THE QUESTIONEERS

ALL-NEW SERIES!

ROSIE REVERE
AND THE RAUCOUS RIVETERS

By **Andrea Beaty** Illustrations by **David Roberts**

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Curricular area	Suggested Learning Activities: *Please note that these are suggestions and by no means prescriptive. Teachers are welcome to use and adapt the plan and resources to suit their needs.* STEM learning activities are highlighted in yellow	CfE Experiences and Outcomes
Literacy	Introduce alliteration **(page 10 and the title of book)** Children can learn about alliteration and could create their own examples. Can they create a sentence using alliteration for each letter of the alphabet? E.g., angry ant on an apple, little lamb licking leaves, raging, roaring, river racing round the rugged rocks etc. Can they make up a sentence or a phrase containing alliteration to describe a picture? Alliteration can be used to make funny tongue twisters: **Jovial jumping Joe juggles jam and juniper berries.** Can the children write their own? Remember you can use some words that don't start with the same letter so that the sentences make sense!	Literacy – Writing By considering the type of text I am creating, I can select ideas and relevant information, organise these in a logical sequence and use words which will be interesting and/or useful for others. LIT 1-26a
Literacy Science Technologies	Rosie is trying to invent a contraption to scare away snakes for her uncle, Zookeeper Fred. Research to find out about the things that snakes are scared of. Look at Rosie's design for her contraption to scare snakes away on the page before Chapter 1. Can you redraw her design and add something to it/change something about it so it will scare the snakes way?	Literacy – Reading Using what I know about the features of different types of texts, I can find, select, sort

		and use information for a specific purpose. **LIT 1-14a** **Science – Planet Earth** I can distinguish between living and non-living things. I can sort living things into groups and explain my decisions. **SCN 1-01a** **Technologies – Digital Literacy** I can explore and experiment with digital technologies and can use what I learn to support and enhance my learning in different contexts. **TCH 1-01a**

		Using digital technologies responsibly I can access, retrieve and use information to support, enrich or extend learning in different contexts. TCH 1-02a Technologies – Craft, Design, Engineering, and graphics I can explore and experiment with sketching, manually or digitally, to represent ideas in different learning contexts. TCH 1-11a

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Science Technologies	Look at the picture before Chapter 3 on page 12 **Gears!** A gear is a wheel with teeth that engages another toothed mechanism in order to change the speed or direction of transmitted motion. Gears are all around us, On page 12 there is a list of 4 things with gears – can you think of anything else that has gears? (e.g., wind-up toys, drills, wind turbines etc.) More information can be found here: Fun facts about gears for kids (easyscienceforkids.com) Levers, pulleys and gears – Key Stages 1 & 2 - NUSTEM Can the children find examples of everyday items that use gears? (manual can openers, rotary whisk, drills, bicycles) Try making some candy gears: https://www.sciencebuddies.org/stem-activities/candygears?from=YouTube Or out of lollipop sticks: https://frugalfun4boys.com/build-working-gears-out-of-popsicle-sticks/	Science - Forces, electricity and waves By investigating forces on toys and other objects, I can predict the effect on the shape or motion of objects. SCN 1-07a Technologies – Craft, Design, Engineering, and graphics I can design and construct models and explain my solutions. TCH 1-09a
Health and Wellbeing	**Page 15**: 'All the neighbours knew that Rosie was an engineer' What is an engineer? What do they do? (*An engineer is someone who uses science and maths to develop solutions to problems. Engineers do not just build machines. They also design systems to make things function better*). https://www.youtube.com/watch?v=owHF9iLyxic&t=2s	Health and Wellbeing: I can describe some of the kinds of work that

	What do the children think that an engineer is? Some ideas might include a man in a hard hat or a man who fixes cars. Here is an opportunity to broaden the children's understanding about engineering and to investigate the huge variety of engineering roles in the workplace for both men and women – from civil engineers to aerospace engineers, biomedical engineers, environmental engineers, agricultural engineers, software engineers etc! Some useful websites about engineering jobs are these - there are many more! https://www.teachengineering.org/k12engineering/types-of-engineering https://sciencekids.co.nz/sciencefacts/engineering/typesofengineeringjobs.html https://www.letsdoengineering.com/meet-our-engineers Maybe invite an engineering parent/family member in to talk to the class or a STEM ambassador?! STEM Ambassadors | Scotland | STEM Ambassadors in Scotland	people do, and I am finding out about the wider world of work. HWB 0-20a / HWB 1-20a
Literacy	**Chapter 4:** Predict – what do you think the emergency could be that Rosie has been brought to help with?	Literacy – Listening and Talking When listening and talking with others for different purposes, I can exchange information, experiences, explanations, ideas and opinions and clarify points by

		asking questions or by asking others to say more. LIT 1-09a
Literacy Technologies Health and Wellbeing	**Chapter 5:** What is archaeology the study of? Research to find out about what archaeology is and what an archaeologist does. What might be some of the things that you would find in an archaeology shop?	Literacy – Reading Using what I know about the features of different types of texts, I can find, select, sort and use information for a specific purpose. LIT 1-14a Technologies – Digital Literacy I can explore and experiment with digital technologies and can use what I learn to support and enhance my learning in different contexts.

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		TCH 1-01a Using digital technologies responsibly I can access, retrieve and use information to support, enrich or extend learning in different contexts. TCH 1-02a Health and Wellbeing: I can describe some of the kinds of work that people do, and I am finding out about the wider world of work. HWB 0-20a / HWB 1-20a
Technologies	Chapters 7, 8 and 9: Be an engineer! 'You're an engineer!' said Lettie. 'Invent something!!'	Technologies – Craft, Design, Engineering, and graphics

The Riveters ask Rosie to help June by building some kind of painting machine. Rosie starts to come up with lots of ideas and jots them down and begins to build her models using 'engineering treasure'.
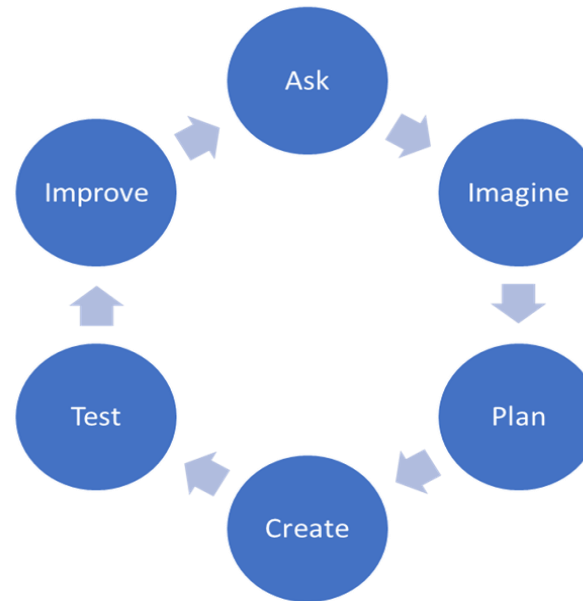
Engineers use something called the 'engineering design process.' Rosie is seen to use this design process of engineering in the story: brainstorming, research, sketching ideas, design, making prototypes, testing and redesign based on performance

Find out about the engineering process by watching this video:
Engineering Design Process - YouTube

By using this approach with the children, the learning activity becomes a skill focussed, STEM (engineering) learning activity.

Introduce the engineering design process to the children and ask them to think about when Rosie uses this process in the book and see if they can identify when she uses the different steps of the design process:

Ask — Imagine — Plan — Create — Test — Improve

I can design and construct models and explain my solutions.
TCH 1-09a
I can recognise a variety of materials and suggest an appropriate material for a specific use
TCH 1-10a
I can explore and experiment with sketching, manually or digitally, to represent ideas in different learning contexts.
TCH 1-11a
I explore and discover engineering disciplines and can create solutions.

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TCH 1-12a

- ➤ **ASK:** Students identify the problem, requirements that must be met, and constraints that must be considered.
- ➤ **IMAGINE:** Students brainstorm solutions and research ideas. They also identify what others have done.
- ➤ **PLAN:** Students choose two to three of the best ideas from their brainstormed list and sketch possible designs, ultimately choosing a single design to prototype.
- ➤ **CREATE:** Students build a working model, or prototype, which aligns with design requirements and that is within design constraints.
- ➤ **TEST:** Students evaluate the solution through testing; they collect and analyse data; they summarise strengths and weaknesses of their design that were revealed during testing.
- ➤ **IMPROVE:** Based on the results of their tests, students make improvements on their design. They also identify changes they will make and justify their revisions.

NB: THIS PROCESS IS A CYCLE – NOT LINEAR

Note: Different sources have slight variations in the steps/number of steps identified in the cycle, but they are broadly the same/very similar.

The Royal Academy of Engineering have identified common attributes and the skills engineers have regardless of their engineering discipline; they call these the **Engineering Habits of Mind**.

There are six Engineering Habits of Mind, and these have now been broken down into more specific skills which are transferable across all curricular areas:

Systems Thinking – Smaller parts coming together to make a whole.
Problem Finding – Finding problems, deciding how to fix them and checking existing solutions.
Visualising – Thinking about how the final product will look.
Creative Problem Solving – Working together to create solutions to problems.
Improving – Making things better.
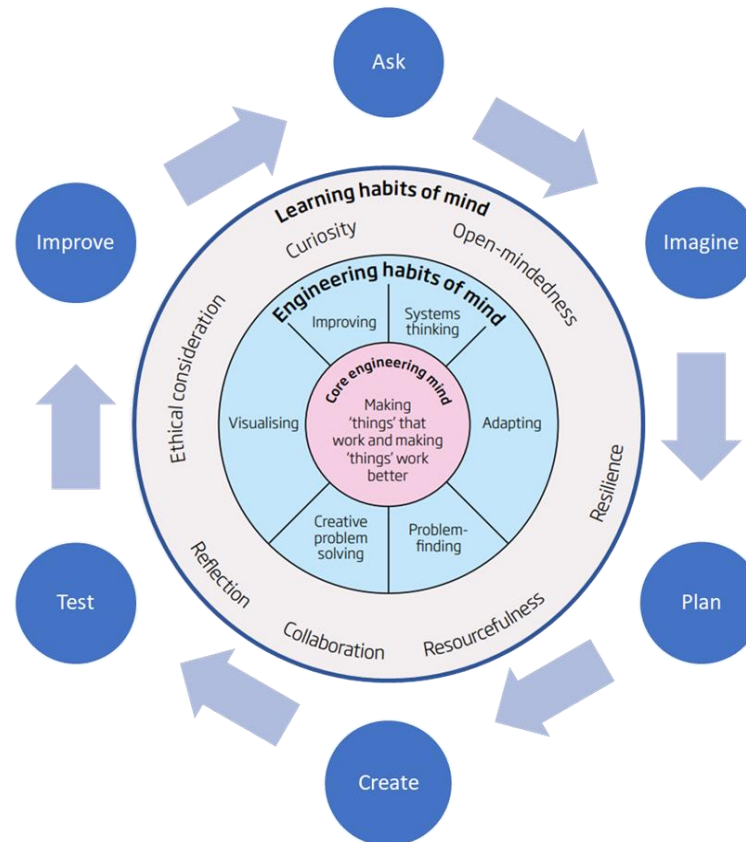**Adapting** – Applying things in a new context
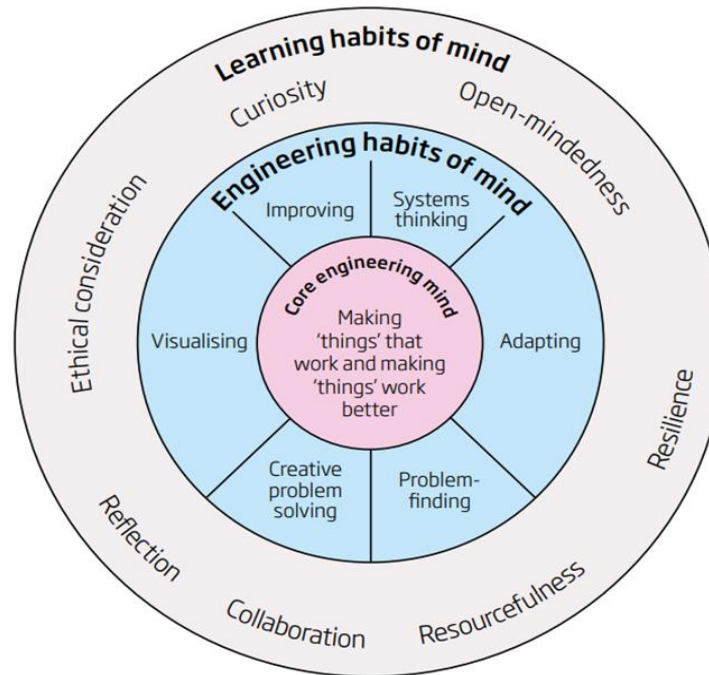
More information can be found here:
Bill Lucas Webinar: Engineering Habits of Mind:
https://www.youtube.com/watch?v=1Ty3MIDPZ3s

These have been broken down:

Systems thinking

- Using ideas from one subject in another subject
- Working out the possible consequences of something, before they happen
- Putting things together to make something new
- Spotting similarities and difference between things
- Spotting patterns and working out what comes next

Problem-finding

- Asking lots of questions to make sure I understand
- Finding out why something doesn't work
- Checking and checking again until I'm happy
- Finding mistakes in mine and other people's work
- Thinking about the world around me, and how it could be better

Visualising

- Thinking out loud when I am being imaginative
- Making a plan before I start work
- Practising something in my head before doing it for real
- Making models to show my ideas
- Explaining my ideas to other people so that they understand

Creative problem solving

- Coming up with lots of good and new ideas
- Making really detailed mind-maps
- Thinking before doing something
- Working succesfully in a group
- Taking on board other people's ideas and using them

Improving

- Working hard and practising to get better, even when it's tricky
- Working out what I need to do to improve
- Making what I've done better
- Experimenting with things, just to see what happens
- Sticking at doing something until it's the best it can be

Adapting

- Explaining how well I am doing to my teacher or friends
- Evaluating how good something is
- Sticking up for what I think when talking with other people
- Deciding how something could be done differently
- Behaving appropriately in different settings

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We can help the children to develop these skills, and to 'think like an engineer' by using these alongside the Engineering Design Process:

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Challenge the children to use **four** objects to create something to make a task easier (e.g., to feed a pet, keep shoelaces from untying, to help someone carry a heavy rucksack etc.) or to solve a problem

> **ASK:** What problem will your invention solve or how will it make a task easier?
> **IMAGINE:** Draw or sketch a few ideas. Maybe carry out some research into ideas that people have used already? Allow the children time to tinker with/explore the materials that are available.
> **PLAN:** Choose one of your ideas and choose four objects. Think about which four objects you will use and how will you put them together.
> **CREATE:** Make your creation – make sure that you use all of the four objects.
> **TEST:** test your invention. Think about what works and what doesn't. Does it solve the problem/make the task easier it was designed for?
> **IMPROVE:** What would you like to change about your invention and why? Does it solve the problem or make a task easier? If not, how can you change it to make it better? Make the improvements or changes and re test your invention. Does it solve the problem/make the task easier now? If not – repeat!

Suggested materials: recycled materials, boxes, string, old CDs, paper plates, paper cups, wooden skewers, corks, balls, marbles, glue, tape, clothes pegs, Velcro, scissors, staples and staplers, low temperature glue gun, paper, cardboard, foil, parts from broken toys, pens, crayons and pencils etc.

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Literacy
Technologies
Health and
Wellbeing

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Chapter 10: Iggy Peck is an architect. What is an architect? Research to find out about what an architect does.

'That tree needs a tree house,' said Iggy, and he thought about how to make one.

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Literacy – Reading
Using what I know about the features of different types

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Maths	**Design a Treehouse using 3D shapes**	of texts, I can find, select, sort and use information for a specific purpose. LIT 1-14a Technologies – Digital Literacy I can explore and experiment with digital technologies and can use what I learn to support and enhance my learning in different contexts. TCH 1-01a Using digital technologies responsibly I can access, retrieve and use information to support, enrich or
	https://www.steampoweredfamily.com/geometry-treehouse-stem-challenge/	
	TREEHOUSE GEOMETRY STEM CHALLENGE www.STEAMPoweredFamily.com	

		extend learning in different contexts. TCH 1-02a Health and Wellbeing: I can describe some of the kinds of work that people do, and I am finding out about the wider world of work. HWB 0-20a / HWB 1-20a Mathematics – Shape, Position and Movement I have explored simple 3D objects and 2D shapes and can identify, name and describe their features using appropriate vocabulary. MTH 1-16a

		Technologies – Craft, Design, Engineering, and graphics I can design and construct models and explain my solutions. TCH 1-09a I explore and discover engineering disciplines and can create solutions. TCH 1-12a
Literacy	**Chapter 11**: Predict – who do you think is in Mrs Wu's garden? What do you think they are doing? (CLIP! SNIP! SCRAPE!)	Literacy – Listening and Talking When listening and talking with others for different purposes, I can exchange information, experiences, explanations, ideas

		and opinions and clarify points by asking questions or by asking others to say more. LIT 1-09a
Science Literacy Art and design	**Chapter 12:** Iggy and Ada were already in the yard, filling small jars with paint and water. They were doing an experiment to find the perfect mixture. "If it's too thick, it won't flow through the tubes, "said Ada. "If it's too thin, it will drop off the canvas." Friction is a force that is created when there is motion between two solid objects, but liquids can also have friction. This type of friction is called **viscosity**. Viscosity is a physical property of fluids. The word viscous comes from the Latin word viscum, meaning sticky. It describes how fluids show resistance to flow or how "thick" or "thin" they are. Viscosity is affected by what the fluid is made of and the temperature of it. For example, water has a low viscosity, as it is "thin". Syrup is much more viscous than oil as it is thick , and a lot more viscose than water! Compare the properties of different liquids and practise setting up a fair test: Viscosity and 'racing' liquids | Experiment | RSC Education Viscosity experiment for kids (science-sparks.com) Or, experiment with mixing water and paint as Iggy and Ada were doing and compare the viscosity. Which mixture would be best for flowing through the tubes of Rosie's Paintapalooza?	Science - Forces, electricity and waves By investigating forces on toys and other objects, I can predict the effect on the shape or motion of objects. SCN 1-07a Literacy – Writing By considering the type of text I am creating, I can select ideas and relevant information, organise these in a

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SPLOOP! ZOOOOOOP! (page 70) are examples of *onomatopoeia* – words that mimic the sounds or noises they refer to.

Can you think of anymore? (squelch, crunch, slurp, splat etc.)

Imagine you are visiting a farm. Write down a list of all the **onomatopoeia** words you might hear in a farm and what is making those noises, Can you think of at least five noises?

For example:

- Chug = engine of a tractor
- Clang = metal gate closing
- Rustle = wheat blowing about in the field
- Quack = the duck
- Splash = running through a puddle

Can you turn these into a poem?

What is onomatopoeia? - BBC Bitesize

Onomatopoeia Poetry Lesson Plan – Kenn Nesbitt's Poetry4kids.com

Make a note of other examples of onomatopoeia that occur in the rest of the book!

Create some artwork based on onomatopoeia:

Onomatopoeia Pop Art Word Projects – 5th Grade Art Project Ideas (glittermeetsglue.com)

logical sequence and use words which will be interesting and/or useful for others.
LIT 1-26a
Having explored the elements which writers use in different genres, I can use what I learn to create my own stories, poems and
plays with interesting structures, characters and/or settings.
ENG 1-31a
Art and Design
I can create a range of visual information through observing

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	https://www.youtube.com/watch?v=rtrhtwXXk-M	and recording from my experiences across the curriculum. EXA 1-04a Inspired by a range of stimuli, I can express and communicate my ideas, thoughts and feelings through activities within art and design. EXA 1-05a
Literacy	**Chapter 13:** Predict – what are the faint snipping and clipping noises beyond the hedge keeping time with the music?	Literacy – Listening and Talking When listening and talking with others for different purposes, I can exchange information, experiences, explanations, ideas

		and opinions and clarify points by asking questions or by asking others to say more. LIT 1-09a
Technologies Literacy	**Chapters 14 - 16:** "It's the Paintapalooza 9!" said Rosie proudly. "It took a few tries, but I think we finally did it." (page 83). Refer back to the Engineering Habits of Mind and think about which of these skills Rosie has used in order to create the Paintapalooza 9. What do you think Rosie's idea is to help June?	Technologies – Craft, Design, Engineering, and graphics I can explore and experiment with sketching, manually or digitally, to represent ideas in different learning contexts. TCH 1-11a I explore and discover engineering disciplines and can create solutions. TCH 1-12a

		Literacy – Listening and Talking When listening and talking with others for different purposes, I can exchange information, experiences, explanations, ideas and opinions and clarify points by asking questions or by asking others to say more. LIT 1-09a
Technologies Science	**Chapter 17** Mrs Lu has designed and made a metal goose that she can make talk. ==Using the **engineering design process**, design and make a model robot or animal from recycled materials. You could use cardboard and the construction kit makedo.==	Technologies – Craft, Design, Engineering, and graphics I can design and construct models and explain my solutions. TCH 1-09a

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Using the micro:bit, make the robot/model 'talk':
Funny voice recorder | micro:bit (microbit.org)

Or a name badge for your model:
https://microbit.org/projects/make-it-code-it/name-badge/

Or add lights by creating a circuit with a switch:
7 Exciting Electric Circuit Projects for Kids | STEM Education Guide
https://microbit.org/projects/make-it-code-it/name-badge/

I can recognise a variety of materials and suggest an appropriate material for a specific use
TCH 1-10a
I can explore and experiment with sketching, manually or digitally, to represent ideas in different learning contexts.
TCH 1-11a
I explore and discover engineering disciplines and can create solutions.
TCH 1-12a

Technologies - Computing Science

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		I can demonstrate a range of basic problem solving skills by building simple programs to carry out a given task, using an appropriate language. TCH 1-15a Science- Forces, electricity and waves I can describe an electrical circuit as a continuous loop of conducting materials. I can combine simple components in a series circuit to make a game or model. SCN 1-09a
Technologies	**Chapters 18 and 19: Page 103:** "You design things?" she asked. Mrs Lu laughed.	Technologies – Craft, Design, Engineering, and

"Well, of course I do!" she said. "I'm an engineer too. And we engineers have to help each other. That's why I left the bucket of tubes and tape for you!"

The neighbours, including Mrs Lu, left recycling treasures on the curb and on Rosie's porch. Set the children a design and build challenge using the **engineering design process**. e.g., build something that floats that will transport *x cargo*, build a bridge that will *carry x weight* or *span x cms*, build a parachute for a Lego figure- how slowly can you make it fall? etc.

List a variety of materials on folded pieces of paper and put in a hat or a box (this is like the tub of recycling treasure that Rosie is given!) and each group picks one out to see which material they must use as the material for the challenge: e.g., foil, paper, plastic cup, bubble wrap, plastic shopping bag, tissue paper, cling film, cardboard, coffee filter paper, paper towel, paper shopping bag etc (materials should be tailored to the challenge set). The children can have as much of their chosen material as they want, or you can put a limit on it e.g., 5 coffee filter papers, 5 plastic cups etc. They can also use string, tape, pens, crayons, glue, staples etc.

e.g., using 5 coffee filter papers to make parachutes for a Lego figure

graphics

I can design and construct models and explain my solutions.
TCH 1-09a
I explore and discover engineering disciplines and can create solutions.
TCH 1-12a

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Literacy Technologies		Literacy – Listening and Talking
	Chapter 22: In Rosie's engineer journal she changed the name of Paintapolooza 9 three times. Why do you think she did this? Why do you think she left the last name?	When listening and talking with others for different purposes, I can exchange information, experiences, explanations, ideas and opinions and clarify points by asking questions or by asking others to say more.
	Engineering Habits of Mind: Give an example from the story when the characters used the following habits of mind:	
	Putting things together to make something new (*systems thinking*) Finding out why something doesn't work (*problem-finding*) Making a plan before I start work (*visualising*) Working successfully in a group/with others (*creative problem solving*) Sticking at something until it's the best it can be (*improving*) Deciding how something could be done differently (*adapting*)	LIT 1-09a Technologies – Craft, Design, Engineering, and graphics I can design and construct models and explain my solutions. TCH 1-09a
	Can you think of a time when you have used any of these in the *Rosie Revere and the Raucous Riveters* STEM challenges you have done?	

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Systems thinking	Problem-finding	Visualising
Using ideas from one subject in another subject	Asking lots of questions to make sure I understand	Thinking out loud when I am being imaginative
Working out the possible consequences of something, before they happen	Finding out why something doesn't work	Making a plan before I start work
Putting things together to make something new	Checking and checking again until I'm happy	Practising something in my head before doing it for real
Spotting similarities and difference between things	Finding mistakes in mine and other people's work	Making models to show my ideas
Spotting patterns and working out what comes next	Thinking about the world around me, and how it could be better	Explaining my ideas to other people so that they understand

Creative problem solving	Improving	Adapting
Coming up with lots of good and new ideas	Working hard and practising to get better, even when it's tricky	Explaining how well I am doing to my teacher or friends
Making really detailed mind-maps	Working out what I need to do to improve	Evaluating how good something is
Thinking before doing something	Making what I've done better	Sticking up for what I think when talking with other people
Working succesfully in a group	Experimenting with things, just to see what happens	Deciding how something could be done differently
Taking on board other people's ideas and using them	Sticking at doing something until it's the best it can be	Behaving appropriately in different settings

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I explore and discover engineering disciplines and can create solutions.
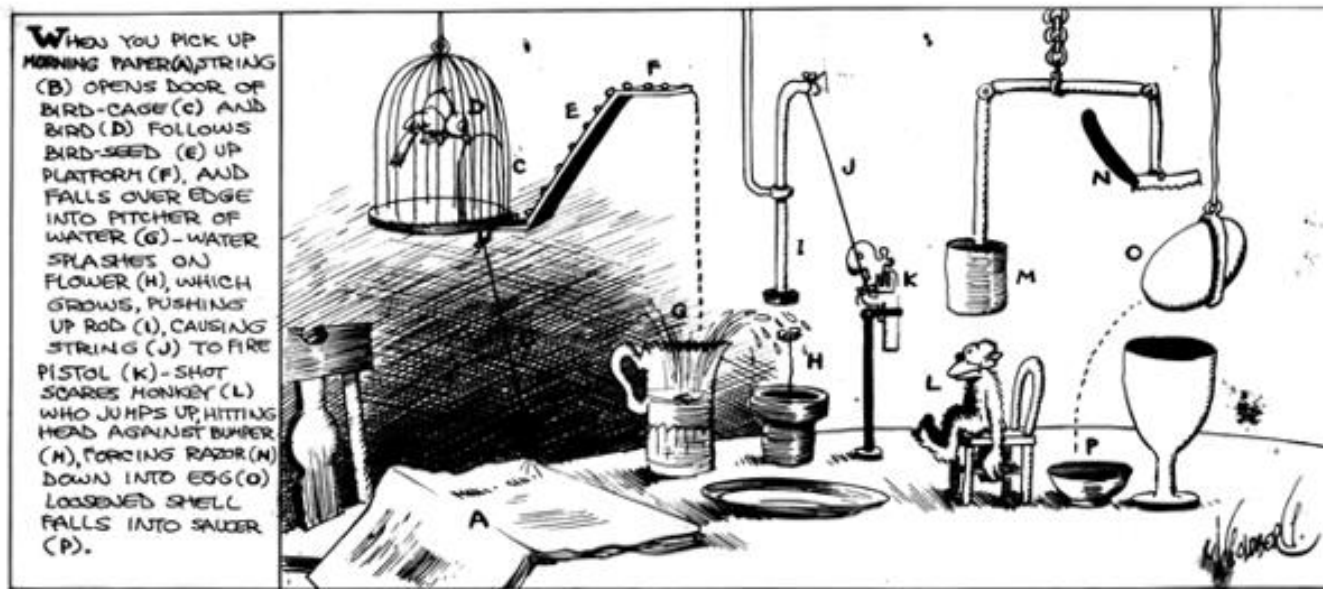TCH 1-12a

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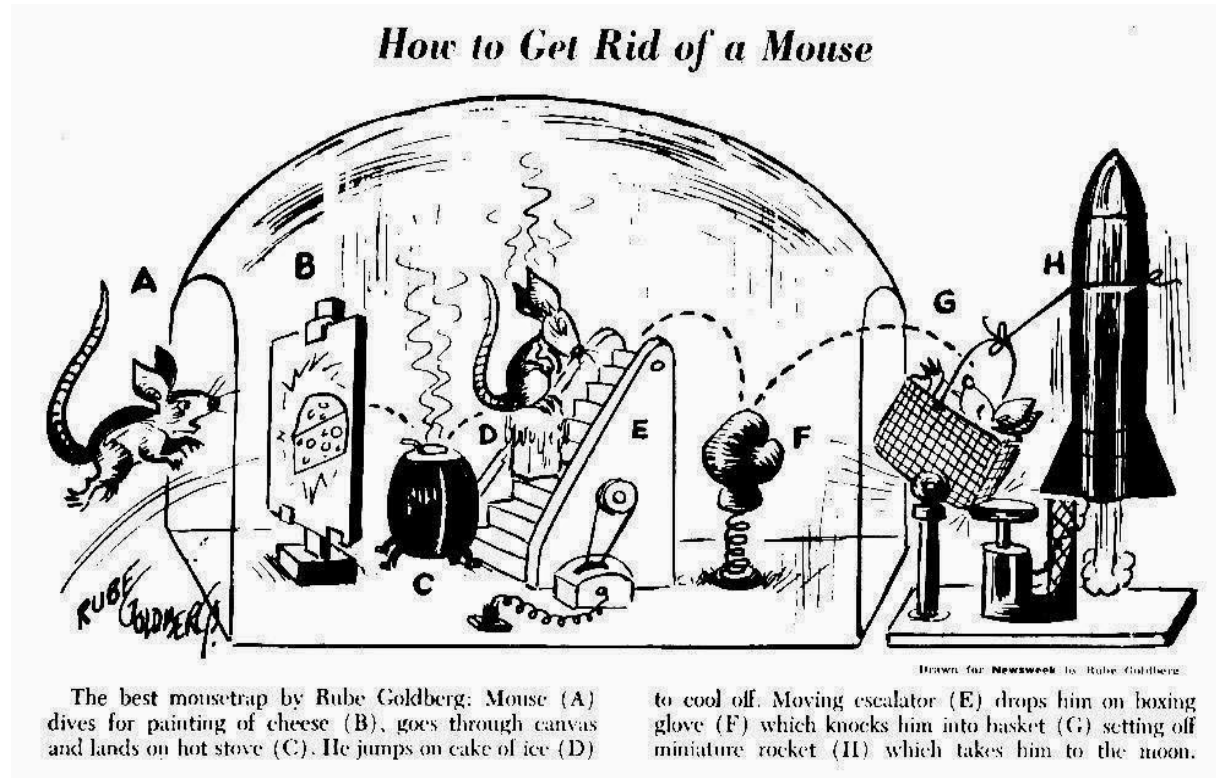| Science Technologies	**Strange inventions!**	Science – Forces, electricity and waves
	Reuben Goldberg (1883 – 1970) was an American cartoonist, engineer, and inventor. He liked to use his imagination to design complicated machines to do simple tasks.	By investigating forces on toys and other objects, I can predict the effect on the shape or motion of objects. SCN 1-07a
	Now these kinds of devices are called Rube Goldberg Machines.	Science – Planet Earth
		By considering examples where energy is conserved, I can identify the energy source, how it is transferred and ways of reducing wasted energy. SCN 2-04a Technologies – Craft, Design, Engineering, and

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How to Get Rid of a Mouse

The best mousetrap by Rube Goldberg: Mouse (A) dives for painting of cheese (B), goes through canvas and lands on hot stove (C). He jumps on cake of ice (D) to cool off. Moving escalator (E) drops him on boxing glove (F) which knocks him into basket (G) setting off miniature rocket (H) which takes him to the moon.

Drawn for **Newsweek** by Rube Goldberg

Wallace and Gromit: Wallace is a cheese-loving inventor, who lives with his dog Gromit. Wallace has created lots of inventions to do all sorts of jobs to try and make life easier:

graphics
I can design and construct models and explain my solutions.
TCH 1-09a
I can recognise a variety of materials and suggest an appropriate material
for a specific use
TCH 1-10a
I can explore and experiment with sketching, manually or digitally, to represent ideas in different learning contexts.
TCH 1-11a
I explore and discover engineering

disciplines and can create solutions.
TCH 1-12a

'525 Crackervac', with a built-in cracker sensor designed to help save Gromit's time and take the strain out of cleaning.

https://www.youtube.com/watch?v=mmgJxSlCYLA&t=24s

More of Wallace's inventions can be found here:
Cracking Contraptions Compilation - Wallace & Gromit - YouTube

Compare Rosie's 'SnakeAway' invention to the concept of a Rube Goldberg Machine. Discuss its many parts and how it works. Ask the children: "What happens first? Next? Last?"

Now have a go at designing and/or building your own Rube Goldberg Machines!

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Rube Goldberg Machine: a comical contraption intentionally designed to perform a simple task in an indirect and (impractically) overly complicated way using everyday objects.

There are lots of resources available to help and guide you:
[Rube Goldberg Institute | Home - Rube Goldberg Institute](#)

How To Build a Rube Goldberg Machine | STEM Lesson Plan: This video will show you how the concept of kinetic energy can help you design and build a Rube Goldberg machine:
https://www.youtube.com/watch?v=Eg4KbgAoA0o

[Study Kinetic Energy with a Rube Goldberg Machine | Lesson Plan (sciencebuddies.org)](#)

How to build your own machine:
[DIY Rube Goldberg machine | STEM Session (youtube.com)](#)

[Engineering Kids | Rube Goldberg Machine - TinkerLab](#)

[Steps to Build Your Own Rube Goldberg Machine | Connections Academy](#)

Share [Audri's Monster,](#) video that reflects how important testing and retesting are to the design process.

Either design and build a Rube Goldberg Machine or design, sketch and label one and present the invention to a partner or the class.