Gary Vity

Teacher's Handbook

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Foreword

Like most people, picture books were a major part of my young life. I can still vividly remember many of them and the effect they had on my enjoyment and understanding of the text. There is something quite wonderful about the power that can be harnessed by joining the written word with apposite images.

For most children, picture books are their first foray into the world of literature – their first taste of the world of books. Being able to be a part of this is a truly magical experience and getting to work with Jules on creating these whimsical worlds is a joy. No one can underestimate the ability of picture books to allow children to deduce, cogitate, ruminate, decipher and (above all else) empathise with characters.

From the outset, Jules and I were always interested in the emotional responses we could evoke from the books we produce. I hope, in most cases, we have been successful and people see that picture books are not just for emergent readers but can be utilised at all levels to bring about new skills, factual learning and greater emotional investment.

by Rufus Thomas

Introduction

Why use Gary Vity to teach gravity?

Research shows that our brains are hard wired to receive information in the form of a story: we pay more attention to a story and become more engaged in it than when we read the same in information in non-fiction form. If you'd like to know more about this research then go in search of articles by GH Bower or DT Willingham.

Artful Fox Creatives have been curious about applying this research to the teaching of primary science. We have written and tested picture books in the classroom.

Our first, 'The Molliebird' (PSTT, 2019) was written to tackle misconceptions about natural selection using an emotive story about a bird and a forest fire. Our research asked the question: can you learn a concept by reading a story in a picture book?

The research showed that you could!
It also showed that the emotive story engaged the children, and they talked more in those lessons. They also referred back to the story later in the term.

Our second, 'Jasper the Spider' (Artful Fox Creatives, 2021) was written to tackle the misconception that spiders are insects (which they are not). It is an emotive tale about a lonely spider who disguises himself as an insect in order to fit in with some ants and make friends. His differences eventually get him evicted. The research asked the question: can you teach and retain a concept using a story in a picture book?

The research showed that the information in the story was learned and retained.
In addition, we found out that the children who used the book used the scientific vocabulary very effectively as a result – more effectively than children who read a non-fiction version of the same information. This was only anecdotal evidence, however.

Therefore, in our third action research project, with 'Gary Vity' (Artful Fox Creatives, 2022) we attempted to collect evidence about this improvement in use of scientific vocabulary and we achieved some interesting results: it seems to encourage girls to use more scientific vocabulary.

In addition, we asked teachers to put a tally chart in their room and mark up a tally whenever the children spontaneously brought up the topic of gravity in other lessons (not science). The groups which had used the book mentioned gravity far more, which supports our previous results on engagement.

So why use this book?

- Improved engagement with the topic
- More class discussion
- Improved oracy (use of vocabulary)
- And it's fun!

The Action Research Project

Science across the city (SAtC) in Stoke-On-Trent gathered a group of teachers to try out 'Gary Vity' (Artful Fox Creatives, 2022) in the classroom to see how effective a fictional text could be in teaching the scientific concept of gravity. The book was trialled as a PowerPoint presentation in its draft form.

Methodology

Our action research project used pilot groups of children from Year 3 classes across 3 primary schools. Careful consideration was given to the gathering of qualitative and quantitative data to ensure we could measure and compare the impact of the project.

Before reading the book/factsheet

Children were asked to discuss the effect of gravity in two pictures scenarios on a worksheet: one of a parachutist descending and the other of a child coming down a slide. They were asked to annotate these images with notes or arrows to describe the forces. Then, we filmed the children discussing the forces in two more scenarios: a car rolling down a slope and a pencil being dropped on the floor. The number of correctly used, scientific, gravity-based words used by each child were then counted.

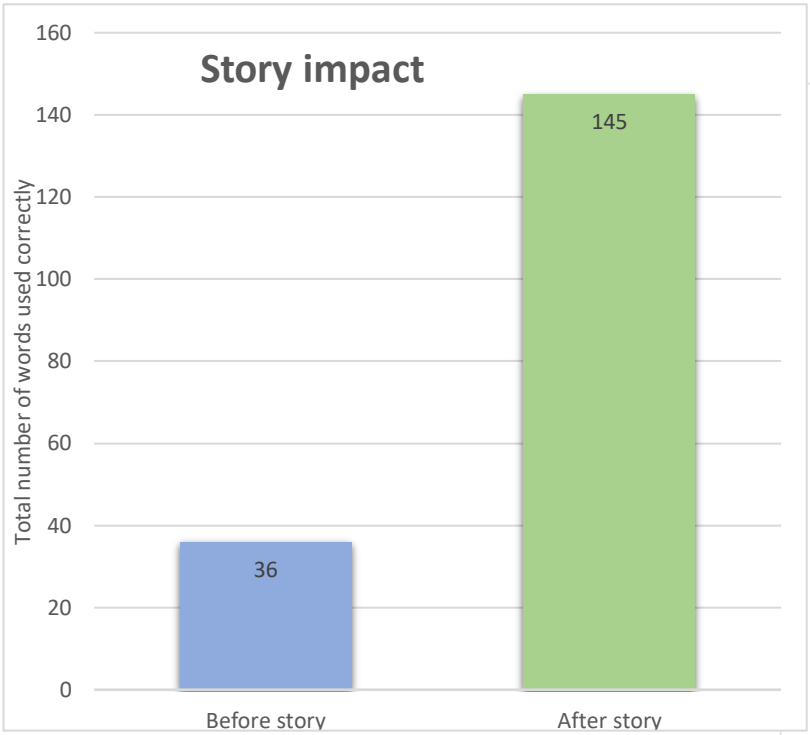
Each group was then taught about gravity, one group with the PowerPoint and the other with the factsheet.

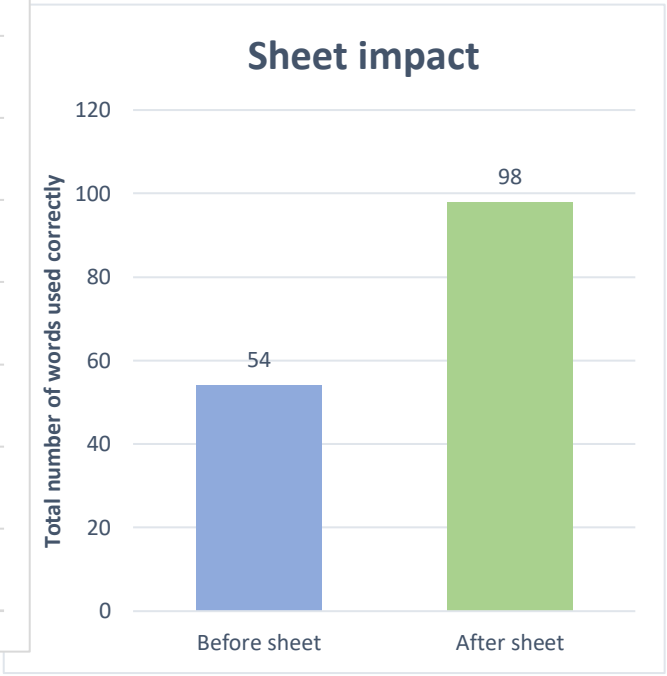
After reading the book/factsheet

Both activities were then repeated after using the book or factsheet and data collected in the same way as before.

Results

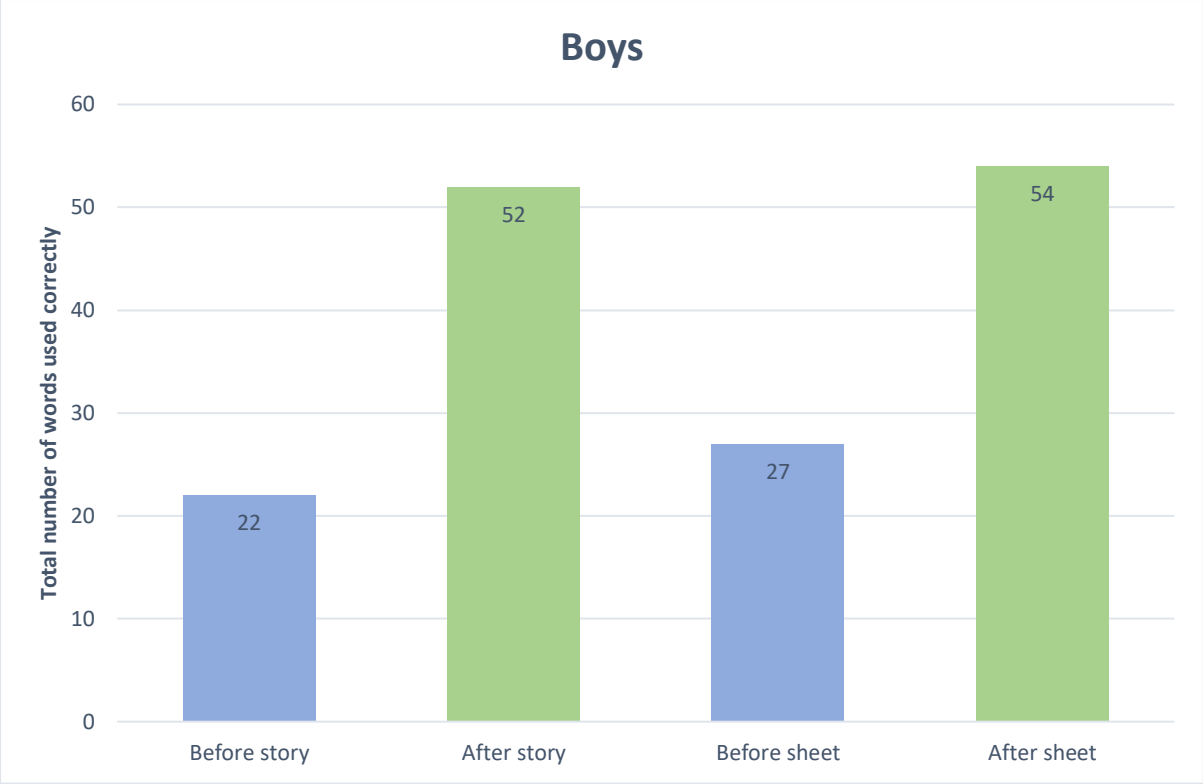
The results show that the story had a greater impact on the vocabulary that the children were using. The pupils who had read the story made quite significant improvements in the correct use of scientific vocabulary linked to gravity. The children who read the factsheet also used scientific vocabulary more often.

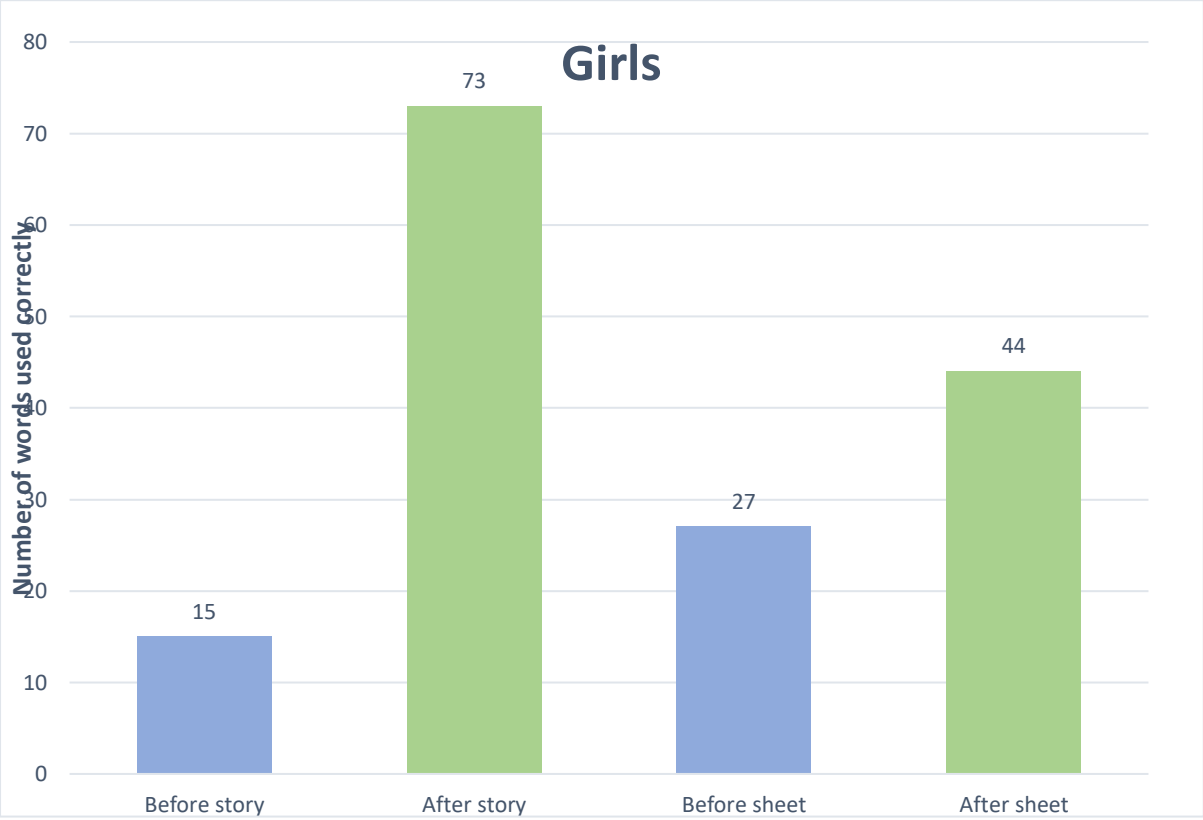




Boys versus girls

However, when we separated out the data by gender, the results showed an interesting difference between the effects of the story versus the factsheet. Whilst boys have shown an improvement using both the story and the non-fiction sheet, girls who read the story made quite significant improvements in the use of their scientific vocabulary compared to the girls who read the non-fiction sheet text. This left us teachers wondering if this significant finding was due to Gary Vity having a female lead character or whether picture books make the science more accessible to girls or indeed, or whether there was another factor at play.


Boys
Total number of words used correctly
60
50
40
30
20
10
0
22
52
27
54
Before story
After story
Before sheet
After sheet


Girls
Number of words used correctly
80
70
60
50
40
30
20
10
0
15
73
27
44
Before story
After story
Before sheet
After sheet

For a full write up of the methodology and results please visit the ASE website - journal 25 of the Journal of Emergent Science.
https://www.ase.org.uk/system/files/JES%2025%20Pottle.pdf

Guided Reading Questions

Cover
Key Question
What is going on in this picture?
What do you think the book is about?
What is she wearing?

Move straight past the flyleaf.

Page 1-2
Key Question
How old is Rosa?
How do you know?

Page 3-4
Key Question
What do you think 'her own language' means?
What makes you think this?
Rosa's parents are not mentioned. Why not?
'Gatto' is an Italian word. What do you think 'gatto' means?

Page 5-6
What do you think 'flush the toaster' means?
How would you say that?
Key Question
Why are there two red arrows?

Page 7-8
Key Question
Rosa draws lots of different things. What do all the different images tell you about her character?
How many pictures of fish can you find?
Where is Napoli?
Why might Rosa have a pencil from Napoli?
Where is the Napoli pencil in the picture?

Page 9-10
Key Question
Why did the pencil roll off the table? Did the table push it off?
The pencil stopped falling at the floor. Why?
What has Rosa misunderstood?

Page 11-12
Key Question
Who or what is Gary Vity?

Nonna tries to explain what is happening and Rosa doesn't understand. What is Rosa thinking in this part of the story?

Page 13-14
Key Question
Why does Rosa check the pencil for signs of magic or a string?
What might 'signs of magic' look like?

Page 15-16
Key Question
The girl in the green jumper is going up in the air. Why is the red arrow going down?
Rosa is neither going up or down. Why is there an arrow under her?
Where else on this picture could you put an arrow?
Do you ever feel 'itchy to move'?
What might the 'top half of a tango' look like?

Page 17-18
Key Question
Why did the Napoli pencil fall out of her pocket?
What else in the image is falling?
Why does Nonna laugh?

Page 19-20
The text says 'The birds were awake.' What do you think this means?
Why else might it be hard to sleep?
Key Question
Why was Rosa's mind busy again?

Page 21-22
How does Rosa feel?
Why does Nonna chuckle?
Key Question
How does Nonna know how to find Gary Vity?

Page 23-24
Key Question
Where is Gary Vity?

Page 25-26
Key Question
What is Gary Vity?
What shapes are the clouds making?
What can gravity do?
What is your favourite line of the poem and why?

Page 27-28
Key Question

What else could you do to experiment with gravity?
Can gravity pull you up?
Which way is down?

Page 29-30
Key Question
Which way is down? Which way is up? Why is it sometimes to the left and sometimes to the right?
Nonna is showing Rosa the gravity on the moon. Is it the same on Earth?
Imagine you are in the blue rocket. Show me, on the picture, which way is down.
Imagine you are in the red rocket. Show me, on the picture, which way is down.

Page 31-32
Key Question
What is 'the core'?
What do you think 'perfetta' means?
Can you remember the rest of the poem without looking?
Why do objects stop falling when they reach the floor? What would happen if the floor wasn't there?

Page 33-34
Key Question
How heavy must the sack be for the basket to go up? (In this configuration of pulleys, there are two strings pulling up. Each string takes half the weight so the sack must be more than half the weight of the basket.)
The basket is going up. Why is the arrow pointing down?

Page 35-36
Key Question
The text mentions Galileo and his experiments. There is a clue on the page about his experiments. What do you think Galileo did? (There is more information about Galileo on the last page.)
Which forces did Rosa study? What do you know about those forces?
How could you put a force to good use?

Page 37-38
Key Question
What is engineering?
What is your favourite force?

Page 39-40
Key Question
Why might Nonna wish she had never explained about gravity?
If you could design a roller coaster, what would it be like?
How might that rollercoaster use gravity? Or friction?

Whole Book
Key Questions
Why are there arrows all over the pictures?
Where else could you put an arrow? Check each page to see where you could put more arrows.
There is a literary 'Easter egg' to find on each page - a repeated image on each page. What is it? (a feather) What does it have to do with gravity?
What does Gatto the Catto's face look like?

Teaching Resources

1.Odd One Out

There are 3 images below.

Show all three images and ask the children if there are any similarities or differences between these images. Ask them which one is the odd one out and why?
It is important to remind pupils that there is no wrong answer.

Prompts

- How do they move?
- How is gravity affecting their movement?
- Can you draw arrows to represent how gravity is acting in the images?

Pupils can share their ideas in pairs, with the whole class or write it on post it notes and stick it somewhere others will read it. It might be used at the beginning of a lesson and revisited again at the end of a lesson to see if pupils have changed their minds.

Pupils may suggest that, '*The balloon is the odd one out because the balloon can travel upwards but the others cannot.'* Or they may suggest that, '*The slide is the odd one out because the balloon and the parachute are up in the air.*' This could lead to discussions about other forces acting on the images, such as air resistance. Pupils might notice that pushing is required for the slide and parachute unlike the hot air balloon. All these answers are valid because they have supported their answer with a good reason.

2. Rocket Mice

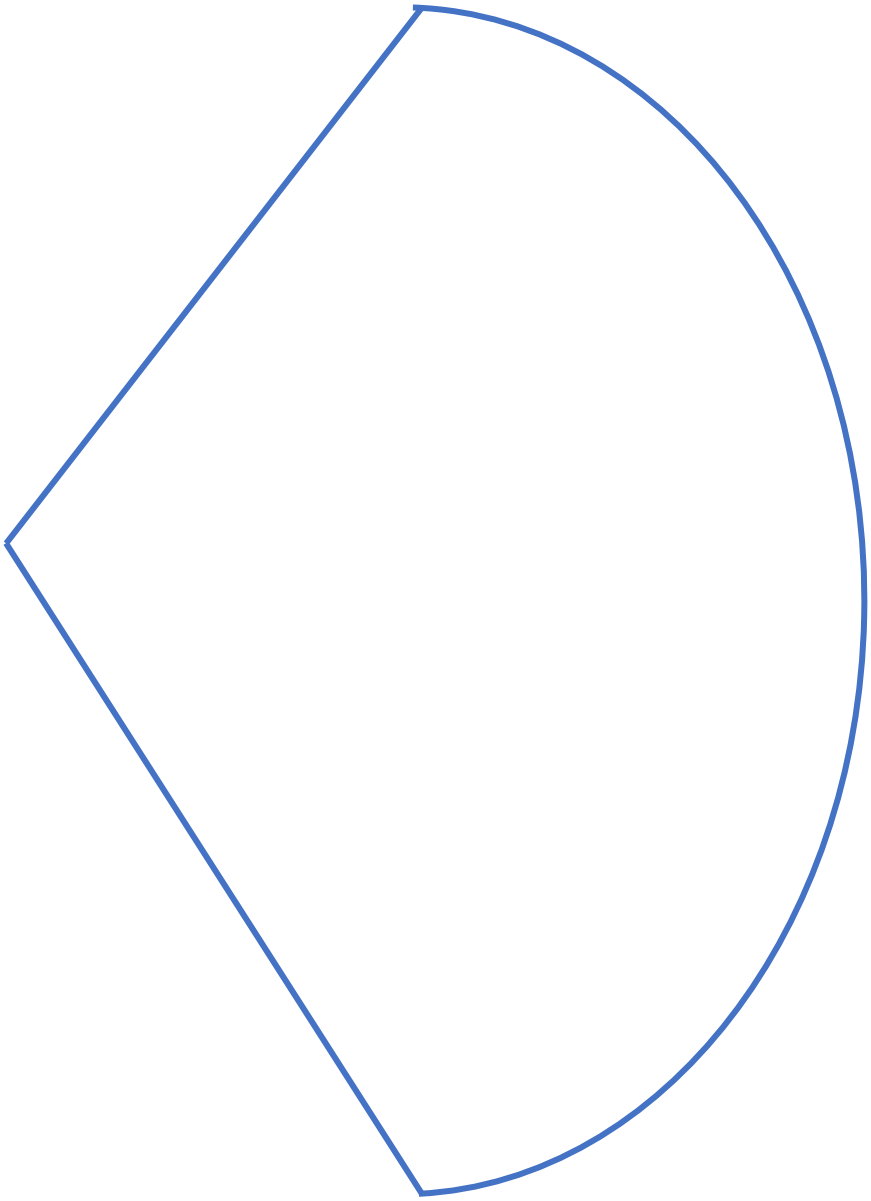
Direct link to this activity adapted from the Science Museum:
https://learning.sciencemuseumgroup.org.uk/resources/rocket-mice/

This activity could be used an end of unit assessment to support summative assessment or as a pre–learning assessment to identify pupils' knowledge of gravity.

You will need:

An empty milk bottle
Scissors
Rocket template
Sellotape
Any decorations to decorate your mouse (pipe cleaners, googly eyes, foam shapes, feathers).

Template



Steps

1. Cut out the template
2. Roll it into a cone shape and use Sellotape to secure it
3. Add decorations to your rocket.
4. Place the rocket onto the top of the milk bottle
5. Whack the sides of the milk bottle and watch the rocket launch into the air.

Discussion
Why did the rocket fly?
What makes the rocket come down?
How could you make the rocket travel higher?

Pupil could draw arrows on the rocket to represent the forces acting on the rocket. They could investigate the effects of using alternative bottles on the distance travelled by the rocket. Children could decide on how they will measure the distance travelled and how want to present their results. A weight can be added to the nose of the rocket for an extra challenge for pupils to investigate.

3. Fun at the Park PowerPoint
https://docs.google.com/presentation/d/1ub3YzGKvGoEVulfHtlPHfh2F2wKs5mPV/edit?usp=share_link&ouid=108932682096610785365&rtpof=true&sd=true
Download and adapt as required.

4. Forces lessons modelled by Jules on DK Books Youtube
Paper spinners (gravity and air resistance):
https://www.youtube.com/watch?v=K_XwZgesg2U&list=PLRu2L9J9oDFWkEtuxFkzY3MvInlqWt_sD

Marble run (gravity and friction):
https://www.youtube.com/watch?v=YN100bpZ4TA&list=PLRu2L9J9oDFWkEtuxFkzY3MvInlqWt_sD&index=2

Drinks can challenge (centre of gravity):
https://www.youtube.com/watch?v=cOTHFbpzcFY&list=PLRu2L9J9oDFWkEtuxFkzY3MvInlqWt_sD&index=5

Rolling uphill (using gravity to perform magic):
https://www.youtube.com/watch?v=YYOiktAVS6c&list=PLRu2L9J9oDFWkEtuxFkzY3MvInlqWt_sD&index=10

Parachutes (gravity and air resistance):
https://www.youtube.com/watch?v=J_4TWhu2EPQ&list=PLRu2L9J9oDFWkEtuxFkzY3MvInlqWt_sD&index=13

Straw rockets (gravity and air resistance):
https://www.youtube.com/watch?v=LqFHtJAa2mA&list=PLRu2L9J9oDFWkEtuxFkzY3MvInlqWt_sD&index=15

Paper bridges (gravity acting on structures):
https://www.youtube.com/watch?v=CrVolfsM-lQ&list=PLRu2L9J9oDFWkEtuxFkzY3MvInlqWt_sD&index=11

5. Starters for Science by PSTT (you may need to sign in to Vimeo to watch)
Levers
https://vimeo.com/792199729

6. Ideas for writing tasks based on the book

- Chronological report – write a diary entry from the day before and the day after Rosa goes to the park to look for Gary Vity. Make it clear what she understands about Gary Vity/gravity before and after going to the park.

- Chronological report – write a postcard from Rosa when she has visited Pisa and found out all about Galileo's experiments.

- Non-chronological report – Write a fact file all about forces.

- Instructions – write or role-play instructions for Nonna on how to use the down-powered-uppity-basketto.

- Explanation – role play being Galileo explaining to Aristotle how you tested out your ideas and why the results prove Aristotle's ideas were wrong.

- Narrative – write a story about the day the forces quit. Imagine being at school when gravity 'stopped working'. What might happen? Write a story about that day.