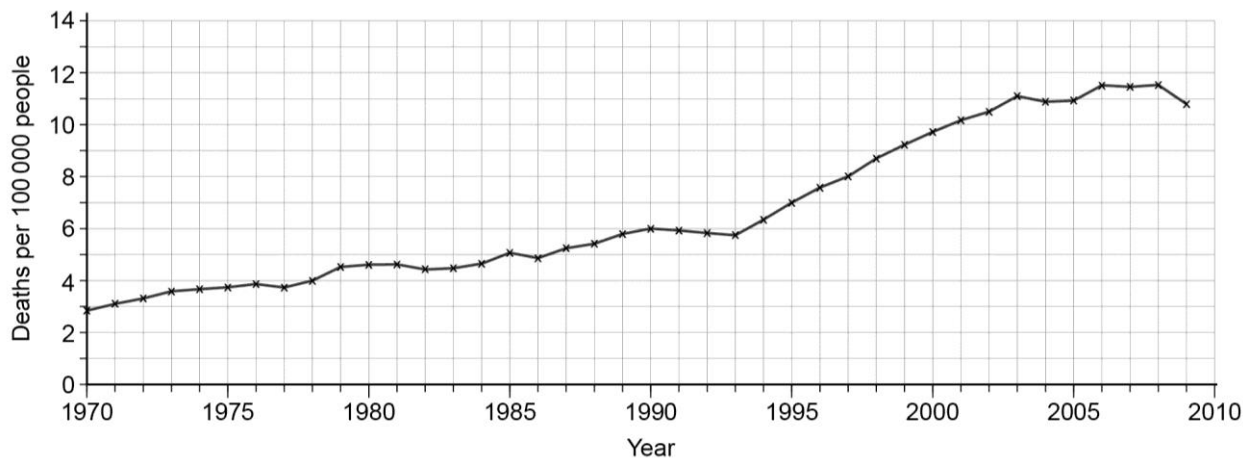The graph shows the number of people per 100 000 people who died of liver disease in the UK each year between 1970 and 2009.

Deaths from liver disease per 100 000 people in the UK by year

1 Approximately how many people died per 100 000 from liver disease in:

   a 1970

   b 2006?

2 The total population of the UK in 1970 was about 55.7 million, and in 2006 it was about 60.9 million. Explain why the values in the graph are calculated as number of deaths per 100 000 people.

3 a Describe the trend in deaths from liver disease in the UK between 1970 and 2006 as fully as you can.

   b Describe the trend since 2006.

4 It has been suggested that the change in trend of deaths from liver disease since 1993 is due to increased alcohol consumption. To test this idea, plot a scatter graph (scatter diagram) using the data in the table.

   a Plot deaths on the *y*-axis against alcohol consumed on the *x*-axis.

Year	1970	1974	1978	1982	1986	1990	1994	1998	2002	2006	2009
Alcohol consumed (dm^3 per person per year)	6.73	8.52	8.71	8.88	9.02	9.52	9.32	10.15	11.46	11.39	10.09
UK deaths from liver disease (per 100 000 people)	2.82	3.65	4.03	4.42	4.88	5.98	6.32	8.72	10.44	11.5	10.82

   b Draw a line of best fit on the graph that best fits your plotted points.

   c Draw a conclusion from your trend line about the relationship between amount of alcohol consumed and deaths from liver disease.

   d Alcohol consumption in 2014 was about 9.4 dm^3 per person per year. Use this value and your scatter graph to predict the number of deaths per 100 000 for that year.

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EASIER

1 Each of the statements (A, B and C) below shows a problem related to the effect of drinking a lot of alcohol over a long period.

Problem caused by drinking too much alcohol		**Who this is a problem for**

A Alcoholic liver disease can cause sickness, weakness and swelling of legs and feet.		the person who has been drinking

B Up to 14 million working days are lost each year by people drinking too much alcohol.		their family

C The NHS spends about £2700 million each year treating people with liver disease.		the society they live in

Using a different coloured pencil for each problem, draw lines to link each problem with the description(s) on the right of who you think it affects.

S1 Give one reason why too much alcohol over a long time is a problem for each of the following.

- the person who drinks it   • their family   • the society they live in

2 Complete each of the following sentences.

a Liver disease is usually a non-communicable disease because _____

_____

b **Malnutrition** is caused by _____

c Scurvy is a **deficiency disease** because _____

HARDER

3 The bar chart shows how the amount of alcohol drunk on average each day affects the risk of developing **cirrhosis**, which is one kind of liver disease.

Describe what the bar chart shows.

_____

_____

_____

_____
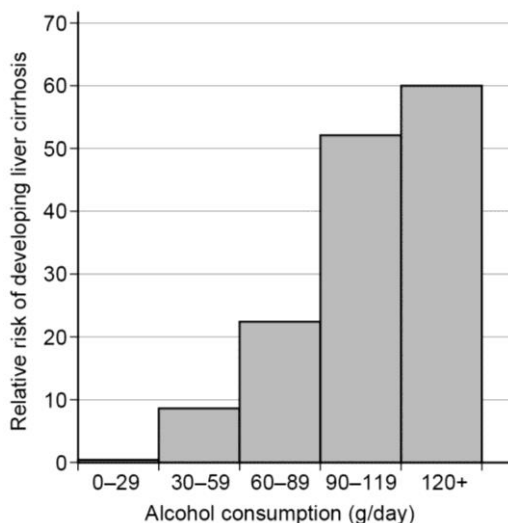
Name _____ **Class** _____ **Date** _____

1   In the list of diseases, circle the names of the non-communicable diseases.

liver cirrhosis   measles   scurvy   malaria

2   **a**   Which disease given in the list in question 1 is a result of **malnutrition**? _____

b   Explain why malnutrition can cause disease.

_____

_____

3   **a**   Name an example of a non-communicable disease that is not given in question **1**.

_____

b   Explain why the disease in your answer to part **a** is called a non-communicable disease.

_____

4   The graph shows how the amount of alcohol drunk each day is related to the risk of developing liver **cirrhosis**.
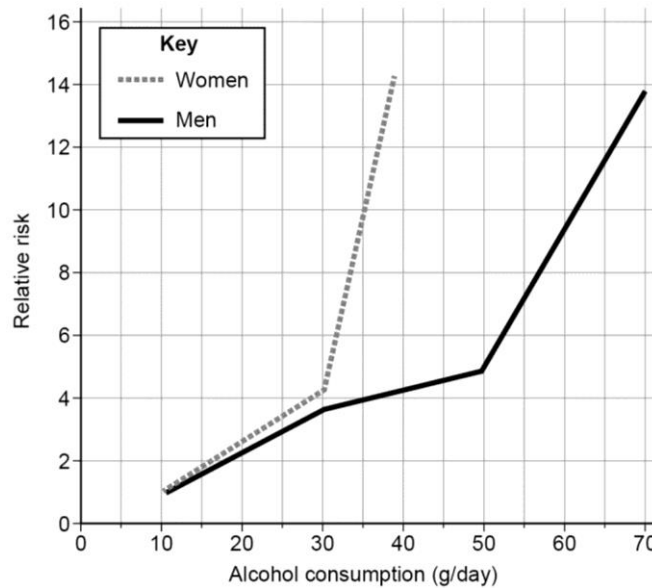
a   What is the relative risk of developing liver cirrhosis for men and for women who drink an average of 35 g of alcohol a day?

men _____   women _____

b   Describe the relationship between alcohol consumption and the risk of developing cirrhosis shown in the graph.

_____

_____

c   Describe one problem at a national level of the effect of high levels of alcohol consumption.

_____

_____

Blood from the small intestine, carrying digested food molecules, passes directly into the liver. Here food molecules are absorbed into liver cells. Some substances, such as some vitamins, may be stored for use later. Other substances are changed, for example to make different amino acids, and returned to the blood to travel to where they are needed. Liver cells also remove any toxins (poisons) from the blood, such as alcohol and waste amino acids, breaking them down and returning them to the blood for excretion via the kidneys.

The liver is remarkable for its ability to replace damaged cells with growing new tissue. However, many years of damage by toxins or by disease can lead to liver disease (including **cirrhosis**), and this can be fatal. By the time someone is diagnosed with liver disease, the damage is beyond what the body can repair. Around one-third of deaths from liver disease are caused by alcohol.

The graph shows the result of a study on 276 802 US men over 12 years, in which the rate of drinking was compared with the cause of death. Relative risk of death was calculated by comparing the number of drinkers who died from each cause with the number of non-drinkers who died from that cause. A relative risk of 1.0 means that there was no difference in rate of death between non-drinkers and drinkers.
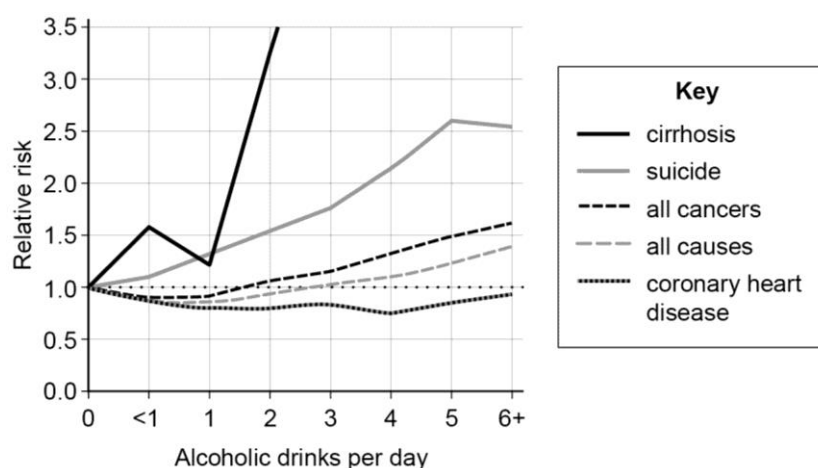
1   Describe the correlation between alcohol consumption and death by:

   a   liver cirrhosis

   b   all cancers

   c   coronary heart disease.

2   Explain why the correlation between cirrhosis and alcohol consumption is greater than for other causes of death.

3   When people visit a doctor or go to hospital, their mass and blood pressure are often checked, and they are asked whether they smoke. Construct an argument to support including a question on alcohol consumption as part of this basic health check.

4   Explain why people who have liver disease may also need to be treated for **deficiency diseases**, even if they eat what is considered to be a healthy diet.

Extra challenge

5   Explain how controlling how much alcohol is drunk could be a target for the World Health Organization definition of health in terms of physical, emotional and social well-being.

Name _____ **Class** _____ **Date** _____

Progression questions

Answer these questions.

1 What do non-communicable diseases have in common?

_____

_____

2 How can diet affect malnutrition?

_____

_____

3 Why does alcohol cause problems for people and for society?

_____

_____

Now circle the faces in the 'Start' row in the table showing how confident you are of your answers.

Question	1	2	3
Start	☹ ☹ ☺ ☺ ☺	☹ ☹ ☺ ☺ ☺	☹ ☹ ☺ ☺ ☺

Assessment

Using a different colour, correct or add to your answers above. You may need to use the back of this sheet or another piece of paper. Then circle the faces in the 'Check' row in the table.

Question	1	2	3
Check	☹ ☹ ☺ ☺ ☺	☹ ☹ ☺ ☺ ☺	☹ ☹ ☺ ☺ ☺

Feedback

What will you do next? Tick one box.

☐ strengthen my learning   ☐ strengthen then extend   ☐ extend

Note down any specific areas you need to improve.

_____

Action

You may now be given another activity. After this, note down any remaining areas you need to improve and how you will try to improve in these areas.

_____

_____

_____