

Christmas Tree Puzzle 1

A number pyramid activity for pairs

What you will need

- One copy of this sheet per child/pair (**please note:** this is an A3 document and needs to be printed at 100%)
- Coloured pencils or pens
- Number rods (optional)
- Numicon Shapes (optional)

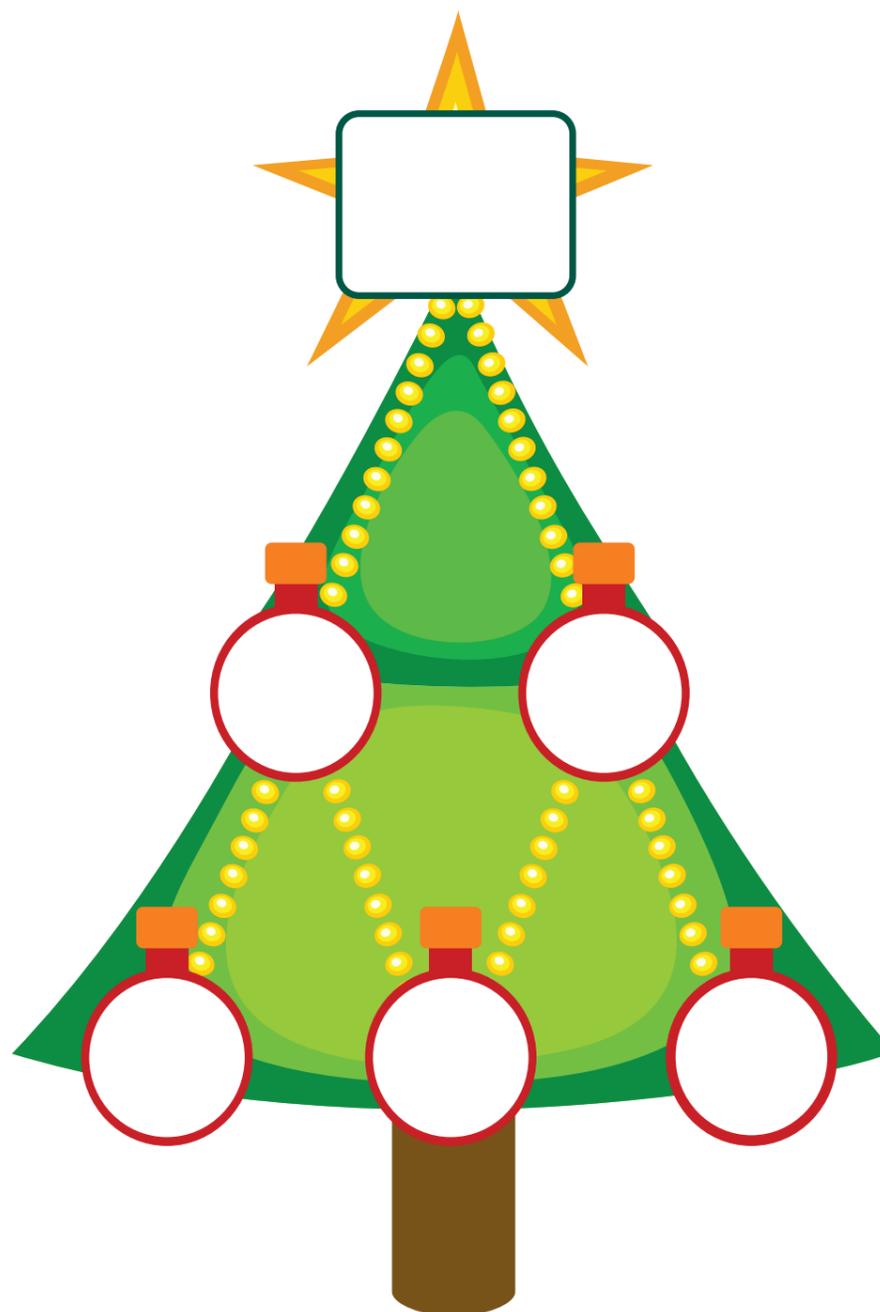
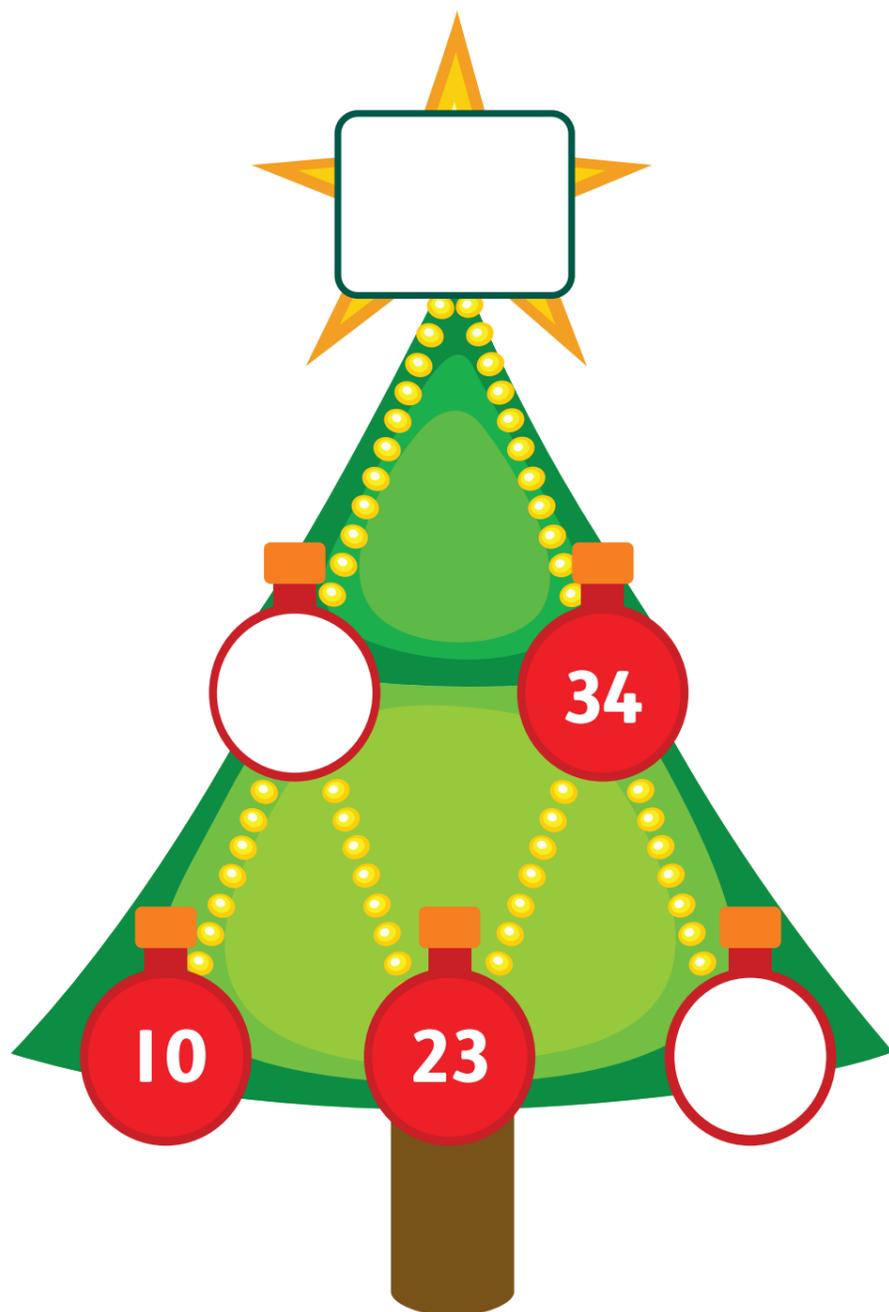
What to do

- Look at the Christmas tree. Each bauble has a number, but some are missing.
- Find the number on each bauble by adding the numbers on the two baubles below it. Can you fill in the numbers in all the baubles on the tree to find the total in the star? You can use the number rods or Numicon Shapes to help you.
- Discuss with your partner: where did you have to start and why?

Teacher Notes

Extensions and questions

- Using your own numbers in the baubles on the bottom row, can you make an even total in the star? Swap trees with your partner and check each other's numbers.
- Can you design your own tree, using the blank template? Design some questions and give them to your partner to complete.
- Using your own numbers in the baubles on the bottom row, what is the smallest total you can find for the star?
- Using your own numbers in the baubles on the bottom row, what is the largest total you can find for the star?



Christmas Tree Puzzle 2

A number pyramid activity for pairs

What you will need

- One copy of this sheet per child/pair (**please note:** this is an A3 document and needs to be printed at 100%)
- Coloured pencils or pens
- Number rods (optional)
- Numicon Shapes (optional)

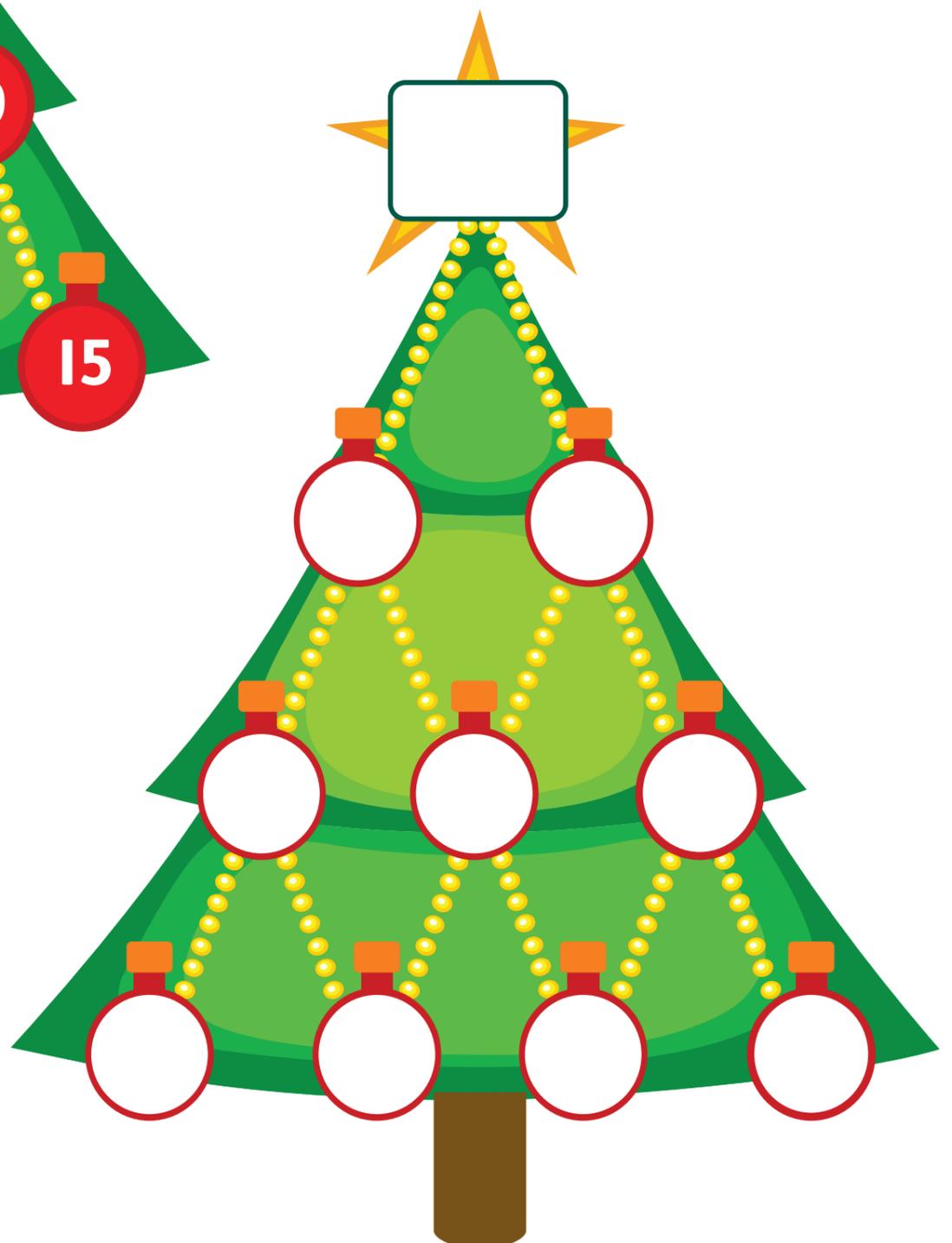
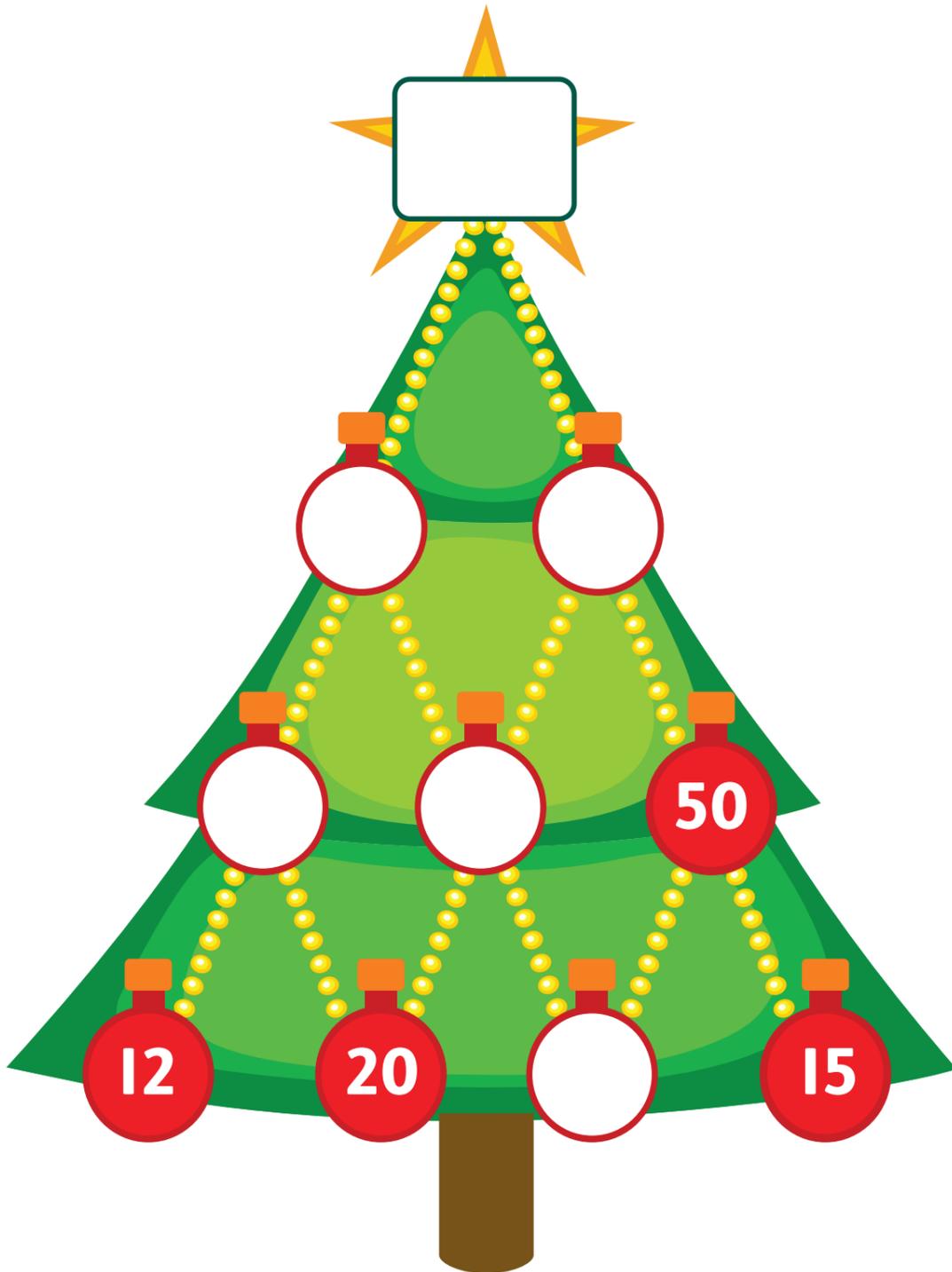
What to do

- Look at the Christmas tree. Each bauble has a number, but some are missing.
- Find the number on each bauble by adding the numbers on the two baubles below it. Can you fill in the numbers in all the baubles on the tree to find the total in the star? You can use the number rods or Numicon Shapes to help you.
- Discuss with your partner: where did you have to start and why?

Teacher Notes

Extensions and questions

- Using your own numbers in the baubles on the bottom row, can you make an even total in the star? Swap trees with your partner and check each other's numbers.
- Can you design your own tree? Design some questions and give them to your partner to complete.



Christmas Tree Puzzle 3

A number pyramid activity for pairs

What you will need

- One copy of this sheet per child/pair (**please note:** this is an A3 document and needs to be printed at 100%)
- Coloured pencils or pens
- Number rods (optional)
- Numicon Shapes (optional)

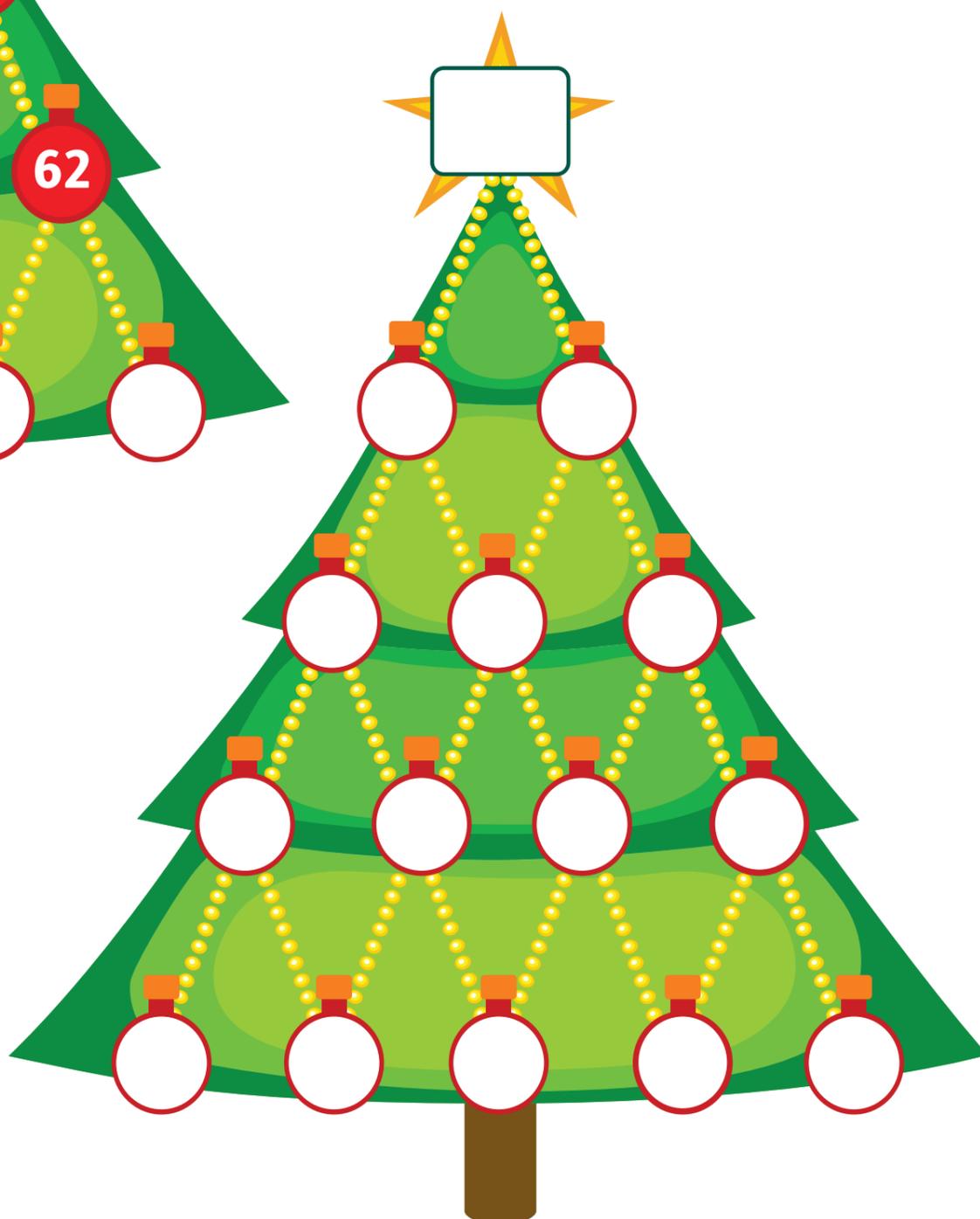
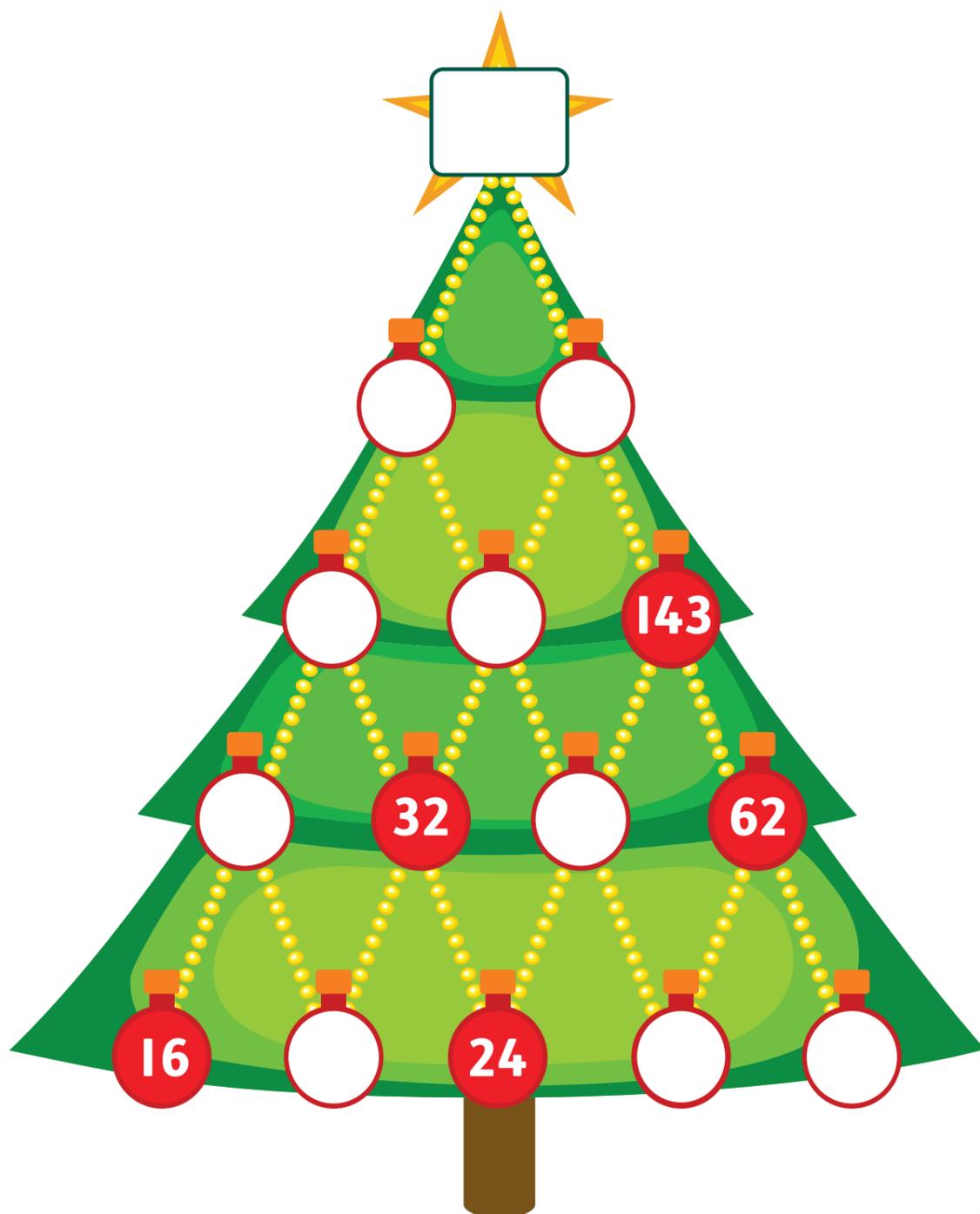
What to do

- Look at the Christmas tree. Each bauble has a number, but some are missing.
- Find the number on each bauble by adding the numbers on the two baubles below it. Can you fill in the numbers in all the baubles on the tree to find the total in the star? You can use the number rods or Numicon Shapes to help you.
- Discuss with your partner: where did you have to start and why?

Teacher Notes

Extensions and questions

- Using your own numbers in the baubles on the bottom row, can you make an even total in the star? Swap trees with your partner and check each other's numbers.
- If there are 3 odd numbers and 2 even numbers in the baubles on the bottom row, can you make an even total? What do you notice?
- Can you design your own tree, with more than 3 layers? Design some questions and give them to your partner to complete.
- Using your own numbers in the baubles on the bottom row, what is the smallest total you can find for the star?
- Using your own numbers in the baubles on the bottom row, what is the largest total you can find for the star?



Christmas Tree Puzzle Answers

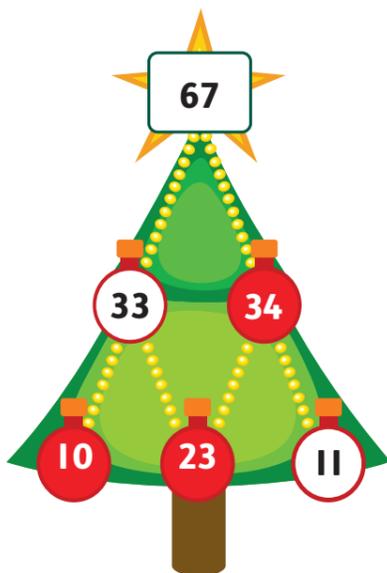
Christmas Tree Puzzle 1

What to do

- Numbers for all baubles are below.
- **Where did you have to start and why?** Answers may vary: either adding up $10 + 23 = 33$, or subtracting $34 - 23 = 11$. Children need to be able to explain that they can start where there are two numbers as part of a number trio, so that they can find the third by either adding or subtracting.

Extensions and questions

- **Can you make an even total in the star?** Children will need to start with all even numbers, or all odd numbers (which will add up to even numbers on the next row up). Look for children trying different combinations systematically. Encourage children to use Numicon Shapes to consolidate and support their understanding that two even numbers added together make an even number, that an even number and an odd number added together make an odd number and two odd numbers added together make an even number (i.e. $E + E \equiv E$, $E + O \equiv O$, $O + O \equiv E$).



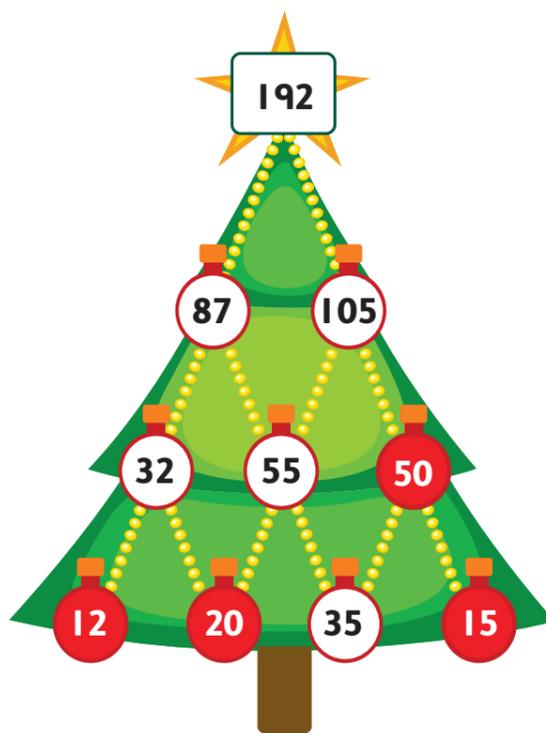
Christmas Tree Puzzle 2

What to do

- Numbers for all baubles are below.
- **Where did you have to start and why?** Answers may vary: either adding up $12 + 20 = 32$, or working out that you can find the empty bauble at the bottom of the tree by subtracting $50 - 15 = 35$. Children need to be able to explain that they can start where there are two numbers as part of a number trio, so that they can find the third by either adding or subtracting.

Extensions and questions

- **Can you make an even total in the star?** Children could start with all even numbers at the bottom, or (as in the original question) two Even and two Odd along the bottom (discuss how you need to arrange the odds and evens at the bottom to make an even total). Look for children testing possibilities and working systematically. Encourage them to use Numicon Shapes to consolidate and support their understanding of the rules for adding Odd and Even numbers (i.e. $O + O \equiv E$, $E + O \equiv O$, $E + E \equiv E$).
- **Design your own tree:** answers will vary. Look for children checking each other's work accurately.



Christmas Tree Puzzle 3

What to do

- Numbers for all baubles are below.
- **Where did you have to start?** Answers will vary: either subtract $32 - 24 = 8$, or subtract $143 - 62 = 81$. Then go backwards from 81 to work out the two missing baubles at the bottom. Start adding the numbers you've worked out to move up the tree to the star. **Why?** Reasons could include that explaining that they can start where there are two numbers as part of a number trio, so that they can find the third by either adding or subtracting. This means these are the only number trios you can work out based only on the red baubles. All the others are dependent on working out those first answers.

Extensions and questions

- **Using your own numbers, can you make an even total?** Children will either need to start with 5 even numbers at the bottom, or 5 odd numbers (which will add up to all even numbers on the next row up) or alternate odd and even numbers. Encourage children to use the Numicon Shapes to support their understanding of what happens when two odd numbers are added, two even numbers are added or an odd and an even number are added together (i.e. $O + O \equiv E$, $E + E \equiv E$, $E + O \equiv O$).
- **If there are 3 odd numbers (O) and 2 even numbers (E) in the baubles on the bottom row, can you make an even total?** Yes, you can make an even total, if you arrange them on the bottom row as $O E O E O$. **What do you notice?** You need to mix up the odd and even numbers, so that after adding them up a couple of times you can reach a row where all numbers are even. This will lead to an even total in the star.
- **Design your own tree:** encourage children to start with 3 or 4 layers of baubles if they needed more support with the What to do section. Answers will vary. Look for children checking each other's work accurately.
- **Finding the smallest/largest total using your own numbers:** encourage children to notice which numbers affect the total more (numbers in the middle of the bottom row, e.g. the 3 middle numbers if starting with 5 baubles at the bottom). For a 5-layer tree, the smallest possible total is 16 (starting from five 1s on the bottom row). The largest possible total depends on how large your starting numbers are. (You may wish to ask children to start with a maximum of 2 or 3 digits at the bottom, for example.) If starting with five 999s at the bottom, the total in the star will be 15 984.

