

## Engineering Changemakers

### Guided Reading Comprehension

Engineers are people who solve problems. They use scientific knowledge and practical skills to find new ways of doing things.

Each of these engineers use different attributes - a personal skill or quality – in their work. You may already share some of these attributes with the engineers and could use them in an engineering career in the future.

Read about these engineers and how they have solved problems and helped to improve the world.

#### SHROUK EL-ATTAR Electronics design engineer

*resilient, creative, passionate*



Shrouk arrived in the UK aged 15 as a refugee from Egypt. She is **resilient** as her family was deported and she had to wait several years for her asylum case to be completed before she could start her degree in electrical engineering at university. Shrouk is now a **creative** electronics design engineer. She has worked with others to design robots that can measure tiny things just a few nanometers across and built a machine that can detect cancer cells. Shrouk is **passionate** about making it possible for everyone, no matter what their background, to have a career in engineering.

#### ROMA AGRAWAL Structural engineer

*collaborative, communicator, open-minded*



Roma lived in India and the US before moving to London. She says that living in different countries made her **open minded** about finding different ways of doing things in engineering. Roma has worked on the foundations of The Shard building. Roma needed to **collaborate** with different team to complete this complicated task in a very small space, without disturbing surrounding building or the London Underground. Roma uses her communication skills to make engineering more accessible to all. She has written a children's book which tells the stories behind awesome structures across the world.

SOPHIE ROBINSON Aerospace Engineer

*creative, hard-working, logical*



Sophie grew up wanting to be an astronaut and loved getting **creative**, making new things with Lego and Meccano. Sophie is now creating the world's first electric vertical (straight up and down) take-off and landing aircraft. It will transport people and goods on short journeys. It will be 100% electric, affordable, and could be used instead of motor vehicles where roads are too busy. This will reduce pollution and help our environment. Sophie has needed to be **hard working** to create the aircraft. She is **logical** when solving problems and always wants to find the next step, the next new thing and how we can join different

technologies together.

ASKWAR HILONGA - Chemical engineer

*imaginative, observant, tenacious*



Hilonga grew up in a village in Tanzania with no electricity or running water. Water from different sources contain different contaminates so need to be cleaned with different filters to be safe enough to drink. Being **imaginative**, Hilonga created a nanofilter which can be easily changed to use with different water supplies. After **observing** which

contaminants are in the water, Hilonga changes the shapes of the nano-materials used to make the filter so that these can trap these contaminants. This is often a trial and error process, so Hilonga needs to be **tenacious**. Hilonga aims to get 1,000 nanofilter water stations across Africa and bring clean water to 5 million people.

## GREG BOWIE Manufacturing Engineer

*creative, patient, resilient*

Greg develops and tests trauma plates. These are used to hold broken pieces of bone together after a fracture while the bone grows back. Trauma plates are usually made of metal. Greg is **creative** in developing a new material which is more like bone and will encourage broken bones to heal faster. Greg is **resilient** and tests to see if material fails and work out what he needs to change. Greg is **patient** and tests how much plates bend without breaking and how tightly screws can be inserted before a plate goes inside a human body. Greg loves that his engineering work makes a difference and improve people's lives.

## RUTH AMOS Inventor

*committed, imaginative, resilient*

Ruth loved making and designing things when she was a child and won an engineering award for her invention of a mobility aid when she was only 15! She never thought she could become an engineer as she didn't know any women in engineering. Ruth now loves to tell young people, especially girls about the role they can have in engineering. Ruth presents a YouTube channel for children named "kids Invent" where she is **committed** to turning children's ideas into reality. She starts every project, from water shooting pianos to jellycopters shooting jelly, from scratch. She doesn't have all the answers and is **resilient** when things don't quite work. There is lot of problem solving, being **imaginative** with solutions is a massive part of engineering!

## ★ Questions

1. Shrouk is resilient, creative and passionate. What do these words mean? Match the attribute to the definition.

Attributes
resilient
creative
passionate

Definition
has strong feelings about things that interest them.
can quickly recover from difficult or challenging situations.
makes new things and has original ideas.

2. The three engineers have had key achievements in their careers. Match the engineer to the achievement.

Engineer
Shrouk
Roma
Sophie

Achievement
Worked on the foundations of The Shard
Developed vertical take-off and landing aircraft
Created robots to take nano measurements

3. The three engineers have also done these things. Match the engineer to the achievement.

Engineer
Shrouk
Roma
Sophie

Achievement
Written books about engineering for children
Build a machine to find cancer cells
Made models using Lego and Meccano

4. Which do you think is the most important achievement by the engineers you have read about and why?

## ★★ Questions

1. Each of the engineers you have read about has different attributes. What do these words mean? Match the attribute to the definition.

Engineer	Attribute
Sophie	logical
Askwar	imaginative
Greg	resilient
Ruth	committed

Definition
sticks with an activity and tries their hardest to make it happen.
quickly recovers from difficult or challenging situations.
thinks of new and interesting ideas.
solves problems by thinking through them in a sensible order.

Which of these attributes best describes you and why?

2. The five engineers have had key achievements in their careers. Match the engineer to the achievement.

Engineer
Sophie
Askwar
Greg
Ruth

Achievement
Turns children's designs into inventions
Developed vertical take-off and landing aircraft
Created a nano filter to clean water
Created a new bone like material to make trauma plates

3. Which engineer:

- Won an engineering award at age 15?
- Loves that his work makes a difference to people's lives?
- Wanted to be an astronaut when she was a child?
- Grew up in a village without running water or electricity?

4. Which do you think is the most important achievement by the engineers you have read about and why?

### ★★★ Questions

1. Each of the engineers you have read about has three attributes. What do these words mean? Match the attribute to the definition.

Engineer	Attribute	Definition
Shrouk	passionate	sticks with an activity and tries their hardest to make it happen.
Sophie	logical	quickly recovers from difficult or challenging situations.
Askwar	imaginative	thinks of new and interesting ideas.
Greg	resilient	solves problems by thinking through them in a sensible order.
Ruth	committed	has strong feelings about things that interest them.

Which of these attributes best describes you and why?

2. The five engineers have had key achievements in their careers. Match the engineer to the achievement.

Engineer	Achievement
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Sophie	Developed vertical take-off and landing aircraft
Askwar	Created a nano filter to clean water
Greg	Created a new bone like material to make trauma plates
Ruth	Created robots to take nano measurements

Which do you think is the most important achievement and why?

3. Which engineer:

- Won an engineering award at age 15?
- Loves that his work makes a difference to people’s lives?
- Built a machine to detect cancer cells?
- Wanted to be an astronaut when she was a child?
- Grew up in a village without running water or electricity?

4. Do you think it is important for everyone, no matter what their background to be able to work in engineering if they want to? Why?