

Teachers' Notes

APPLES NOT ORPLES

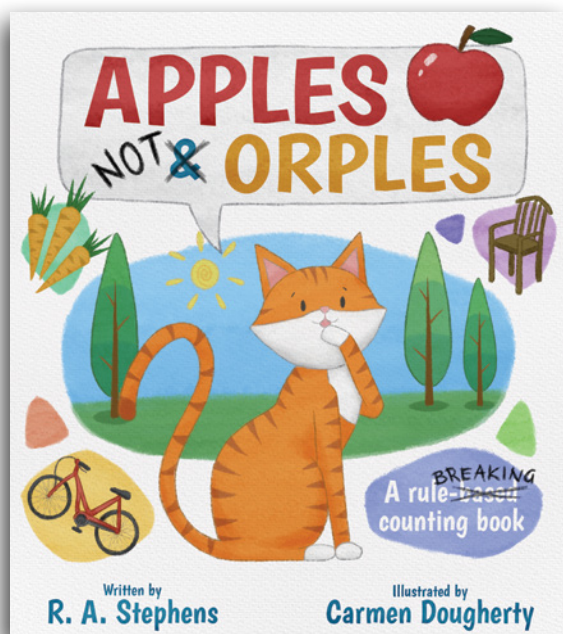
R. A. Stephens / Carmen Dougherty

ISBN: 9781761111693

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Reading level: 5 to 8

BOOK SUMMARY



Two apples plus three oranges.

Does that make five orples?

NO! It's still two apples and three oranges.

Join the band of animals for a counting and adding challenge.

But don't get too mixed up!

THEMES

Mathematics • Wordplay • Imagination • STEAM Concepts • Algebra for kids • Patterns

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**R.A. Stephens is available for author talks and workshops.
Contact Wombat Books for more information.**

Apples Not Orples Teachers' Notes can be used in schools (independent learning, small groups, and whole classes); at home with caregivers; and as part of mental health support programs facilitated by counsellors, psychologists, children's charities, etc.

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ABOUT THE AUTHOR



Rochelle Stephens is the Director of Wombat Books and Rhiza Press. With qualifications in teaching, counselling, editing and publishing, Rochelle brings expertise and knowledge to her work in publishing and editing. Since pioneering Wombat Books, Rochelle has been actively involved in every aspect of story development and book production.

Rochelle has written for science textbooks and other educational texts and is passionate about making science and maths real for children. While Rochelle loves genres like fantasy, she believes that when it comes to science and maths there is so much to appreciate without any fantasy needed. In her experience there is fun to being observant and planning out how to approach a curious query - such as counterfeit money!

AUTHOR NOTES

This book can be used with both young children as a fun pattern matching book and counting book, or with older children as a cute introduction to mathematical “like” terms.

I am a maths teacher who constantly explains to students why they cannot mix letters to make new numbers in addition. Maths addition follows very specific rules and you can only add “like” items to another. For example when teaching students in junior secondary I would say that if you have $x + y$ they are two different things, so it doesn’t make xy . That’s like saying there is an apple and an orange and when you add them you get one appleorange. You can’t mix it and make something new in maths like that. You can only group and add things that are the same.

Apples are just apples and oranges are just oranges. They are not orples.

I decided to play with the words a bit to help interact with children of all ages. As I use my quirky understanding of maths to share this little story I hope it can give lessons to everyone - children learn to look for similarity and teenagers and adults come to understand how a basic concept in algebra works.

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ABOUT THE ILLUSTRATOR



Carmen Dougherty is a graphic designer and illustrator from Queensland. She has a keen eye for detail and enjoys creating unique artworks that tell a story. Her favourite books are crime thrillers, sci-fi and high fantasy. In her spare time, she creates and illustrates characters for her own stories that she hopes to publish one day.

Carmen has created covers and interiors for a broad range of age groups and genres, such as *Jerry's Window*, *Sea Glass*, *The Wordspinners* series, *Integrate* (2nd Edition), *Signal Erased*, *Verindon Conspiracy*, *Remind Me Why I'm Here*, *Evacuation Road* and many more.

ILLUSTRATOR NOTES

At times maths can be difficult to engage with, especially if a student finds a concept hard to understand. One thing that I've found most people can relate to is that moment when someone finally explains a concept in just the right way that it makes you go: AH HA! NOW I'VE GOT IT! That's what it was like making the drawings for this book. I went through many draft ideas before finally settling on the narrator cat and his animal friends.

The idea really came to life when I got the idea for the monkey scene. Rochelle and I were discussing the book, and she told me how much fun she was having coming up with the various name combos. I cheekily thought, I bet I can include this in the book somehow. And, what better way than a giggling troupe of monkeys? My favourite part of the book was the Noooo's. Once I had settled on the idea of including various animals in each scene, I knew it would be funny to have them interact with the cat in ways that mimicked the nature of each animal in real life. This was what helped me to come up with the little jokes like the dog startling the cat; the koala and the cat discussing the confusing chable; and the overexcited rabbit sneaking up on the cat. It was a challenging process, coming up with interesting pictures for this book, but I very much enjoyed it.

I mostly draw digitally using Photoshop. I have a big drawing tablet and a bunch of interesting Photoshop brushes that make the lines I draw look like they were done with crayons, pencils and watercolour paints. I also used a paper texture overlaid on top to help sell the effect of the traditional mediums. Because all the elements were made digital on separate layers, I could pick up each part I had drawn and move it around on the page until I found a placement I liked. It made the editing and layout process much easier and faster. My thinking behind the art style was to make it look like a child's drawing. Not too simplistic that it would put off older readers, but simple enough that any kid could mimic themselves.

The hardest aspect of this book was the combo items, such as the 'orples' and 'chables'. It was challenging to find the best way to depict these. I designed the combo items to have clearly recognisable characteristics of each of its component items. The apples are shiny and smooth and the oranges are matte and bumpy. So when monkey propose the orple you can see the skin is bumpy and shiny, taking on the traits of both fruit. Working through the best way to draw the combo items actually helped us to improve the text as well. We were able to identify little places where extra jokes could be added to keep the book light-hearted and fun. I think we ended up finding the best way to show off the funny combos while still keeping the book's message clear.

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REASONS FOR STUDYING THIS BOOK

Ever wondered why you can't add things up that aren't the same? Because apples and oranges can't make oranges! In this quirky counting book, readers will engage with all the different ways you can go WRONG in adding like terms. As many maths teachers would understand, this is a common struggle for young learners when they are introduced to algebra and patterns.

With a fun look at mixing up counting for young kids, this book also combats algebra gone wrong for older kids. Like terms learnt in a fun way. It's algebra for pre-schoolers!

Read this book to understand algebra concepts, seeing visually why you can't mix and match. Written in a way that you can interact with the reader, this STEAM book explores several common algebra mistakes and how to avoid them.

KEY CURRICULUM AREAS

Curriculum Areas and Key Learning Outcomes.

YEAR ONE

Mathematics

AC9M1A01 - recognise, continue and create pattern sequences, with numbers, symbols, shapes and objects, formed by skip counting, initially by twos, fives and tens

AC9M1A02 - recognise, continue and create repeating patterns with numbers, symbols, shapes and objects, identifying the repeating unit

AC9M1N05 - use mathematical modelling to solve practical problems involving additive situations including simple money transactions; represent the situations with diagrams, physical and virtual materials, and use calculation strategies to solve the problem

AC9M1N04 - add and subtract numbers within 20, using physical and virtual materials, part-part-whole knowledge to 10 and a variety of calculation strategies

English

AC9E1LE02 - discuss literary texts and share responses by making connections with students' own experiences

AC9E1LA03 - explore how texts are organised according to their purpose, such as to recount, narrate, express opinion, inform, report and explain

YEAR TWO

Mathematics

AC9M2A01 - recognise, describe and create additive patterns that increase or decrease by a constant amount, using numbers, shapes and objects, and identify missing elements in the pattern

AC9M2N04 - add and subtract one- and two-digit numbers, representing problems using number sentences, and solve using part-part-whole reasoning and a variety of calculation strategies

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English

AC9E2LA03 - identify how texts across the curriculum are organised differently and use language features depending on purposes

AC9E2LY01 - identify how similar topics and information are presented in different types of texts

YEAR THREE

Mathematics

AC9M3N06 - use mathematical modelling to solve practical problems involving additive and multiplicative situations including financial contexts; formulate problems using number sentences and choose calculation strategies, using digital tools where appropriate; interpret and communicate solutions in terms of the situation

AC9M3SP01 - make, compare and classify objects, identifying key features and explaining why these features make them suited to their uses

AC9M3N07 - follow and create algorithms involving a sequence of steps and decisions to investigate numbers; describe any emerging patterns

English

AC9E3LE02 - discuss connections between personal experiences and character experiences in literary texts and share personal preferences

AC9E3LY02 - use interaction skills to contribute to conversations and discussions to share information and ideas

AC9E3LY05 - use comprehension strategies when listening and viewing to build literal and inferred meaning, and begin to evaluate texts by drawing on a growing knowledge of context, text structures and language features

AC9E3LA09 - identify how images extend the meaning of a text

AC9E3LE03 - discuss how an author uses language and illustrations to portray characters and settings in texts, and explore how the settings and events influence the mood of the narrative

AC9E3LA03 - describe how texts across the curriculum use different language features and structures relevant to their purpose

AC9E3LY01 - recognise how texts can be created for similar purposes but different audiences

YEAR EIGHT

Mathematics

AC9M8A01 - create, expand, factorise, rearrange and simplify linear expressions, applying the associative, commutative, identity, distributive and inverse properties

AC9M8A03 - use mathematical modelling to solve applied problems involving linear relations, including financial contexts; formulate problems with linear functions, choosing a representation; interpret and communicate solutions in terms of the situation, reviewing the appropriateness of the model

TEACHING POINTS AND ACTIVITIES

This book may be used in whole class, small group or independent learning activities in schools.

Please note, the following suggestions and activities are suited to a variety of year levels spanning Foundation to Year 6 primary aged children. Some activities may be applicable to early secondary school students, as well.

KNOWLEDGE AND LITERAL UNDERSTANDING

PRE-READING QUESTIONS

1. Show the cover to the class and ask the students what they think the book might be about.
2. Read the back cover blurb. Does this give them more of an idea of what the book could be about?
3. Ask students if they have any theories about what will happen in the book.

AFTER-READING QUESTIONS

1. Ask students if their theories about the book were correct.
2. Were the students expecting a narrative or a more instructive book?
3. Was there a favourite combination of ideas or illustrations that the students liked?
4. Did it teach the students something new?
5. What is the takeaway from reading *Apples Not Orples*?

ACTIVITIES

CREATE YOUR OWN COMBINATIONS

Continuing on the fun of the combinations from the book create your own unique mashups in zany mathematic questions. Remember the rules you learned in *Apples Not Orples*! Like goes with like!

When you're finished you can share your math creations with someone else at your table or in your group.

REFLECTION

Reflect on your past work in math class. Have you ever struggled with 'like' and 'like' addition? What can you do differently next time? Discuss with a partner the rules uncovered in *Apples Not Orples*.

Is there another rule in math that you struggle with? What could you take away from *Apples Not Orples* and its explanations to apply to other mathematical theories? Does breaking it down help?

RULES

In *Apples Not Orples* we went over a mathematical rule that often gets broken or ignored. Do you have any ideas why that rule might keep getting broken and why it's hard to understand initially?

Write down your idea and then discuss as a group.

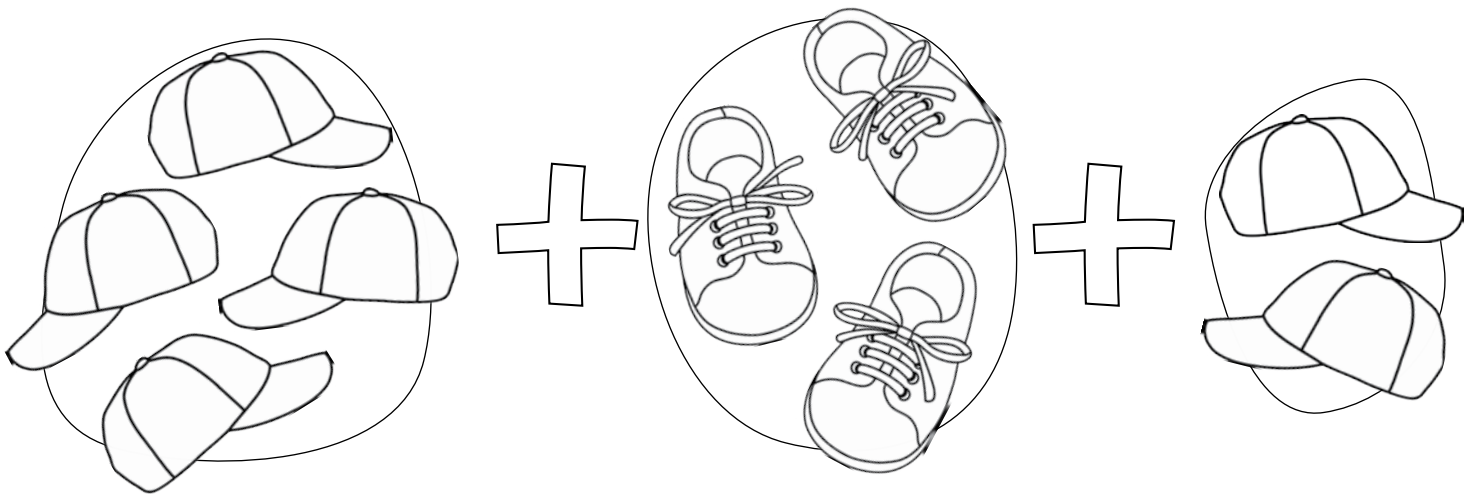
PRINT OUT FUN

After this page is a number of printouts for mathematic activities based on the *Apples Not Orples* book. Included is an answer key at the end.

You just learnt about like terms!

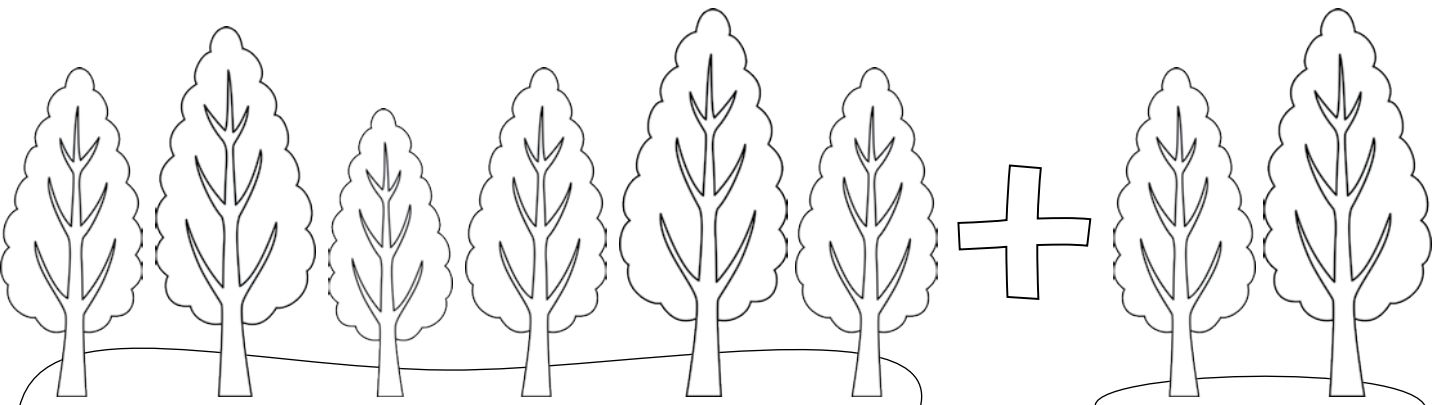
Remember, you can only add the items that are the same.

1) 4 hats + 3 shoes + 2 hats



=

2) 6 trees + 2 trees

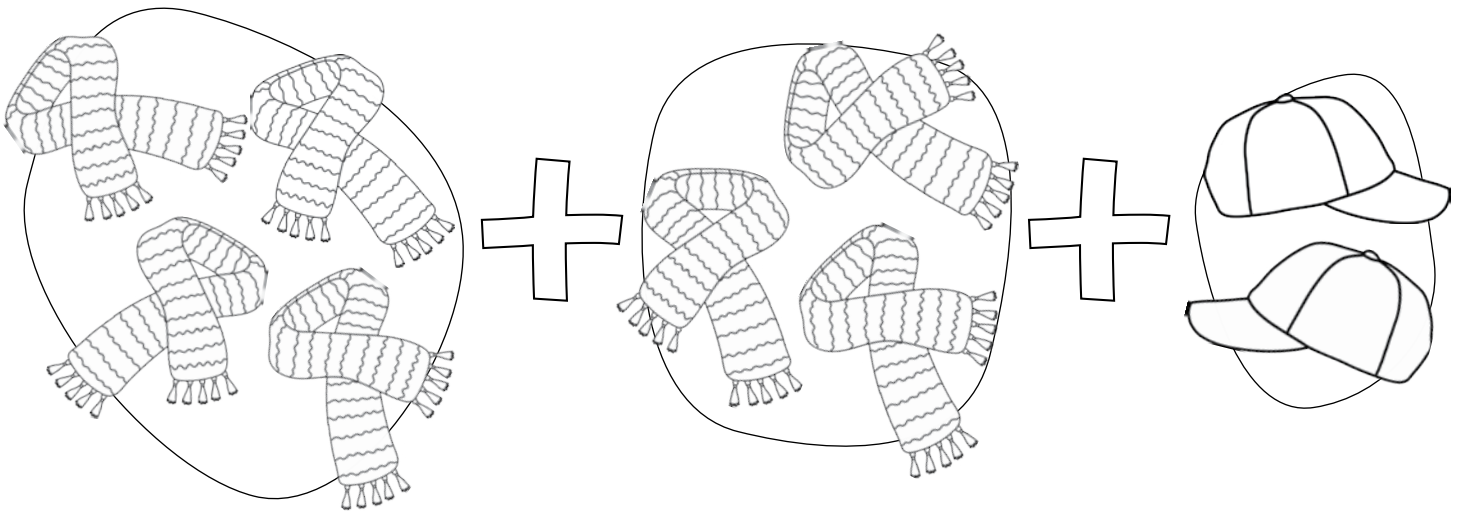


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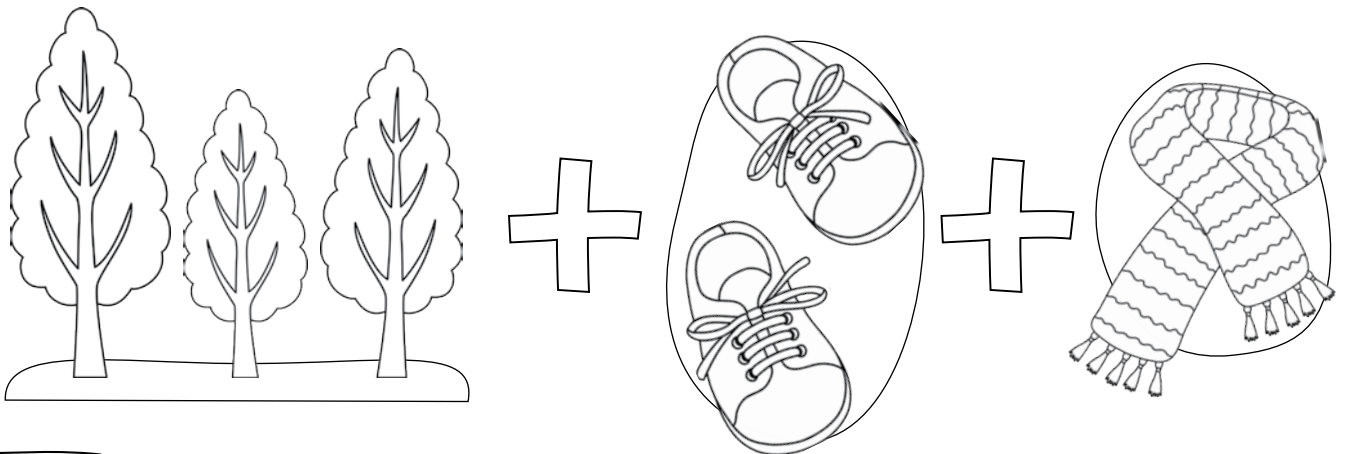
You just learnt about like terms!

Remember, you can only add the items that are the same.

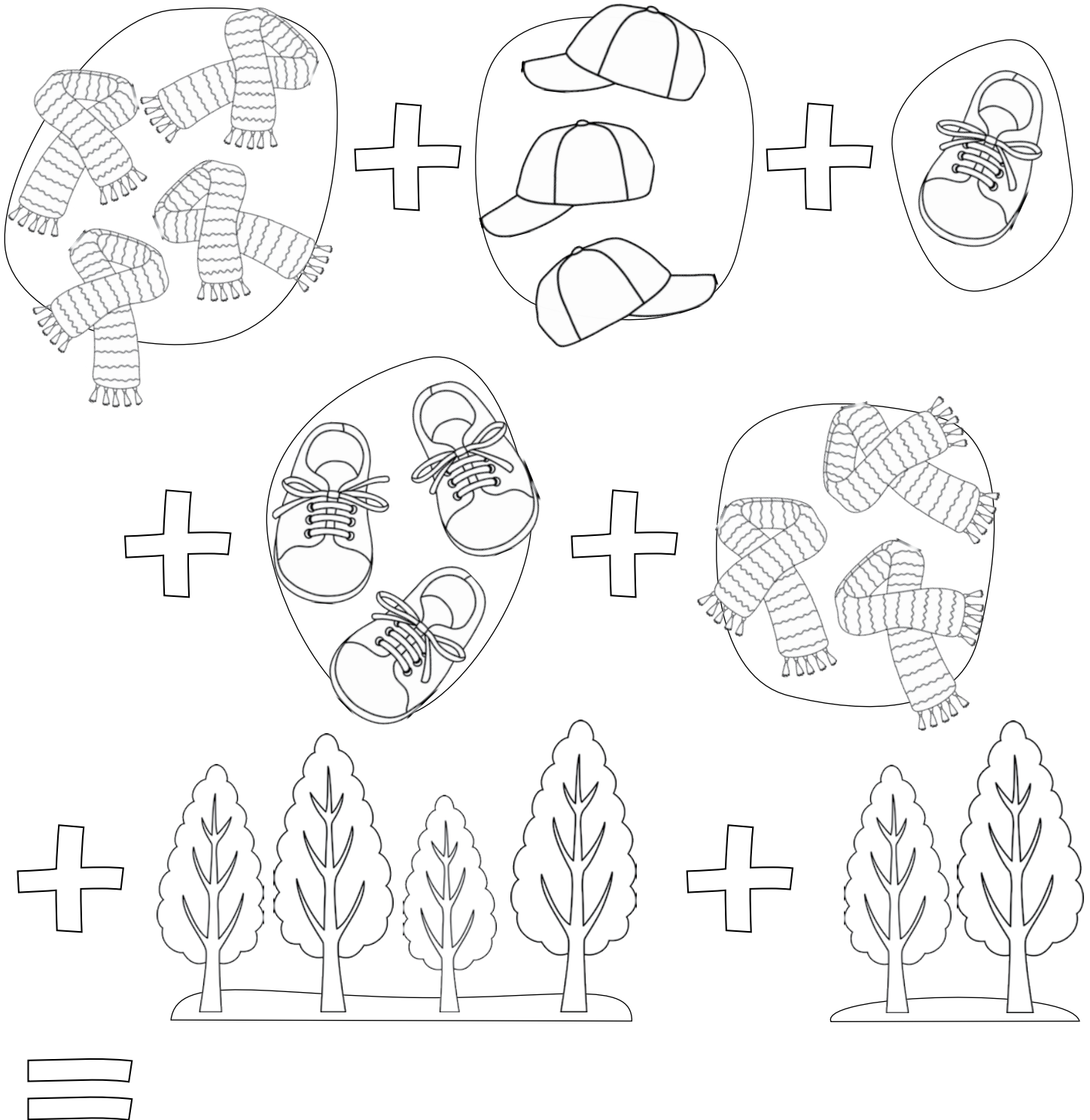
3) 4 scarfs + 3 scarfs + 2 hats



4) 3 trees + 2 shoes + 1 scarf



5) 4 scarfs + 3 hats + 1 shoe
+ 3 shoes + 3 scarfs + 4 trees
+ 2 trees



You just learnt about like terms!

Remember, you can only add the items that are the same.

$$1) 3x + 6y$$

$$=$$

$$3) 6f + 5f$$

$$=$$

$$2) 4a + 3a$$

$$=$$

$$4) 10c + 5d$$

$$=$$

$$5) 6a + 7b + 2a + 3b$$

$$=$$

$$6) 8x + 2y + 5x + 3y - x$$

$$=$$

$$7) 4a + 2b + 5b + 7a - 1a - 3b$$

$$=$$

You just learnt about like terms!

Remember, you can only add the items that are the same.

$$8) 9a + 1a$$

$$=$$

$$9) 10a + 5b$$

$$=$$

$$10) 8b - 6b$$

$$=$$

$$11) 9v - 3a$$

$$=$$

$$12) 5b - 7b + 8a - 1a$$

$$=$$

$$13) 9r + 4p - 2r + 6p + 7r$$

$$=$$

You just learnt about like terms!

Remember, you can only add the items that are the same.

1) Some students have brought brought fruit to share for a special lunch. James has brought three apples and two pears, Millie has brought ten strawberries and 1 pear, Kiran has brought two apples and Tristan has brought four apples, two pears and five strawberries.

What fruit does the class have to share?

Show your working in the space provided then write the solution as a sentence.

2) $2x + 5y + 3z + 9y + 2x$

Show your working in the space provided.

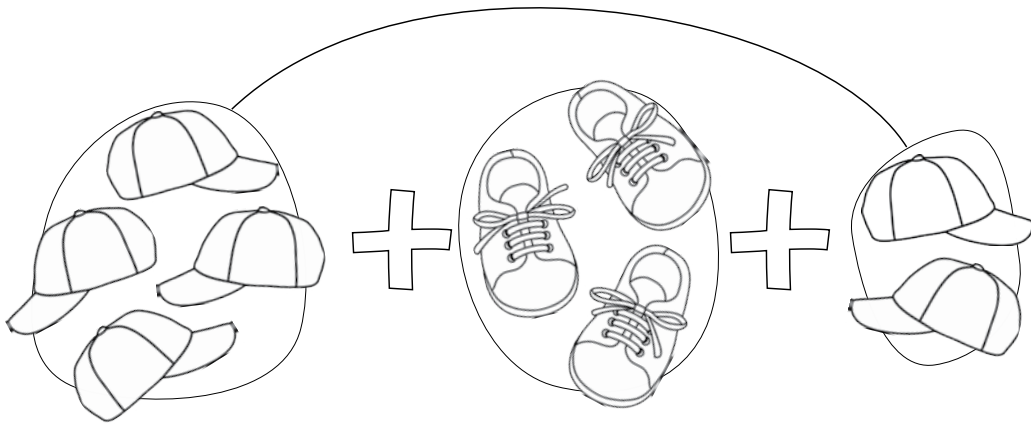
3) $8a + 7b + 3c + 2a - 2b - 5d$

Show your working in the space provided.

4) Five children bring three muffins each to a party. Another four children bring two chocolates each. The child brings one muffin and one chocolate to share. Out of the ten children each eat one muffin first. What is left to share?

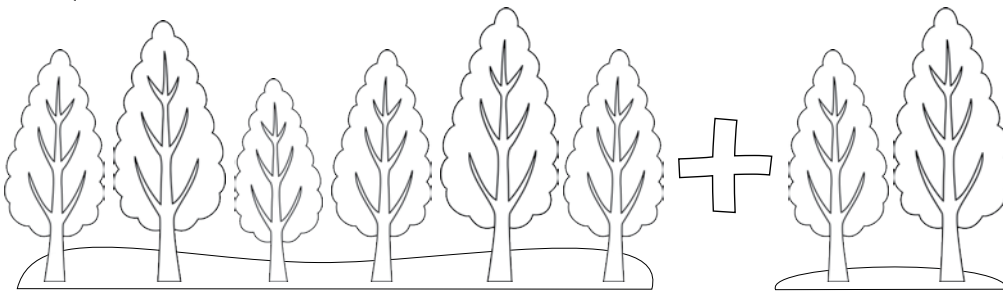
Show your working in the space provided then write the solution as a sentence.

1) 4 hats + 3 shoes + 2 hats



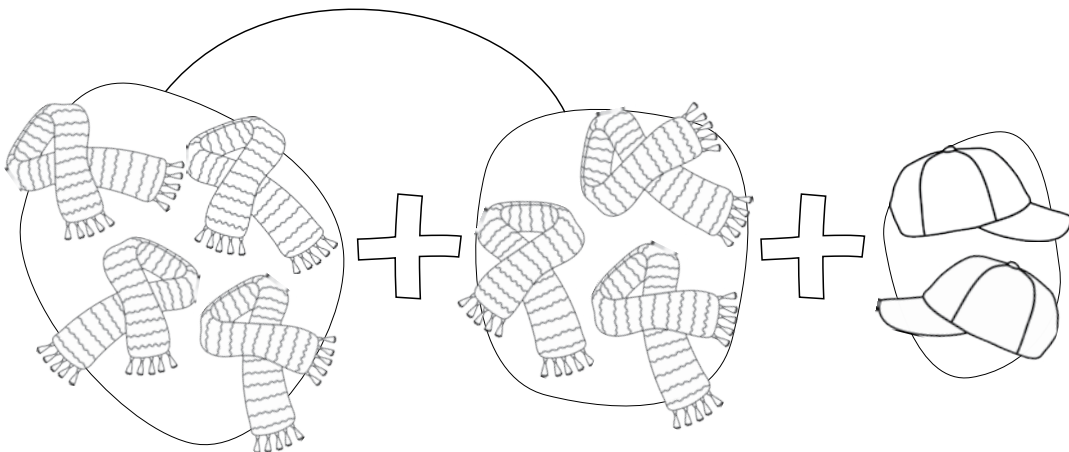
 6 hats + 3 shoes

2) 6 trees + 2 trees



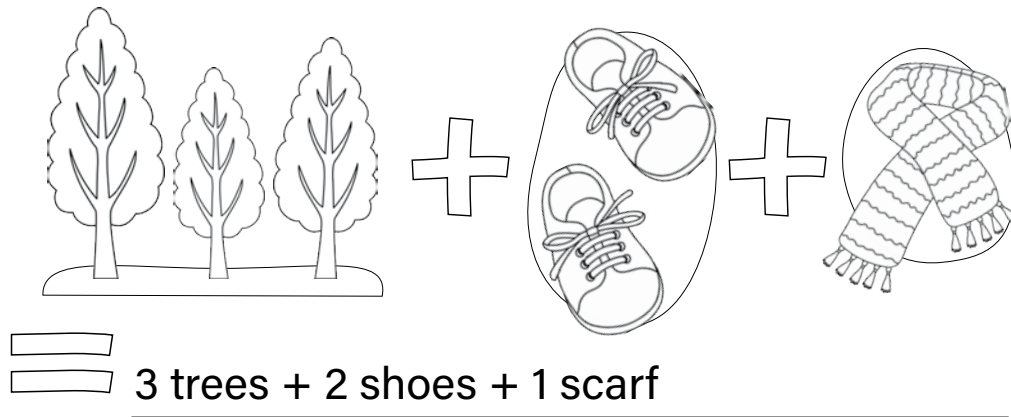
 8 trees

3) 4 scarfs + 3 scarfs + 2 hats

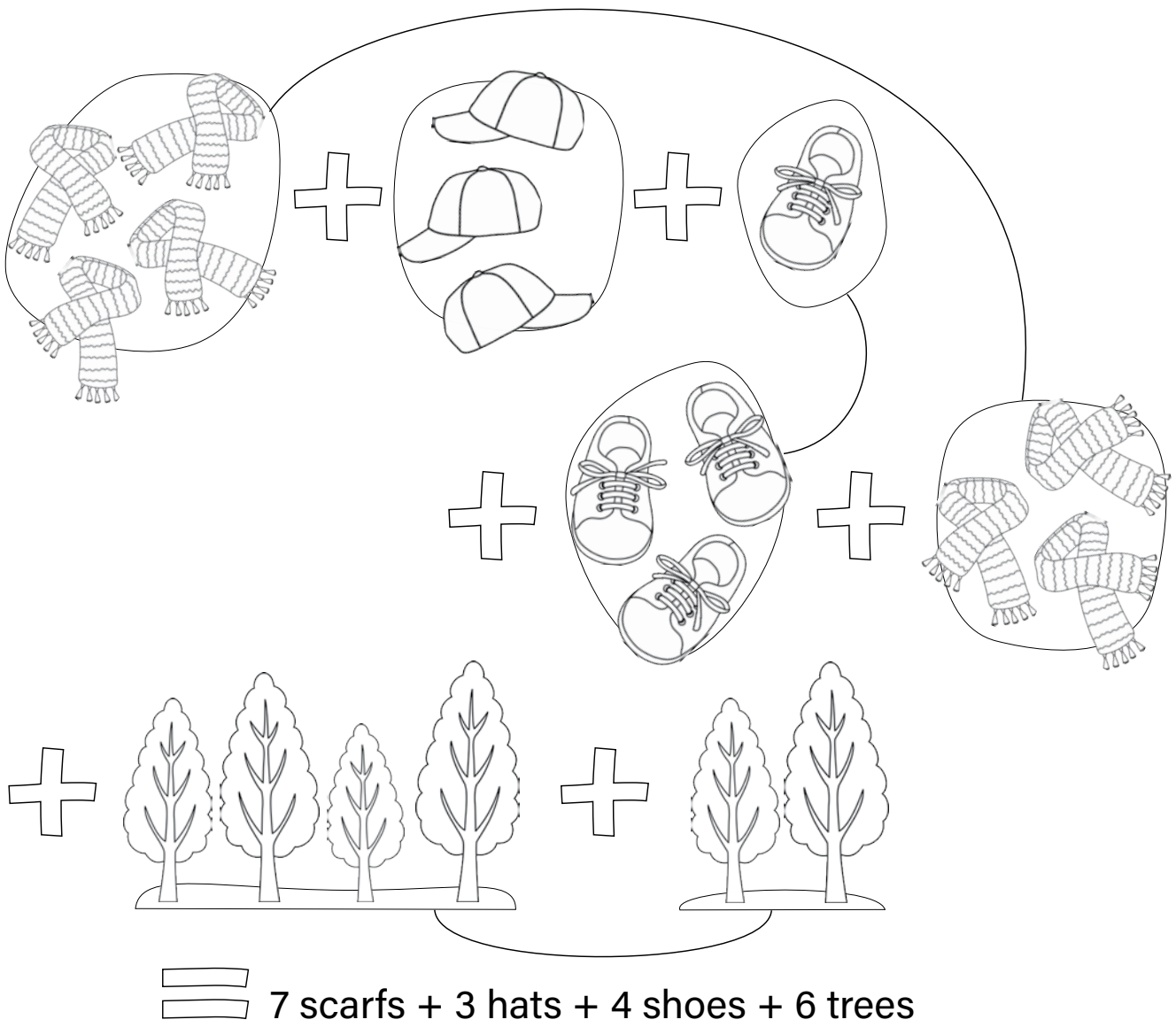


 7 trees + 2 hats

4) 3 trees + 2 shoes + 1 scarf



5) 4 scarfs + 3 hats + 1 shoe +
3 shoes + 3 scarfs + 4 trees + 2 trees



Level 2: Page 4

- 1) $3x + 6y = 3x + 6y$ (nothing simplifies)
- 2) $4a + 3a = 7a$
- 3) $6f + 5f = 11f$
- 4) $10c + 5d = 10c + 5d$ (nothing simplifies)
- 5) $6a + 7b + 2a + 3b$
 $(6a + 2a) + (7b + 3b)$
 $= 8a + 10b$
- 6) $8x + 2y + 5x + 3y - x$
 $(8x + 5x - x) + (2y + 3y)$
 $= 12x + 5y$
- 7) $4a + 2b + 5b + 7a - 1a - 3b$
 $(4a + 7a - 1a) + (2b + 5b - 3b)$
 $= 10a + 4b$

Level 2: Page 5

- 8) $9a + 1a = 10a$
- 9) $8b - 6d = 8b - 6d$ (nothing simplifies)
- 10) $10k + 5b = 10k + 5b$ (nothing simplifies)
- 11) $3v - 9v = 6v$
- 12) $5b - 7b + 8d + 1d$
 $(5b - 7b) + (8d + 1d)$
 $= 2b + 9d$
- 13) $9r + 4p - 2r + 6p + 7r$
 $(9r - 2r + 7r) + (4p + 6p)$
 $= 14r + 10p$

Level 3: Page 6

- 1) $3a + 2p + 10s + 1p + 2a + 4a + 2p + 5s$
 $(3a + 2a + 4a) + (10s + 5s) + (2p + 1p + 2p)$
 $= 9a + 15s + 5p$
WRITTEN ANSWER: The class has nine apples, fifteen strawberries and five pears to share.
- 2) $2x + 5y + 3z + 9y + 2x$
 $(2x + 2x) + (5y + 9y) + 3z$
 $= 4x + 14y + 3z$
- 3) $8a + 7b + 3c + 2a - 2b - 5d$
 $(8a + 2a) + (7b - 2b) + 3c - 5d$
 $= 10a + 5b + 3c - 5d$

- 4) $3m + 3m + 3m + 3m + 3m + 2c + 2c + 2c$
 $+ 2c + 1m + 1c - 10m$
 $(3m + 3m + 3m + 3m + 3m + 1m - 10m) +$
 $(2c + 2c + 2c + 2c + 1c)$
 $= 6m + 9c$

OR

$$* (5 \times 3m) + (4 \times 2c) + 1m + 1c - 10m$$

$$(15m + 1m - 10m) + (8c + 1c)$$

$$= 6m + 9c$$

WRITTEN ANSWER: There are six muffins and nine chocolates left at the party

* You can use multiplication for the 5 children who do the same.
 E.g. $5 \times 3m = 15m$ (so 15 muffins). And this is acceptable. However as we focussed only on adding like terms in this worksheet we have left it as addition and subtraction.