

TWENTY FIRST CENTURY  
**science**

Module C2

MATERIAL CHOICES

Practice test

FOUNDATION

Name:.....

Form/teaching set:.....

**Answer all of the questions.**

**Write your answers in the spaces provided on this paper.**

1 This question is about crude oil.

(a) Crude oil is a mixture of hydrocarbons.

Which elements are present in a hydrocarbon?

Put a **ring** around each of the **two** correct answers.

**carbon    hydrogen    oxygen    nitrogen**

[1]

(b) Use the words from this list to finish the sentences.

**fuels    lubricants    minerals    polymers**

Crude oil is refined to make fuels, raw materials for chemical synthesis and

.....

Most crude oil is used for .....

[2]

[Total marks: 3]

2 The table shows properties of some materials.

Material	Strength	Stretchiness	Water absorbency
	6 = most strong 1 = least strong	6 = most stretchy 1 = least stretchy	5 = most absorbent 1 = least absorbent
cotton	2	2	6
leather	6	1	4
polyester	5	4	3
rubber	3	6	1
poly(ethene)	4	5	1
wool	1	3	5

(a) A shirt needs to absorb sweat and has to be fairly strong.

Shoe uppers need to be very strong, not let in water, and not stretch too much.

A pair of socks needs to be quite stretchy and absorb sweat.

A supermarket shopping bag needs to be strong, stretch quite a lot without breaking, and not absorb much water.

Suggest which material is the **best** choice for making each article

Article	Material
shirt	
shoe uppers	
socks	
shopping bag	

[4]

(b) Shirts are often made from a mixture of cotton and polyester.

What are the advantages of using this mixture instead of cotton on its own?

Put tick (✓) in the boxes next to the **two** best answers.

Polyester absorbs less water than cotton.

Polyester absorbs more water than cotton.

Polyester is more stretchy than cotton.

Polyester is stronger than cotton.

[2]

(c) Which of the materials below are **not** obtained from living things?

Put ticks (✓) in the boxes next to the **two** correct answers.

cotton

leather

polyester

rubber

poly(ethene)

wool

[2]

[Total marks: 8]

3 Ted and Sally are having double glazing fitted in their house.

The new window frames are made from PVC.

(a) Where does the raw material to make PVC come from?

Put a ring around the best answer.

air crude oil plants rocks

[1]

(b) Which of the following are part of a **life cycle assessment** for the PVC window frames?

Put ticks (✓) in the boxes next to the **two** correct answers.

the energy required for making the window frames from PVC

the cost of making the window frames from PVC

how attractive the PVC window frames will look when they have been fitted

how well the PVC window frames will hold the glass in the windows

the environmental impact of disposing of the window frames when they are no longer used

[2]

[Total marks: 3]

4 Read this newspaper article about recycling.

## More recycling is needed

In 2002, England only recycled about 13% of domestic waste, one of the worst records in the EU.

A survey gathered data from all local collection authorities on the scale and type of recycling doorstep collections offered in England.

The results show that 94% of local authorities now offering a doorstep collection for two or more materials, such as glass and paper, to some households. But only 25% of local authorities currently comply with the Government's 2010 target, offering all their households a doorstep collection of at least two materials.

Local councils are being urged to improve the collection service offered to householders, and increase the number of households recycling. Measures include collecting a wider range of materials on a weekly basis, better information to householders and increased effort to collect materials from 'difficult' households, such as flats in tall buildings and houses in the countryside.

Use information from the article to help you answer these questions.

(a) Which of the following statements are good reasons for recycling glass?

Put ticks (✓) in the boxes next to the **two** correct reasons.

broken glass can be dangerous	
glass comes in many different colours	
recycled glass is not as clear as newly-made glass	
recycling is more expensive than making new glass	
recycling uses less energy than making new glass	

[2]

(b) (i) What percentage of domestic waste was recycled in England in 2002?

..... %

[1]

(ii) What percentage of local authorities currently offer all households a doorstep collection of at least two materials?

..... %

[1]

(c) The article states that it is difficult to offer recycling to some households.

Choose one of these households, and suggest why it is difficult to offer recycling collection services to people living there.

.....

.....

..... [2]

[Total marks: 6]

**[Total marks for test: 20]**

TWENTY FIRST CENTURY  
**science**

Module C2

MATERIAL CHOICES

Practice test

HIGHER

Name:.....

Form/teaching set:.....

**Answer all of the questions.**

**Write your answers in the spaces provided on this paper.**



1 The table shows properties of some materials.

Material	Strength	Stretchiness	Water absorbency
	6 = most strong 1 = least strong	6 = most stretchy 1 = least stretchy	5 = most absorbent 1 = least absorbent
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polyester	5	4	3
rubber	3	6	1
poly(ethene)	4	5	1
wool	1	3	5

(a) Which of the materials are **not** sustainable?

..... [1]

(b) On a hot day, a cotton shirt is more comfortable to wear than one made of polyester.

Which statement best explains this fact.

Put a tick (✓) in the box next to the correct answer.

Cotton is white, so it absorbs heat energy.

Cotton absorbs more sweat, so you stay dry.

Polyester is heavier, so it is less comfortable to wear.

Polyester stretches more, so it goes out of shape.

[1]

(c) Shirts are often made from a mixture of cotton and polyester.

What are the advantages of using this mixture instead of cotton on its own?

Put ticks (✓) next to the **two** best answers.

Polyester absorbs less water than cotton.

Polyester absorbs more water than cotton.

Polyester is more stretchy than cotton.

Polyester is stronger than cotton.

[2]

[Total marks: 4]

2 Ted and Sally are having double glazing fitted in their house.

The new window frames are made from PVC.

(a) Which of the following are part of a **life cycle assessment** for the PVC window frames?

Put ticks (✓) in the boxes next to the **two** correct answers.

the energy required for making the window frames from PVC

the cost of making the window frames from PVC

how attractive the PVC window frames will look when they have been fitted

how long the PVC window frames will last before they need to be replaced

the environmental impact of disposing of the window frames when they are no longer used

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

[2]

(b) Sally and Ted considered wooden window frames instead of PVC.

Here are some of the points they considered.

Put a tick (✓) in the **one** correct box after each statement.

	reason for choosing wood	reason for choosing PVC
Making PVC window frames has more environmental impact than making wooden window frames.	<input type="checkbox"/>	<input type="checkbox"/>
Making PVC window frames uses more energy than making wooden window frames.	<input type="checkbox"/>	<input type="checkbox"/>
To make wooden window frames, trees have to be cut down.	<input type="checkbox"/>	<input type="checkbox"/>
Wooden window frames are more expensive than PVC window frames.	<input type="checkbox"/>	<input type="checkbox"/>
Wood has to be grown but PVC is made from crude oil.	<input type="checkbox"/>	<input type="checkbox"/>
Wood is a sustainable material but PVC is not.	<input type="checkbox"/>	<input type="checkbox"/>
Wood needs to be painted or stained but PVC does not.	<input type="checkbox"/>	<input type="checkbox"/>
Wood rots over a period of time but PVC does not.	<input type="checkbox"/>	<input type="checkbox"/>

[4]

[Total marks: 6]



- 3 Poly(ethene) is a polymer. It is used to make many different products, including cling film, shopping bags, bottles, and crates.

For the polymer to have different uses, several types of poly(ethene) with different melting points and strengths are made.

(a) Why does one type of poly(ethene) melt at a higher temperature than another type?

Put ticks (✓) in the boxes next to the best answers.

The forces between the molecules are stronger.

The molecules are made from a different monomer.

The molecules are held together by ionic bonding.

The molecules need more energy to break out of their regular arrangement in the solid.

The molecules need more energy to break the links between the monomers.

[2]

(b) Cling film is very soft and stretchy.

What is done to make poly(ethene) have these properties?

Put ticks (✓) in the boxes next to the best answers.

The polymer chains are made using different monomers.

The polymer has decreased chain length.

The polymer has increased crystallinity.

Plasticizers are added to the polymer.

The polymer chains are cross-linked.

[2]

[Total marks: 4]

4 Read this newspaper article about recycling.

## Recycling lottery to be set up in Britain

Soon Britons could enter a ‘recycling lottery’, offering cash prizes in a bid to encourage people to adapt to a more environmentally friendly lifestyle.

The National Consumer Council aims to boost recycling by staging a prize draw using recycled products as the ticket.

A similar scheme in Norway boosted the number of people who recycled drink cans from 30 per cent to 70 per cent. Participants squashed the can, wrote their name and phone number on it, and dropped it into the recycling bin to go forward for the prize draw.

The NCC believes the lottery could work in Britain, and, in particular, wants to target Britain’s growing battery mountain. Just 1000 tonnes out of a total of 25 000 tonnes of household and industrial batteries are recycled each year. These batteries may contain metals such as zinc, lead, nickel, and cadmium.

An NCC spokesman said: ‘This is one of the most exciting and imaginative schemes there is – it’s simple, fun, and effective. It’s a terrific way to get people interested in and engaged with recycling, and to reward them for playing their part.’

A poll was commissioned to find out whether people would participate in a recycling lottery draw. Overall, three-quarters of the 2059 people surveyed said they thought it would be a good idea, with more than 80 per cent of 18 to 29-year-olds being keen to see it introduced.

Use information in the article to help you answer the following questions.

- (a) Suggest two reasons why people need the encouragement of a lottery to make them recycle materials.

.....

.....

.....

.....

[2]

**(b)** What percentage of Britain's household and industrial batteries is recycled each year?

You should show your working.

percentage of batteries recycled = ..... %

[1]

**(c)** The poll suggests that more 18 to 29-year-olds would participate in a recycling lottery, compared to the number of older people.

Suggest why.

.....  
.....  
.....

[2]

**(d)** Why would an increase in recycling batteries have a greater environmental impact than an increase in recycling drink cans?

.....

[1]

[Total marks: 6]

**[Total marks for test: 20]**