THIRD SPACE LEARNING

Christmas Tree Relay

Math Activity

6th to 8th Grade

Note to Teachers

Students work in pairs or groups of three and race to answer festive questions. Each correct answer wins one of the 12 pieces of the Christmas tree puzzle.

You will need

- A Christmas tree puzzle for each group, cut into 12 pieces
- Question cards and hint cards for each group, cut out
- A record sheet for each group

How to run it:

1. Keep the puzzle pieces and the question and hint cards on your desk. Clip each group's puzzle pieces to its cards so you can see which question, hint and piece each group needs next.
2. Give each group question 1. When they have an answer, one student brings it to you.
3. If the answer is correct, give the group the next question and a piece of the puzzle.
4. If the answer is wrong, give the group the hint card for that question and one more try. If they are wrong again, give them the next question.
5. Students complete the puzzle by answering 10 questions correctly. Questions 11 and 12 are there for groups that need extra chances.

Three relays that build in difficulty:

Relay	Best for	Topics
Candy Cane	6th grade	Percentages, rates, mean, ratio, angles, volume
Ornament	7th grade	Sale prices, LCM, scientific notation, speed, probability
Holly	8th grade and Algebra 1	Depreciation, combined ratios, independent events, systems of equations

The Common Core standard for each question is on the answer pages.

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The Rules

1. Work in pairs or groups of three.
2. You will be given a question to start. Work out the answer, then one person from your group takes it to the teacher.
3. If your answer is correct, you get the next question and a piece of the puzzle.
4. If your answer is wrong, you get a hint card and one more try. If you are wrong again, you get the next question.
5. There are 12 puzzle pieces to collect and up to 12 questions to try.
6. Answer 10 questions correctly to complete your Christmas tree!

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Record Sheet

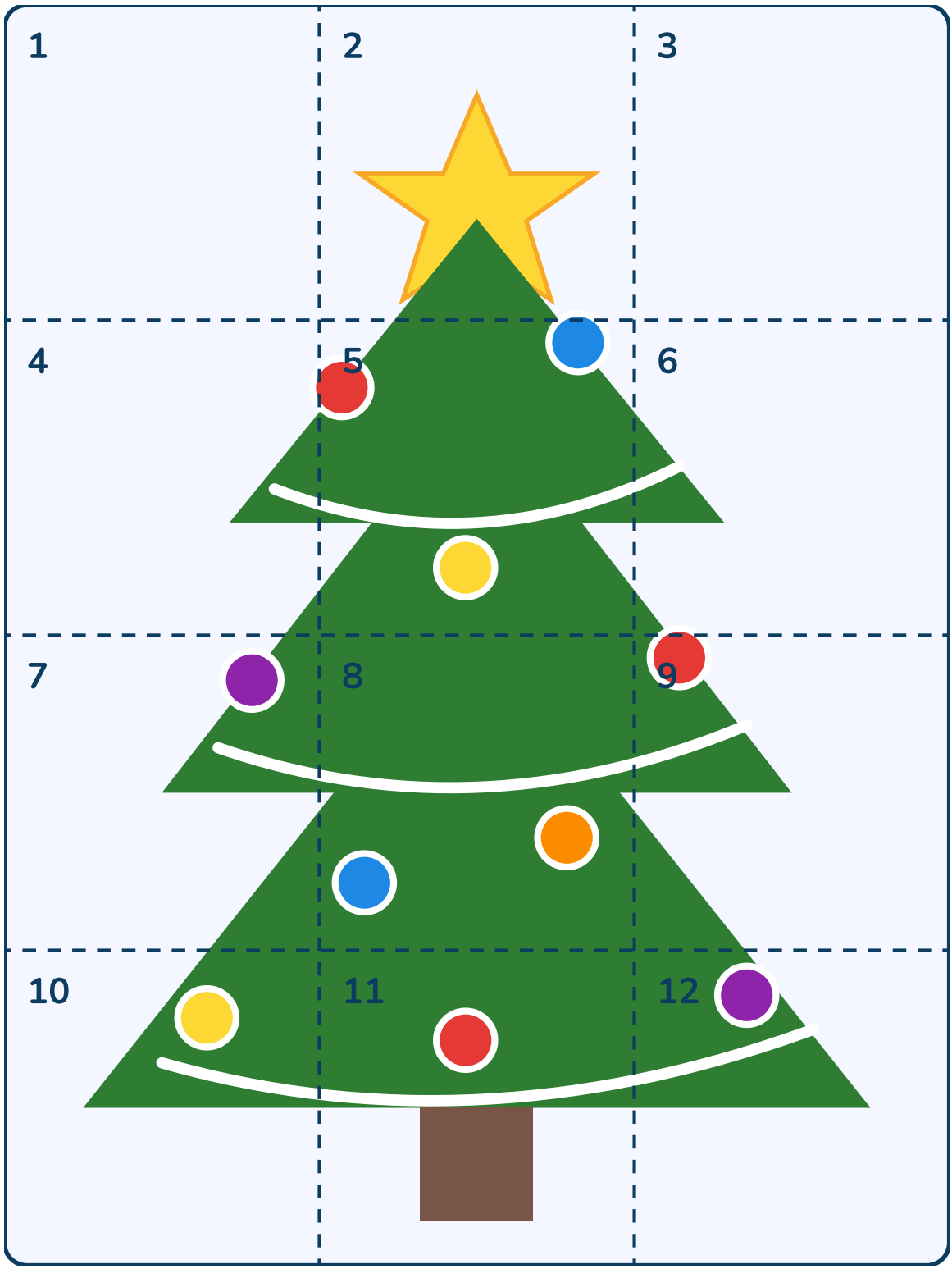
Team name: _____ **Relay:** Candy Cane / Ornament / Holly

1	2	3
4	5	6
7	8	9
10	11	12

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Christmas Tree Puzzle

Cut along the dashed lines to make 12 puzzle pieces.



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Candy Cane Relay: Questions 1 to 6

Candy Cane 1

In the Christmas sale, all prices are reduced by 15%. A TV costs $240. How much money will you save in the sale?

Candy Cane 2

Rudolph is given 4 reindeer treats every hour. How many treats will he have been given after 12 hours?

Candy Cane 3

It takes Santa's fastest elf 2.26 seconds to make a wooden train. How many seconds will it take the elf to make 1,000 wooden trains?

Candy Cane 4

Santa's sleigh flight from the North Pole to New York takes 7 hours 36 minutes. What is the flight time in minutes?

Candy Cane 5

The heights of six elves are 32 in, 20 in, 16 in, 16 in, 24 in and 12 in. What is the mean height?

Candy Cane 6

Mr. Claus bakes 12 Christmas tree cookies and 8 candy cane cookies. Write the ratio of Christmas tree cookies to candy cane cookies in simplest form.

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Candy Cane Relay: Questions 7 to 12

Candy Cane 7

The base of Santa's workshop is a triangle. Two of its angles are 58° and 72°. What is the size of the third angle?

Candy Cane 8

On Tuesday, Santa ate 1/8 of a Christmas cake. On Wednesday, he ate 3/8 of the same cake. How much of the cake has Santa eaten? Give your answer in simplest form.

Candy Cane 9

Annie wants to buy 16 candy canes for her Christmas tree. Each candy cane costs 28¢. How much will 16 candy canes cost?

Candy Cane 10

Eddie the elf has 10 Christmas sweaters: 3 have trees on them, 5 have candy canes and 2 have reindeer. Describe in words the probability that Eddie wears a candy cane sweater tomorrow.

Candy Cane 11

A present is a rectangular prism that measures 10 in by 2 in by 5 in. What is its volume?

Candy Cane 12

A toy train has a volume of 120 cubic inches. Each cubic inch of the wood weighs 0.5 ounces. How much does the train weigh?

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Candy Cane Relay: Hint Cards

Hint 1 What is 10% of $240? What is 5% of $240?	**Hint 2** Make a table: 1 hour = 4 treats, 2 hours = 8 treats...	**Hint 3** What is 2.26 × 1,000?
Hint 4 How many minutes are in an hour?	**Hint 5** Add the heights, then divide by the number of elves.	**Hint 6** Write the ratio 12 : 8, then divide both numbers by the greatest common factor.
Hint 7 What do the angles in a triangle add up to?	**Hint 8** Add the numerators, then simplify by dividing by the greatest common factor.	**Hint 9** What is 10 × 28? What is 6 × 28?
Hint 10 Use one of these words: impossible, unlikely, equally likely, likely, certain.	**Hint 11** Volume = length × width × height	**Hint 12** What is 120 × 0.5?

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Ornament Relay: Questions 1 to 6

Ornament 1

In the Christmas sale, all prices are reduced by 15%. A TV costs $240. What is the sale price of the TV?

Ornament 2

Brian the elf builds a doll every 8 seconds. Lisa the elf builds a doll every 12 seconds. They have just finished a doll at the same time. After how many seconds will they next finish a doll at the same time?

Ornament 3

Santa's elves have to make 940,000,000,000 toys each year. Write this number in scientific notation.

Ornament 4

Santa flew his sleigh about 3,410 miles from the North Pole to New York. The flight took 7 hours 45 minutes. What was the sleigh's average speed in miles per hour?

Ornament 5

The shortest elf in Class A is 15 in tall and the range of heights in Class A is 22 in. The shortest elf in Class B is 13 in tall and the range in Class B is 23 in. Find the range of heights for all the elves in both classes.

Ornament 6

Mrs. Claus has 150 cookies. The ratio of Christmas tree cookies to candy cane cookies is 7 : 3. How many candy cane cookies are there?

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Ornament Relay: Questions 7 to 12

Ornament 7

The base of Santa's workshop is a trapezoid. Three of its angles are 95°, 85° and 110°. What is the size of the fourth angle?

Ornament 8

Lizzie the elf has 3/4 of a quart of hot cocoa in her flask. She pours some into her mug and now has 2/5 of a quart left. How much did she pour? Give your answer in simplest form.

Ornament 9

Jack has $20 to spend on boxes of holiday candy. Each box costs $1.65. He buys as many boxes as he can. How much change will he get?

Ornament 10

The probability that Eddie the elf wears a Christmas sweater to elf school is 0.75. What is the probability that he does not wear a Christmas sweater?

Ornament 11

A toy chest is a rectangular prism. It is 3 ft long, 1 1/2 ft wide and 2 ft tall. What is the volume of the toy chest?

Ornament 12

A present is a prism with a trapezoid cross section. The parallel sides of the trapezoid are 6 in and 10 in, and its height is 4 in. The present is 5 in long. What is its volume?

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Ornament Relay: Hint Cards

Hint 1 In a sale, do prices go up or down? Find 15% first.	**Hint 2** What is the least common multiple of 8 and 12?	**Hint 3** Write it as a number between 1 and 10 multiplied by a power of 10.
Hint 4 Write 7 hours 45 minutes in hours first. Speed = distance ÷ time	**Hint 5** What is the height of the tallest elf in each class?	**Hint 6** How many parts are there in the ratio 7 : 3 altogether?
Hint 7 What do the angles in a quadrilateral add up to?	**Hint 8** Find a common denominator for 4 and 5.	**Hint 9** How many boxes can Jack buy for $20 or less?
Hint 10 What do the probabilities of all the outcomes add up to?	**Hint 11** Volume = length × width × height	**Hint 12** Find the area of the trapezoid, then multiply by the length.

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Holly Relay: Questions 1 to 6

Holly 1

Santa buys a new sleigh for $240,000. Its value goes down by 3% each year. What is the sleigh worth after 4 years? Give your answer to the nearest dollar.

Holly 2

Rudolph thinks of two numbers. Their greatest common factor is 5. Their least common multiple is a multiple of 12. Write down two numbers Rudolph could be thinking of.

Holly 3

Santa's elves make 4.2×10^7 bikes and 5.7×10^7 scooters each year. How many bikes and scooters do they make altogether? Give your answer in scientific notation.

Holly 4

Santa's sleigh flew 18,000,000 feet in 465 minutes. What was its average speed in miles per hour? Give your answer to the nearest whole number. (1 mile = 5,280 feet)

Holly 5

There are 10 boy elves and 20 girl elves in a class. The mean quiz score for the whole class is 60. The mean score for the girl elves is 54. What is the mean score for the boy elves?

Holly 6

The ratio of Christmas tree cookies to candy cane cookies is 3 : 1. The ratio of candy cane cookies to snowman cookies is 2 : 3. Write the ratio of Christmas tree to candy cane to snowman cookies.

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Holly Relay: Questions 7 to 12

Holly 7

Joe spends 1/3 of his allowance on a present for his mom and 25% on a present for his dad. What fraction of his allowance is left?

Holly 8

The probability that Eddie the elf wears a Christmas sweater is 0.8. The probability that he wears Christmas socks is 0.3. The two events are independent. What is the probability that he wears at least one of them?

Holly 9

A Christmas sweater for Santa costs $65.50. A junior elf has saved $14.50. Mrs. Claus pays $19.99 toward it and lends the elf the rest. The elf pays back $1.80 a week. How many whole weeks will it take to pay Mrs. Claus back?

Holly 10

A toy chest measures 30 in by 20 in by 32 in. Each present is a cube 6 in on each side. Ronny the elf has 100 presents. Can he fit all 100 presents in the toy chest? Explain your answer.

Holly 11

The base of Santa's workshop is a regular hexagon. What is the size of each interior angle?

Holly 12

Santa buys 3 sleds and 2 dolls for $95. He buys 1 sled and 4 dolls for $65. How much does one sled cost, and how much does one doll cost?

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Holly Relay: Hint Cards

Hint 1 What do you multiply by for a 3% decrease? Do this 4 times.	**Hint 2** If two numbers have a GCF of 5, what must they both be multiples of?	**Hint 3** The powers of 10 are the same, so add the first parts.
Hint 4 Change the feet to miles and the minutes to hours first.	**Hint 5** Work out the total score for the whole class, then the total for the girls.	**Hint 6** Make the number of candy cane cookies the same in both ratios.
Hint 7 What is 25% as a fraction?	**Hint 8** Find the probability that he wears neither, then subtract it from 1.	**Hint 9** How much does the elf need to borrow from Mrs. Claus?
Hint 10 How many presents fit along each edge of the chest?	**Hint 11** Split the hexagon into 4 triangles from one corner.	**Hint 12** Write two equations, then multiply the second one by 3.

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Candy Cane Relay: Answers

Best for 6th grade.

#	Answer	Standard
1	**$36**	6.RP.A.3c
2	**48 treats**	6.RP.A.3b
3	**2,260 seconds**	5.NBT.A.2
4	**456 minutes**	6.RP.A.3d
5	**20 inches**	6.SP.B.5c
6	**3 : 2**	6.RP.A.1
7	**50°**	8.G.A.5
8	**1/2**	5.NF.A.1
9	**448¢ or $4.48**	6.NS.B.3
10	**Equally likely (a 1 in 2 chance)**	7.SP.C.5
11	**100 cubic inches**	6.G.A.2
12	**60 ounces**	6.RP.A.3b

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Ornament Relay: Answers

Best for 7th grade.

#	Answer	Standard
1	**$204**	7.RP.A.3
2	**24 seconds**	6.NS.B.4
3	**9.4×10^{11}**	8.EE.A.3
4	**440 mph**	7.RP.A.1
5	**24 inches**	6.SP.B.5c
6	**45 cookies**	6.RP.A.3
7	**70°**	7.G.B.5
8	**7/20 of a quart**	5.NF.A.1
9	**$0.20 (he buys 12 boxes)**	7.EE.B.3
10	**0.25**	7.SP.C.5
11	**9 cubic feet**	6.G.A.2
12	**160 cubic inches**	7.G.B.6

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Holly Relay: Answers

Best for 8th grade and Algebra 1.

#	Answer	Standard
1	**$212,470**	HSF.LE.A.2
2	**For example, 15 and 20, or 5 and 60**	6.NS.B.4
3	**9.9×10^7**	8.EE.A.4
4	**440 mph**	7.RP.A.3
5	**72**	6.SP.B.5c
6	**6 : 2 : 3**	7.RP.A.2
7	**5/12**	7.NS.A.3
8	**0.86**	7.SP.C.8
9	**18 weeks**	7.EE.B.3
10	**No: only $5 \times 3 \times 5 = 75$ presents fit**	6.G.A.2
11	**120°**	7.G.B.5
12	**Sled $25, doll $10**	8.EE.C.8

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Michelle Craig, Instructional Coach,
Sherwood Forest Elementary, Washington

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