

Subject: **Science**

Topic: **Working scientifically**

Application: **Thinking like an inventor**



Using the worksheet and podcast resources

This worksheet is based on the [Inventive podcast](#).

It supports Gatsby Benchmark 4: Careers in the curriculum by introducing a career and role model. The worksheets are based on topics in the KS3 curriculum.

The short audio clips can be used to provide context to the worksheet and could be played during a lesson.

A QR code on the student sheet links directly to the podcast.

KS3 National Curriculum statements

Working scientifically

- Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience;
- Select and plan the most appropriate types of scientific enquiries, including identifying independent, dependent and control variables, where appropriate;
- Interpret observations and data;
- Present reasoned explanations;
- Identify further questions arising from results.

Note:

This worksheet uses the example of inventor Ruth Amos to encourage students to think creatively and problem solve. Although not directly linked to a curriculum topic, this worksheet supports the principles of working scientifically and could be used in all science subjects at KS3.

Students should listen to the clips from the podcast to hear Ruth talking about her work.

Audio clips from Inventive podcast.

Available from: nustem.uk/inventive/#ruth (scan QR code)

- **Ruth Clip 1:** Favourite inventions
- **Ruth Clip 2:** Mobility aid

Other resources

[Ruth's career poster](#)

[More information about Ruth](#)

Meet the engineer



Ruth Amos

Inventor & entrepreneur

Ruth Amos takes ideas from young viewers and turns them into reality on her Kids Invent Stuff youtube channel. She loves the creativity, problem-solving and practical hand-on side of engineering. Ruth didn't go to university but started inventing when she was at school. She won the Young Engineer for Great Britain award for her StairSteady device, designed while she was doing her GCSEs.

Scan the QR code



to access all the resources and the full podcast from: nustem.uk/inventive/#ruth

Know

1. Creative, Open minded, Flexible, Resilient, committed.

Credit other correct responses – pupils may suggest quite a variety.

2. Answers depend on pupils' own ideas [can be written or shared during think-pair-share; pupils may need some guidance e.g. from lessons or hobbies like sport or art].

Apply

3. Pupils can draw or write answers. Get them to look round the room, think of other lessons, their journey to school, their hobbies, their homes for inspiration. Think about things that are similar shapes or opposites. Ideas include plate, bowl, clock, watch, wheel, steering wheel, sun, full moon, earth, pen lid, round table, tomato, orange, slice of cucumber etc.

4a. Look for wide-ranging answers that could work - even if they don't exist or seem impossible e.g. a phone case that sticks to clothing; a phone that follows you if you leave it somewhere.

4b. Anything that works; look for imaginative creative solutions e.g. a recharging phone case so the battery won't run out and can be called to help find someone find out where it has been left.

5. Look for wide-ranging answers that could work - even if they don't exist or seem impossible e.g. solar lamps <https://literoflight.org/>, insulating walls, etc.

Extend

6. Credit anything useable, even if it can't be built in the classroom.

Expect instructions and the drawing to indicate equipment needed, the basic set up, a quick explanation of how the device or method works

Thinking like an inventor

Engineering is very creative.

Engineers are problem solvers. When engineers are given a problem, they adapt, design or invent something to solve it. When the invention is built, they can test it to find out if it works.

The first attempt to build an invention is called a prototype. Lots of inventions fail as a prototype and may be abandoned. If things go well, the prototype is improved until a final version is made. Sometimes, engineers trying to solve one problem find a solution to a completely different one!

Some attributes that inventors need are:

- Creative - thinks of new and different solutions;
- Open minded - willing to listen to new ideas;
- Flexible - willing to adapt or change plans;
- Resilient - bounces back after failure;
- Committed - keeps on trying, don't give up.

Meet the engineer



Ruth Amos

Inventor & entrepreneur

Entrepreneur Ruth Amos takes ideas from young users and turns them into reality on her Kids Invent Stuff YouTube channel. She loves the creativity, problem-solving and practical side of engineering. Ruth didn't go to university but started inventing when she was at school. During her GCSE's, she won the Young Engineer for Great Britain award for her StairSteady device.

Link to Ruth' story



Know

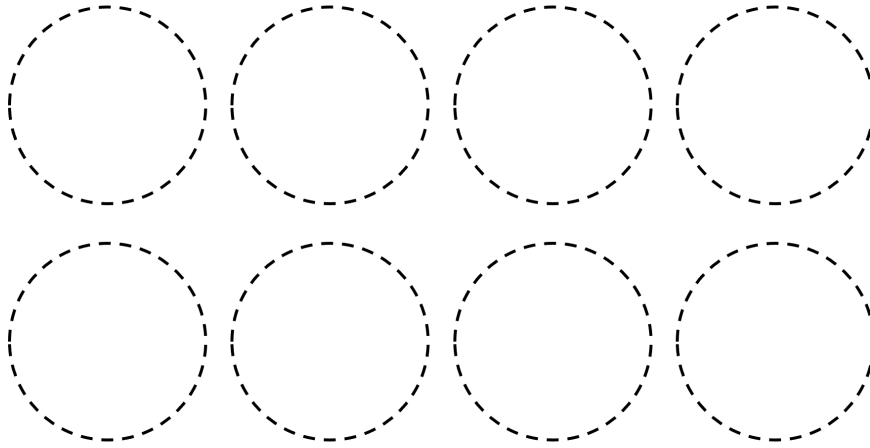
1. What qualities do inventors need to have?

2. Give an example of when you showed the following qualities. Your examples can come from school, hobbies etc

Creative:	
Open minded:	
Flexible:	
Resilient:	
Committed:	
Problem solving:	

Apply

3. Inventors are creative - they look at things in different ways and find imaginative solutions. To develop your imagination, change all the circles in this diagram into a different object that includes, or looks like a circle (for example a wheel, clock face, sun).



4. Inventors solve problems. Imagine your friend keeps losing their phone and has asked you to invent a device to help them:

4a. Stop the phone being lost.

4b. Make the phone easier to find.

List your ideas for each of these, include drawings if they help.

5. Inventors solve problems. Imagine you have been asked to invent ways to reuse empty plastic bottles to reduce energy usage.

List your ideas, include drawings if they help.

Extend

6. Take one of your ideas from questions 4 or 5.

Create instructions and a sketch that Ruth Amos could use to build your invention.