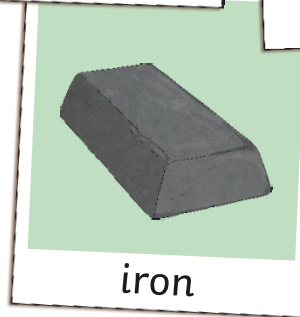
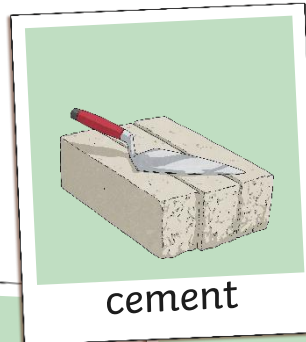
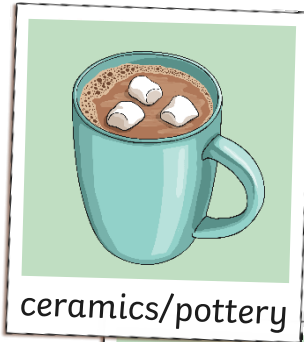
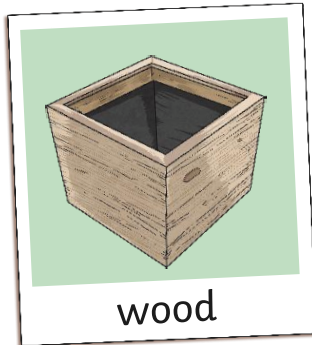


# Stephanie Kwolek



# Best Material for the Job

Look at the materials listed. Write words to describe their properties.

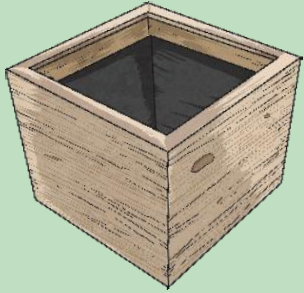


Why don't we use rubber bricks to make buildings?

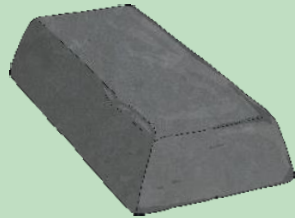
Think about their properties and the things these materials are commonly used for.

# Hard Materials

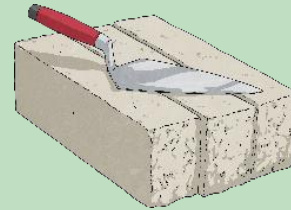
What materials could be described as hard?  
What jobs do we usually use them for?



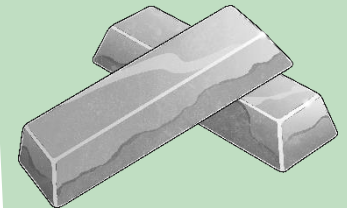
wood



iron



cement



steel

Think about these materials and their uses, why are they good?

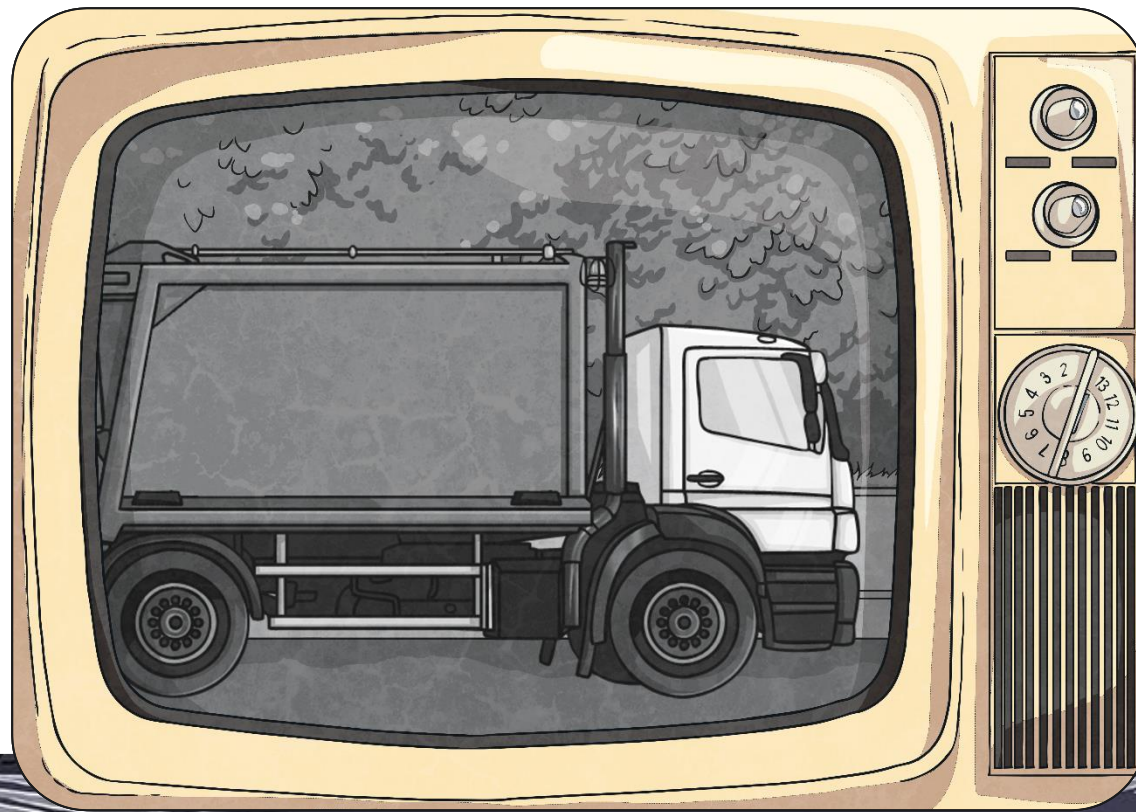
Is there any downside to any of these?

These materials we usually use for building large structures or machines. The biggest downside is that they are often very heavy (dense).

# Stephanie Kwolek

Stephanie Kwolek was tasked with the job of finding a light material that was also very hard and strong.

Born in 1923 in Pennsylvania, USA, Kwolek's father was interested in science and passed this interest on to his daughter, who left university aged 23 with a degree in chemistry.



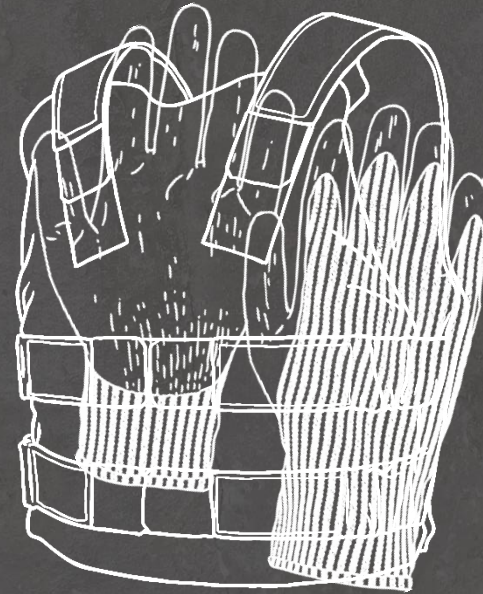
# Stephanie Kwolek

Stephanie created a very hard plastic - in fact, it was 5 times stronger than steel of the same weight! It was also much, much lighter.

As well as in cars, Stephanie soon found that her invention was being used for another very special job. Because this material was exceptionally strong and lightweight, it could be used in bulletproof vests.

The invention was 'Kevlar'. It is still used today in the bulletproof clothing worn by police and armed forces, so it has saved an enormous number of lives. In addition, Kevlar has been included in the manufacture of protective gloves, diving equipment, boots, helmets and fireproof clothing.

"I don't think there's anything like saving someone's life to bring you satisfaction and happiness."



# Materials Investigation

You need to collect a selection of materials to test their hardness and weight and record these on the **Stephanie Kwolek Investigation Activity Sheet**. These could include wood, plastic, rubber, ceramic, metal or fabric! Obviously don't use anything valuable and check with a parent before carrying out the test.

Use a nail or pin to scratch the surface of your material and record how easy it is to make a mark on the surface, or even tear through it.

Then using scales, or just by comparison, list your materials from heaviest to lightest.

When you have finished your investigation, answer the questions on the bottom of the sheet.

**Stephanie Kwolek Investigation**

To choose materials for jobs based on their properties.

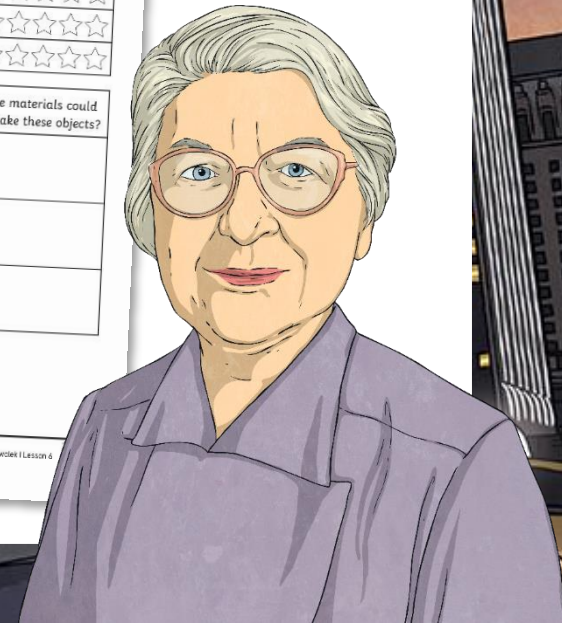
Describe how hard each material is, by trying to scratch it with a nail or pin.

Material	Rate your material for hardness out of 5 and explain why you gave it that score
	☆☆☆☆☆
	☆☆☆☆☆
	☆☆☆☆☆
	☆☆☆☆☆
	☆☆☆☆☆
	☆☆☆☆☆

Rank the Materials		Which of the materials could be used to make these objects?
Lightest to Heaviest	Weakest to Strongest	
		a table
		a suitcase
		shoes

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Science | Year 5 | Scientists and Inventors | Stephanie Kwolek | Lesson 6



# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q

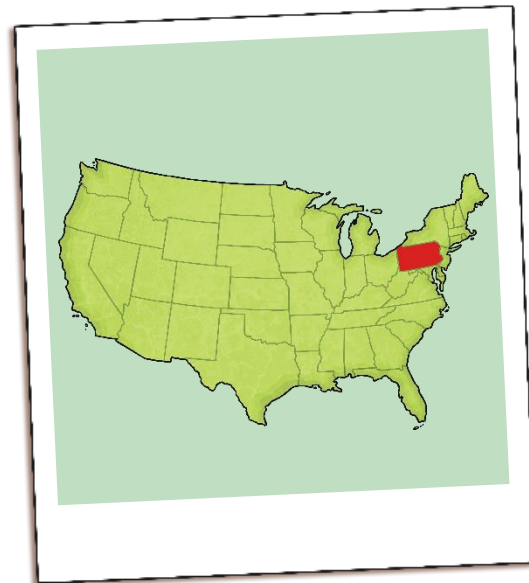
Where and when was Stephanie Kwolek born?



# Kwolek Kwiz!

A

Pennsylvania, USA, 1923



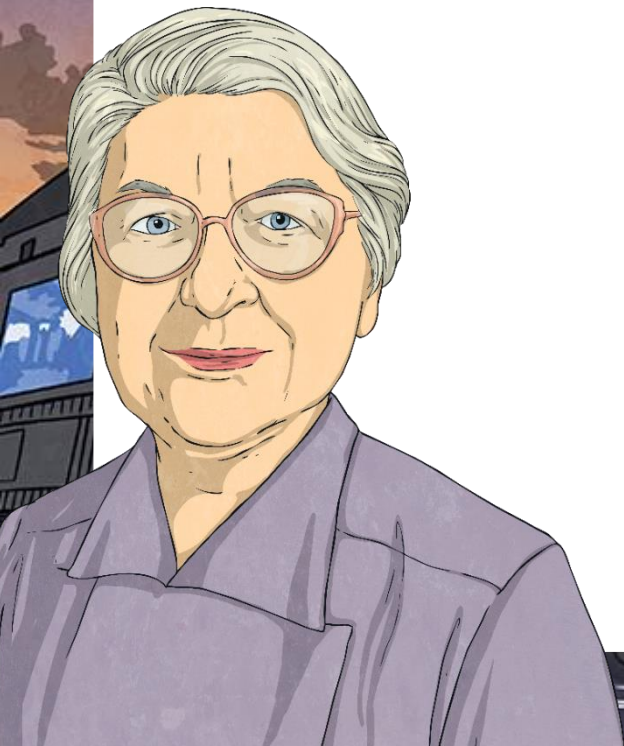


# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q

For what product was Stephanie originally trying to create a lighter, strong material?

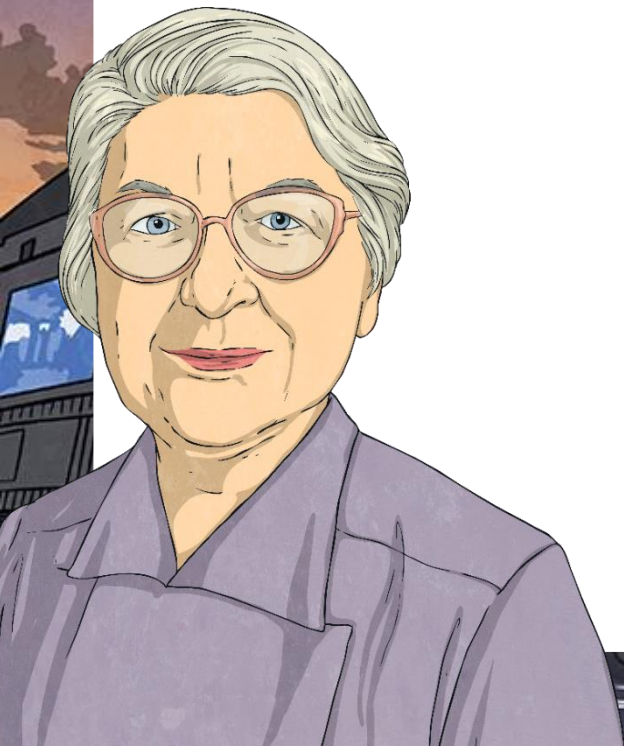


# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

A

car tyres



# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q

Why was Stephanie trying to make car tyres lighter?



# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

A

To reduce the amount of fuel used by vehicles with heavy tyres.



# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q

What did Stephanie end up inventing? Can you remember its name?



# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

An illustration of Stephanie Kwolek, an elderly woman with short, wavy grey hair, wearing red-rimmed glasses and a purple button-down shirt. She is smiling slightly. The background behind her is a stylized city street scene with buildings and a yellow taxi.

**A**

A light, strong plastic called Kevlar.

# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q

How strong is Kevlar, compared to steel?

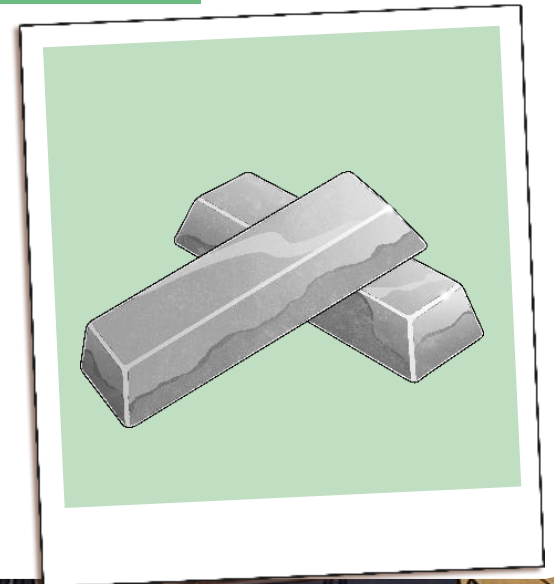
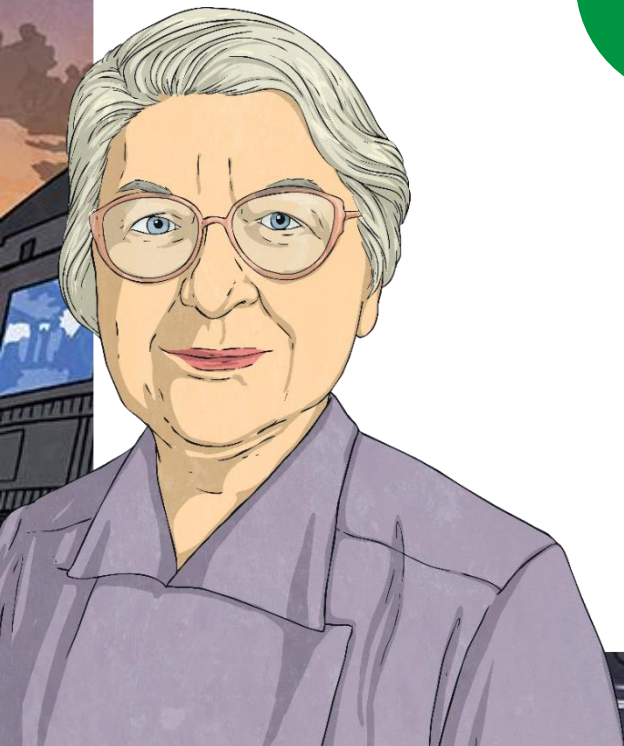


# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

A

Five times stronger than steel of the same weight.





# Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q

How many uses of Kevlar can you remember?

bulletproof vests

diving equipment

protective gloves

bike tyres

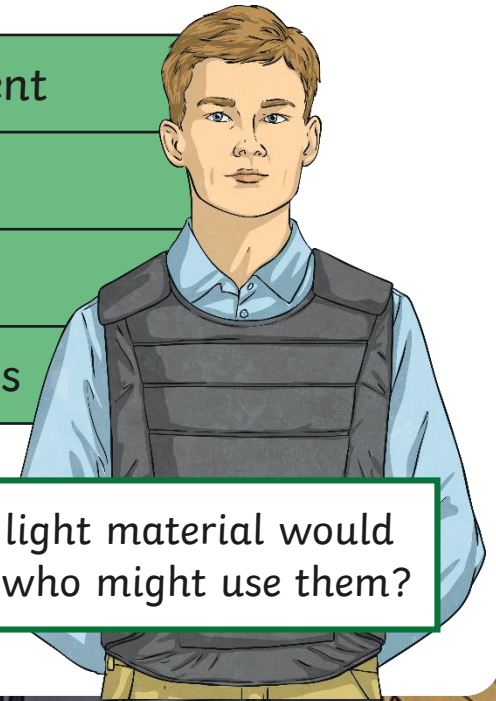
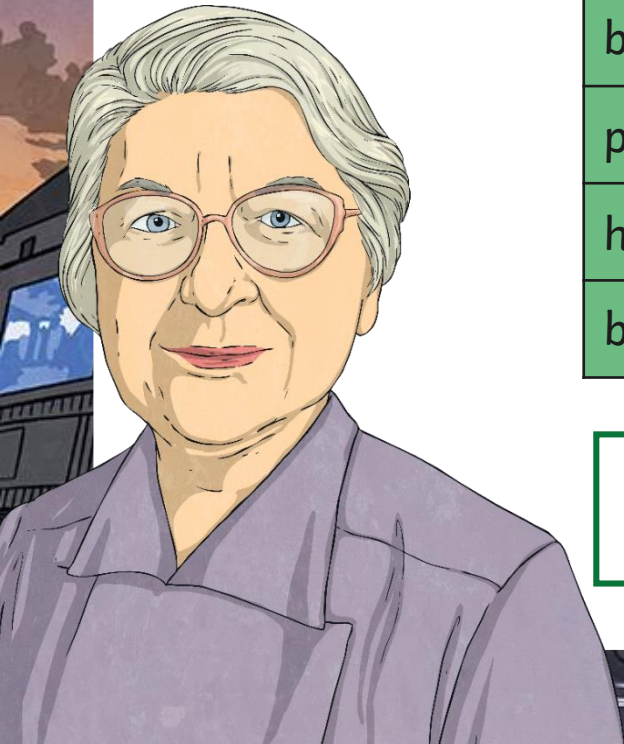
helmets

car tyres

boots

fireproof clothes

Can you explain why a very strong, light material would be useful for each of these items and who might use them?





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