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STOP BY AND SAY HI!



12 DAYS OF CHRISTMAS PROBLEM SOLVING

The 12 Days of Christmas offers a fun way to connect your classroom holiday sing-a-long with fantastic math concepts.

Start out by asking middle grade students - *have you ever wondered how many gifts in total were received?*

Many will immediately work on adding them up this way:

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

Although this is not going to produce the true answer, it can be a great opportunity to reinforce finding sums of 10.

By counting the ten made $(1 + 9) + (2 + 8) + (3 + 7)$, and $(4 + 6)$ and adding the remaining numbers $(+5, +10, +11, +12)$, the sum of 78 can be determined fairly quickly.

That's quite a heap of presents! However, you might ask, "Is this really what the song says - that one gift is given each day?" After a closer look at the lyrics, students will see that on the second day, it appears that the "true love" gives three gifts- two turtle doves and another partridge in a pear tree!

Now the math fun really begins! Ask students to list the days and the number of presents given! Have them predict the grand total before actually doing the figuring.

Day 1 - 1 gift

Day 2 - 3 gifts

Day 3 - 6 gifts

Day 4 - 10 gifts and so on.

This song is "super mathy" with patterns galore! Ask students to see if they notice any patterns as they figure the gifts. They might see this one:

Day 1 : 1

Day 2 : 3 $(1 + 2)$

Day 3 : 6 $(1 + 2 + 3)$

Day 4 : 10 $(1 + 2 + 3 + 4)$

Recognizing patterns in math is the basis of all kinds of more advanced work. Some students might notice the numbers of gifts received are all "triangular numbers," numbers that can be formed by dots in triangles.

When students have a chance to work with the new sums, then total them, they should find that the grand total of all gifts received is 364!

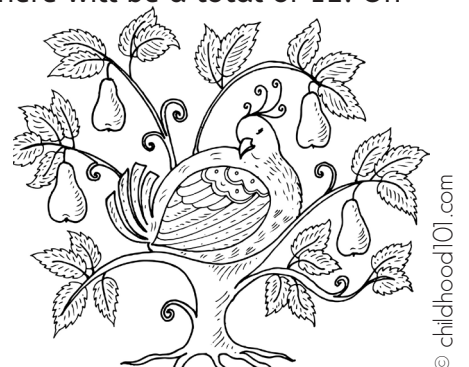
For older students, additional questions can lead to more discoveries. For example:

Which gifts will total a dozen by the end of the song?

Partridges and drummers (Each day, one partridge will be given so there will be a total of 12. On just one day, Day 12, a dozen drummers will be given.)

Of the 364 gifts, which ones will be given in the greatest numbers?
Geese and swans - (6 geese will be given a total of 7 days for a total of 42 geese; 7 swans will be given 6 out of the twelve days for a total of 42 swans).

Finally, challenge students to calculate how many gifts would be received if the pattern continued for 30 days.



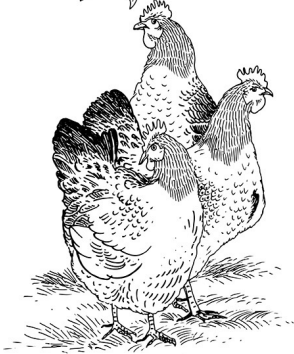
12 DAYS OF CHRISTMAS PROBLEM SOLVING



On the first day of Christmas,
My true love gave to me
A partridge in a pear tree.



On the second day of Christmas,
My true love gave to me
Two turtle doves
and a partridge in a pear tree.



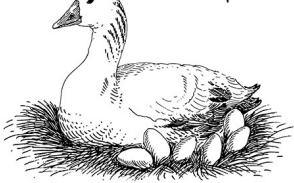
On the third day of Christmas,
My true love gave to me
Three French hens,
two turtle doves
and a partridge in a pear tree!



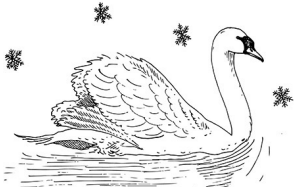
On the fourth day of Christmas,
My true love gave to me
Four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!



On the fifth day of Christmas,
My true love gave to me
Five golden rings.
four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!



On the sixth day of Christmas,
My true love gave to me
Six geese a-laying,
five golden rings.
four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!



On the seventh day of Christmas,
My true love gave to me
Seven swans a-swimming,
six geese a-laying,
five golden rings.
four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!



On the eighth day of Christmas,
My true love gave to me
Eight maids a-milking,
seven swans a-swimming,
six geese a-laying,
five golden rings.
four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!

On the ninth day of Christmas,
My true love gave to me
Nine ladies dancing,
eight maids a-milking,
seven swans a-swimming,
six geese a-laying,
five golden rings.
four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!

On the tenth day of Christmas,
My true love gave to me
Ten lords a-leaping,
nine ladies dancing,
eight maids a-milking,
seven swans a-swimming,
six geese a-laying,
five golden rings.
four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!

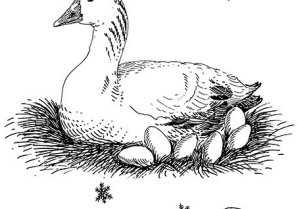
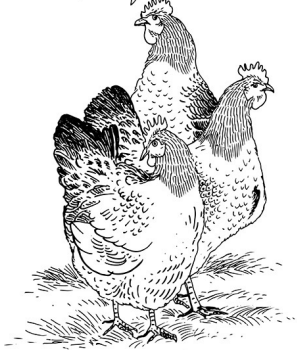
On the eleventh day of Christmas,
My true love gave to me
Eleven pipers piping,
ten lords a-leaping,
nine ladies dancing,
eight maids a-milking,
seven swans a-swimming,
six geese a-laying,
five golden rings.
four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!

On the twelfth day of Christmas,
My true love gave to me
Twelve drummers drumming,
eleven pipers piping,
ten lords a-leaping,
nine ladies dancing,
eight maids a-milking,
seven swans a-swimming,
six geese a-laying,
five golden rings.
four calling birds,
three French hens,
two turtle doves
and a partridge in a pear tree!

12 DAYS OF CHRISTMAS PROBLEM SOLVING

Directions: First estimate, and then calculate, how many gifts in total the songwriter received in the 12 Days of Christmas song. Show your working out.

My estimate:



Total number of gifts received:



12 DAYS OF CHRISTMAS PROBLEM SOLVING

Directions: Record the number of gifts received for each day as a number sentence.

First day	Seventh day
Second day	Eighth day
Third day	Ninth day
Fourth day	Tenth day
Fifth day	Eleventh day
Sixth day	Twelfth day

What patterns do you see in the numbers?

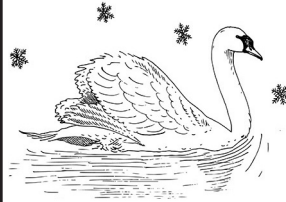
12 DAYS OF CHRISTMAS PROBLEM SOLVING

Directions: Calculate how many of each gift were received in total.

Partridge in a pear tree



Swans a-swimming



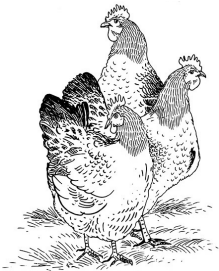
Turtle doves



Maids a-milking



French hens



Ladies dancing



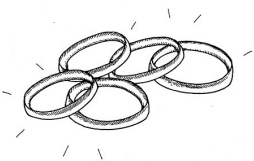
Calling birds



Lords a-leaping



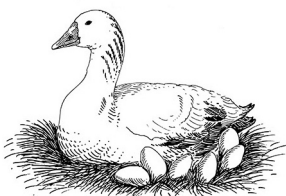
Golden rings



Pipers piping



Geese a-laying



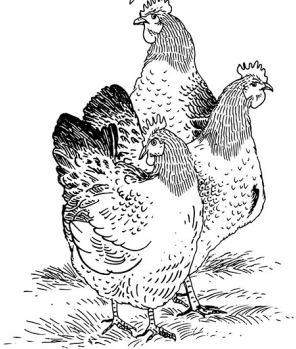
Drummers drumming



12 DAYS OF CHRISTMAS PROBLEM SOLVING CHALLENGE QUESTIONS



Which gifts will total a dozen by the end of the song?



Of all the gifts, which ones will be given in the greatest total numbers?



If my true love continued to give me presents in this same pattern for 30 days, what would the total number of gifts be?

