5 m/s for 70 s h) 180 m/s for 20 s

Q3 **How long** does it take a car to travel:

a) 10 m at 20 m/s e) 180 m at 6 m/s
b) 50 m at 10 m/s f) 40 m at 12 m/s
c) 55 m at 30 m/s g) 200 m at 8 m/s
d) 90 m at 20 m/s h) 2,000 m at 16 m/s

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History

High **Expectations** lead to High **Achievers**

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Geography