Teacher notes and curriculum concordance for

Elizabeth.

Picture

 Elizabeth

by Dr Joe

ISBN:

Recommended Retail: $16.50

Recommended Age: primary school

and young adult

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# Curriculum concordance

## Science

**Use and influence of science: Science helps people influence their environment and make decisions.**

The book has a major focus on how people can use scientific knowledge to help them influence their environment and make decisions. The content focus is on air pressure, a rarely discussed and challenging science concept – easy to understand, yet hard to believe. This idea is repeatedly emphasised in the book to help illustrate how scientific knowledge influences our behaviour and can help us make decisions. It engages the reader to challenge their way of understanding the world to perceive air, always around them yet always taken for granted, in new ways.

The book Arrendrallendriania contains elements of many other science strands, including:

* Life and living: life on other planets, organisms and their needs, structure and function.
* Science as a human endeavour: science involves asking questions,
* Physical science: physics of motion and the ultimate inertial reference frame.
* Science inquiry skills: asking questions and testing answers.

# Teacher questions and points to ponder

## Introduction: The scientist 1

What do you think generates the sense of danger in this book?

What are your thoughts about ‘the scientist’? Does she sound dangerous, and why?

## Chapter 1: The day Mum returned 4

Who is Elizabeth?

What does Chase think about Elizabeth?

Who does Chase’s mother appear to work for?

How long has it been since they’ve seen each other? Why do you think?

## Chapter 2: The energy efficient house 13

What is the competition about this time?

What is heat?

How do you think heat travels from one place to another?

How can you prevent heat travelling from one place to another, such as in the energy efficient house competition?

## Chapter 3: Markets and mischief 21

Have you ever been to a market? Does your school have a market?

Why does Arren want to hold a school market?

Who met the mad scientists? What happened?

## Chapter 4: When good ideas run dry 28

How did Chase convince the school committee to hold a market? (It wasn’t necessarily the logical or financial reasons; he took time to find out what they were concerned about, then dealt directly with the issues.)

Do you think it might be a good idea for your school to hold a craft market?

## Chapter 5: Shoebox studies 34

What are the four natural states of matter? (solid, liquid, gas, plasma)

What three ways does heat travel (Conduction – or by touch, Convection – by flowing liquids and gasses, and by Radiation – as infrared radiation travels from the sun)

What is the scientist looking for?

## Chapter 6: The experiment 41

Who was being experimented on in this chapter? What did they find out?

Why do you think Lucky’s mother won’t let them do any more experiments on him, is she being nice, or is there another reason? (She wants to gain his trust in case they need his help later, perhaps)

How would you explain Convection to someone who’d never heard it before?

## Chapter 7: The market success 53

What does the mad scientist do once she finds Arren?

What does heat have to do with making Fairy Floss (candy sugar)?

What do you think Chase should have done with his feelings of concern?

## Chapter 8: The p14 weather satellite 65

Why does Arren fix the satellite? (Chase’s mother makes her) Do you think this is fair?

Pyrokinesis, or setting fire to things by the power of the mind, is science fiction. Are there any recorded instances of pyrokinesis in mythology or history?

How would you explain heat transfer by radiation to someone who’d never heard it before?

## Chapter 9: The Trojan 75

What is a Trojan and why did Obe-jo use one?

Why is Arren nervous about speaking to the girls at school?

Whose responsibility was it to protect Arren’s information?

## Chapter 10: The second market 87

What did Arren and Chase sell at the second market? (a hovercraft)

What happened at the market that convinced Chase that his friend Arren wasn’t really safe anymore? Should he have done about this, or told someone, but didn’t?

If someone asks you for a favour that you feel isn’t right, what should you do? What did Arren do?

## Chapter 11: Mum 96

What was Chase’s mother doing for work before he and Lucky were born? (Working for the government, probably as a spy.)

What happened to Elizabeth that made parenting tough for her? What did she do about it? What might have been a better thing to do about it?

Do you think parents have to choose between work and family in order to be happy?

When is the right time to talk about tough topics with your parents? Is it better to wait, or bring it up as soon as you are able to?

## Chapter 12: Visit from a scientist 104

How does the scientist capture Arren? (They reprogram her computer to obey only Obe-jo)

## Chapter 13: Battle for Arrendrallendriania 109

Who do they visit to get help to find Arren (The Mechanizer, and Kharon – two other life forms similar to Arrendrallendriania)

Why doesn’t the glass car heat up as it compresses the air in front of it, especially if it is travelling faster than some asteroids are when the hit the atmosphere? (It phases through – not touching the atoms. Probably anyway, this is all just science fiction!)

## Chapter 14: Kharon 118

What do you think Obe-jo thinks about Arren?

Do you think some stories about gods or angels might really be stories about humanities interactions with aliens? Some science fiction shows (such as Stargate SG1 and others) count on it. Is it easier to believe in angels, or aliens? (Neither has been accepted as real by mainstream science thus far.)

What must they do to survive the enormous heat (+500 degrees centigrade) on Venus?

## Chapter 15: Venus 125

How do they save Arren? (They don’t, Obe-jo does. Then Chase convinces Obi to let her go.)

The story doesn’t say what happens to Melyssa, the mad scientist. What do you think should happen to her? Is some kind of punishment in order, and what? What does she say happens to her to make her want to hurt Arren?

## Chapter 16 Ice in a Box 132

Who wins the heat efficient house competition? Do you think it is fair? How would you make some rules to make it a fair competition (having ice cubes all the same size would be a good start! This is a great opportunity to talk about fair testing.)

# Ms Garibaldi quotes

Again we throw some gratuitous Italian in there. Why? You’ll see…

From page 22

Momenti = Momentoes, knick knacks etc.

Sacra Maria, Figlia = Sacred maria, girl! (kind of swearing)

Ms Garibaldi smiled, and patted her on the cheek. “We needa mucha piu… money, for this I think!” =

Ms Garibaldi smiled, and patted her on the cheek. “We need much more… money, for this I think!”

From page 23

“Sia bene ragazza?” Ms Garibaldi asked her.

“Si, si.” Arren nodded. “Signora Garibaldi, mi possa prendere un bichiere di aqua?” She asked.

“Cherto!” Ms Garibaldi replied, stumbling up and pottering off.

Translates to;

“Are you all right, girl?” Ms Garibaldi asked her.

“Yes, yes.” Arren nodded. “Mrs Garibaldi, would you mind getting me a drink of water?” She asked.

“Certainly!” Ms Garibaldi replied, stumbling up and pottering off.

# Extra activities

## Convection currents

\*adult help required\* cold ice, live flames and flammable materials.

*Hot air rises*: use a match to illustrate that fire, which is hot air, goes up. Alternatively you can use a plastic bag over a larger fire (invert the bag to catch the hot air.) Then, when the bag is full of hot air, let it go. It will float upwards if the air inside is hot enough.

*Cold air falls*: Just as easy to demonstrate, but much less visual. Make sure there are no breezes in the room you are using. Hold out a tray of ice (including the ice tray from the refrigerator). Have students notice how they can feel the cold air much further below than above the ice, because cold air falls.

Explain that these processes are going on all over the world all the time. Where hot air rises new air from below is pushed into the gap (by the air even further down, or the air beside it). Also, when cold air falls new air is pushed into the gap. This creates air currents.

These invisible air currents are all over the world, all the time. Simple ones can be found right inside the classroom. On a hot day an air conditioner pours out cold air that will usually blow along till it hits the wall, falls to the ground, runs along the ground and heats up just a little, and then may even be pushed into the gap created by the air conditioner and go all around again! Alternatively a hot stove will heat up the air, and it often flows up and runs along the roof, there it will begin to cool and fall, and then may even find its way back to the stove (but not always).



Taken 23rd august 2012 from <https://www.eeb.ucla.edu/test/faculty/nezlin/PhysicalOceanography.htm>, based on Garrison, 1993, Figure 8.3.