

# **HOMEWORK SHEET 1**

## LIVING WITH MICRO-ORGANISMS STUDENT INFORMATION SHEET

Micro-organisms are very small life forms, so small that you usually need a powerful microscope to see them. Micro-organisms are found everywhere in our environment, although fortunately most of them are completely harmless.

Types of micro-organisms include:

- Bacteria
- Viruses
- Moulds and yeast

Micro-organisms can cause disease, infection, food poisoning and food spoilage.

Many micro-organisms, especially mould fungi can grow on human and animal foodstuffs. If given the opportunity, they will grow on the food spoiling it and making it unfit to eat. Food spoilage can be important economically. If it cannot be sold, the money spent on growing and preparing the food has been wasted. One way of preventing food spoilage is by adding chemicals called preservatives to food. These chemicals prevent or slow down the growth of micro organisms.

### Food Poisoning

Food poisoning is when people become ill by eating food. It is often caused by micro organisms (especially bacteria), which grow on food. When people eat the infected food, they become ill. Bacteria can get on to the food from work surfaces or hands. Good hygiene can reduce the occurrence of food poisoning.

Bacteria called *Salmonella* and *Campylobacter* cause two types of food poisoning.



### Diseases other than food poisoning

Micro organisms cause many diseases in addition to food poisoning.

Human beings try to prevent the spread of disease in two ways:

1. Installing sanitation systems - provides cleaner water
2. Immunization programmes - helps protect people against some infectious diseases.

However it is not always possible to prevent a disease, so humans have also had to develop ways of treating a disease if we are to become infected.

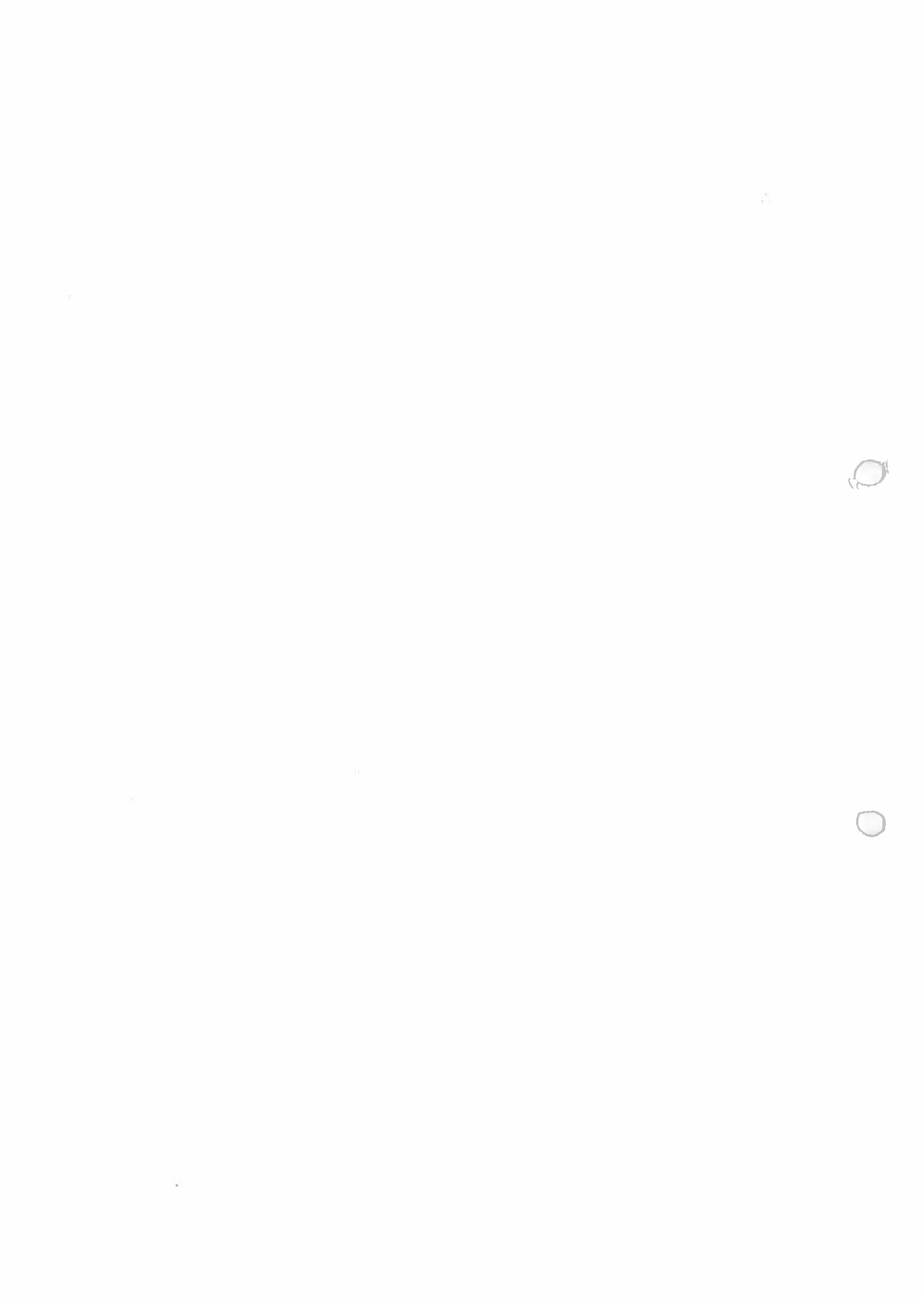
One way of doing this is by using chemicals to kill the micro organisms (antibiotics).

Athlete's foot is a common skin problem caused by a fungus. It usually occurs on the skin between the toes, which becomes itchy and scaly. In time, skin may break and become sore. Athlete's foot can be easily treated using a spray or a cream bought from a pharmacy.

Thrush is also caused by a fungus, but infects both internal organs and mucous membranes of the mouth, throat and genital tract. Again thrush is easily treated using creams bought from a pharmacy.

Answer the following questions in your jotter in sentences

- 1) Name three types of micro organism
- 2) List two harmful effects micro organisms have on humans
- 3) In what way can humans prevent food spoilage?
- 4) Name two common bacteria which cause food poisoning
- 5) Which two ways have humans prevented the spread of disease?
- 6) Write a short note on a common fungal infection.



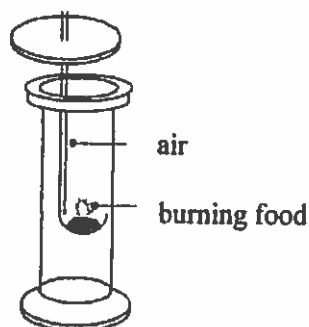
# **HOMEWORK SHEET 2**

St. Andrew's Academy

S2 Biology

## **Respiration Homework**

1. The following diagram shows a sample of food being burned inside a gas jar. After burning, a little limewater was added to the gas jar and shaken.

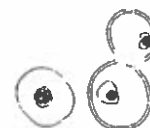


- a) Which gas is used up by the burning food? (1)
- b) Which gas is produced by the burning food? (1)
- c) What happens to the limewater? (1)
2. Copy and complete the equation below to show the chemicals involved in aerobic respiration. (3)
- GLUCOSE + ..... → ..... + .....
3. What type of energy is released by respiration? (1)
4. Other than movement, give two uses of energy by animal cells. (2)
5. State the precise location of aerobic respiration in the body. (1)



# HOMWORK SHEET 3

Name \_\_\_\_\_



1. Why is yeast added to dough?

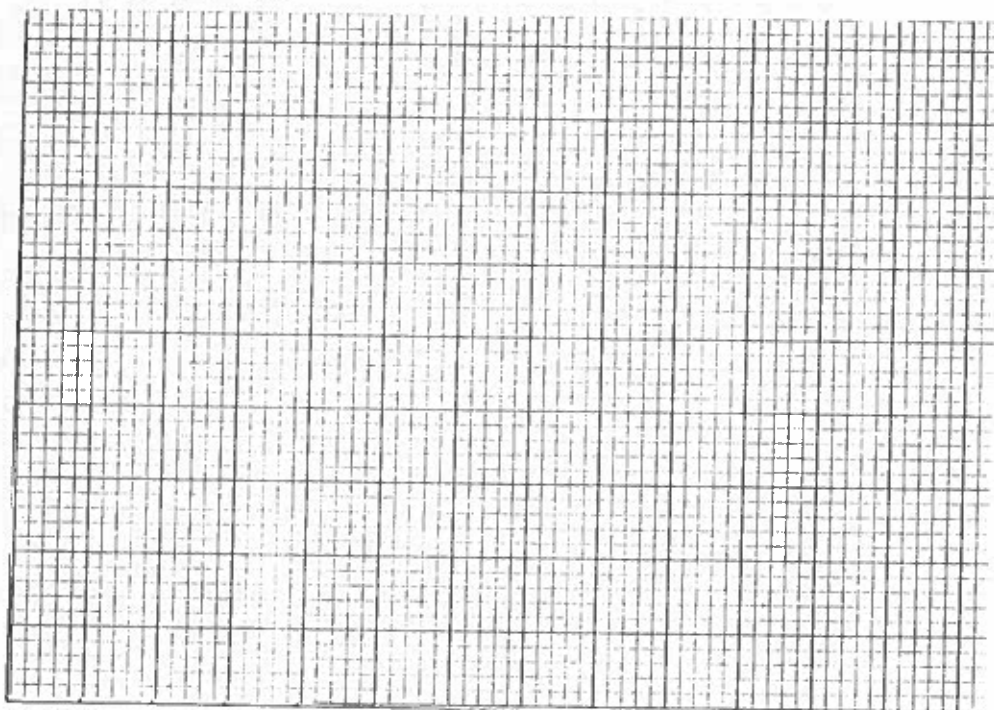
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2. In this experiment the volume of gas given off was measured by measuring the diameter of a balloon.

| time (mins.)  | 0 | 10 | 20 | 30   | 40   | 50   |
|---------------|---|----|----|------|------|------|
| diameter (cm) | 0 | 24 | 40 | 52.5 | 54.8 | 54.8 |



Present the results as a line graph.



3. Suggest a reason why the graph levels off near the end.

\_\_\_\_\_  
\_\_\_\_\_

4. Suggest a way to make the reaction go faster.

\_\_\_\_\_  
\_\_\_\_\_

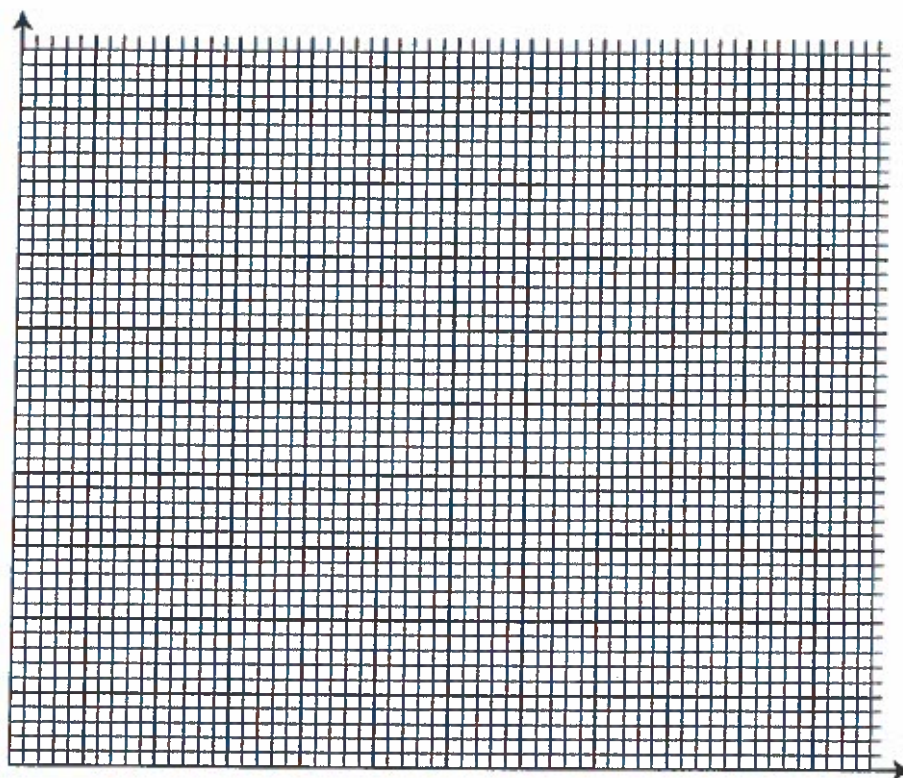
5. Which group of micro-organisms does yeast belong to?

\_\_\_\_\_  
\_\_\_\_\_

Linda left some bread in a dish to observe the growth of mould on it.  
She measured the area of mould every 2 days. Her results are shown below.

| days                             | 0 | 2 | 4 | 6  | 8  | 10 | 12 | 14 |
|----------------------------------|---|---|---|----|----|----|----|----|
| area of mould (cm <sup>2</sup> ) | 0 | 0 | 2 | 10 | 40 | 55 | 58 | 60 |

Draw a graph of her results.



Over which two days did the mould grow fastest?

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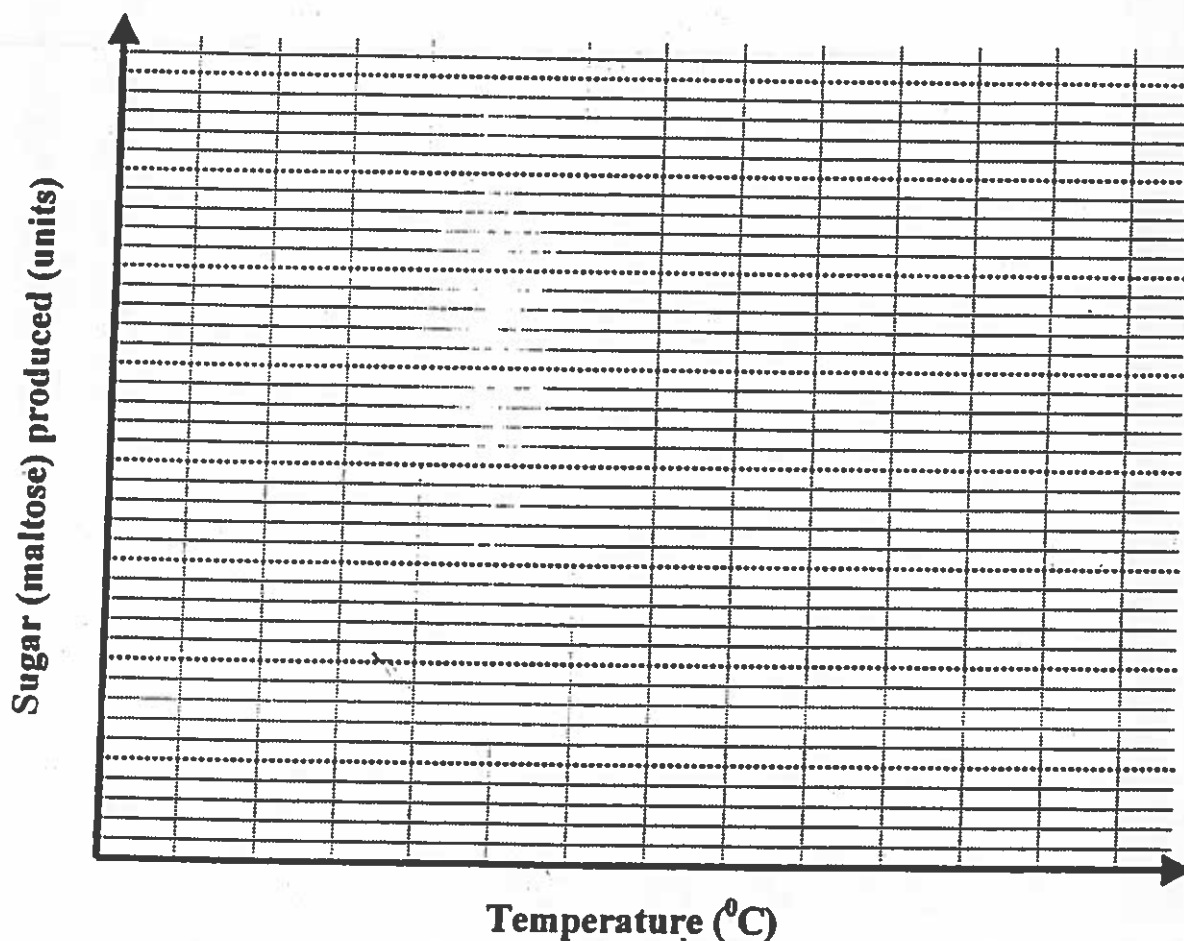
## HOMEWORK 4

In order to investigate the effect of temperature on the action of an enzyme, samples of amylase and starch mixture were kept at different temperatures. After 15 minutes each sample was tested for the amount of maltose sugar present.

The results are shown below.

| Temperature<br>(°C) | Sugar (maltose) produced<br>(units) |
|---------------------|-------------------------------------|
| 10                  | 18                                  |
| 20                  | 32                                  |
| 30                  | 45                                  |
| 40                  | 80                                  |
| 50                  | 30                                  |
| 60                  | 10                                  |

(a) Plot these results as a line graph.



(b) Why should the pH of all the mixtures be kept the same during the experiment?

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(1)

(c) From the results, at what temperature was the enzyme most active?

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(1)

(d) How could you have improved this experiment to find out the temperature at which amylase works best?

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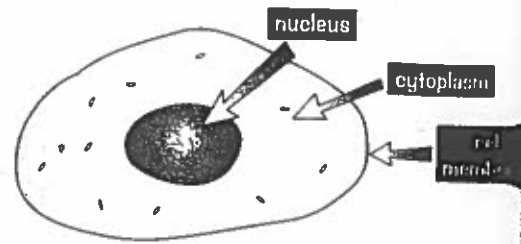
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(1)

## Genes, Chromosomes and DNA

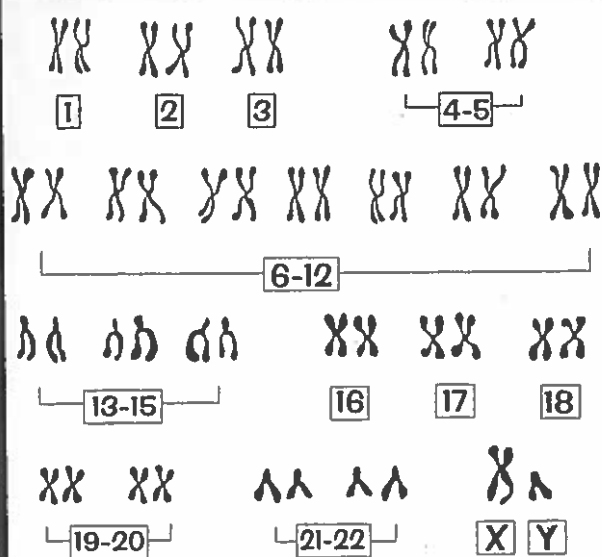
Q1) This is a typical animal cell.

- What part of the cell are chromosomes found in?
- If this was a human cheek cell, how many chromosomes would there be inside it?
- What is the chemical that chromosomes are made of?

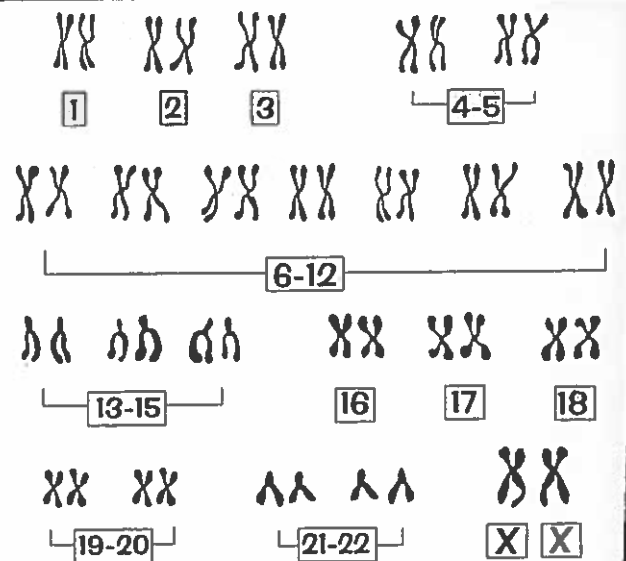


Q2) The figures below show the chromosomes of a human male and female.

**Chromosomes from a normal human male**



**Chromosomes from a normal human female**

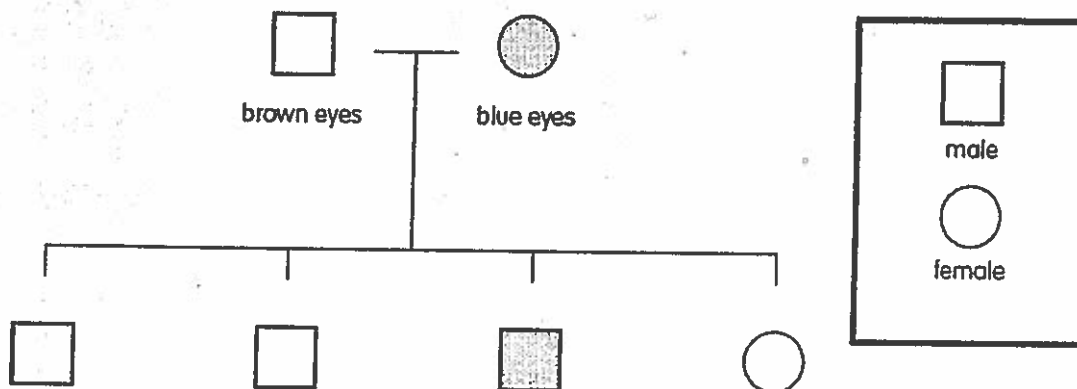


- What is the difference between the two sets of chromosomes?
- Why do we talk in terms of pairs of chromosomes?
- How many chromosomes do we have in each body cell?
  - Where in the cell are the chromosomes found?



# HOMWORK SHEET 6

Look at this family tree.



How many boys did the couple have?

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Which gene is dominant?

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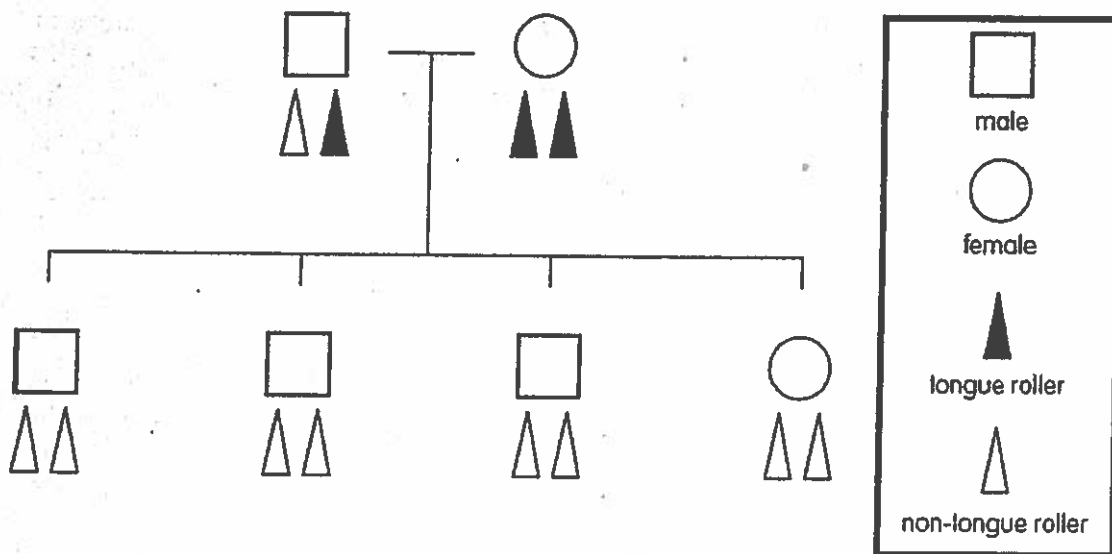
Complete the punnett square for the above cross.

|                |   | Mother's genes |   |
|----------------|---|----------------|---|
|                |   | b              | b |
| Father's genes | B |                |   |
|                | b |                |   |

| Fill in the colour of eyes for the following combinations of genes. |  |
|---|--|
| BB  |  |
| bb  |  |
| Bb  |  |



1. In this family tree tongue rolling is dominant to non-tongue rolling.



Represent this cross as a punnett square where T = tongue roller gene and t = non-tongue roller gene.

|                |   | Mother's genes |  |
|----------------|---|----------------|--|
| Father's genes | x | T              |  |
|                |   |                |  |
|                |   |                |  |

- Use the information in your punnett square to shade in the triangles, showing all the possible combinations of children.
- For the girl born in the family what are the chances she could be tt - i.e. a non-tongue roller?

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## HOMWORK SHEET 7

*Whose DNA is it anyway? Gene Jury*

### What can we find out from our DNA? The story of Craig Venter

DNA is used by the police to identify people. Scientists can also use it to explain some diseases. In both of these examples, it is useful to compare DNA from many people using records that are kept in a DNA database.

With all of this genetic information available to strangers, there is a concern about what personal information DNA might reveal.



**Q1. Do you think it is right or wrong to hold a DNA database?**  
Circle an answer

**A. Totally agree    B. Sort of agree    C. Disagree a little    D. Totally disagree**



Craig Venter, one of the scientists who first read human DNA, had his own DNA read to find out what it would reveal.

His DNA showed many things, including that he should have wet (and not dry) earwax, and that he is less likely than most people to have antisocial behaviour. It has revealed more serious things too, such as that he is more likely to develop Alzheimers disease and heart problems, and that he is more likely to become an alcoholic.

Since finding out about what genes he has, he has been taking drugs that can prevent heart problems and may reduce the risk of Alzheimers.



**Q2 . If somebody finds out what genes you have, what do you think they could find out about you?**

n  
A  
a  
is



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**Q3. We know that Craig Venter has genes which may make him more likely to become an alcoholic. Does that mean that his boss should use this information when choosing whether or not to employ him?**

**Yes / no**

**Reason:**

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The picture is not simple. Just because someone has a gene doesn't mean that they will definitely develop a certain appearance or a disease. Most diseases need certain genes and a certain environment; for example, Craig Venter's DNA shows that he is more likely to become an alcoholic, but if he lives in a house where nobody drinks, and he has no friends who drink, then he is unlikely to drink himself. As yet, Craig Venter has not developed any of the diseases mentioned earlier; however he has suffered from skin cancer, yet his genes have shown that he has a normal risk of having this disease.

What can we really find out about someone from reading their genes? The answer is that if someone has a gene for a certain appearance or disease, we can say someone is *likely* to have the appearance or disease, but it is not certain.



**Q4. Given that personal information is easily available from DNA, who should be able to look at it?**



**Q5. Does it make a difference if we don't understand enough about the information DNA holds yet?**



**Q6. How has this story changed your opinions on the accessibility of DNA databases?**

