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Family-School Partnership to Promote Mathematics for Deaf Children

Support: NDCS / RNID / BATOD / Harris Manchester College /University of Oxford

Teacher notes

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AN EARLY INTERVENTION TO IMPROVE DEAF CHILDREN'S MATHEMATICS LEARNING

General principles we used in the intervention

1. The children should always be actively solving problems. Each one of them should produce an answer for every problem. They only discuss the answers after each one has answered the questions.
2. They should have manipulatives to help them all the time. They can use these when they need them even if in our booklet we do not specifically ask them to use materials.
3. Discussing their answers is an important part of learning. Both children who have right and wrong answers need an opportunity to demonstrate their thinking. Acting out word problems with materials helps them connect the word problems with real life and helps them show their reasoning.
4. Even when all the children have made mistakes, we don't need to tell them the answer. We can start a solution with the materials and then see whether they can continue it. Or we can pose another question – for example, show me the sweets she has now; show me the ones that her granny gave her; so how many did she have to begin with?
5. Sometimes the language may seem really tricky for deaf children. We tried to create opportunities for them to learn to be flexible in their use of language. For example, the word "more" is not always connected to addition: Anna has 8 sweets and Sharon had 5. How many more sweets does Anna have than Sharon? The children need to learn to use language flexibly because this is going to be part of their future learning too.
6. The aim of our problems is to encourage the children to reason. In the inverse addition-subtraction relation problems, they should be able to reason that if you add and take away the same number of bricks to a row, the number in the row does not change. This is why we let them count the initial row and then cover it.
7. In the word problems, they will be learning how to use counting in different ways to solve different types of problems. Here the logic that they see in the situation should guide the way they count. It is only later that they will connect these different ways of counting with calculating. But if they don't understand the logic of these situations, they will not understand the arithmetic operations later on.

This teacher handbook contains the problems in the same order that they appear in the children's booklets. The starting point of each session is also indicated. It is important that the activities are followed through without missing any out, or altering the order in which they are given.

The programme also includes games that the children can play on the web. Scroll down to find the games.

This project would not be possible without the support of the RNID and the NDCS. We are extremely grateful for their support and to the schools, teachers and children who helped us develop and evaluate the effectiveness of these materials.

Terezinha Nunes, Deborah Evans, Rossana Barros & Diana Burman

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Early mathematics intervention for deaf children

This workshop is sponsored by the NDCS

- The programme contains four components that provide children with a basis for learning mathematics:
  - Purple: Additive composition of number
  - Yellow: The inverse relation between addition and subtraction
  - Green: One-to-many correspondence reasoning
  - Orange: Addition and subtraction story problems

- Going along side these areas there are a set of board games for the children to play at school and to take home. In the first board game children throw dice to determine the number of steps that each player takes, as they can learn incidentally about numbers in two forms (dots and symbols) and the order of numbers. In the subsequent 4 board games children have further experience of the four components of this workshop.

- There are also computer games that children should play throughout the programme. These games can be found at http://www.education.ox.ac.uk/research/resgroup/cl/ndcs/index.php

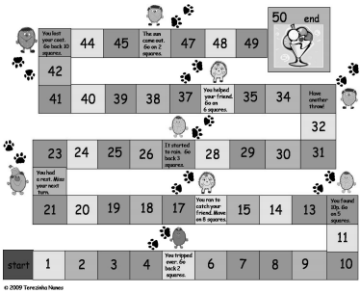
Maths session 1 BK 1

Child's name: _____

Date: _____

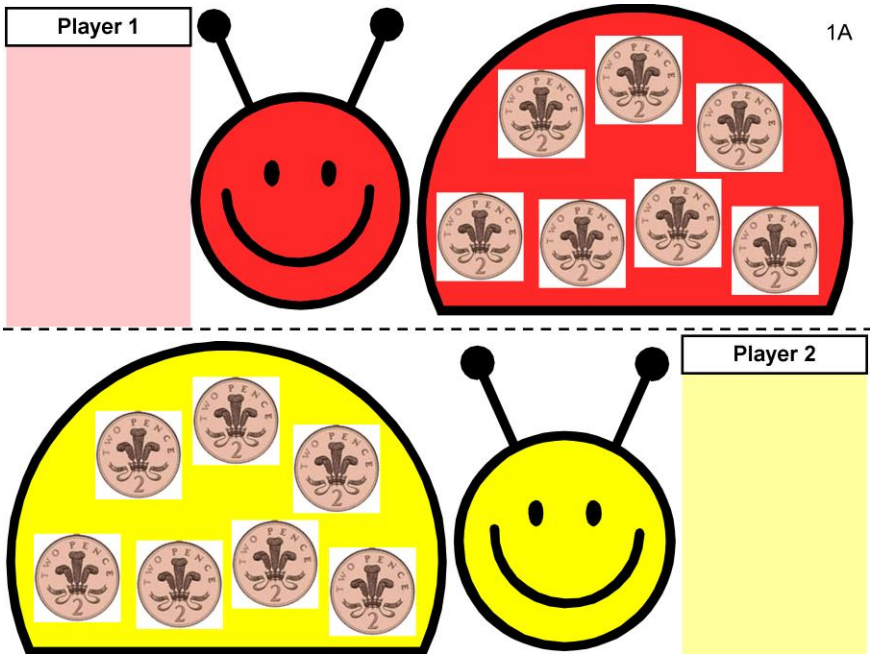
School:_____

Note:



It's time for the children to start playing Board game 1, 'The Monsters walk!' Also remind them to go to the Games corner at http://www.education.ox.ac.uk/research/resgroup/cl/ndcs/

**If you want to print more copies of the 5 board games you can find them at http://www.education.ox.ac.uk/research/resgroup/cl/ndcs/resources.html



PURPLE

Ladybird 2p spot activity for two players

You will need:

A dice

30 x 1p coins

16 x 2p coins

To play:

1.Children decide which ladybird they are going to try to fill with 2p's

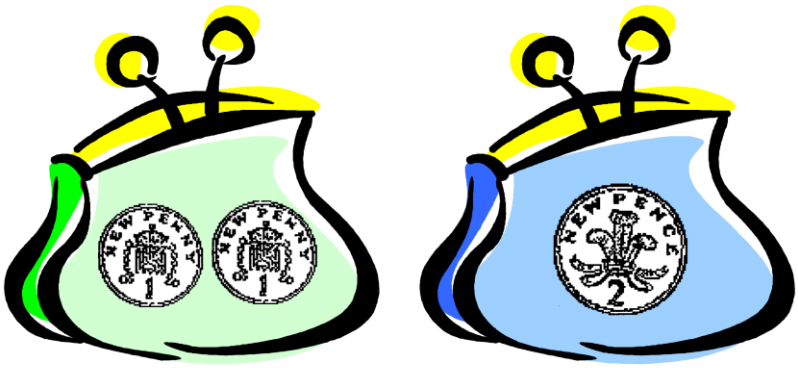
2.First child throws dice.

3.Child collects from central pile of 1p's the corresponding number of coins to that on the dice and puts them on her 'waiting area' on board.

4.Second child's throws dice and does the same.

5.From now on, when a child has 2 x 1p they can exchange it for a 2p coin which they put on a 2p spot on their designated side of the lady bird.

6.Their target is to fill the 2p spots on their ladybird by exchanging the 1p's for 2p's.



Put out 1 x 2p and 2 x 1p coins

Point to the purse on the left and ask the child ‘ How much is in this purse?’

Ask them to show with fingers how much is there.

If not sure, look on the coins for the number ‘1’ and say ‘Look, here is 1p’ and hold up 1 finger, ‘and here is 1p ‘ holding up another finger.

‘ How much is there altogether in the purse?’

Then point to the purse on the right and say ‘How much is in this purse?’ Ask the child to show with their fingers how much is there.

If they are unsure, ask them to look on the coin for the ‘2’ and get them to hold up the correct number of fingers.

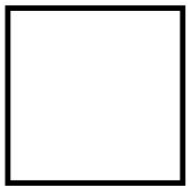
‘So, how much was in the 1st purse?

How much is in the second purse?

Does one purse have more money in than the other purse or not? ’(BSL: Are they the same or different?)

If child incorrect, repeat with number of fingers held up for each purse and get them to compare the 2 fingers on one hand and the two on the other.

‘So, there is 2p in this purse, and 2p in that purse, but one has a 2p and the other has 2 x 1p’s, but it is the same amount in each.’



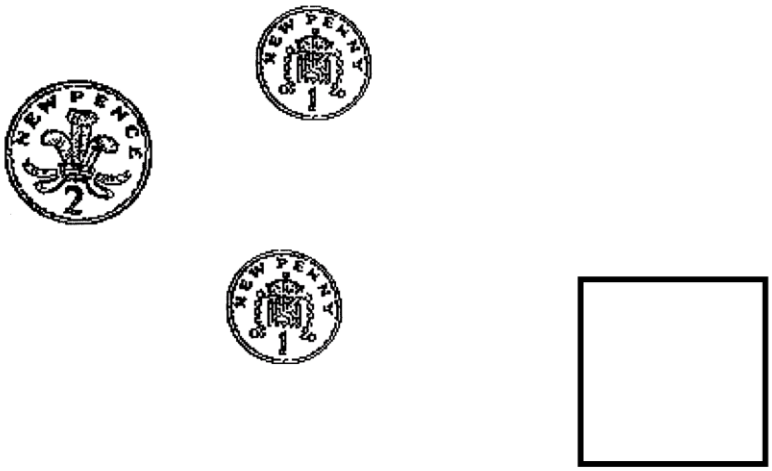
Put out 1 x 2p and 1 x 1p.

Ask ‘How much money is here?’

If they are not sure ask them how much the biggest coin is worth and to hold up the corresponding number of fingers (2) .

Then how much the smaller coin is worth(1) and to hold up that number of fingers and then ask, if they have 2, how much it is if they add one more (3), encouraging them to count on from 2.

Ask the child to write the number in the box on the page.



Put out 1 x 2p and 2 x 1p.

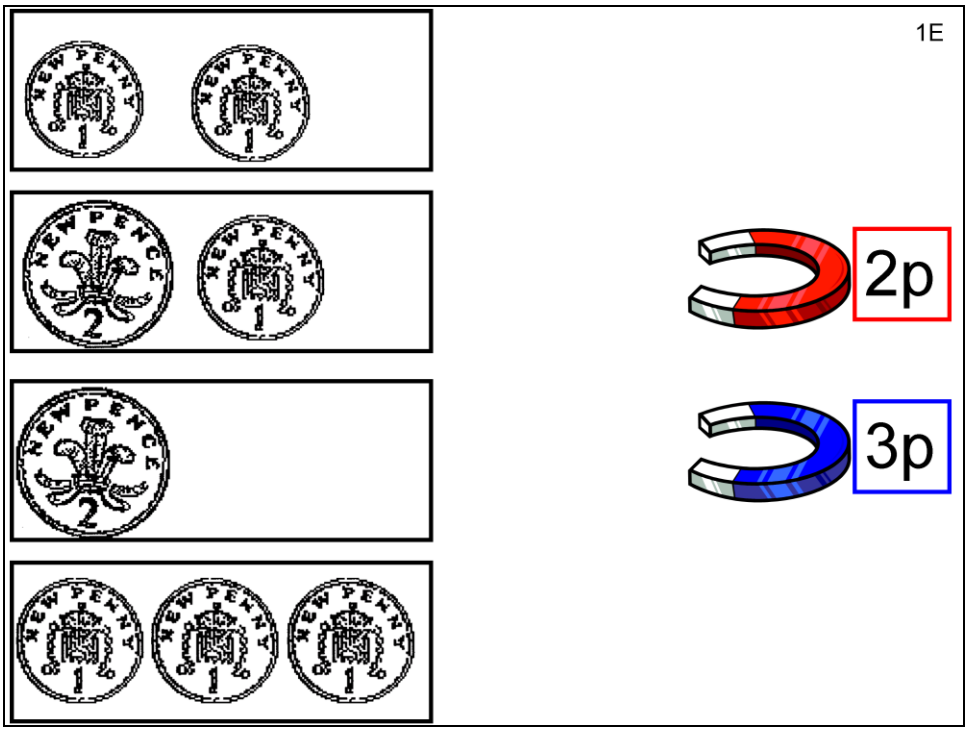
Ask the child ‘How much money is here?’

If the child is nor sure, ask them to look at the biggest coin and hold up the number of fingers that coin is worth.

If unsure get them to look for the ‘2’.

Then ask them to look at the smaller coins and hold up the number of fingers for each of them and see how much the 3 coins make altogether. Encourage them to **count on** from the 2p, saying ‘2…….3…….,4’

Ask them to write the number in the box on the page.



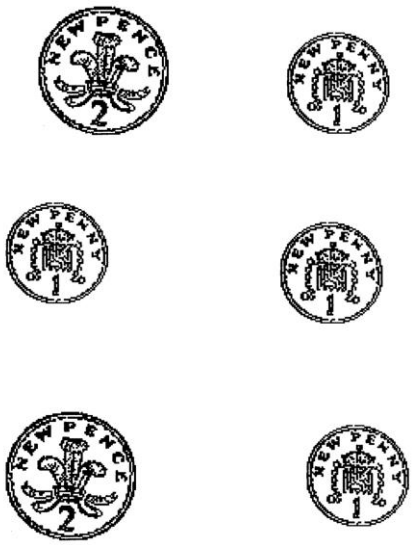
Have available for the child 2 x 2p, 6 x 1p

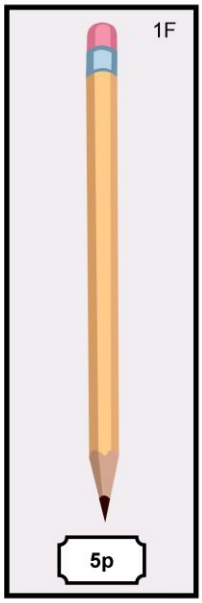
Ask the child to match the amount on the left with a line of coins on the right which total the same amount .

Ask the child to draw a line to connect them.

Check for more than one way.

They will notice that for each amount there are two ways of making that amount, so they could lay out each of the combinations and discuss to reinforce the idea of equivalent amounts.





Put out 2 x 2p and 4 x 1p

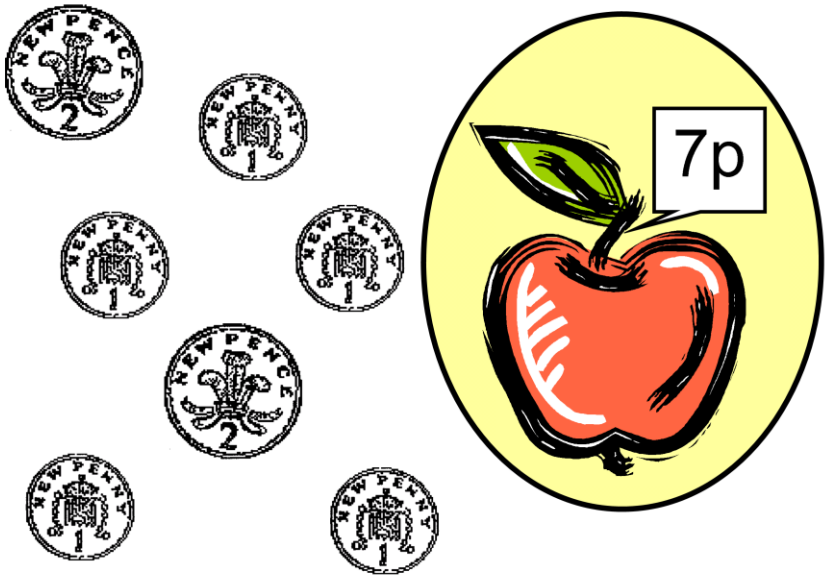
Ask the child: ‘How could you make 5p to buy the pencil? Show me with the coins’.

They have to incorporate at least one 2p.

If they try to use all 1p’s they will not have enough.

Encourage them to say the amount of the larger coin (2) and hold up fingers if stuck and count on with the 1p’s or the 2p according to which coins they choose.

When they have made their 5p, ask them to tick the coins on the page which they used.

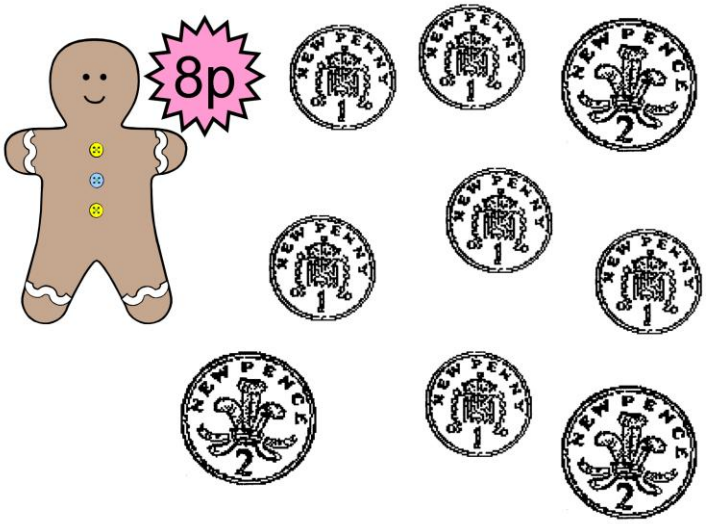


Put out 2 x 2p and 5 x 1p.

Ask the child:' The apple costs 7p. Which coins could you use to pay for the apple?'

If the child tries to use all 1p's they will not have enough. They will need to use at least 1 x 2p.

If they are stuck, encourage them to say the amount of the larger coin (2p) and show with fingers and then to count on with the coins until they reach 7p. They may chose to use the other 2p as well.



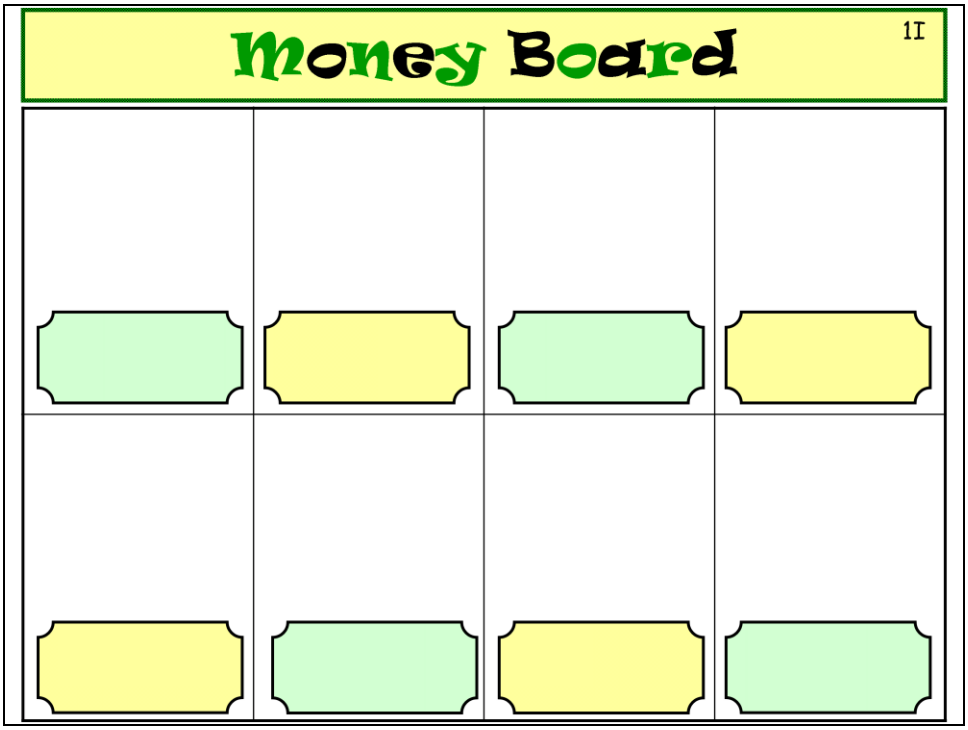
Put out 3 x 2p and 6 x 1p.

Ask the child ‘ If the gingerbread man costs 8p, which coins would you give to the shopkeeper to pay 8p?’

If they try to use all 1p’s they will find that they do not have enough.

If they are stuck encourage them to say the amount of the larger coin (2p) and show with their fingers, and count on from there, either with 1p’s or they might choose 2p’s.

At the end ask the child to tick the coins they chose to make the 8p.



Money Board activity

This base board can be used to give children practice at making amounts with coins or at counting amounts put out by the teacher.

You will need:

Base board for each child

20 x 1p and 10 x 2p coins (plus 5p's, 10p's etc if you are doing this later in the intervention with higher value coins)

Dry wipe marker pen and cloth

To Play:

Activity 1

Write an amount in each box, for example 3p, 5p , then ask the child to lay out coins to match the amount written. If they lay out 3 x 1p for 3p, ask them if they can think of a different way of making that amount in the box next to it.

Activity 2

Lay out different combinations of coins in each of the squares, and ask the child to write in the box how much money is in each square,

e.g. 3 x 1p

1 x 2p + 1 x 1p

Inversion

This series of tasks aims to get the children to think about the inverse relation between addition and subtraction.

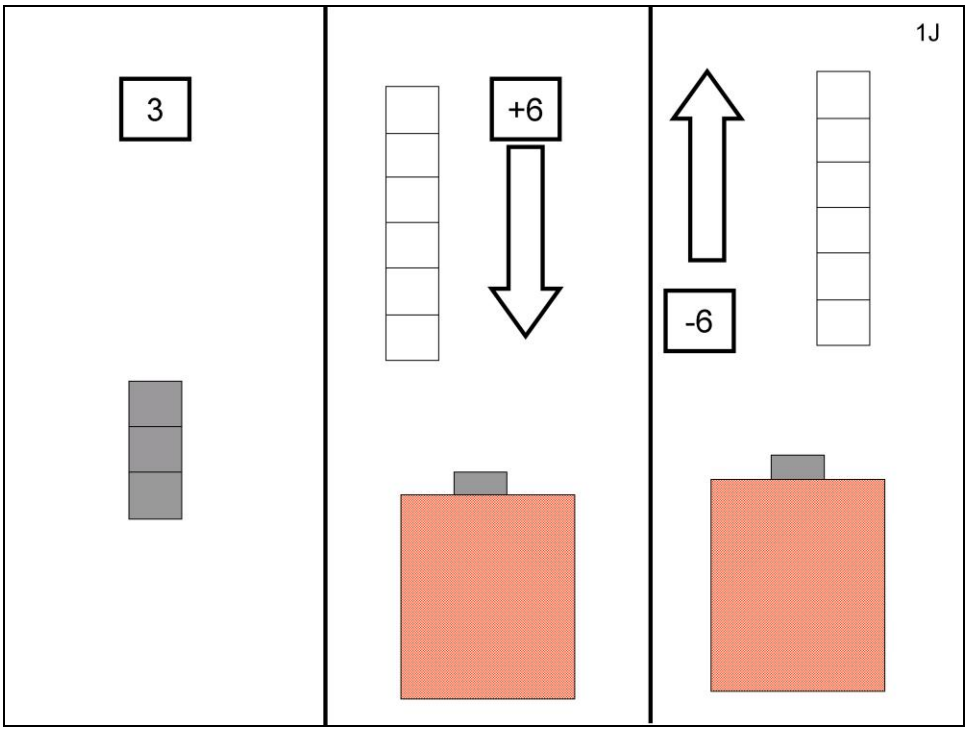
The first set of items is presented by showing the children a row of bricks, that they count. Then we cover the row, so that they can no longer count, and add and subtract bricks to this initial row. When the children make a mistake, we uncover the row and ask them to count the bricks in the row.

In the first items and some others later on, they have a visual cue: we add bricks of a different colour and take the same ones away – this type of item is identified as “different colour, same end”. Later, we remove the colour cues and also take the bricks from the opposite end of the row.

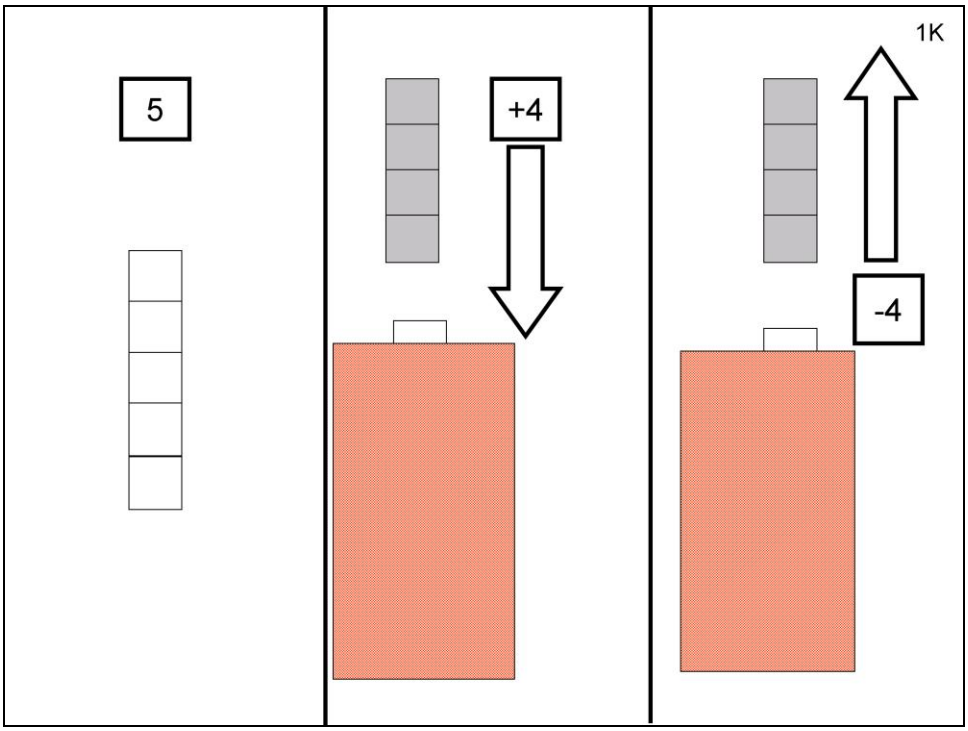
At the end of this session, there are some items that use pictures of boxes or bags and of objects – pencils, cards, bottles. You can use these pictures to show what happened – how many were put in first, how many added, and how many taken away. In later sessions, the tasks that are about materials will be told like stories and you have cards that show the stories through pictures.

For all these items, the children just write their answers on a single page.

YELLOW

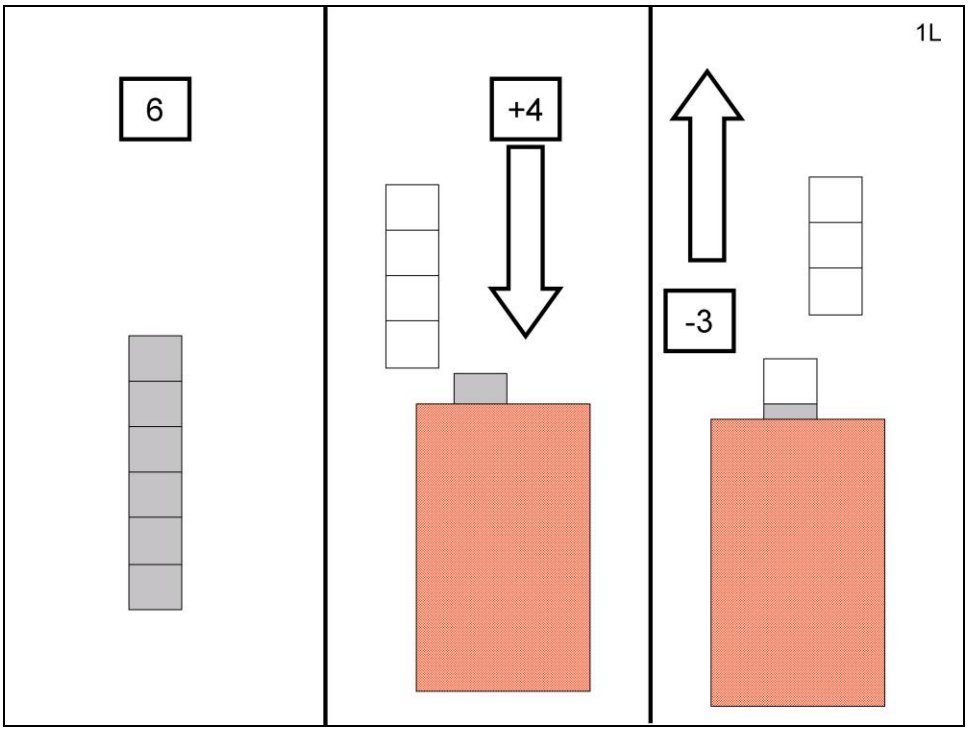


Make a row with 3 bricks and let the child count these. Put them under a cloth leaving one end of the row visible. Add 6 bricks of a different colour to that end as you say: I add six yellow ones (or whatever colour you are adding). Then take the same 6 bricks away and say: I take away 6 yellow ones (we don't show same that these are the same, we only refer to the number and the colour). How many bricks are in the row now?



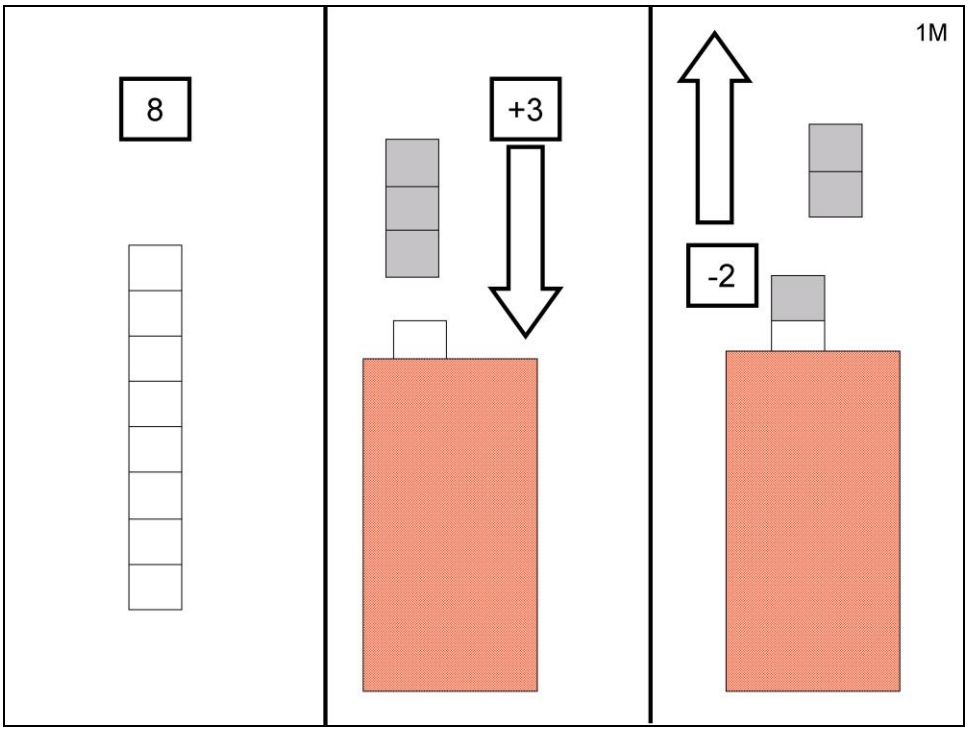
Follow the same routine as before, letting the child count the bricks in the initial row. The bricks added and taken away are of a different colour. The same bricks that are added are taken away.

Cover the row and tell the child what you are doing: I am adding 4 yellow ones (or whatever colour you are adding) and taking 4 yellow ones out. How many bricks are in the row now altogether?



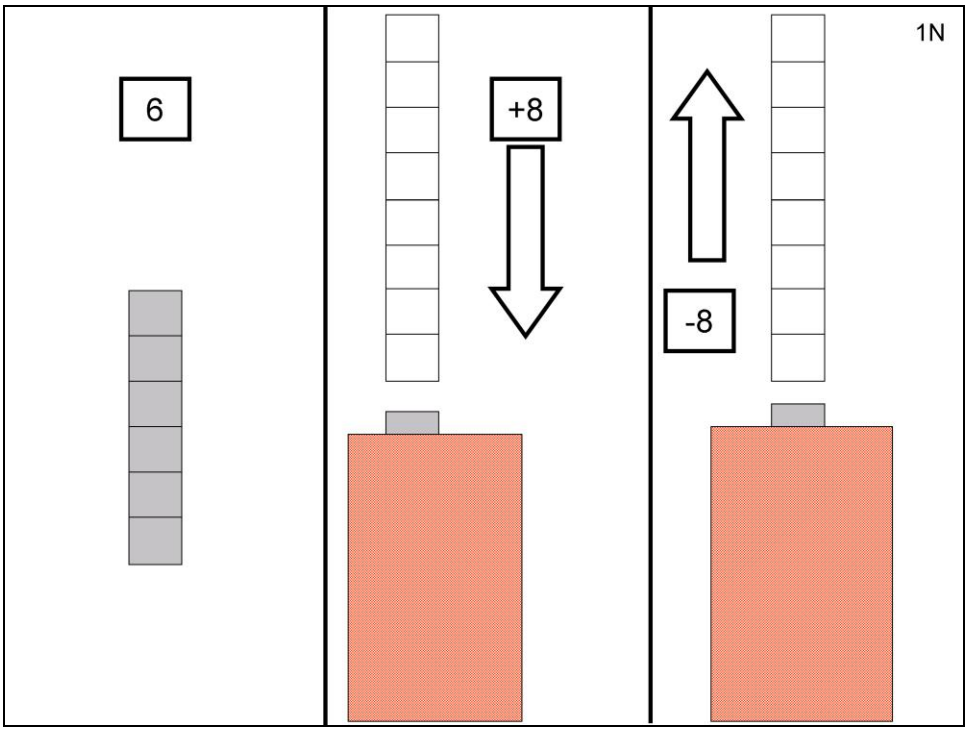
Follow the same procedure. Add 4 bricks of a different colour and take 3 of these away. The child should be able to see that one brick was left because it is of a different colour. But now the answer is not the same number of bricks that were in the row so the child has to think more about this.

I am adding 4 yellow ones (or whatever colour you are adding) and taking 3 yellow ones out. How many bricks are in the row now altogether?



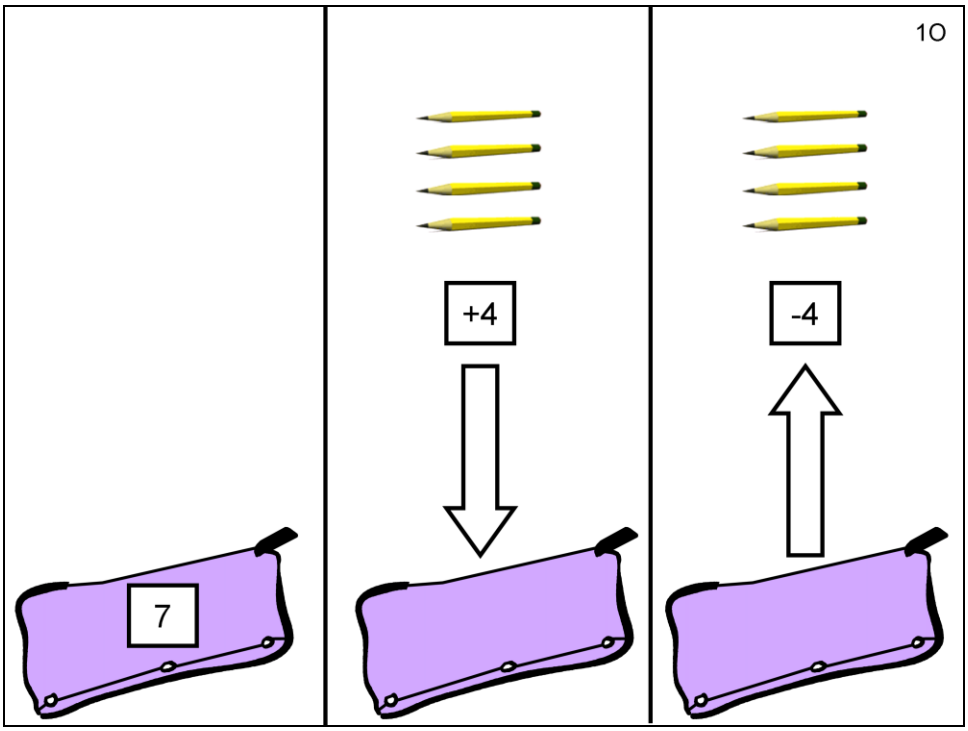
Same routine. The bricks added are still of a different colour. This time you add 3 and take 2 away.

I am adding 3 yellow ones (or whatever colour you are adding) and taking 2 yellow ones out. How many bricks are in the row now altogether?



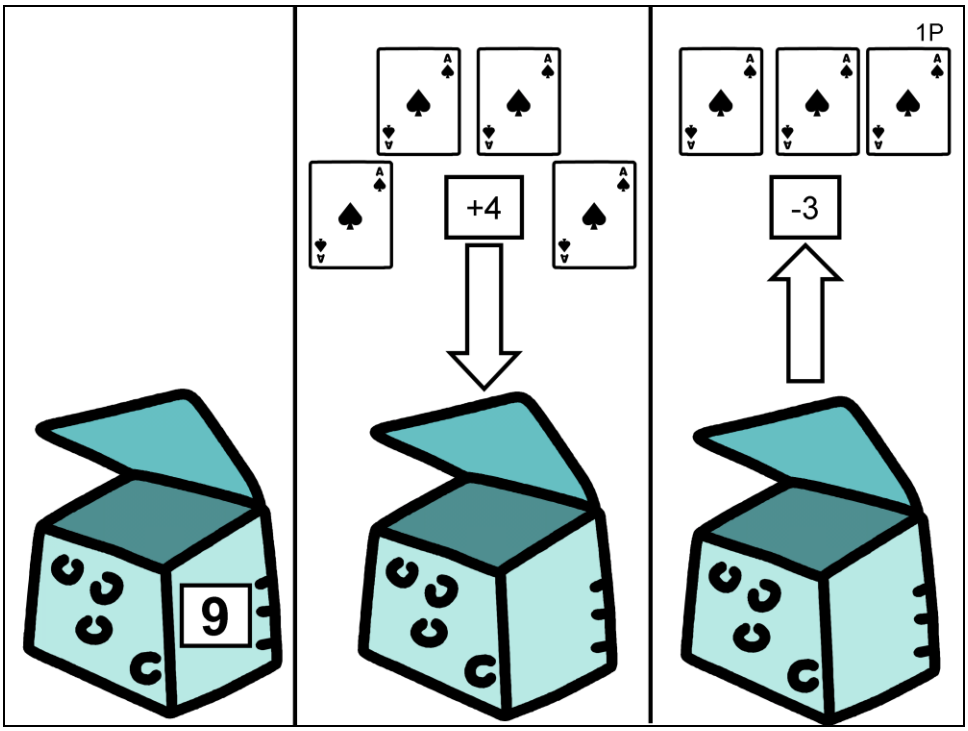
Following the same routine – let the child count the bricks in the initial row, add bricks of a different colour. Take the bricks from the same end of the row and the same number that you added.

I am adding 8 yellow ones (or whatever colour you are adding) and taking 8 yellow ones out. How many bricks are in the row now altogether?



The next few problems will be with pictures of objects.

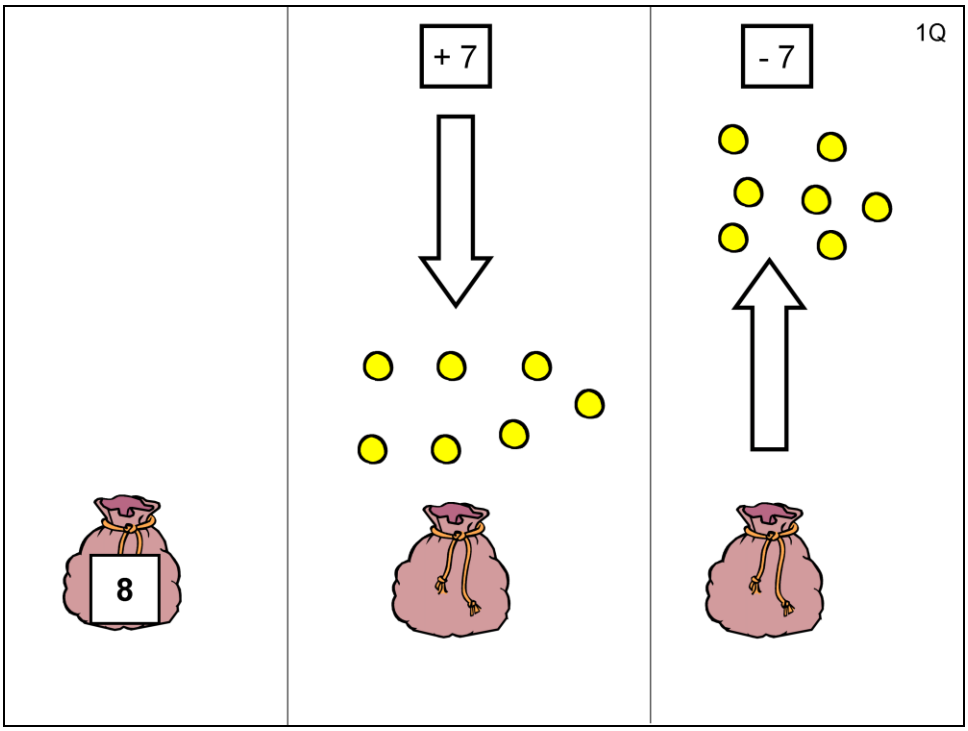
Show the child that you are placing 7 pencils (cut out pictures) in the bag and let the child count these with you as you place them inside. Then you add 4 pencils and take 4 away. How many pencils are left in the bag?



This task is also with pictures of objects.

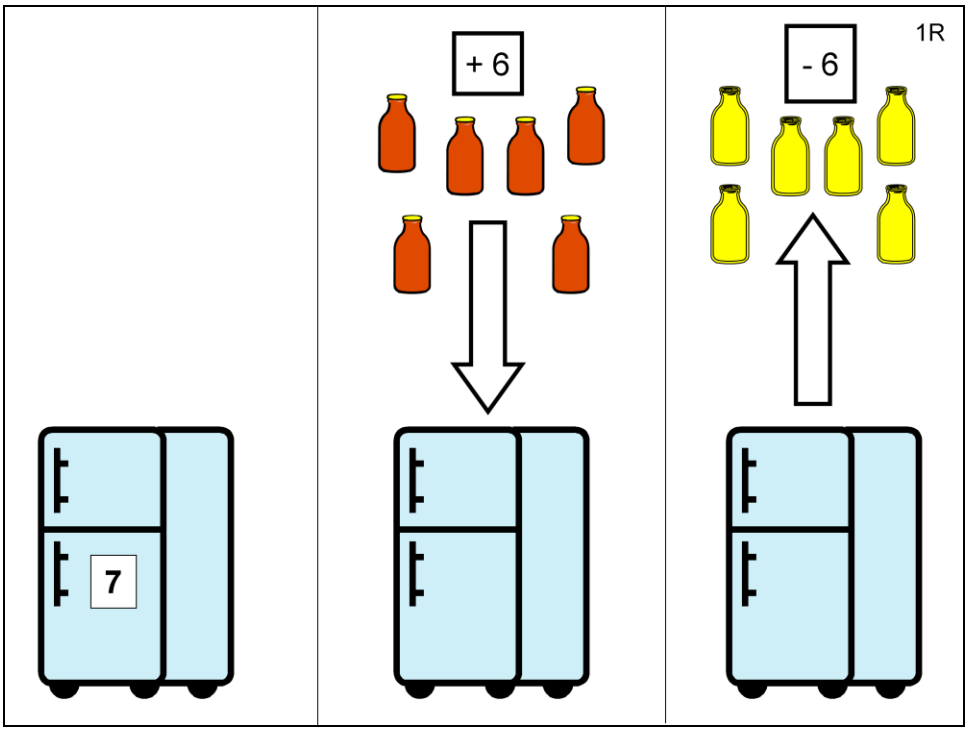
Show the child that you are placing 9 cards in the box and let the child count these with you.

Add 4, take 3 away and say that this is what you are doing. How many cards are left in the box?



This is another problem with cut out objects.

Show the child that you are putting 8 balls in the bag and let the child count them with you. Then show that you are putting 7 more in, and taking 7 out. How many balls are left in the bag now?

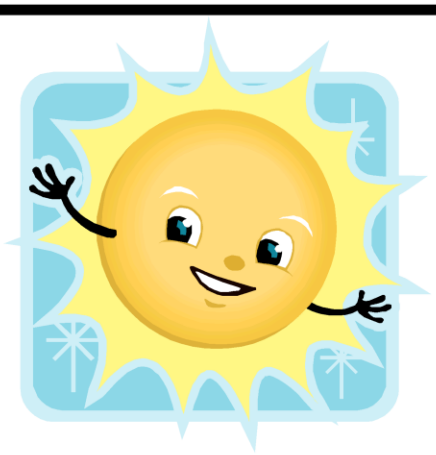


With pictures of objects:

Show the child that you are putting 7 **yellow** bottles of drinks in the fridge. Then you add 6 **red** drinks and take 6 **yellow** ones away. (IF you put the yellow ones on the left side, add the red ones on the right side, then when you take drinks out from the left these will be yellow.)

How many drinks are left in the fridge now?

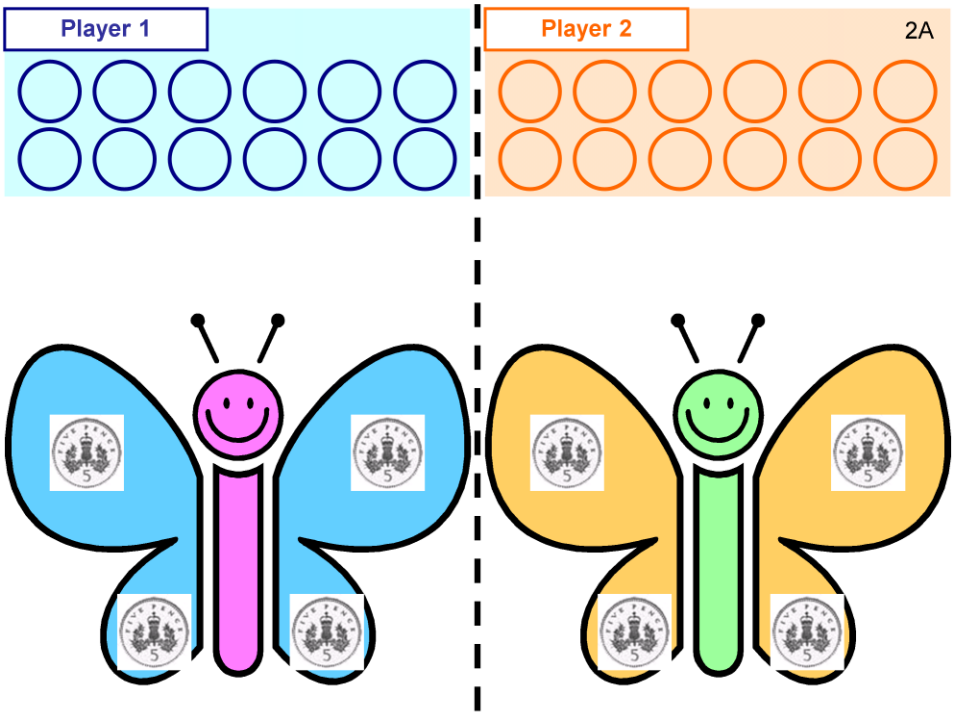
Maths session 2 BK 2



Child's name: _____

Date: _____

School:_____



PURPLE

Butterfly 5p activity for 2 players.

You will need :

8 x 5p coins

30 x 1p coins

Dice or number cards 1 – 6

To play:

1. Put 5p coins and 1p coins on table as the ‘bank’.

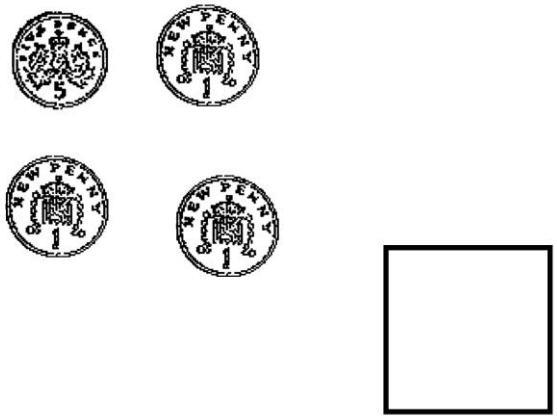
2. Ask child to choose which butterfly they want to fill.

3. Then with a second child or with teacher taking the other butterfly, start the activity.

4. Roll the dice and child collects the number of 1p’s according to number they have thrown on their ‘waiting area’ on the board.

5. They collect the 1p’s until they have enough 1p’s to exchange with the bank for a 5p coin which they then place on a 5p spot on the butterfly.

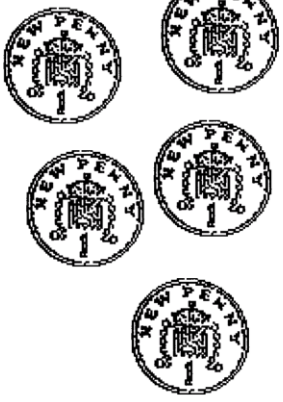
6. Activity continues with player 1 and 2 taking turns until the winner has completed 4 exchanges of 1p’s for 5p and all 5p spots are covered on their butterfly.



Put out 1 x 5p and 3 x 1p.

Ask the child ‘How much money do you have?’

Ask them to show with fingers how much they think. If they are stuck, get them to look at the 5p and hold up the correct number of fingers then add the 1p’s and count on from 5 to get the total. Ask them to write the amount in the box.



Jack has ☐

Alice has ☐

Put out 1 x 5p and 5 x 1p

Ask the child:' Jack and Alice are going to the sweet shop. They each have some money which you can see on the page.

How much does Jack have? Can you write the amount in the box?

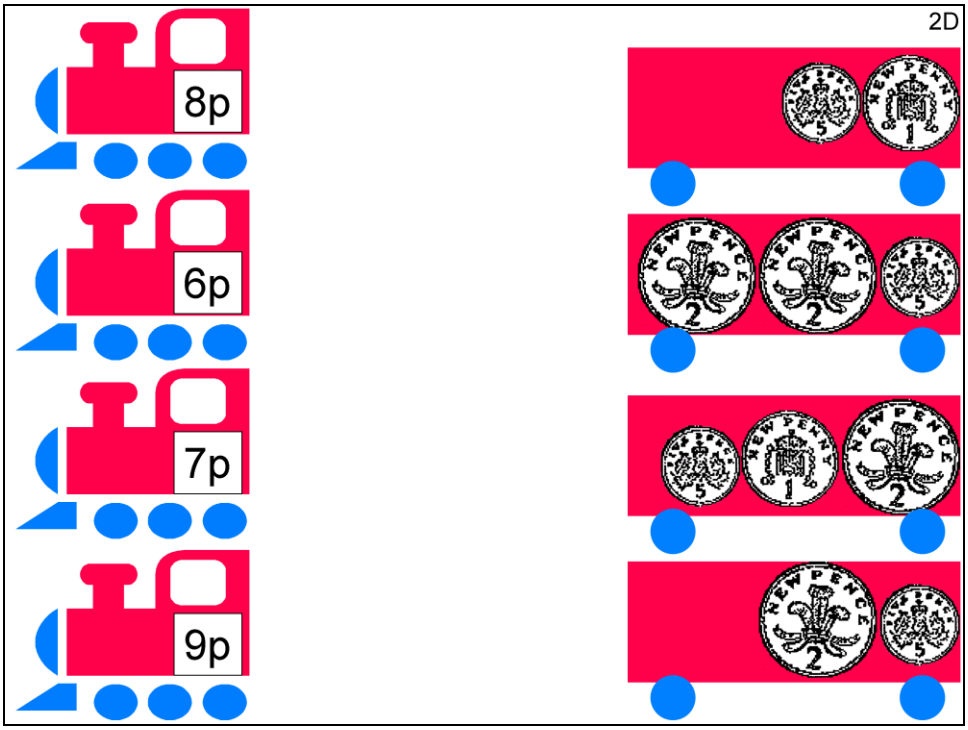
How much does Alice have? Can you write the amount in the box?

Does one of the children have more than the other?' (BSL: Are they the same or different?)

If the child is stuck, ask them to hold up the number of fingers to correspond to Jack's coin and the number of fingers to correspond to Alice's coins and then compare.

What do they notice about the 5p and the 5 x 1p.

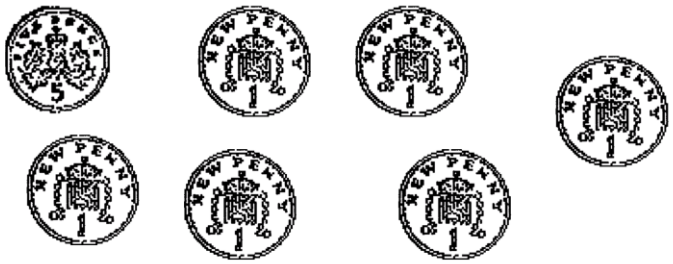
See if the child can tell you that they are the same amounts but with different coins.



Have available for the child 4 x 2p, 2 x 1p, 4 x 5p

Ask the child to match the amount on the left with a line of coins on the right which total the same amount .

Ask the child to draw a line to connect them.



Put out 1 x 5p and 6 x 1p.

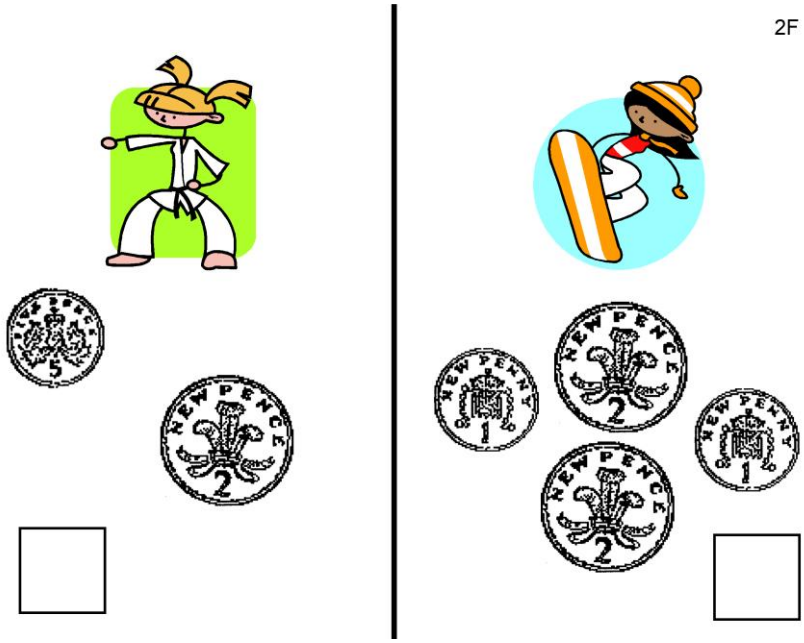
Ask the child: 'The boat costs 9p. Which coins would you use to pay the shopkeeper?'

If they try to use all 1p's they will not have enough.

If they are then stuck, get them to identify the coin worth the most and hold up the corresponding number of fingers. Then encourage them to **count on from the 5p** with the 1p's until they get to the amount needed.

Ask the child to tick the coins they have used.

2F



Put out 1 x 5p, 3 x 2p, 2 x 1p

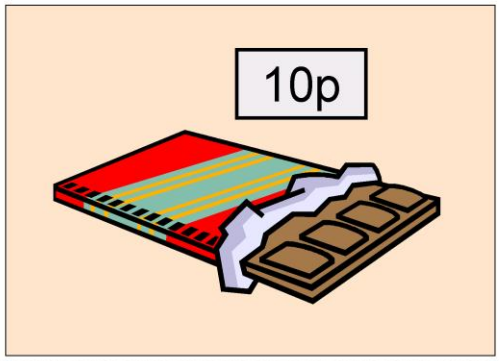
Say to the child “Natasha and Mahnoor each have some money to spend at the tuck shop after sports club.’

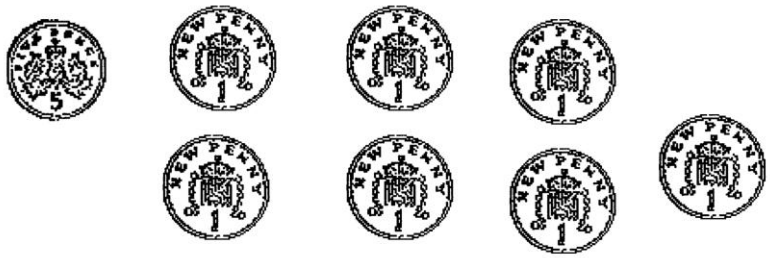
‘How much money does Natasha have? Can you write the number in the box?’ If stuck encourage the child to identify the 5p and count on with the 2p (5….6….7…)

‘How much money does Mahnoor have? Can you write the number in the box?’ Again encourage the child to identify the larger coin (2) and count on from there.

‘Does one of the girls have more money than the other?’ (BSL: Are they the same or different?)

If child says yes one has more , ’Tick which girl you think has more.’



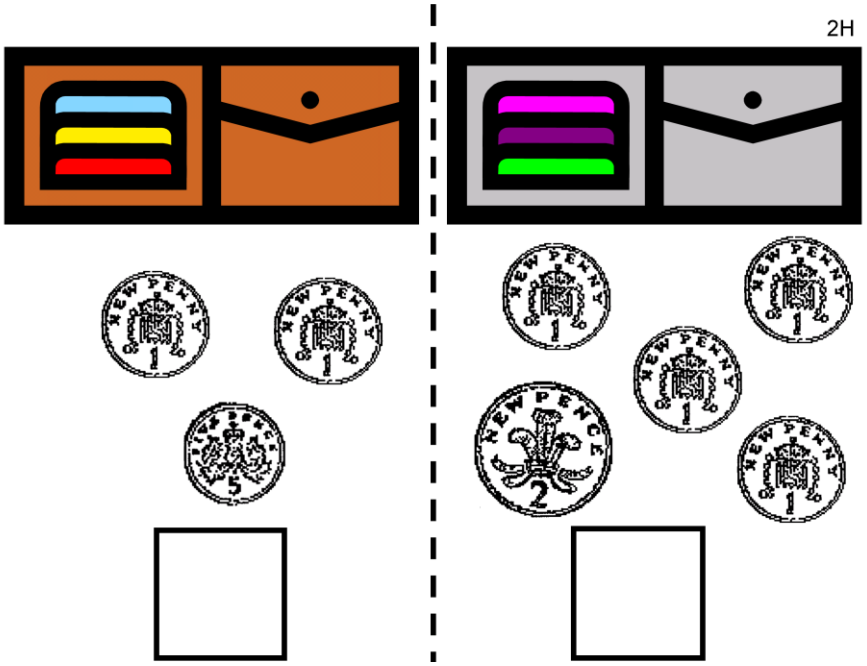


Put out 1 x 5p and 7 x 1p

Ask the child:' If the chocolate bar costs 10p, which coins would you use to pay the shopkeeper?'

If they try to use all 1p's they will not have enough and will need to incorporate the 5p. If they are stuck, again get the child to identify the largest value coin and hold up that number of fingers. Then encourage them to count on from that number until they reach the required amount (5….6,7,8,9,10).

Ask the child to tick the coins they selected.



Have available **for child to lay out** (1 x 5p, 1 x 2p, 6 x 1p)

Ask the child to put out the coins to match those by each wallet

Say to the child: 'Tom's wallet on the left contains these coins. How much does Tom have? Can you write the amount in the box?'

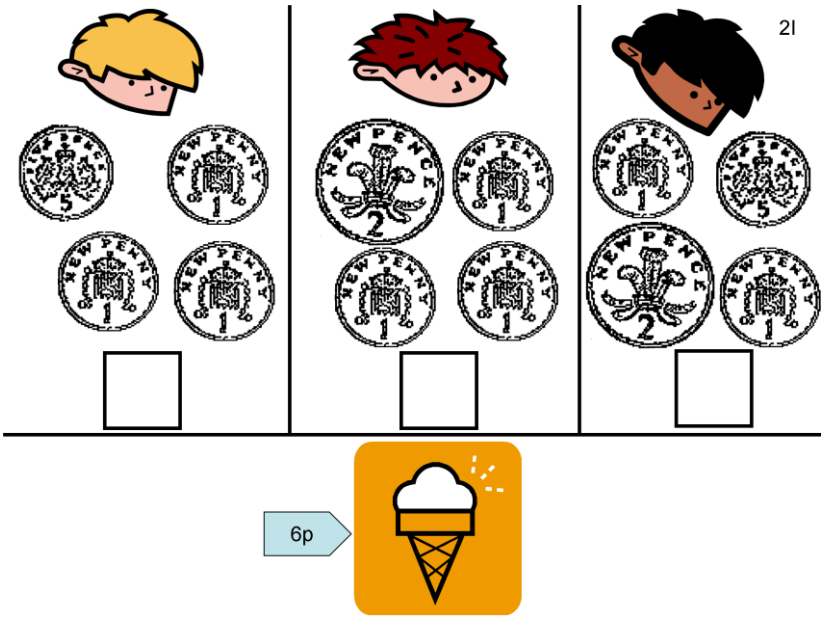
' Krisian's wallet on the right contains these coins. How much does Krisian have? Can you write the amount in the box?'

If the child is stuck, ask them to identify the largest value coin (either the 5p or the 2p) and hold up the appropriate number of fingers, then encourage them to count on from that number until they have counted all the coins.

' Which boy has more money?' (BSL: Are they the same or different?)

' Can you tick the wallet that you think contains more?'

Child might notice or be drawn to notice that one boy has more coins but the boy with the least coins has the most in value.



Have available 2 x 5p, 2 x 2p, 8 x 1p

Ask the child to select and lay out the coins to match those in front of each character.

Say to the child ‘How much does the first character have?’

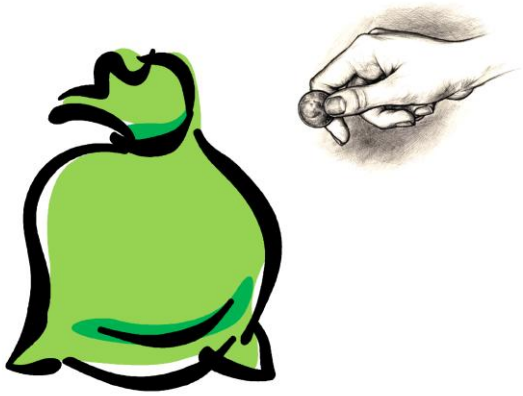
If they are stuck, encourage them to start with the largest value coin and hold up the corresponding number of fingers and then to count on with the smaller coins.

When they have worked out the amount, ask them to then write it in the box underneath.

Repeat for Character 2 and character 3.

Finally, ask ‘Which of the characters does **not** have enough money to buy an ice cream costing 6p? (BSL: Who money right?)

‘Can you tick which character is the unlucky one?’



Money in the bag activity (1p,2p,5p)

You will need:

Cloth bag or non transparent box

10 x 1p, 10 x 2p, 10 x 5p

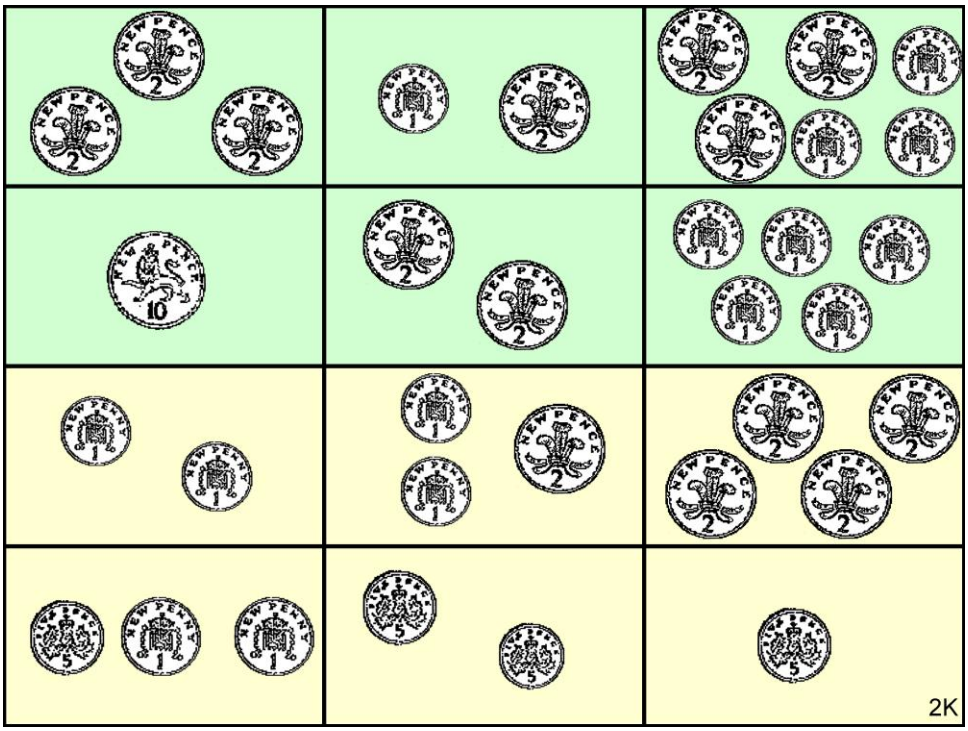
To play:

Player 1 takes turn to pull out 2 coins on first go and lays them out on the table and says how much they have in total.

2. Player 2 takes first turn and pulls out 2 coins and lays them out on the table and says how much they have in total.

3. Activity continues with each player taking **one** coin each time and, by counting on, saying how much they have in total.

4. Winner is the player who has the most money after 5 draws from the bag.



Money ‘Bingo’ Activity

You will need:

A base board for each child

A set of cards with amounts written in numbers (7p, 3p, etc.)

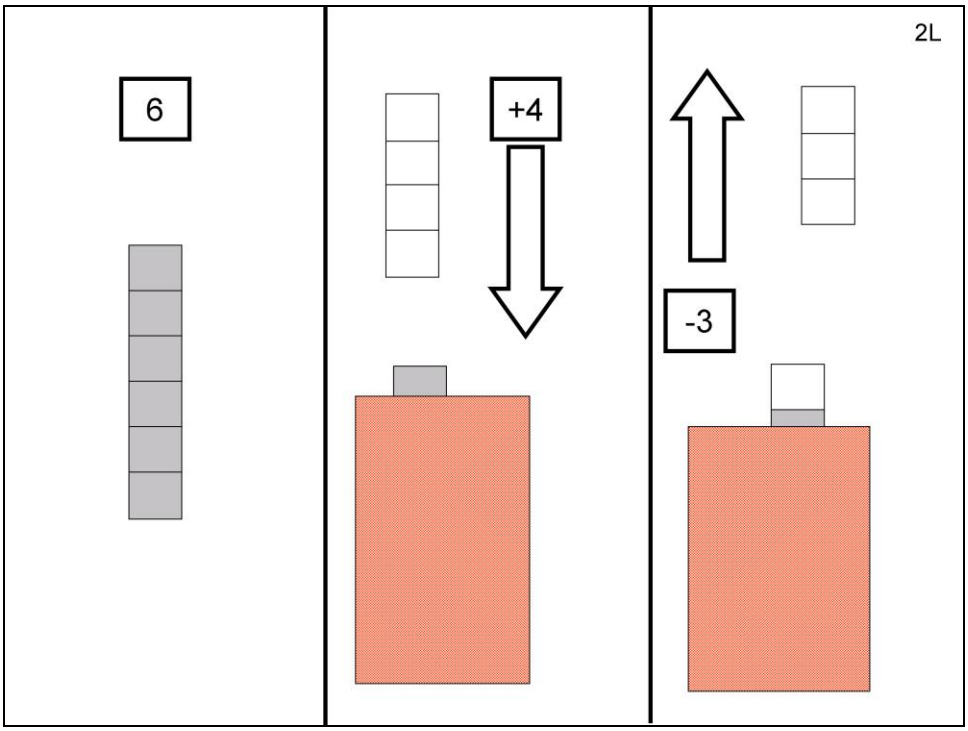
To play:

1.Teacher or child draws a card from the pack and shows the card.

2. Children look on base boards to see if they have a combination of coins which total this amount.

3. If so, they can then put the card over the matching square on their board.

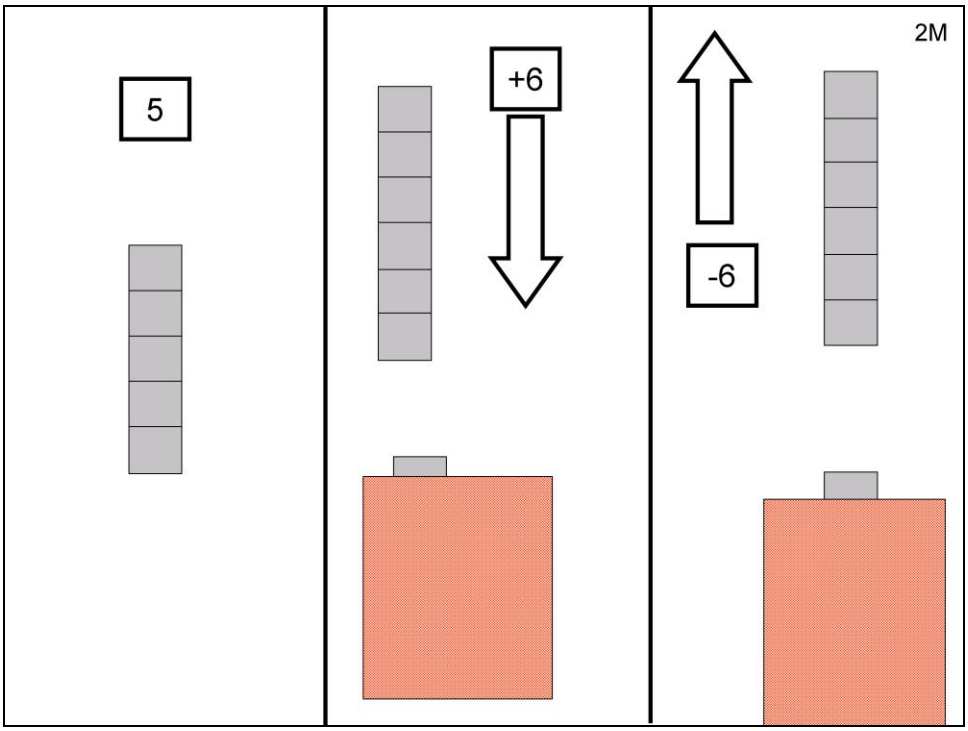
4. The winner is the first child to complete a row, or to fill the board, depending on choice.



YELLOW

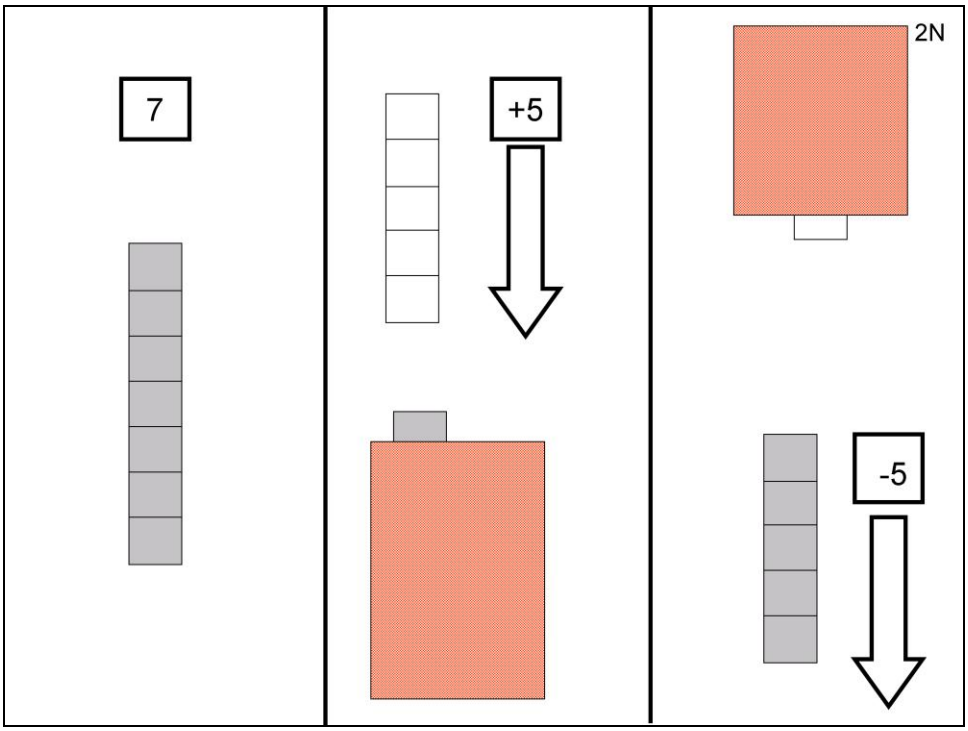
Start with a row of 6 bricks that the child counts with you. Cover with the cloth. To the end that is showing from under the cloth, add 4 bricks of a different colour and take 3 away.

I am adding 4 yellow bricks (or whatever colour you are adding) and taking 3 yellow bricks out. How many bricks are in the row now altogether?



Start with a row of 5 bricks that the child counts with you. Cover with the cloth. Now that the child has had some experience, we will remove the colour cues so all the bricks are of the same colour. To the end that is showing from under the cloth, add 6 bricks and take 6 away. They are all of the same colour.

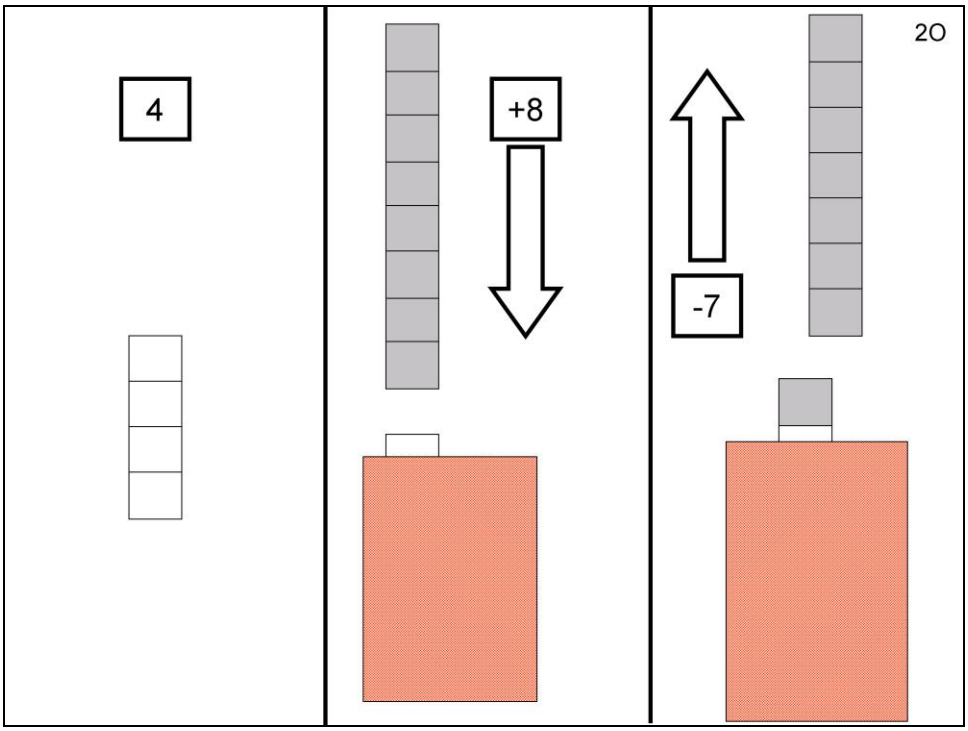
We have 5 under the cloth. I add 6 and then take away 6. How many bricks are in the row now?



Some of the problems now become more difficult because we will be adding bricks to one side of the row and taking them away from the other. We will still have some of the easier ones because it is important that they think flexibly, and don't try to just think in one way all the time.

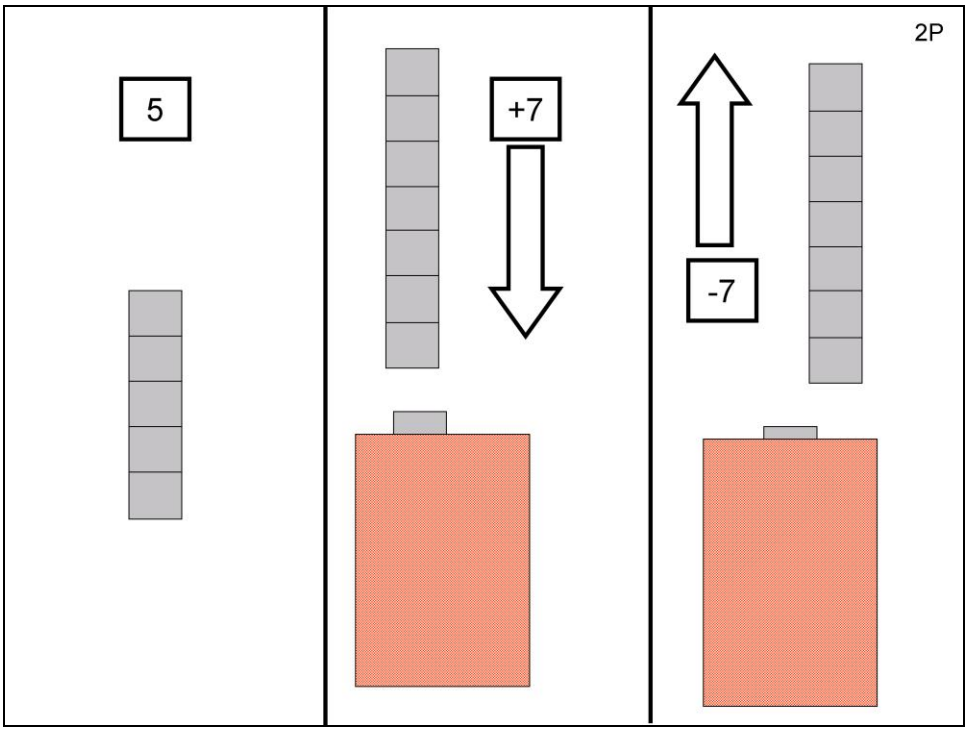
When the children have given their answer, if they made a mistake, we can put the bricks we took away and place them next to the ones that were added. This visual comparison helps them think that the ones that were taken away are equivalent to those that were added.

Start with 7 bricks and let the child count these with you. Add 5 of a different colour, then take 5 away from the other end.

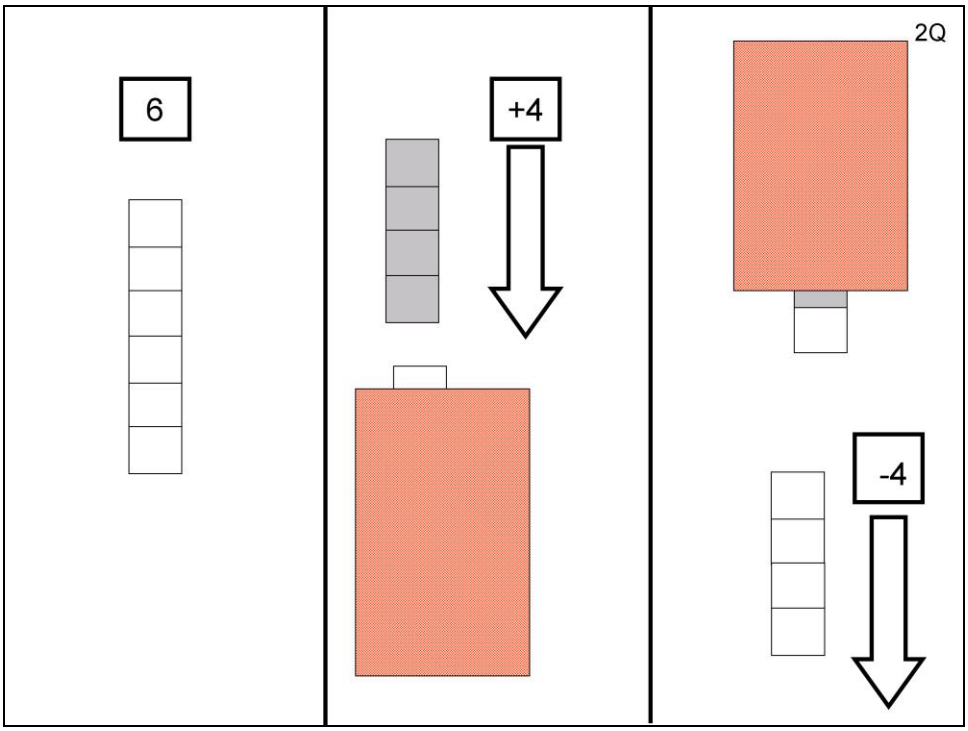


This is an easier problem as we add and take away from the same end of the row. But the number added and taken away is different.

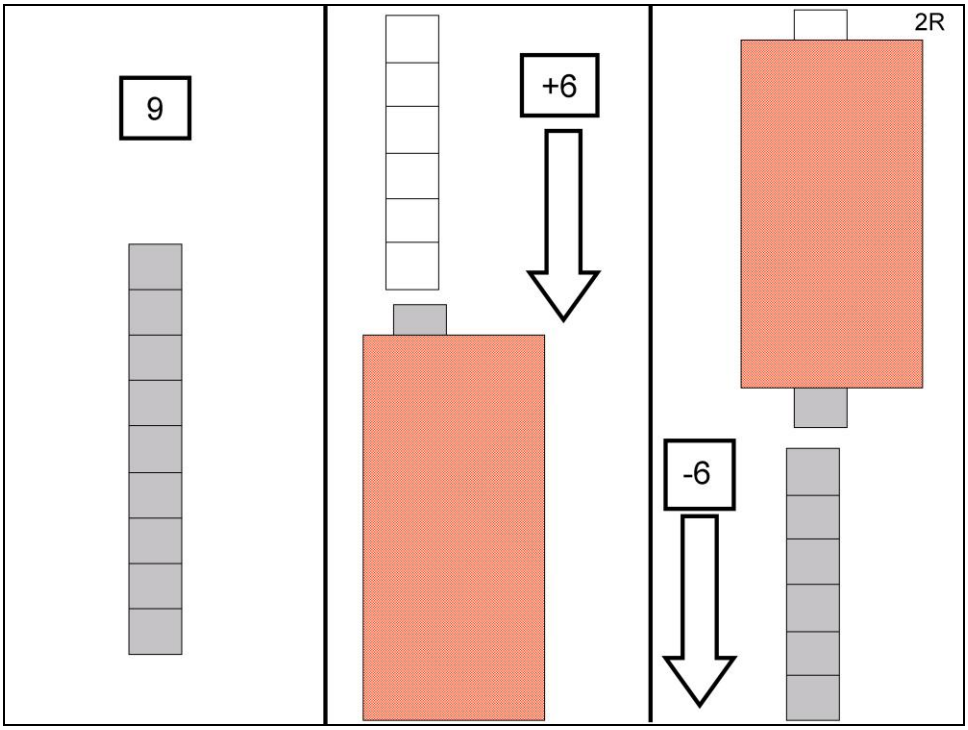
Start with 4, add 8 of a different colour, take 7 away.



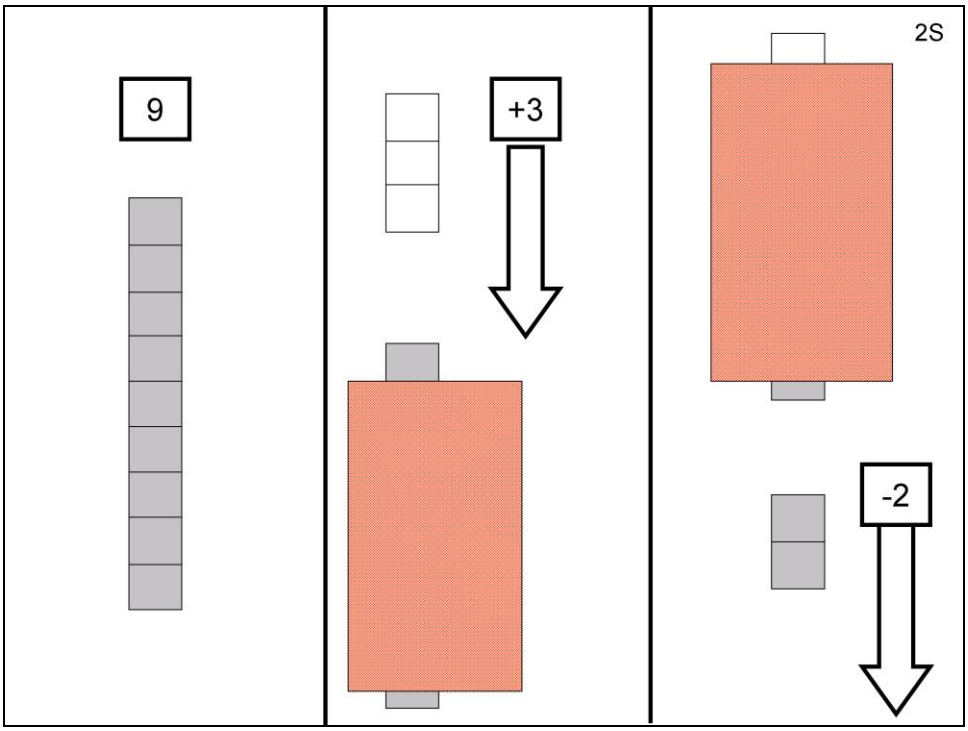
Start with 5, add 7 of the same colour and take away 7 of the same colour from the same end of the row. How many bricks are left in the row now?

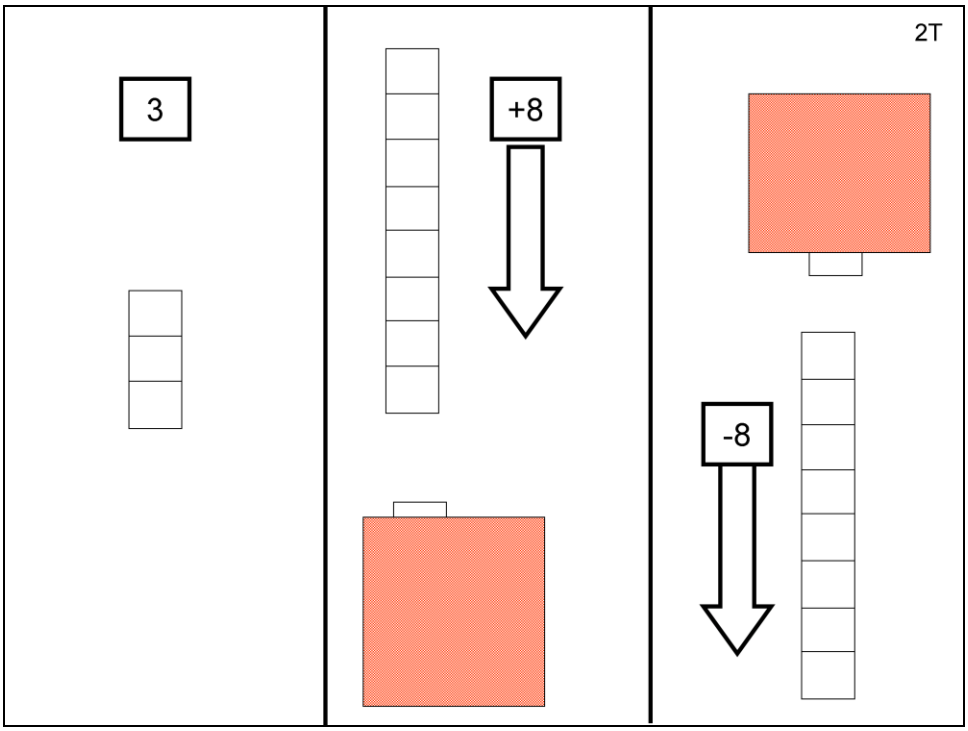


Start with 6. Add 4 of a different colour, take away 4 from the other end of the row. How many bricks are left in the row now?



As you will be now completely familiar with this type of problem, we have not repeated the instructions. You can use the pictures to see whether it is the same colour bricks, whether they are added and taken away from the same or different ends of the row, and whether the number added and taken away is the same.


9
+3
2S
-2


3
+8
2T
-8

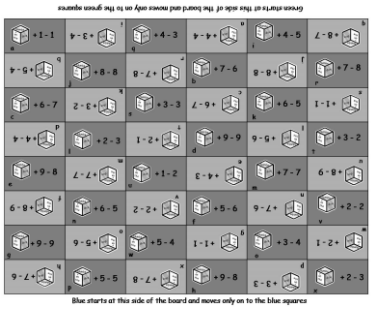
Maths session 3 BK 3

Child's name: _____

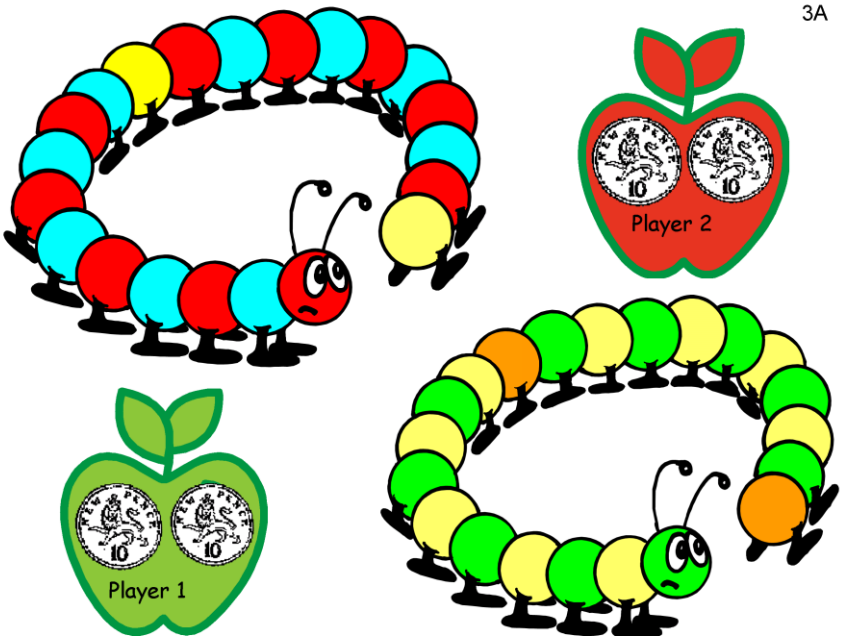
Date: _____

School: _____

Note:



It's time for the children to start playing Board game 2, 'Is it more, less or the same!'
Now they have TWO board games to play and play again!!
Also remind them to go to the Games corner at
http://www.education.ox.ac.uk/research/resgroup/cl/ndcs/



PURPLE

Caterpillar 10p activity for 2 players

You will need:

caterpillar base boards

dice

40 x 1p

6 x 10p

To play:

1. The coins are placed on the table as the ‘bank’.

2. Each player selects which caterpillar they want to fill.

2. First player throws dice then collects the corresponding number of 1p’s as indicated by the dice.

3. Each 1p is put on to a segment on the caterpillar body.

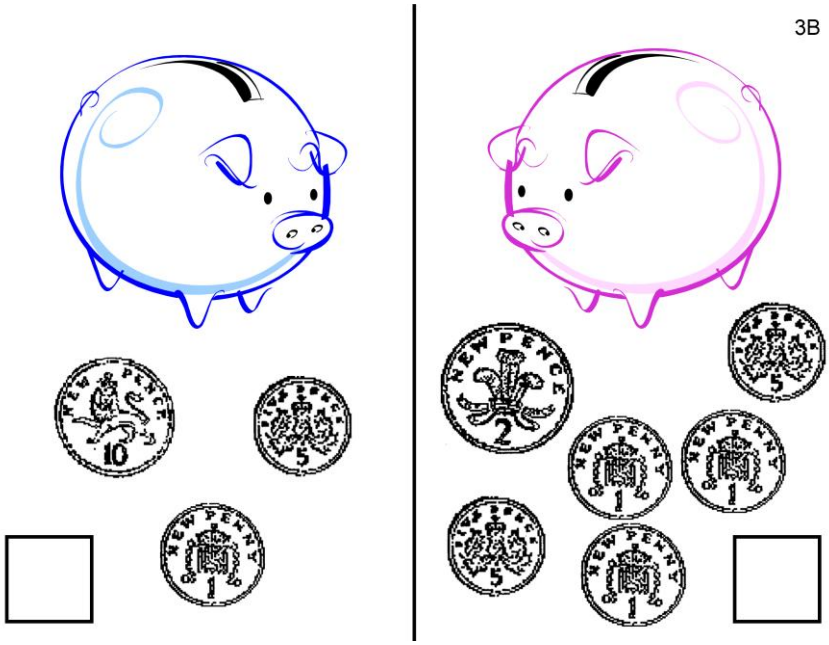
4. Next player rolls dice and does same procedure.

5. When a player has 10 x 1p they can exchange the pennies with the bank for 1 x 10p coin which they put on one of the 10p spaces on their apple.

6. Activity continues in turn until the winner has both 10p spaces covered with 10p coins. On the final throw, the player must throw the exact number required to make the exchange with no extra pennies left over.

7. Ask the child what the 2 x 10p is equal to.

3B



Have available 1 x 10p, 3 x 5p, 4 x 1p, 1 x 2p

Say to the child:

'Joe has emptied his piggy bank and has found this much money inside' (pointing to the 1 x 10p, 1 x 5p, 1 x 1p). Can you get out the same coins and then see how much money he has?

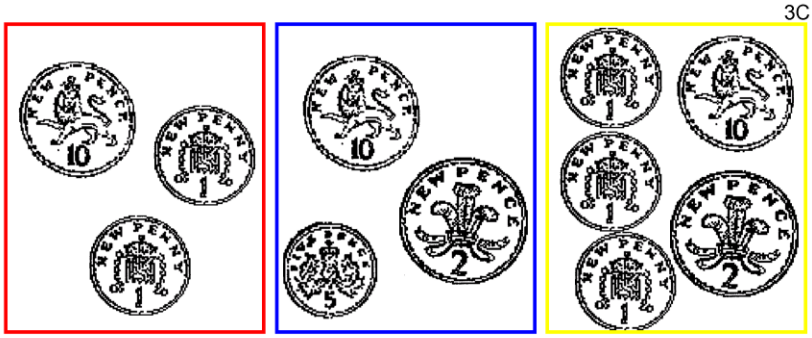
Can you write the amount in the box underneath?'

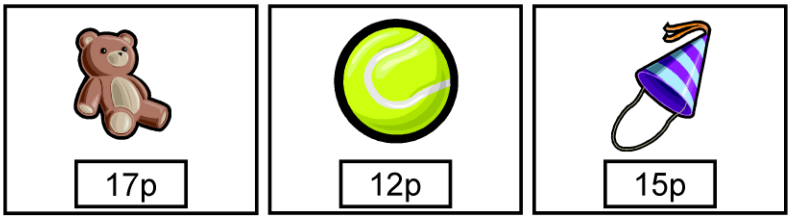
' Hannah has emptied her piggy bank and found this much money inside' (pointing to the 3 x 1p, 1 x 2p, 2 x 5p).'Can you get out the same coins and then see how much money she has?

Can you write the amount in the box underneath?'

If they are stuck, ask the child to start with the largest coin (5p or 10p) and count on either with 5p, 2p or with 1p's. Ask them to show the amounts with their fingers.

Ask them to tick which child has more money. (BSL: Who has biggest money?)





Have available 3 x 10p,1 x 5p, 2 x 2p, 5 x 1p

Say to the child: 'Each of these boxes at the top contain a different amount of money.

There are 3 toys, each toy has a price on it .

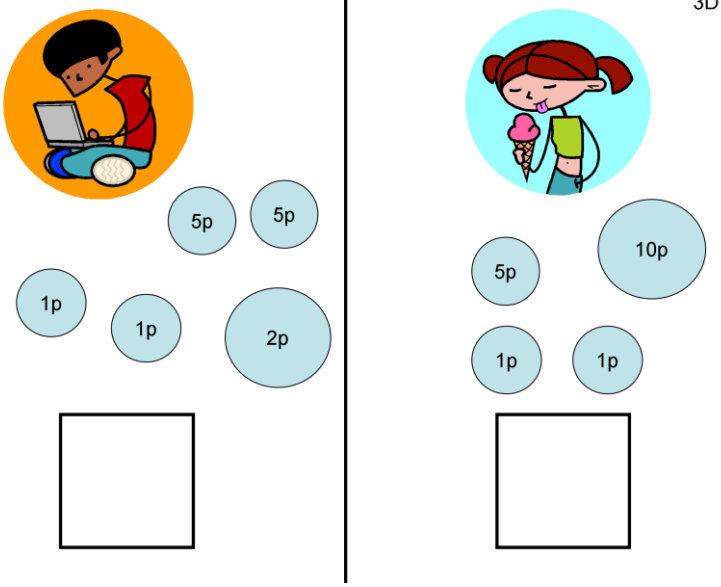
Can you work out how much money is in the first box?'

If the child is stuck, ask them to identify the largest value coin and hold up the same amount of fingers. Then count on from 10 with the 1p's until they reach 12.

'Now can you draw a line to join the box with the toy which matches the amount in the purse?'

Then do the same for the next two boxes, so that each toy is joined by a line to the box which matches the price.

Each time get the child to count on from the largest coin and if they are stuck to use their fingers to show the amount as it increases.



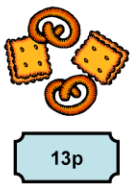
Have available 1 x 10p, 4 x 1p, 3 x 5p, 1 x 2p

Ask the child: ‘Jack has been given some pocket money. How much does he have? Can you write the amount in the box?’

If the child is stuck, ask them to identify the larger coin and show with fingers and ask them how much with 5p more and then one penny more, and so on. Encourage them to count on from largest coin.

‘Alice has been given her pocket money, how much does she have?’ Can you write the amount in the box?’ If stuck, repeat procedure of identifying larger coin and showing with fingers, then counting on.

Can you tick which child has more money?.



Have available 2 x 5p, 4 x 1p, 3 x 2p, 1 x 10p

Say to the child: 'Each day you have 30p to spend. Here is the money at the bottom of the page.

On Monday you bought some pretzels which cost 13p. Which coins would you use to pay for them? Can you show me which coins you would choose?'

If the child is stuck, ask them to identify the largest value coin (10p) and say the amount and show on their fingers. Then encourage them to count on from that, aided by their fingers according to which coins they choose, until they reach 13p.

Ask them to draw a line from the coins they choose to the food.

Then say:

'On Tuesday you wanted to buy some biscuits. How much do they cost? Which coins would you use to pay for them?

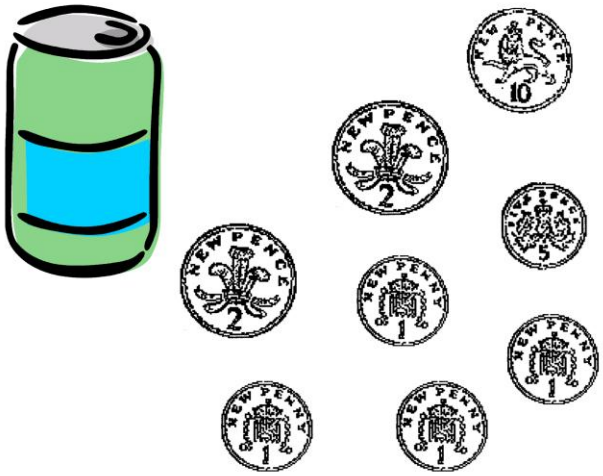
Show me how you would make that amount.' Child can re-use coins already chosen for previous food.

If stuck, ask them to find the coin with the largest value (10p) and then show on fingers how much that is, then count on with the available coins until they reach 16.Ask the child to draw lines from the coins chosen to the food.

Then say:

'On Friday you want to buy some fruit kebabs. How much do they cost? Show me which coins you would use to pay for them.'

If child is stuck, again get them to chose the highest value coin and show on their fingers the amount, then encourage them to count on according to the coins they chose to make up the amount to 19. Ask them to join the coins chosen with the food.

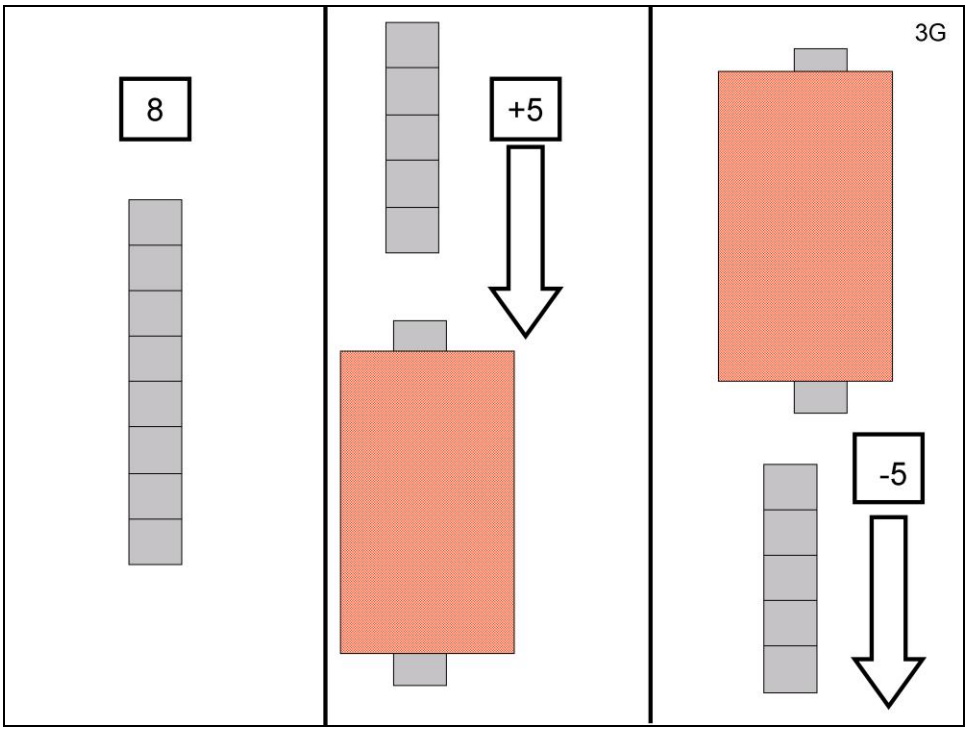


Have available 1 x 10p, 1 x 5p, 2 x 2p,4 x 1p

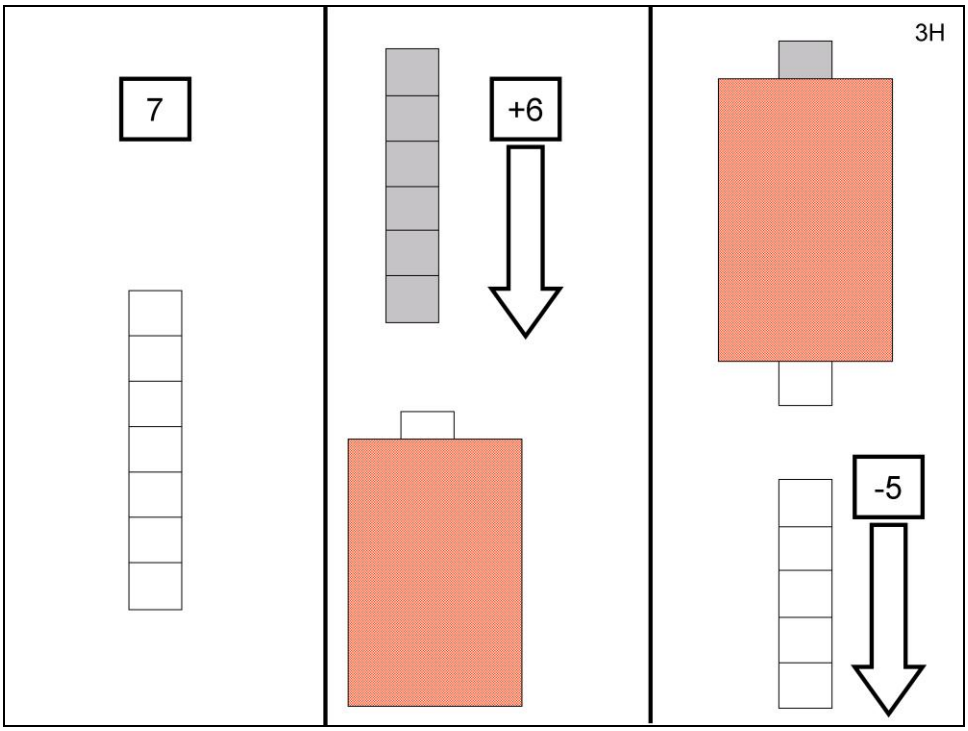
Say to the child:' The can of drink costs 18p. Show me which coins you would chose to pay the exact amount for the can.'

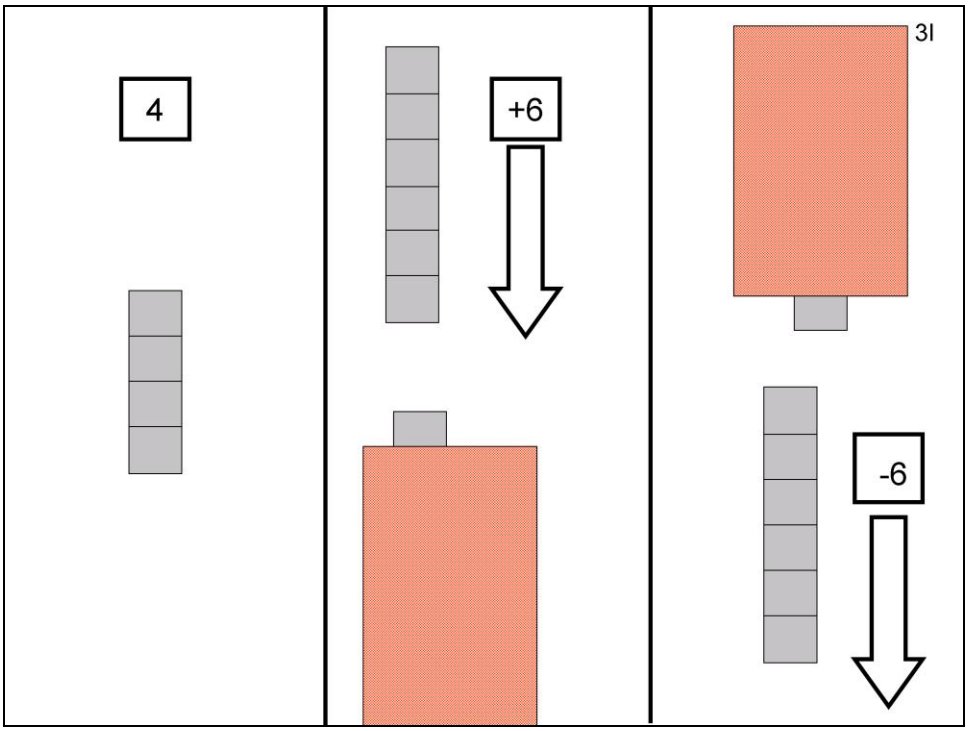
If they are stuck, ask them to identify the largest value coin and hold up fingers to show the amount, then to count on from that coin, again showing with fingers, until they reach 18.

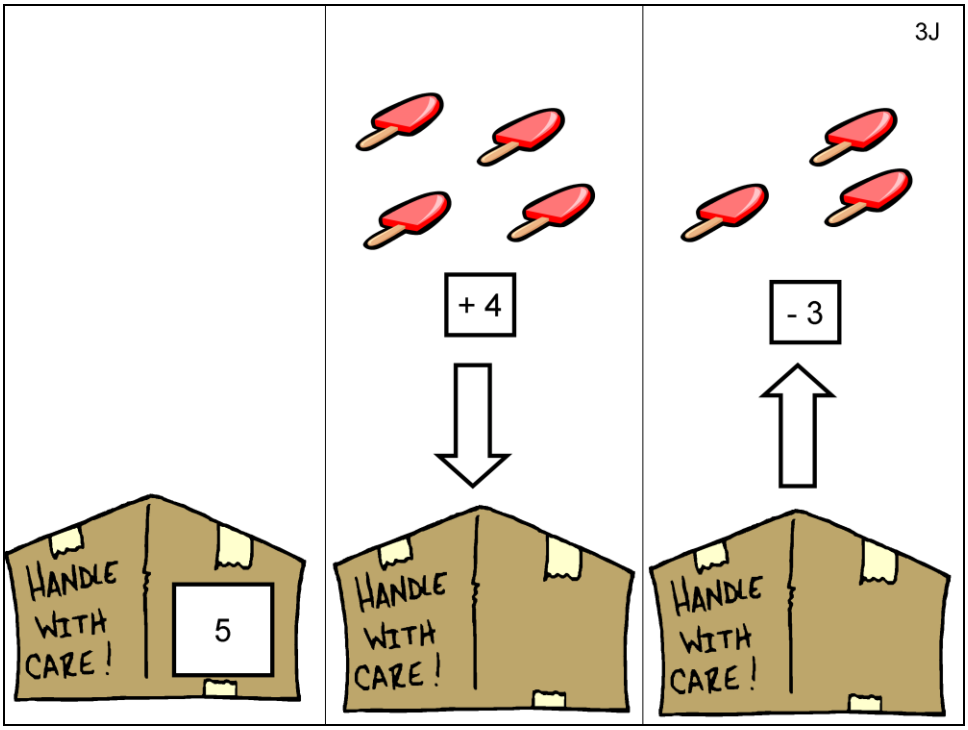
Ask the child to show which coins they chose by putting a cross over them with a coloured pencil.



YELLOW


7
+6
3H
-5


4
+6
3l
-6



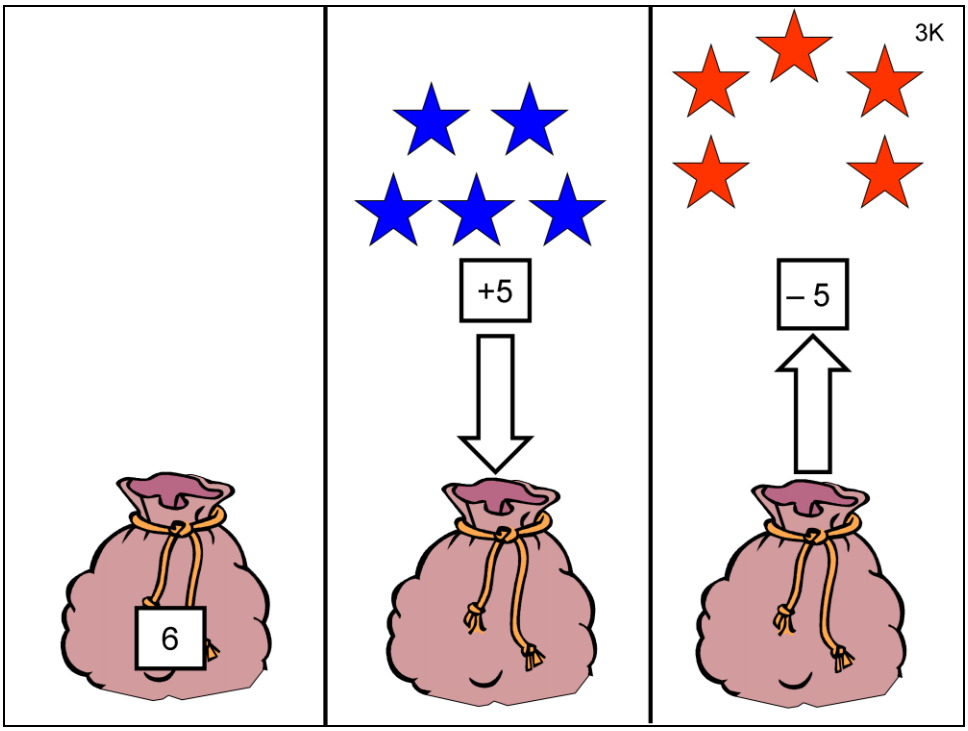
This is a new type of problem, which you present with the help of pictures. These will be more like story problems.

The teacher put 5 lollies in the box in the morning.

In the afternoon she put 4 lollies in the box.

Then the children came and took 3 out.

How many lollies are in the box now?

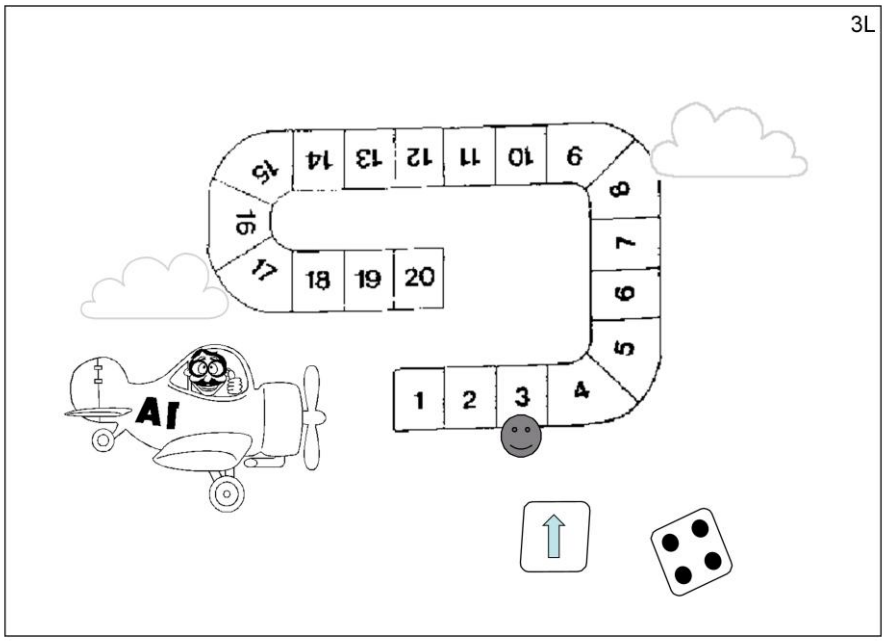


Mummy put 6 red stars in the bag.

The children put 5 blue stars in the bag.

Mummy took away 5 red stars.

How many stars are in the bag altogether?



ORANGE

In this activity, you throw two dice. One has a number, the other has the direction you have to move.

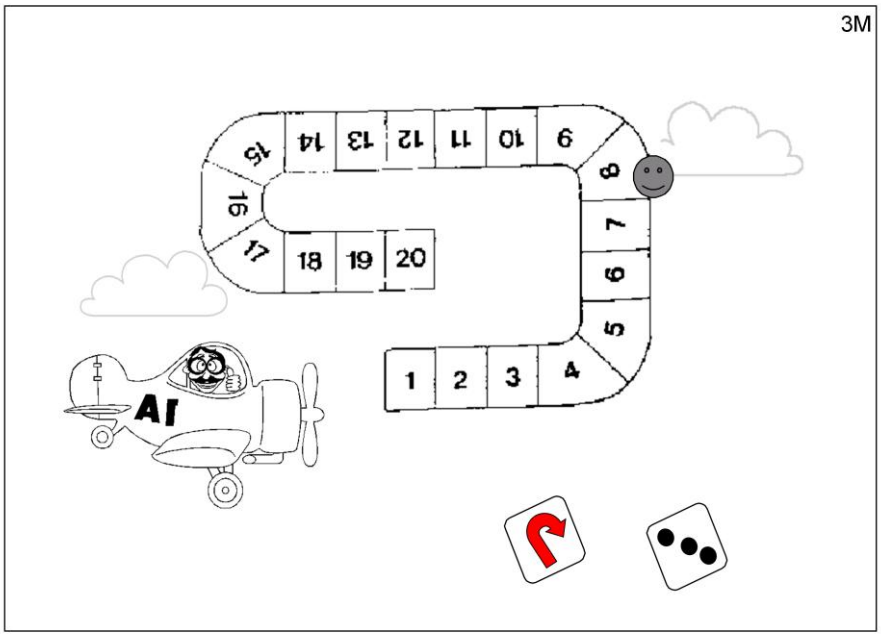
A girl was playing an activity.

She was on the number 3.

She threw 4 and the sign for moving forward.

Where is she now?

Put a tick to show where she will be next.



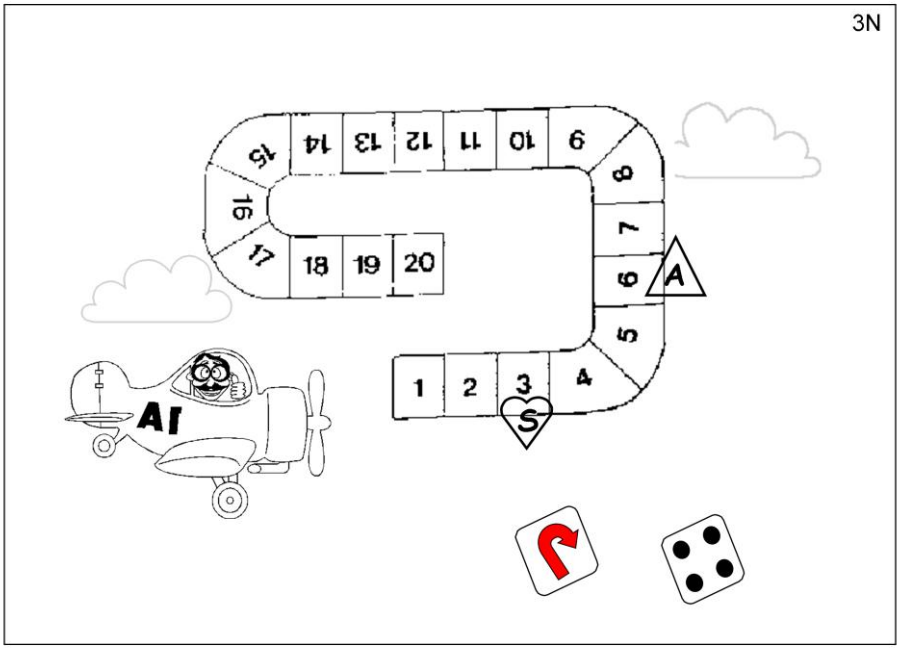
A boy was playing the activity.

He was on the number 8.

He threw 3 and the sign for moving backwards.

Where is he now?

Put a tick to show where he will be next.



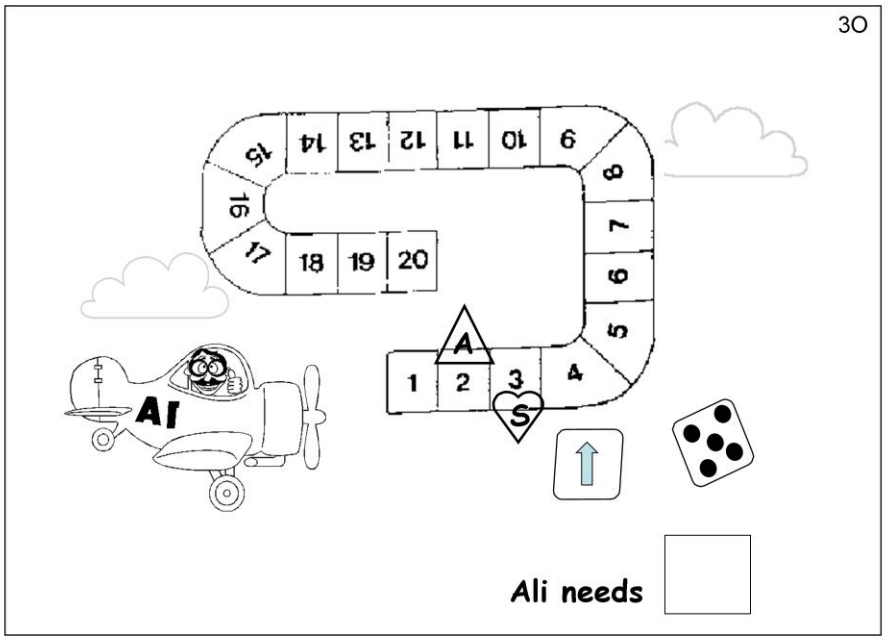
Ali and Sara were playing the activity.

Where is Ali? Where is Sara? Who is winning?

Ali threw 4 and has to move backwards.

Is Ali still ahead of Sara?

Put an A where Ali is going to be.

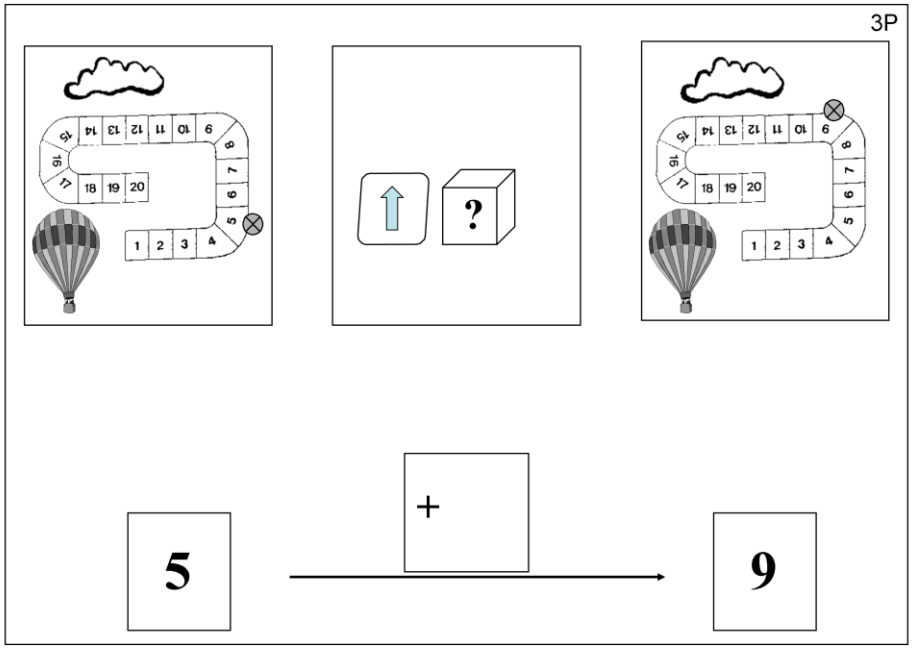


Now it is Sara's turn.

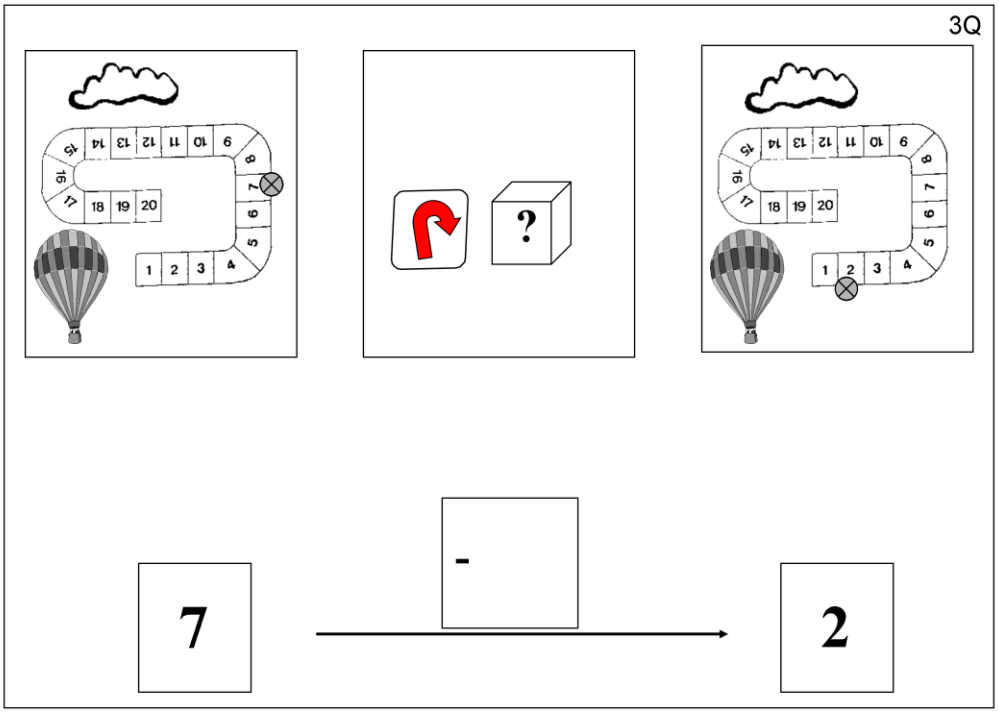
Sara threw 5 and moves forward.

Put an S where Sara is going to be.

Then it is Ali's turn. What number does Ali have to get to catch up with Sara? Write your answer in the box.



A boy was playing an activity.
He was on the number 5.
Then he threw the dice.
He moved forwards and ended on number 9.
What number did he throw?
Write your answer in the box.



A girl was playing an activity.

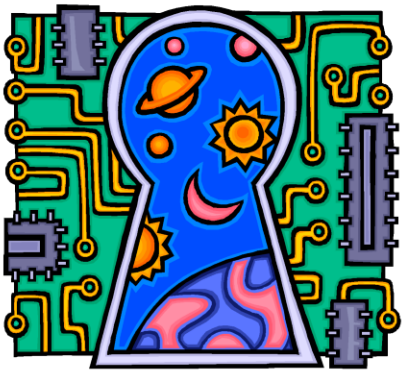
She was on the number 7. She threw the dice.

She moved backwards and ended on number 2.

What number did she throw?

Write your answer in the box.

Maths session 4

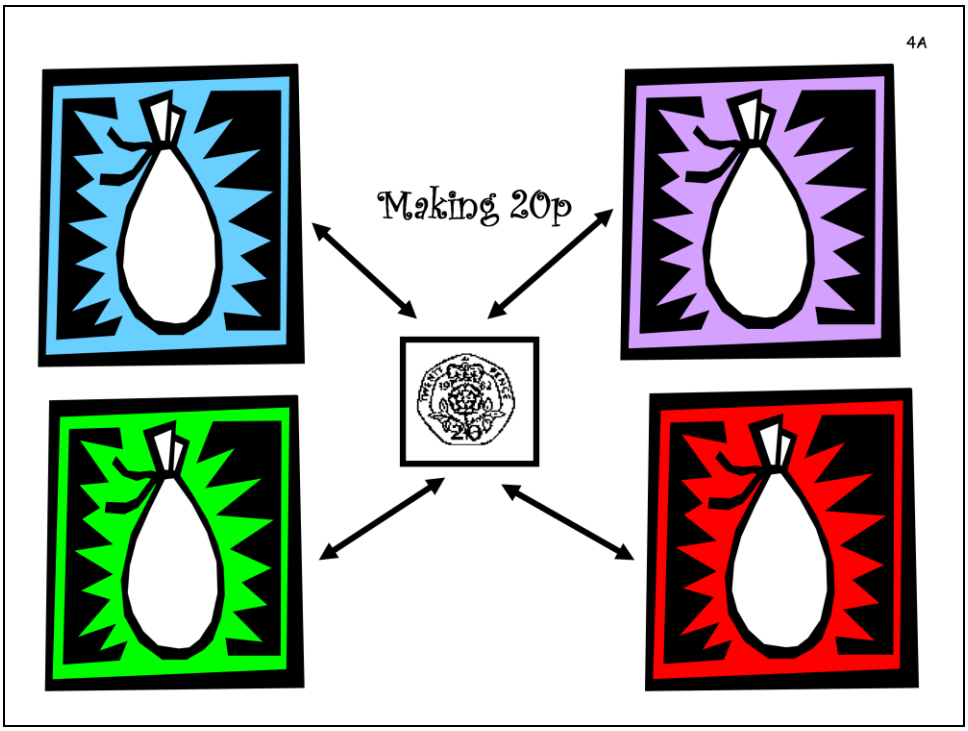


BK 4

Child's name: _____

Date: _____

School: _____



PURPLE

The 20p challenge activity

You will need:

Dice

a copy of the base board for each player

Coins for each player (3 x 10p, 6 x 5p, 10 x 2p, 20 x 1p)

To play:

•The first player throws the dice and collects the amount shown on the dice, but in value of coins e.g. 5 on the dice could be 2p+2p+1p, or 6p on the dice could be 5p +1p. Children should be encouraged to collect the coin with the highest value first and then count on with smaller coins.

•The first player can start to fill a money bag by putting the coins they have collected onto a bag on their board, aiming to make a total of 20p in each bag after several throws of the dice.

•They can complete one bag after several turns but if they throw a larger number than they need, they can start to fill another bag.

•The players take it in turns to throw the dice, collect the coins and place on the board. On the last throw, the player must get the exact number needed to complete the last bag.

•The winner is the first player to fill their bags with different combinations of coins to make 20p.

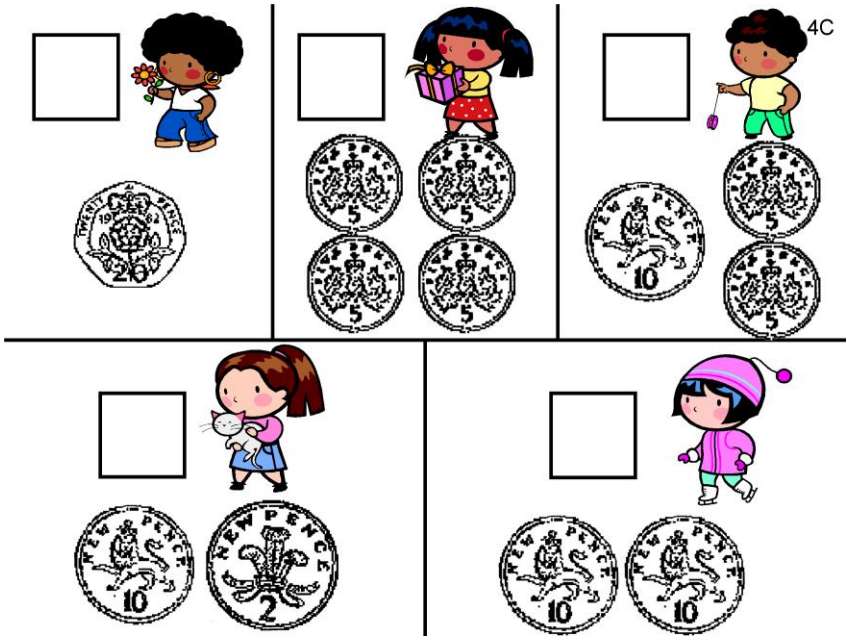
Discuss with them the fact that the same total can be made using different coins, that the totals are equivalent even though the coins used are different.

Have available 2 x 10p, 1 x 20p, 3 x 2p, 1 x 5p, 9 x 1p.

Say to the child: ’The bus ticket to town costs 29p. Which coins would you chose to pay the exact fare?’

If the child tries to use the smaller coins they will not have enough. If they are stuck ask them to identify the largest value coin (20p) and count on from there with smaller coins. Some children may chose 2 x 10p but will still then be counting on from 20, some may be able to incorporate 5p’s, 2p’s as well as 1p’s.

Ask them to mark on the blank spaces the values of the coins they chose.



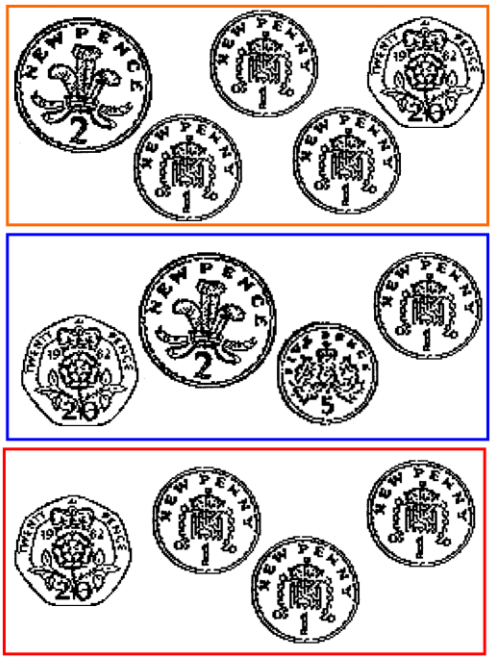
Have available 1 x 20p, 4 x 10p, 6 x 5p, 1 x 2p

Say to the child ;'Look at the amounts of money by each child and see if you can tell me how much they each have.'

If they are stuck, ask them to look for the highest value coin and encourage them to count on from there, using their fingers to show how much they are counting on each time. (Teacher could note on the page the amount said for each child to enable child to concentrate on the coins).

'Which is the odd one out do you think and why? (BSL: Who is different?)

' Can you put a cross on the one which is different?'



Have available 3 x 20p, 1 x 5p, 2 x 2p, 7 x 1p

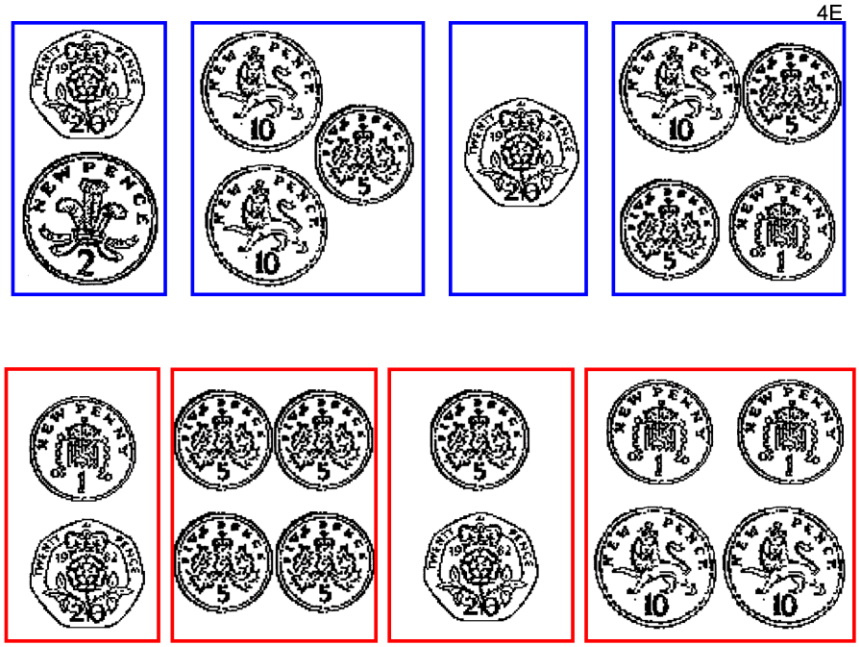
Ask the child :' Can you tell me how much is in the top bubble?'

Ask them to point to the coins and show how they are counting on. If stuck ask them to identify the 20p and count on from that, using fingers to count on.

Then ask them to draw a line to the stamp which is priced at that amount.

Repeat for the middle bubble and again ask the child to count on from the 20p if they are stuck, each time identifying the next largest coin and counting on. Ask the child to draw a line from the amount of money to the corresponding stamp.

Do the same for the final bubble to check that the last stamp can be afforded with the last bubble of money.



Ask the child ‘ Can you draw a line to join up the matching amounts?

Encourage the child to count on from the largest coins each time.

If they are stuck, get them to use their fingers to hold up the starting amount from which they are choosing to count on.

Put out on the table 1 x 20p, 2 x 10p,3 x 2p,4 x 1p.

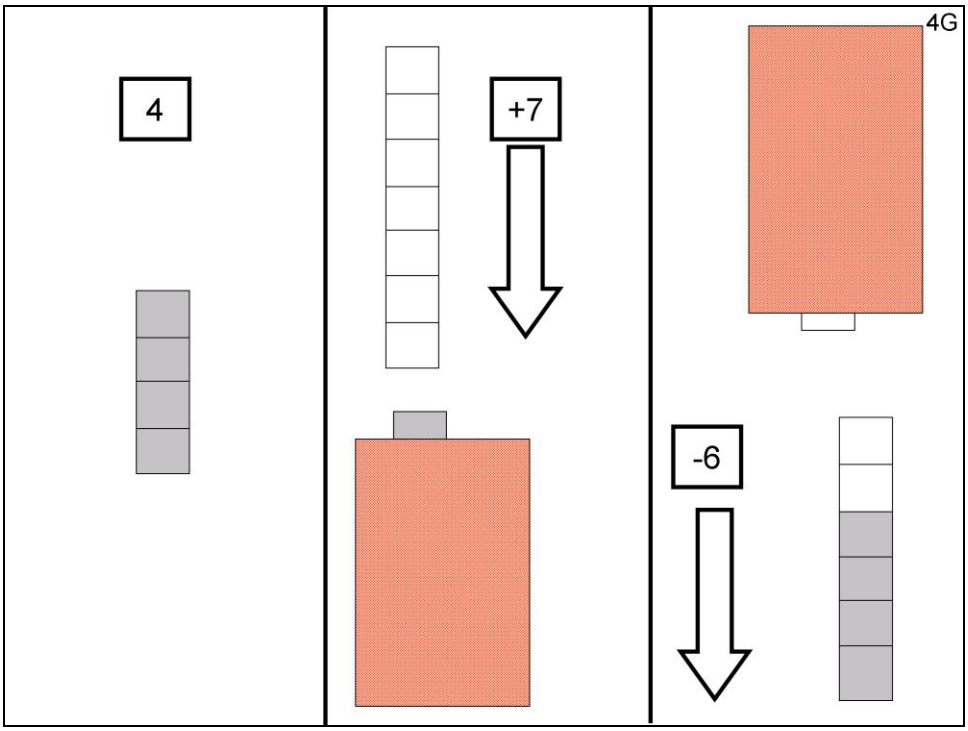
Say to the child: 'Sam has been saving up to go to the fair and has all this money in his wallet.

He wanted to go on these two rides.

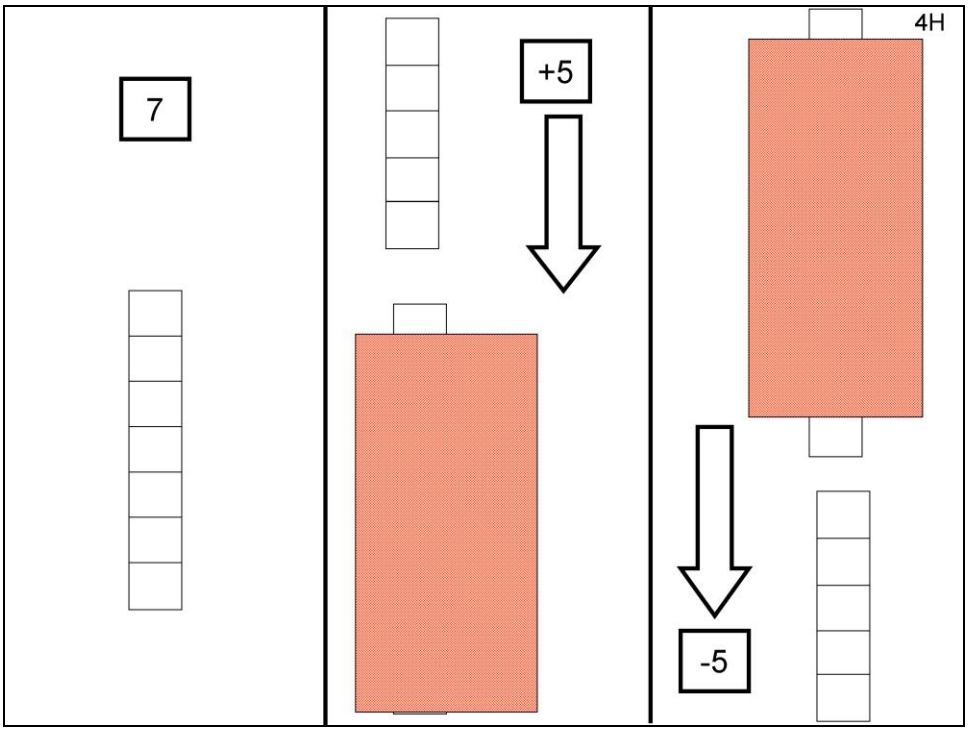
Each ride costs 25p. Can you put out in two piles the coins he could use to pay for each ride to see if he has enough money to go on both?'

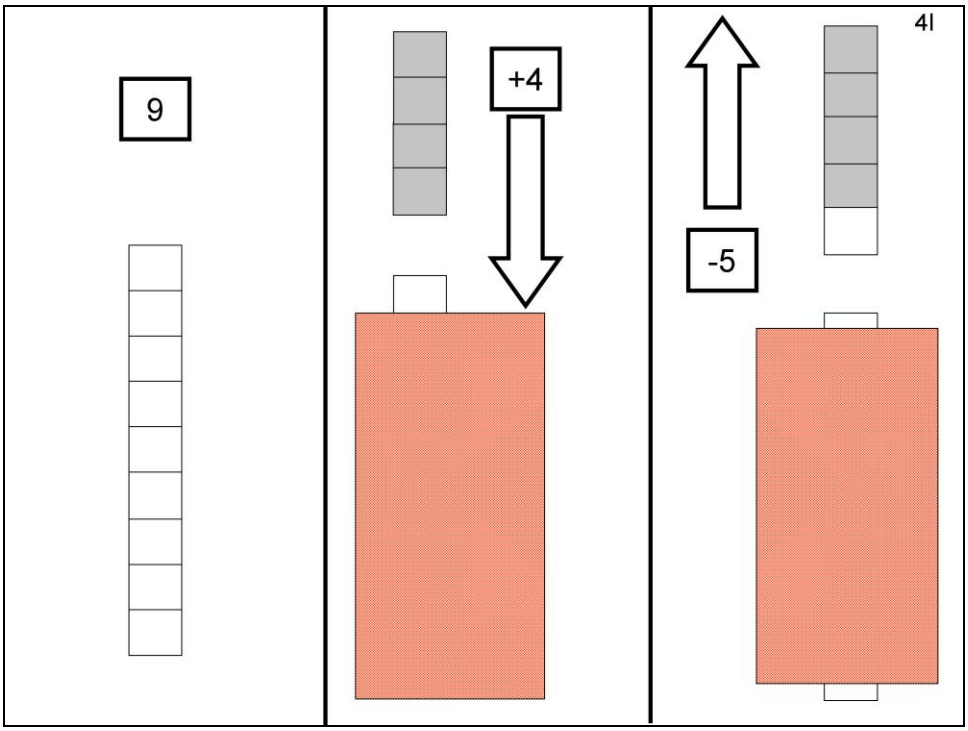
Ask the child to say aloud how they are making the amounts. If stuck, get them to identify a large value coin (20p or 10p) and count on from there with smaller coins. Some may chose 2 x 10p instead but will then count on from 20 the same.

Ask the child to join the coins they used with the ride paid for.



YELLOW

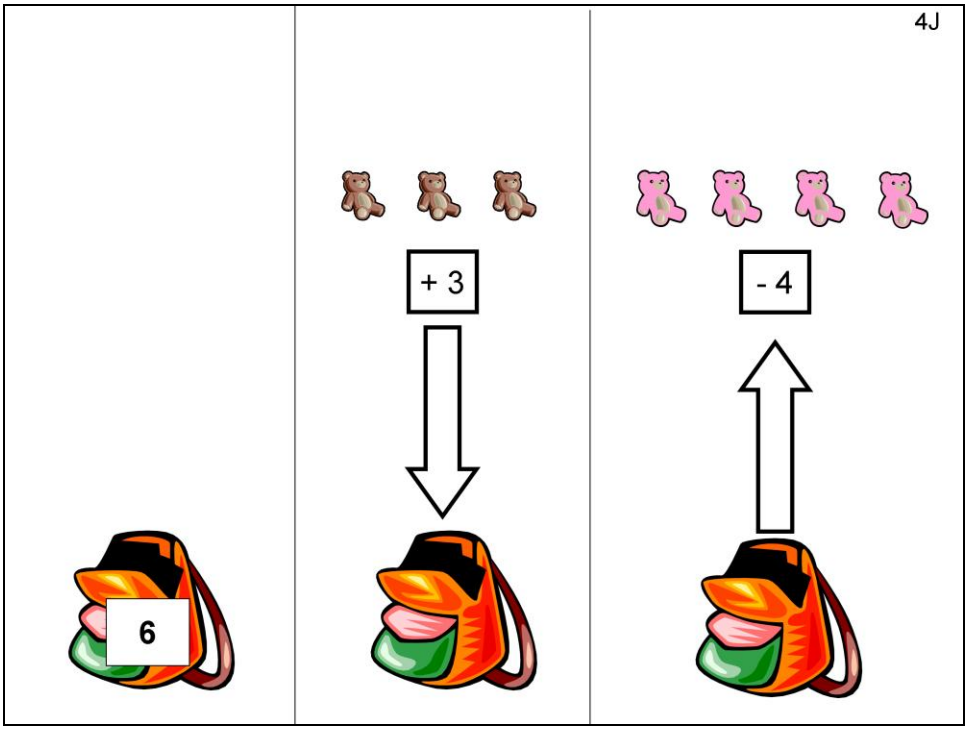

7
+5
4H
-5



This item is a bit more difficult because now we take away more bricks than we put in.

Start with 9. Add 4 or a different colour. Take 5 away. The child will see that one more was taken away.

How many bricks are in the row now?

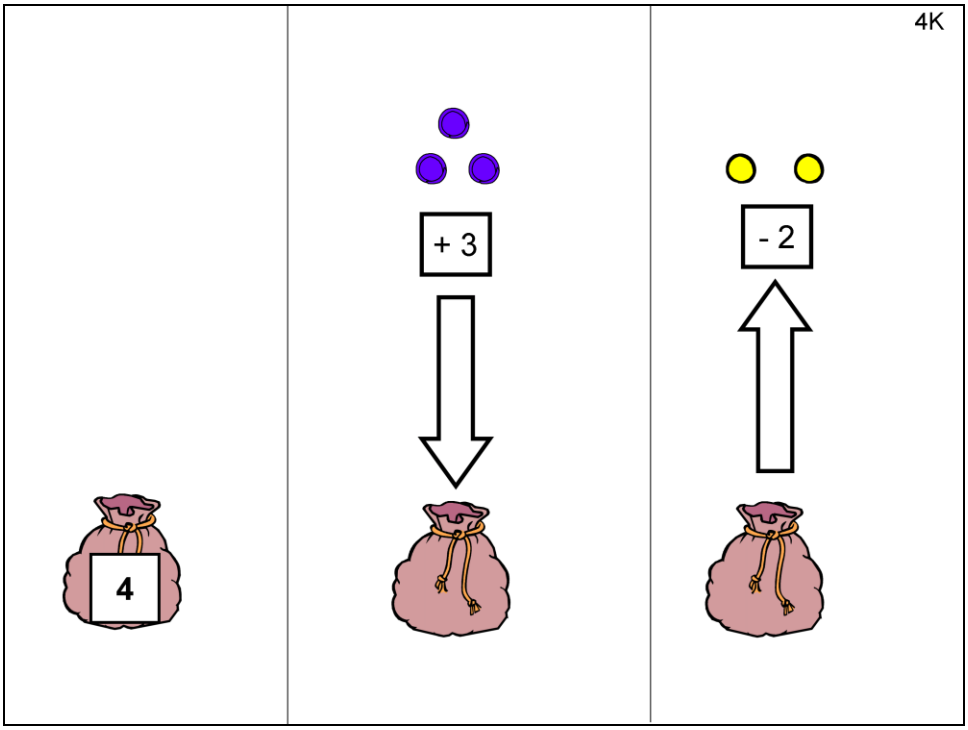


A girl had 6 teddies in her bag.

Then mummy gave her 3 teddies.

Then her sister took 4 teddies from the bag.

How many teddies are in the bag now?



There are 4 balls inside the bag.

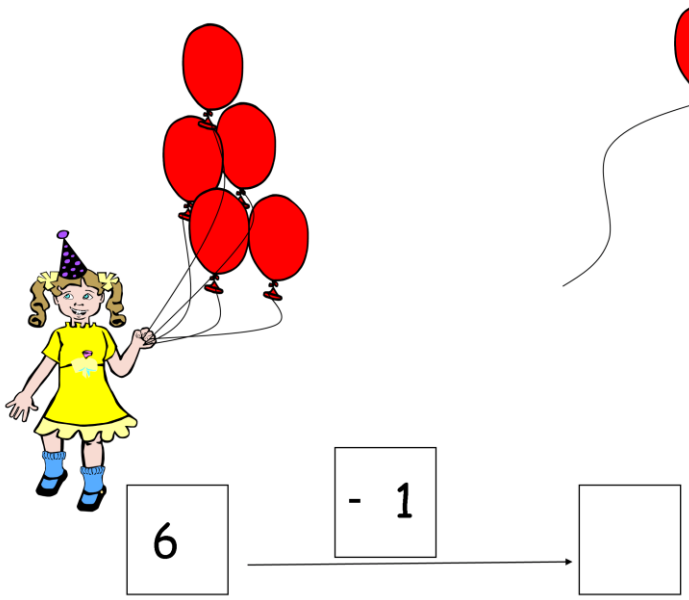
Then a boy came and put in 3 blue balls.

Then his friend took 2 yellow balls out.

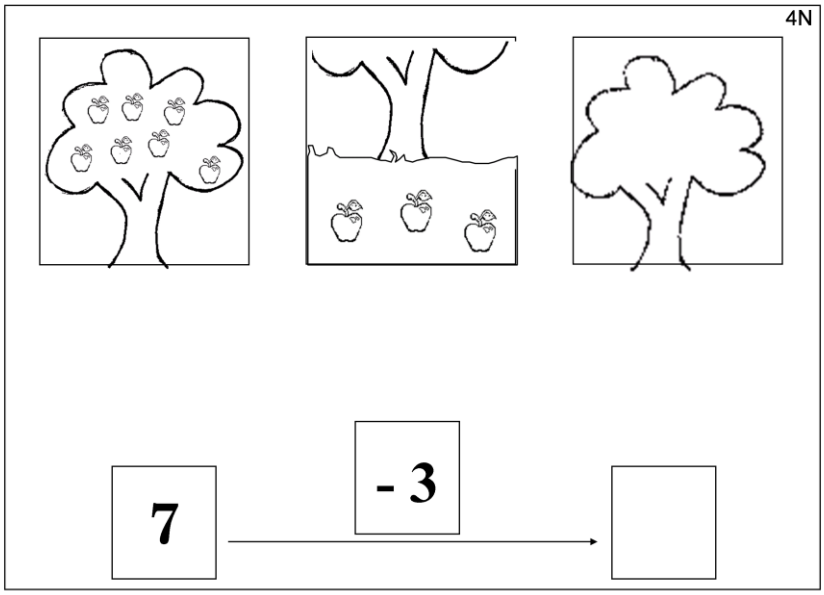
How many balls are in the bag now?

ORANGE

A girl has one cat and she has two dogs. How many animals does she have altogether? Write your answer in the box.



The girl had 6 balloons. One flew away. How many does she have now?



There were 7 apples on a tree.

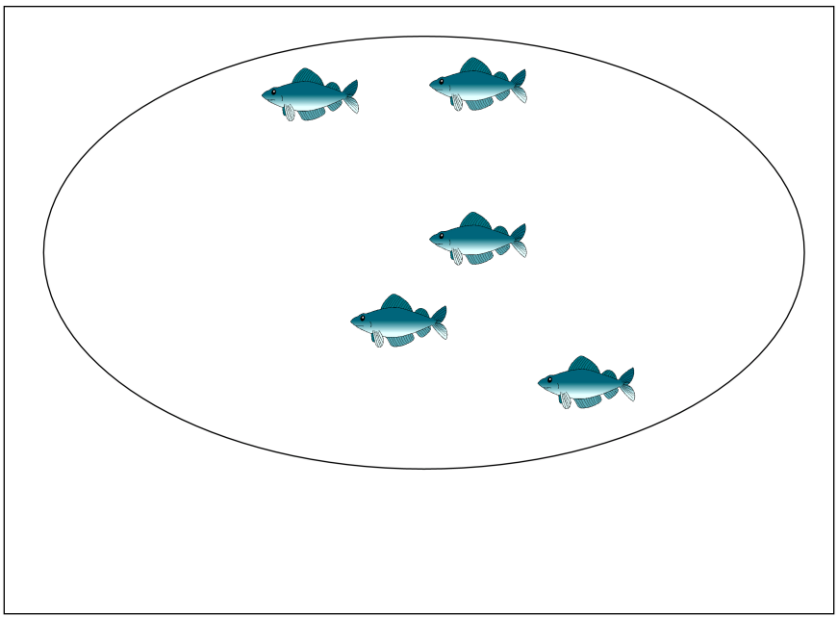
3 apples fell off.

How many apples are on the tree now?

Draw the apples on the tree.

Write the number in the box.

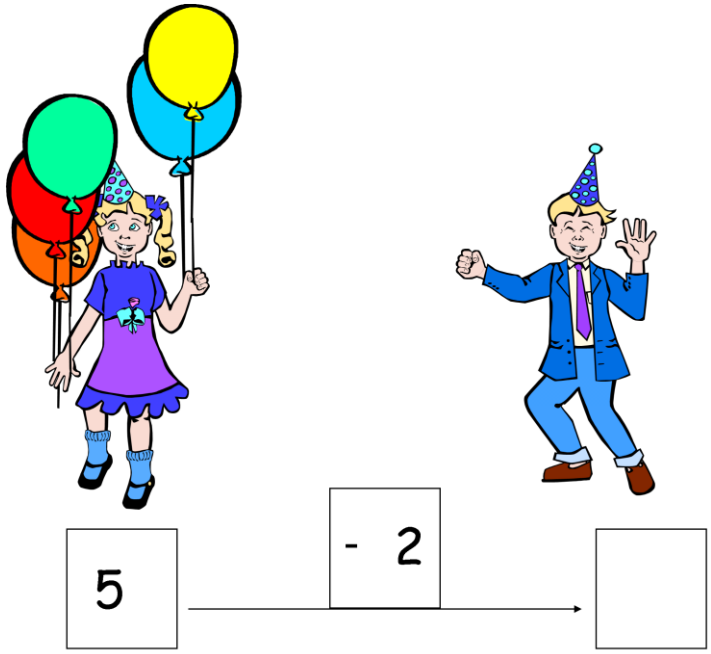
40



There are 9 fishes in the pond.

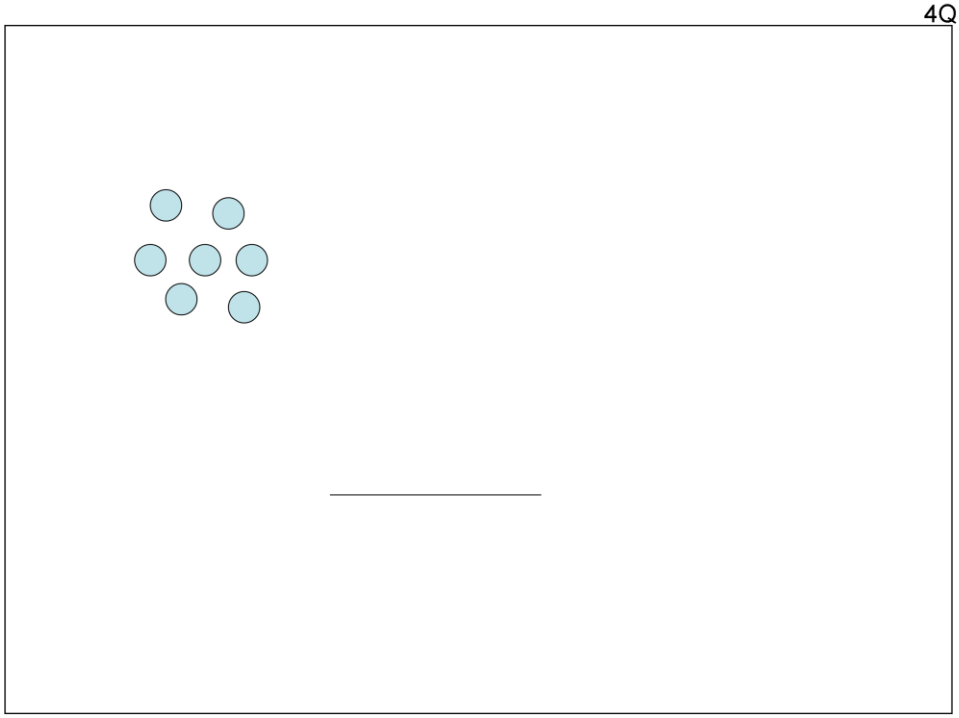
You can see 5 of them.

Can you finish drawing the fishes in the pond?



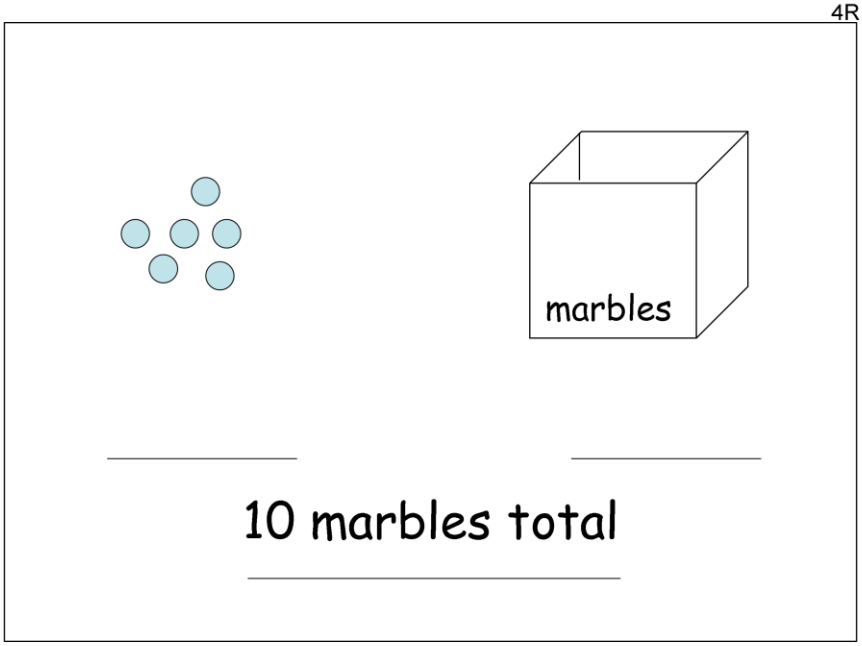
A girl had 5 balloons. She is going to give her friend 2 balloons. How many will she have left?

4Q



A boy has 7 green marbles and 3 yellow marbles. Draw the yellow marbles.

How many does he have altogether? Write the answer on the line.



A boy has 10 marbles altogether.

How many can see outside the box? Write the number on the line.

The other marbles are in the box.

How many marbles are in the box? Draw them on the front of the box.

Write your answer on the other line.

Maths session 5

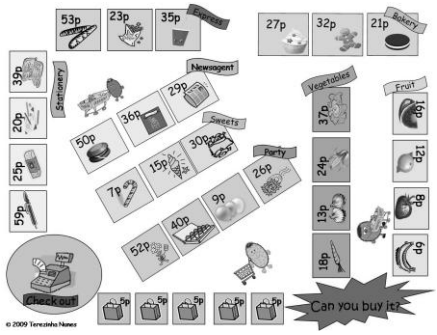
BK 5

Child's name: _____

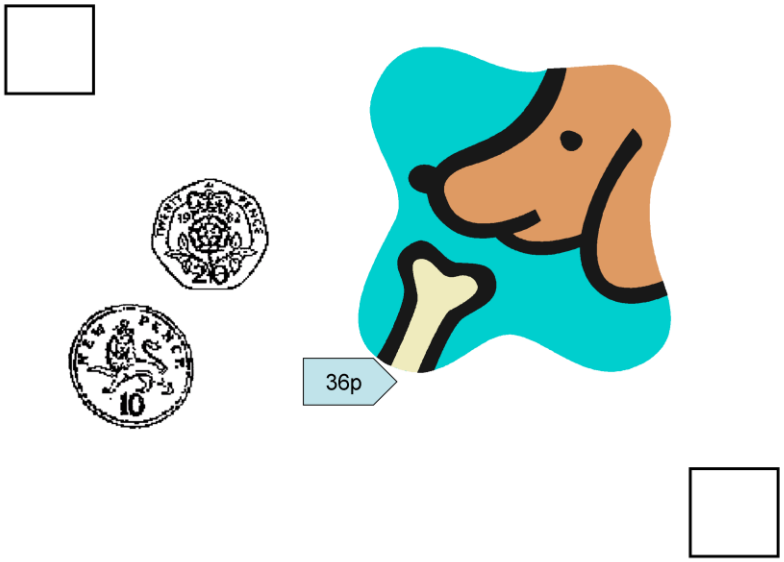
Date: _____

School: _____

Note:



It's time for the children to start playing Board game 3, 'Can you buy it?'
Now they have THREE board games to play!!
Also remind them to go to the Games corner at
http://www.education.ox.ac.uk/research/resgroup/cl/ndcs/



PURPLE

Have available 1 x 20p, 1 x 10p for first part

1 x 5p, 2 x 2p, 2 x 1p for second part

Say to the child: 'Sean wanted to buy his dog a chew but he only had these coins, how much does he have?'

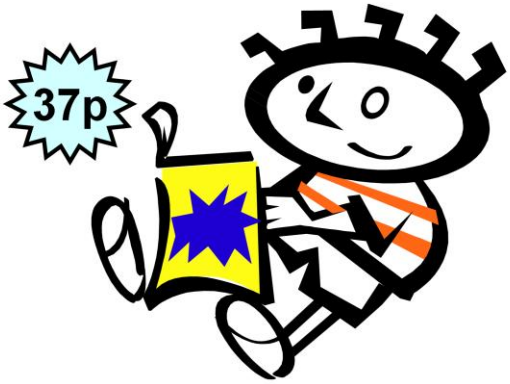
If stuck, encourage the child to identify the largest coin and count on.

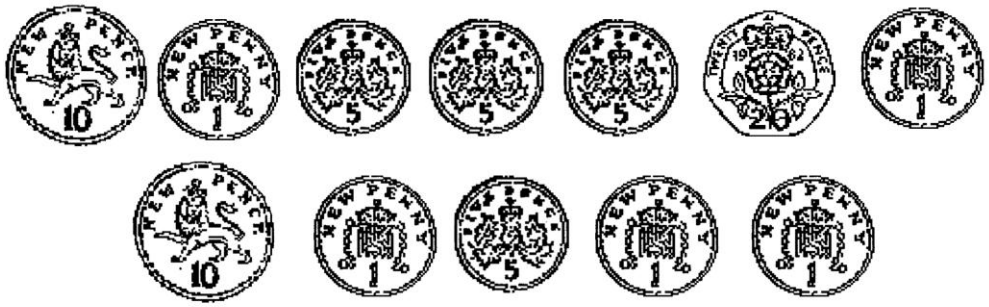
'Can you write the amount in the top box?'

'The chew costs 36p. How much more does he need to buy it?'

Child needs to count on from 30p with the coins left on the table to reach 36p.

' Can you write the amount in the bottom box that he still needs and draw the coins you used?'





Have available on table 1 x 20p, 2 x 10p, 4 x 5p, 5 x 1p

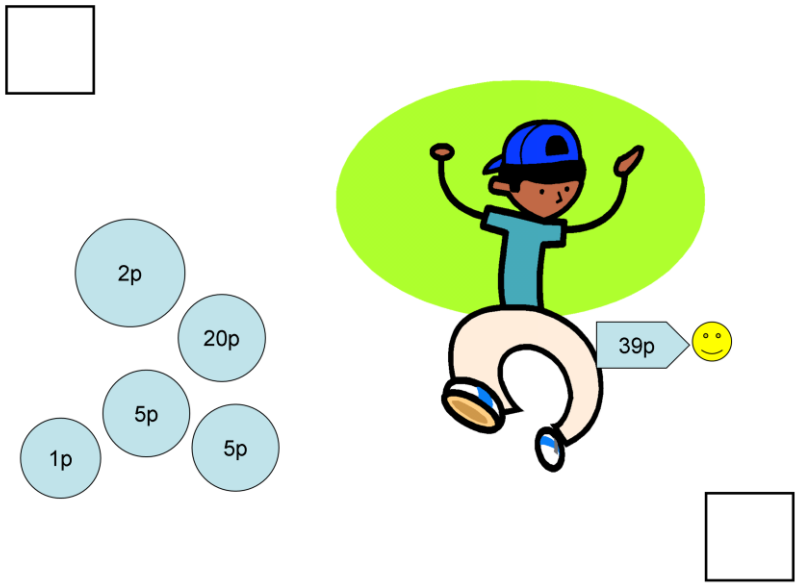
Say to the child:' Max wants to buy his favourite comic which costs 37p.

Which would be the **least** number of coins you could use to pay the shopkeeper?' (BSL: Small number of coins?)

If the child is stuck, ask them to identify the largest value coin(20p, or they may choose 2 x 10p to make 20) and then count on with the smaller coins.

If the child chooses 2 x 10p you might ask them about the comparison with 20p coin , same value but different coins, to see if they are seeing the equivalence.

Ask the child to cross with a coloured pencil which coins they chose to make the 37p.



Have available 1 x 20p, 2 x 5p, 1 x 2p, 1 x 1p for 1st part,

then 1 x 5p, 3 x 2p, 3 x 1p for second part

Say to the child :'Teak is happy because he has almost saved enough money to buy the stickers he wants which cost 39p.

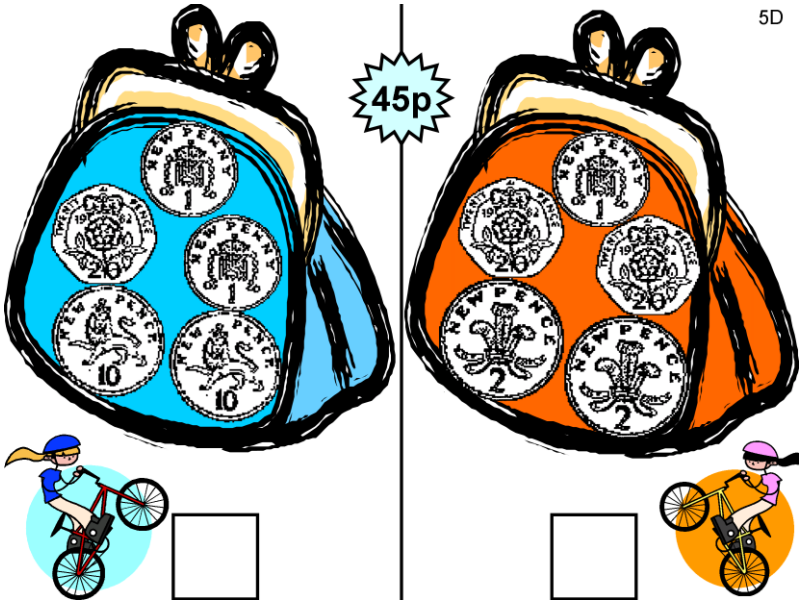
He has the coins in the picture. How much does he have? Can you write the amount in the top box?'

How much more money does he need to save for the stickers?

Child needs to count on from 33p to 39p using the coins still left on the table.

'Can you write the amount he needs to save in the bottom box? You could draw the coins you chose next to it.'

5D



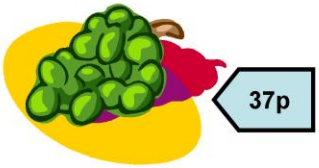
Have available on table: 2 x 10p, 3 x 20p, 2 x 2p, 3 x 1p.

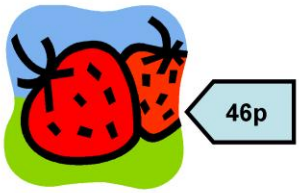
Ask the child to match the coins to the amounts in the two purses, then say:

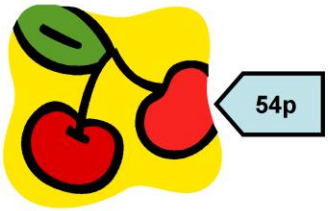
‘Sarah and Su-Yung want to put stickers on their bicycles .The stickers cost 45p per pack. How much does each girl have?’

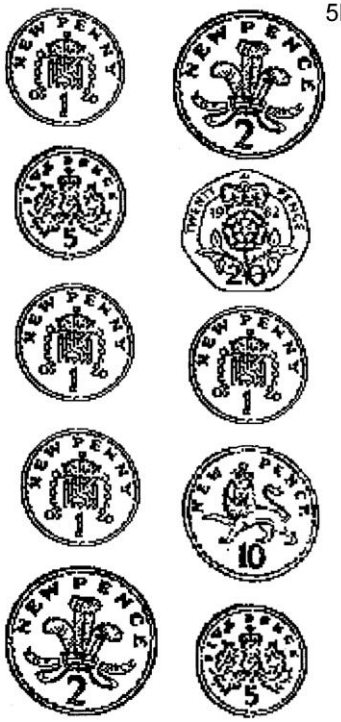
Ask the child to count out loud how they are totalling the coins. If they are stuck, ask them to identify the coin in the purse with the greatest value (20p) and count on from 20 with the next largest value coin. They can use their fingers to help them each time and then relate this to the coins.

‘Which girl has the right money to pay for the stickers? ‘ ask the child to tick which girl they think.









Have available on table: 1 x 20p, 1 x 10p, 2 x 5p, 2 x 2p, 4 x 1p

Say to the child:' Tom went to the supermarket and wanted to choose a box of fruit.

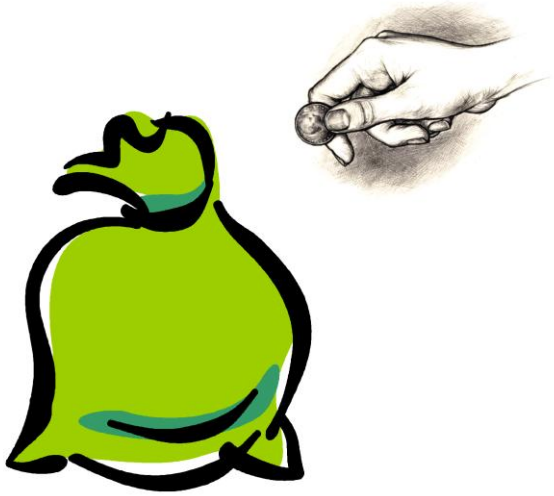
He had the choice of grapes, strawberries, or cherries.

Can you count his money to see how much he has?'

When you know how much he has, can you tick which fruits he has the money for?'

If the child is stuck, ask them to identify the largest value coin on the table (20p) and count on from that with the next largest, using fingers to help if they need and then relate to the coin, and so on until they total 48p.

Child should see he has choice between the grapes and the strawberries but not the cherries.



Money in the bag activity (1p,2p, 5p,10p, 20p,50p)

You will need:

Cloth bag

5 x 1p, 5 x 2p, 5 x 5p, 5 x 10p, 5 x 20p , 1 x 50p

To play:

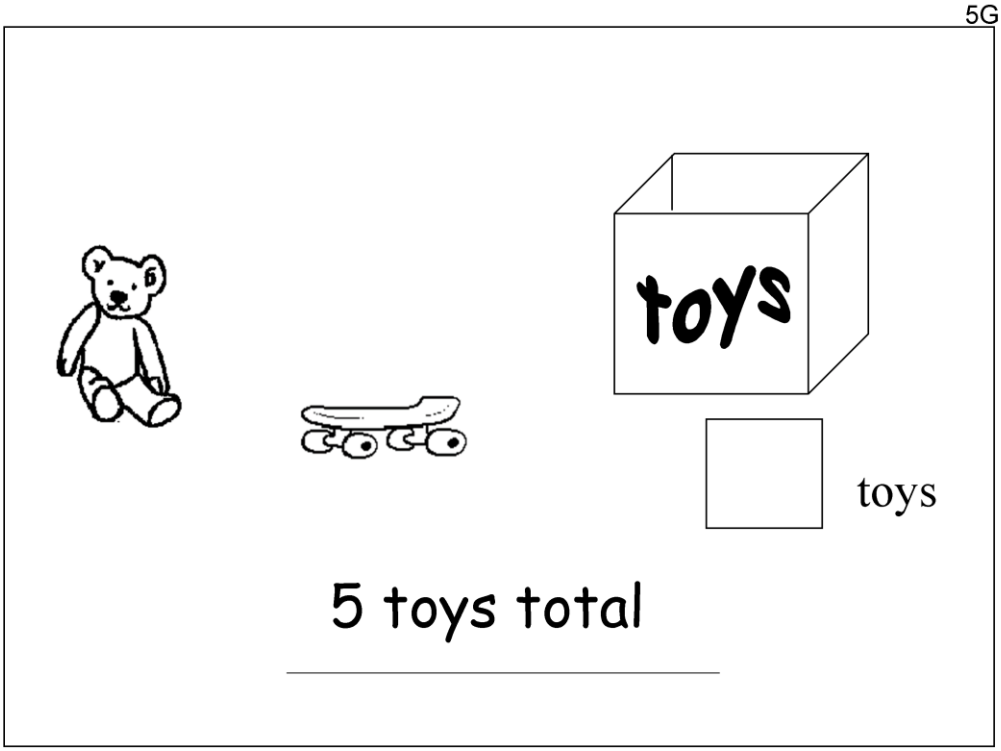
First player pulls 2 coins from bag and lays them on table in front of them. They start with the highest value coin and count on with the smaller coins and says how much they have in total.

Second player repeats this.

3. Play continues in turn with each player drawing **one** coin and counting on from the previous amount saying how much they now have in total.

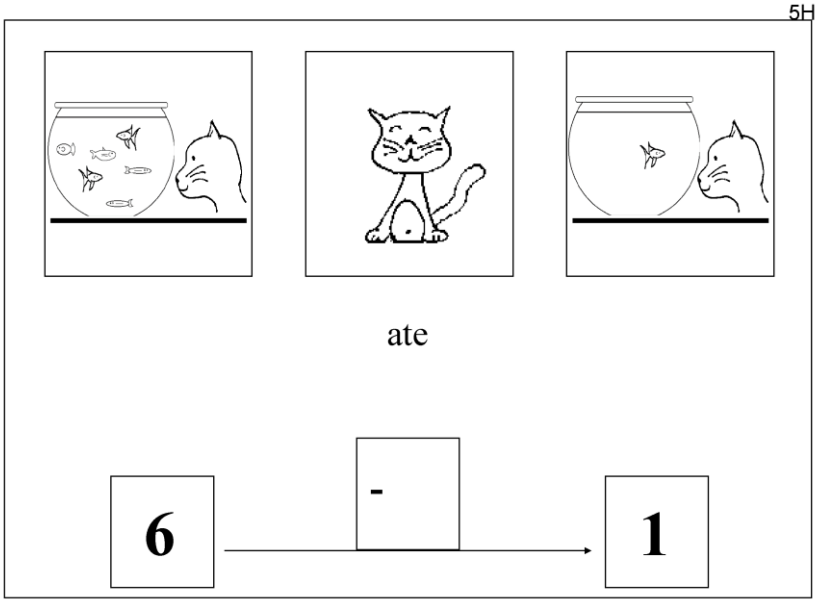
4. The winner is player who has the most money after 6 draws.

The activity should be played speedily so that the children have to become quick at identifying the larger amount and counting on with a smaller. For example if they have built up a total of 16p (10p, 5p, 1p), then they pick out the 50p, they need to identify the larger value coin and count on, so 50+10+5+1.



ORANGE

The boy has 5 toys altogether.
You can see 2 of his toys.
How many toys are in the box?
Write your answer in the box.



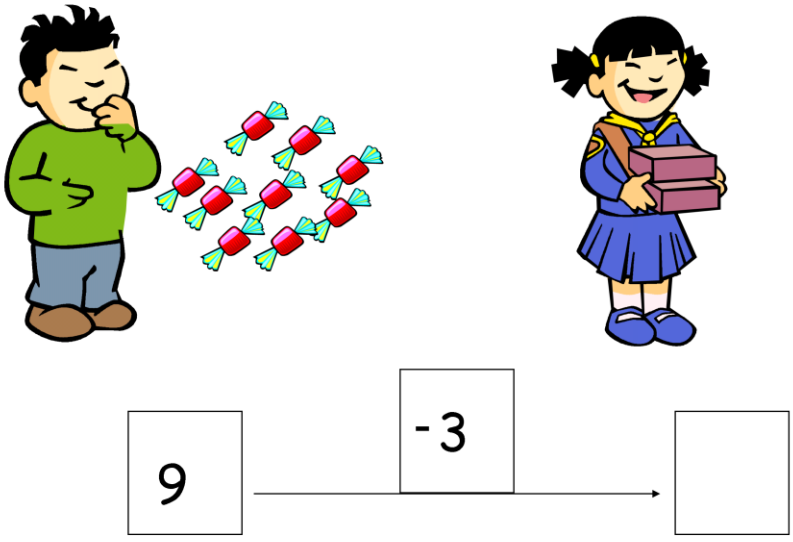
There were 6 fishes in a bowl.

The cat ate some.

Now there is one fish.

How many fishes did the cat eat?

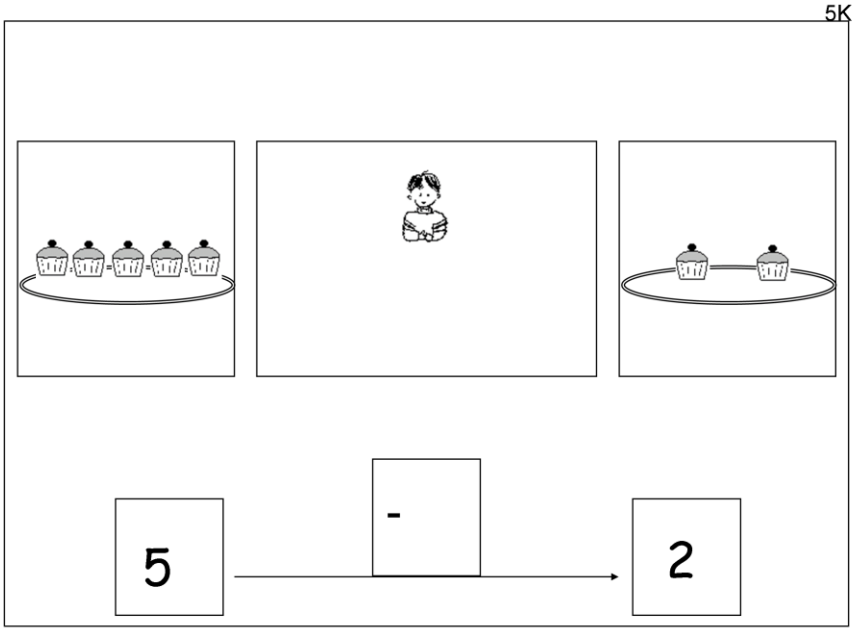
Write the number in the box.



The boy had 9 sweets. He gives 3 to his friend. How many does he have now?

3		7 total

A girl has 7 lollipops. 3 are lemon and the others are strawberry flavour.
Draw the strawberry lollipops. How many are strawberry lollipops?



There were five cakes on a plate.

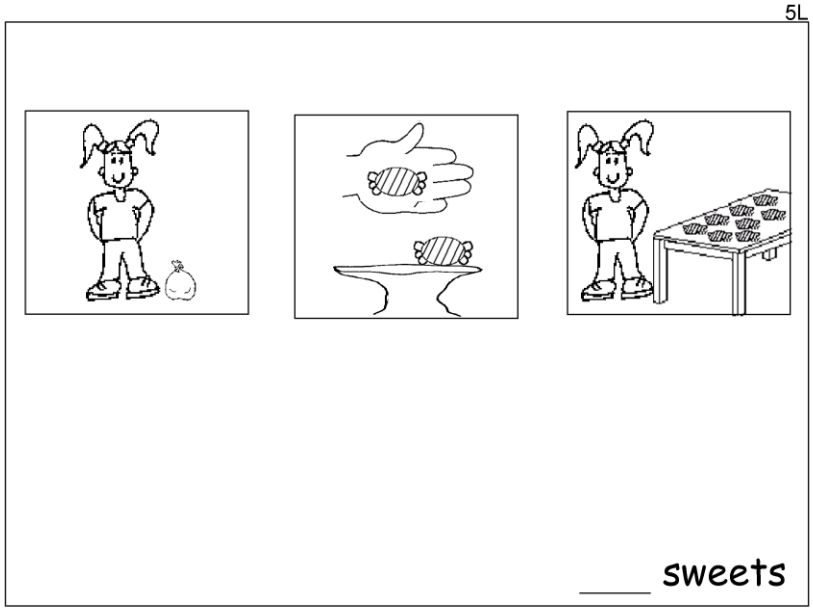
The boy ate some.

Now there are 2 cakes on a plate.

How many cakes did the boy eat? Draw the empty cups next to the boy.

Now write the number of cakes the boy ate in the box.

5L



The girl had some sweets in her bag.
Her Mum gave her 2 sweets.
Now she has 8 sweets.
How many sweets did she have in the bag?
Put your answer on the line.

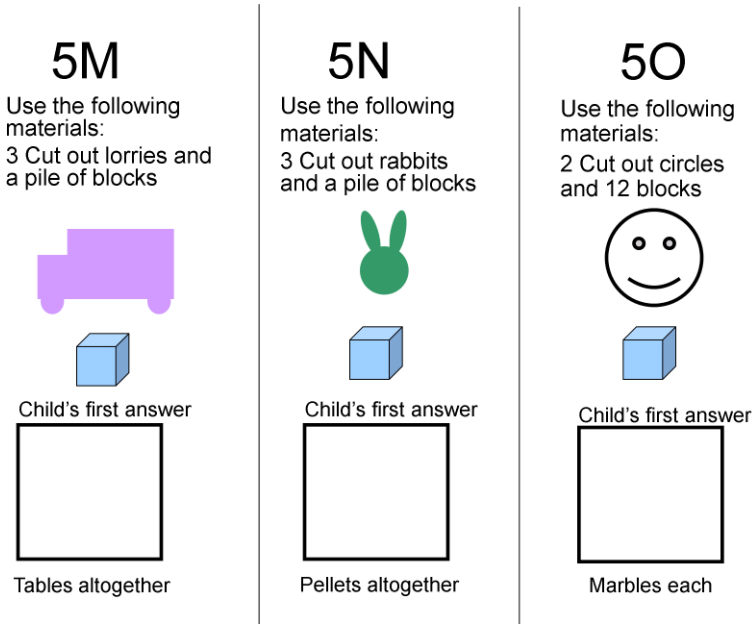
Correspondence

The tasks in this section will require the children to put one set of items in one-to-many correspondence with another set. We have cut-out objects that the children can use to act out the stories. You can suggest to them that they can use the bricks to be the “pretend tables” or the “pretend pellets of food for the rabbits”.

In the first few problems, the children may need a bit of help. For example, you may have to encourage them to “put the pretend tables (the bricks) on top of the lorries”. Some children may do this for one lorry and stop so you can ask about the other lorries. When the children start to understand these problems, they will do this with little help. They may also need help with the sharing items – starting up by giving one to each recipient until they have distributed all the items.

In some of the tasks, instead of using manipluatives we ask them to draw. This should help them see that they can use drawings and diagrams to solve problems too.

GREEN



5N Cut out lorries and bricks to be the make-believe tables.

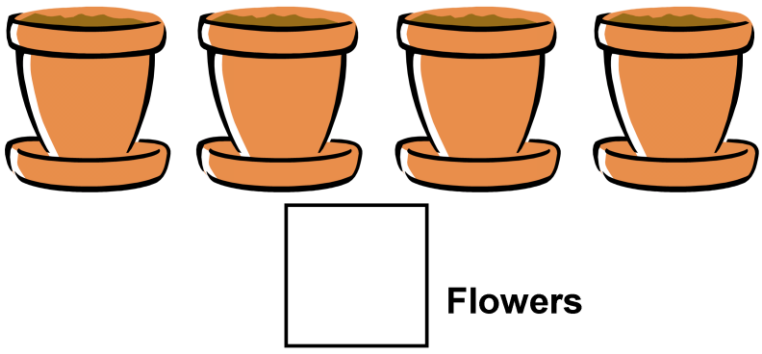
Three lorries were bringing tables to the school. Inside each lorry there were 4 tables. How many tables were they bringing to the school? (The children can make the row of lorries and put the bricks on top to try to solve this).

5O Cut out rabbits and bricks to be the pellets of food

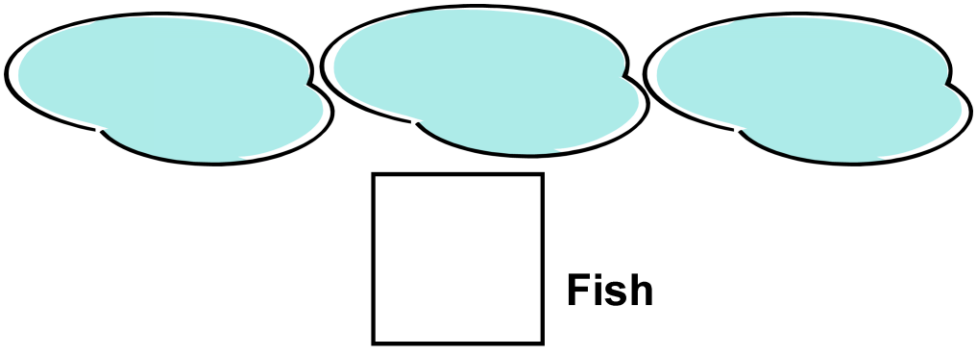
A boy has 3 rabbits. Each rabbit needs to eat 5 food pellets every day. How many food pellets does he use for his rabbits every day?

5P Blocks to represent marbles and cut out faces

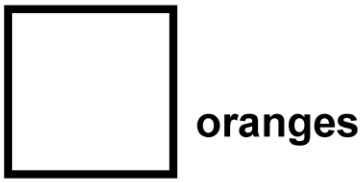
Two boys share 12 marbles. How many marbles will each boy get?



1D If the florist plants 4 flowers in each pot how many flowers will he have altogether? (encourage the child to draw the flowers)



1E In each pond live 3 fish how many fish will there be altogether? (encourage the child to draw the fishes)



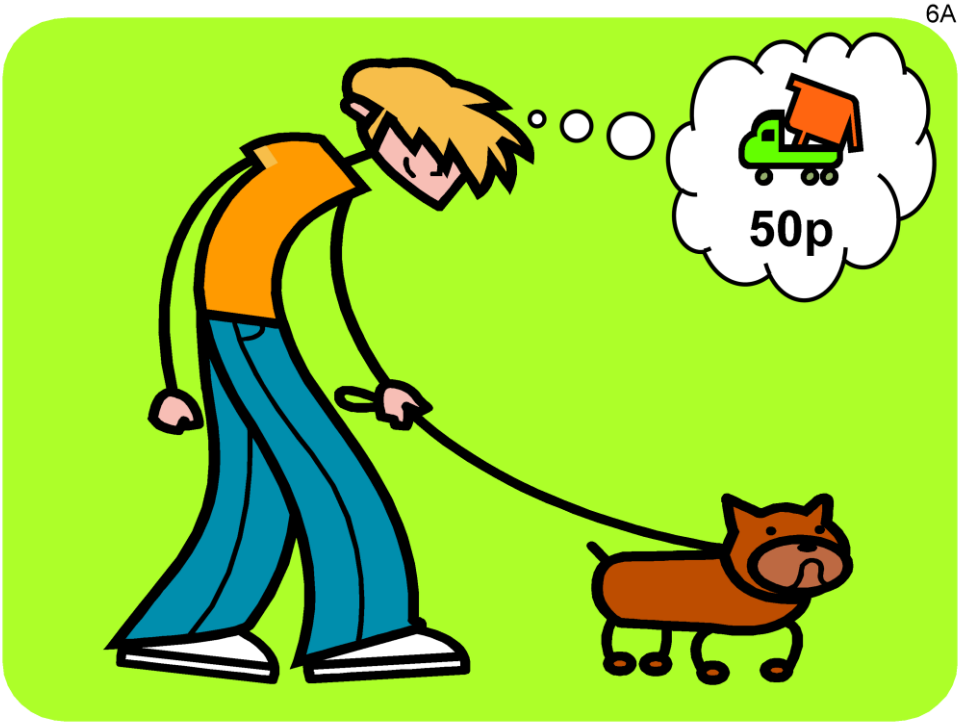
1F Four children are sharing 12 oranges. How many oranges will each child get? Encourage child to draw the oranges

Maths session 6 BK 6

Child's name: _____

Date: _____

School: _____



PURPLE

Have available 7 x 10p (also have 50p coin, 20p coin 5p coin, 2p coin ,ready for end)

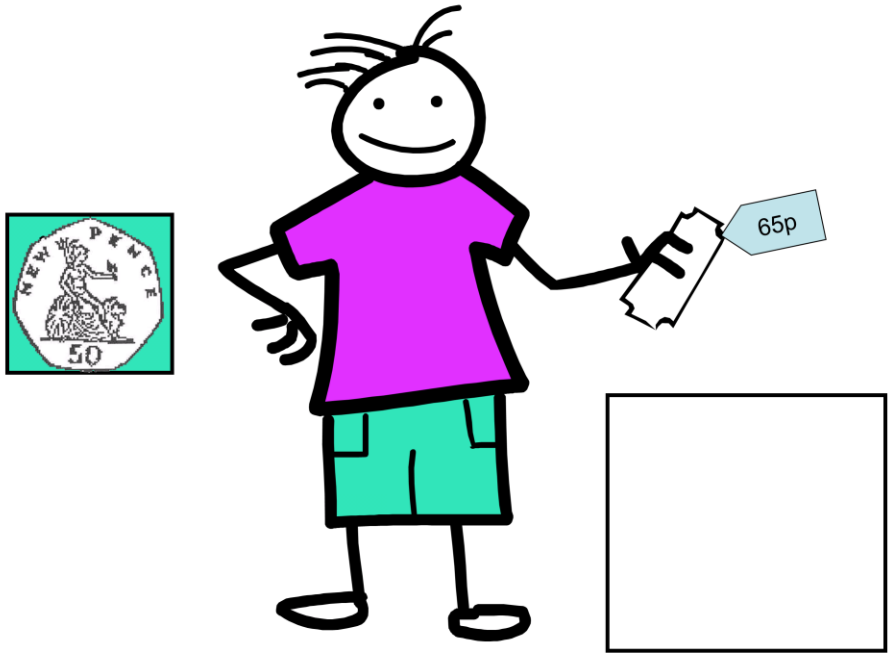
Say to the child: 'Dan gets 10p every time he walks his Granddad's dog.

How many walks will he have to do before he can afford to buy the toy lorry for his little brother, which costs 50p ?'

Child needs to count in 10p's to 50.

'Is there a coin that you know of which is worth that amount ? ' (Have 50p available with 20p coin, 5p coin, 2p coin also) See if child recognises 50p.If they are stuck ask child to look for 50 written on coin.

Talk about the equivalence of the 5 x 10p they have counted out and 50p coin.



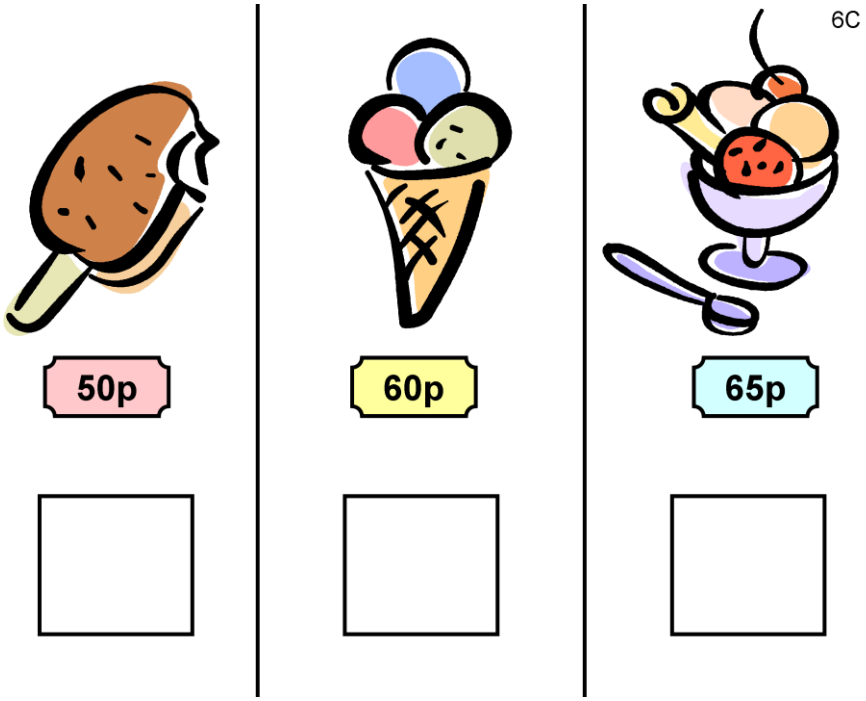
Put out 50p initially and say to the child:

'John has to pay his bus fare which is 65p He only has this coin in his pocket. How much money must he borrow from his friend?'

If stuck, ask the child if they recognise the 50p coin, how much is it worth. If not sure look for the number on the coin. Talk through how much this is with fingers, relate it to how many 10p's this is equivalent to, as with previous question.

When they are working out how much more money he needs to get to 65p, have 1 x 10p, 3 x 5p , 5 x 2p, 2 x 1p on table for them to use if they have worked it out on their fingers, see if they can relate this to a coin.

Ask child to draw coins chosen in box.



Have available on table: 1 x 50p, 2 x 20p, 3 x 10p, 2 x 5p

Ask child if they recognise the 50p coin, how much is it worth. If not sure look for the number on the coin. Talk through how much this is with fingers, relate it to how many 10p's this is equivalent to.

Say to the child:' The ice creams are different prices, can you put out the coins to pay for the first ice lolly(50p) and see if you have the money to buy it.'

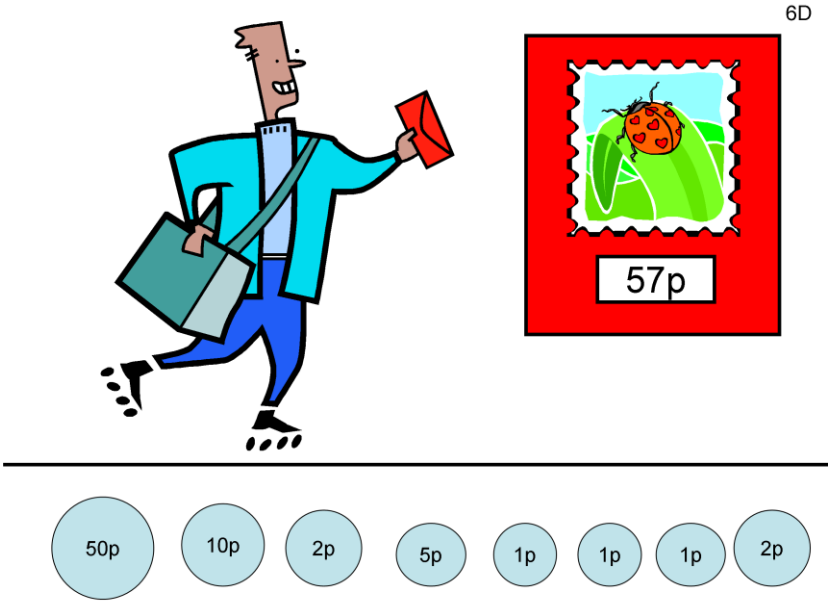
See if the child can use the 50p or if they combine smaller coins to make amount. Afterwards, talk about equivalence (50p coin and 2 x 20p + 10p etc.)

'Tick the box if you can buy the first ice-lolly.'

'Now put the money all together again and see if you have the money to buy the middle ice-cream.' See if the child counts on from 50p, if they are stuck see if they can select the largest coin and count on from 50p.They may chose a combination of smaller coins instead, if so talk afterwards about how different combinations of coins (50p + 10p and 3 x 20p) can total the same amount and which is easier to count.

'Then put the money together again and see if you have the money for the last dish of ice-cream'

Repeat procedure of identifying largest value coin if necessary and discuss which combination of coins they have chosen, relating to equivalence of values.



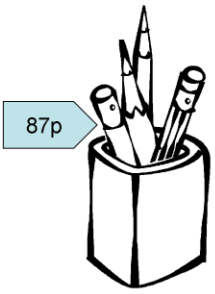
Have available the following coins on table: 1 x 50p, 1 x 5p, 1 x 10p, 2 x 2p, 3 x 1p

Say to the child: 'Jeevan needs to buy a stamp to send a letter to his pen-friend in Australia.

The stamp will cost him 57p from the machine. He needs to put the **exact** money into the machine, which coins should he choose?'

If the child is stuck, get them to identify the largest value coin, then to count on to the amount they need with their fingers, relating this to the coins available.

'Tick the coins you choose with a coloured pencil.'



Have available 1 x 50p, 4 x 20p,2 x 10p, 2 x 5p, 2 x 2p, 3 x 1p

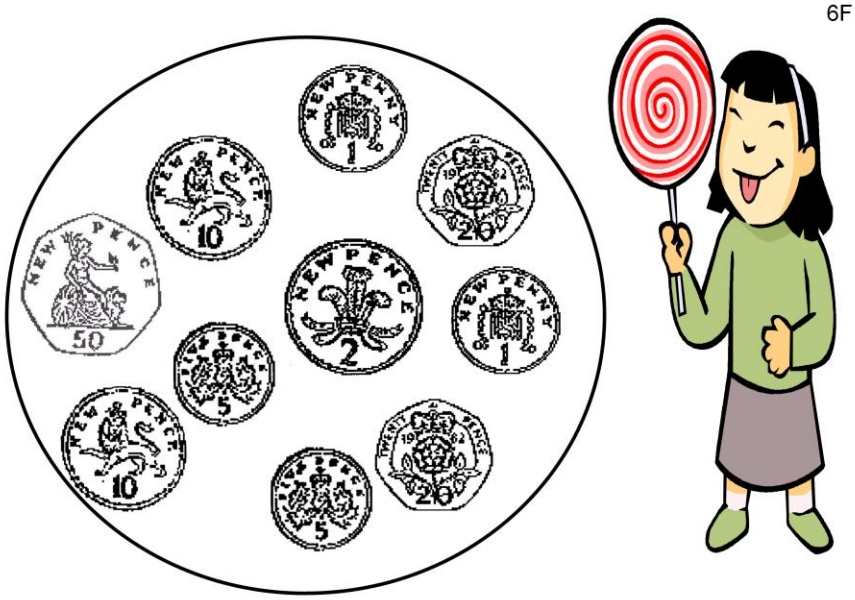
Say to the child:' Julia has been doing some good work at school and she has been given a special treat with some extra pocket money. She now has 70p to spend but she wants to buy some new pens which are 87p.

Her big sister said she would lend her the rest of the money.

How much more does Julia have to borrow from her sister?'

Ask child to count on from 70p with the coins available until they reach 87p.

'Can you draw which coins she borrowed from her sister?'

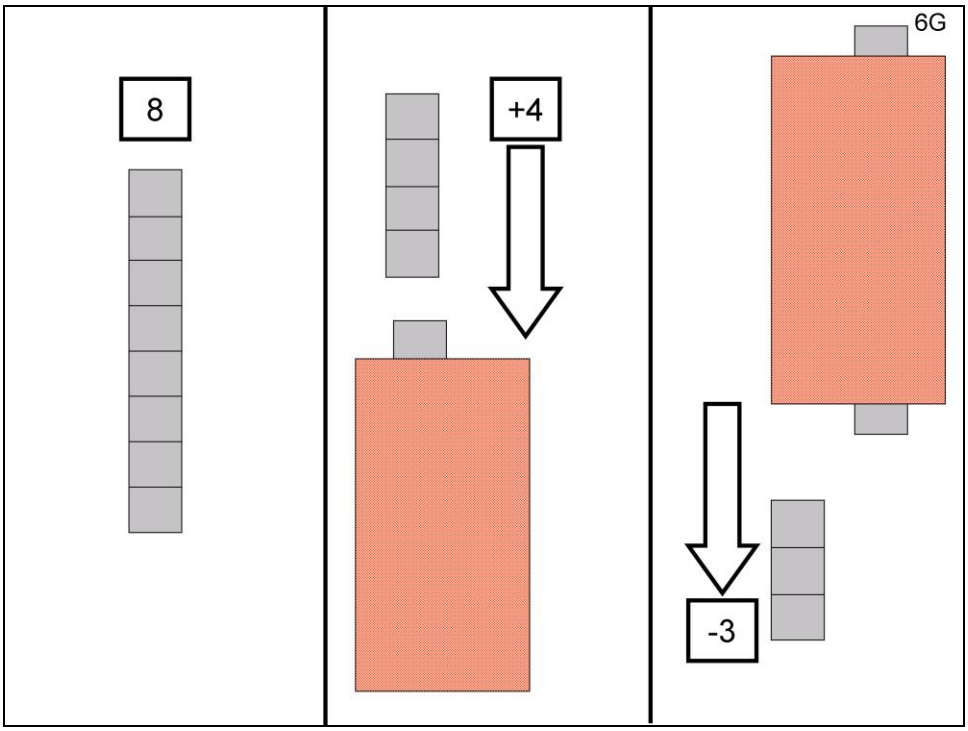


Have the following coins available on the table 1 x 50p, 2 x 20p, 2 x 10p, 2 x 5p, 1 x 2p, 2 x 1p

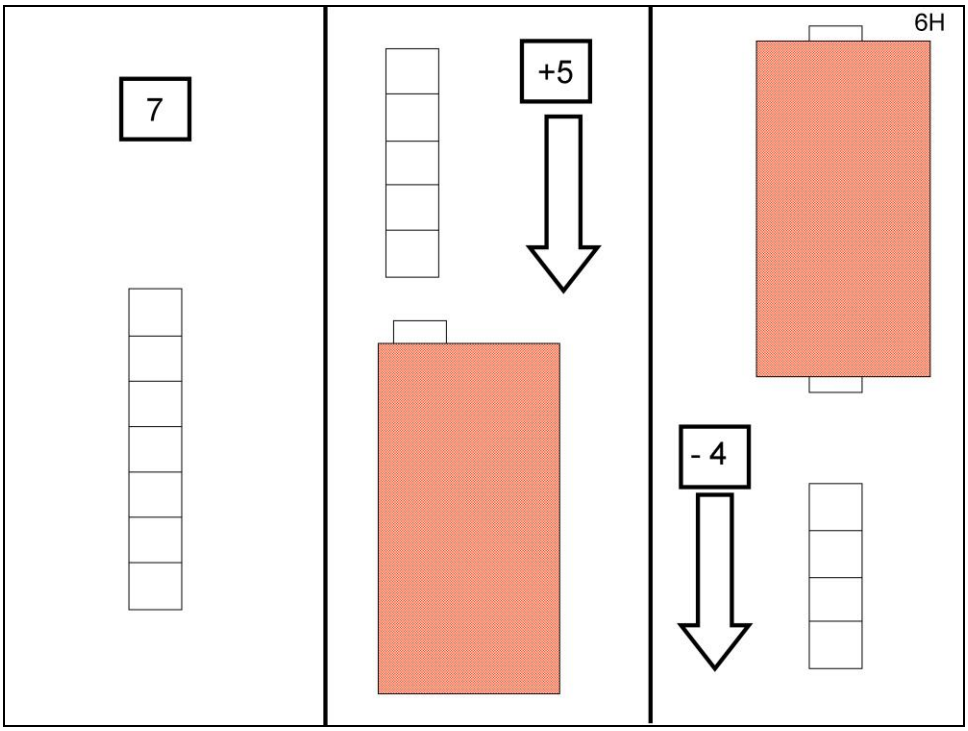
Say to the child :'If Jasmine could pick three coins, which ones should she choose to have the most money to buy some sweets?'

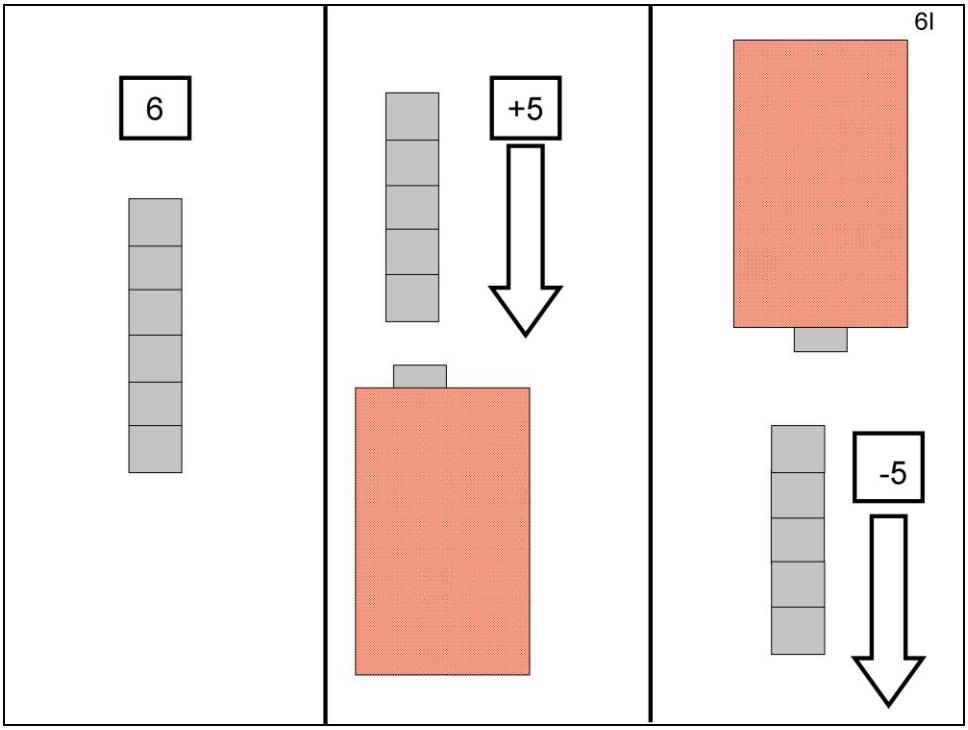
Depending on which coins the child chooses, see if they have used their knowledge of the values of the coins, if not talk further about equivalence of e.g. 2 x 10p and 20p etc.

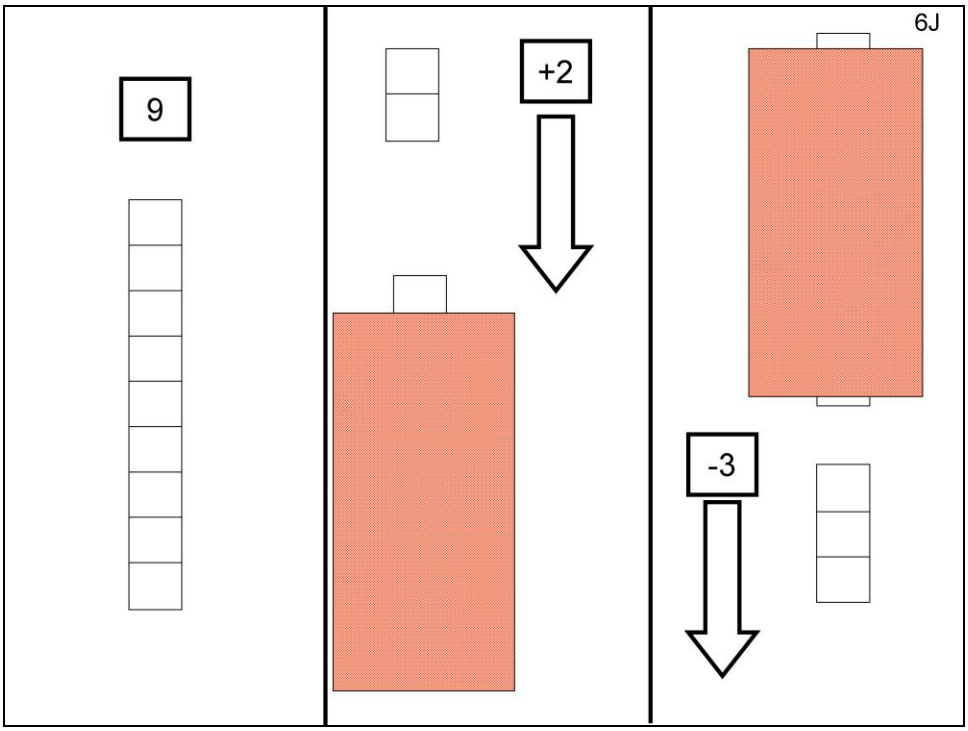
'Tick the coins you have chosen.'

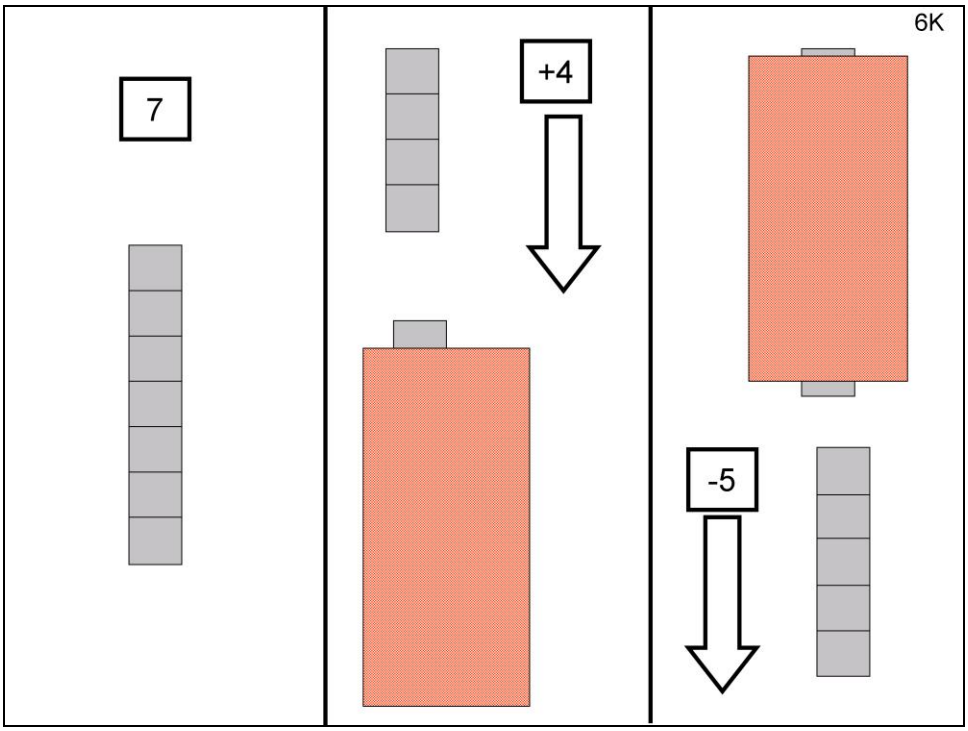


YELLOW


7
+5
6H
- 4


6
+5
6l
-5

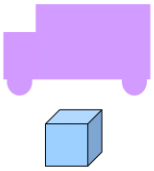

9
+2
6J
-3


6K
7
+4
-5

6L

Use the following materials:

4 cut out lorries and pile of blocks



Child's first answer

Bags altogether

6M

Use the following materials:

8 Cut out rabbits and a pile of blocks

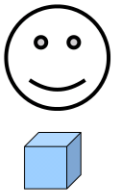
Child's first answer

Tables altogether

6N

Use the following materials:

2 cut out girls and 16 blocks



Child's first answer

Sweets each

GREEN

6L Four lorries are carrying bags of sand. Each lorry carries 5 bags. How many bags are they carrying in all?

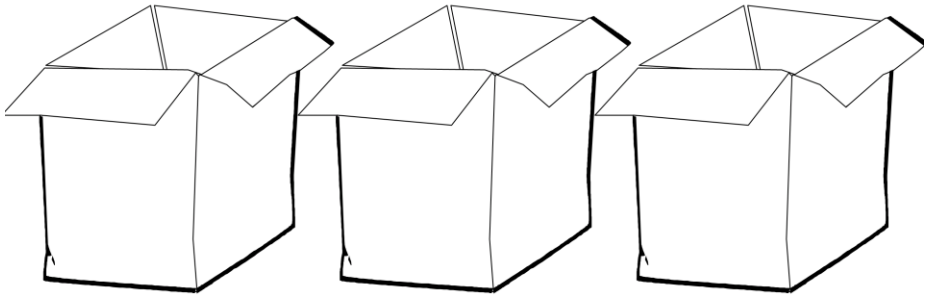
6M Cut out rabbits and bricks to represent the tables

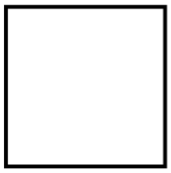
There are 8 rabbits in the school. We need tables for the rabbits. The rabbits like to sit together, 2 rabbits at each table. How many tables do we need?

6N Using bricks for the sweets and tokens for the girls

Four girls are sharing 12 sweets. How many sweets will each one get?

Suggest that the children can use the tokens to represent the girls and the bricks to represent the sweets. If the children can't get started, suggest that they get the 12 bricks. Ask how they are going to share the sweets to the 4 girls. When they finish, ask how many sweets did each girl get.



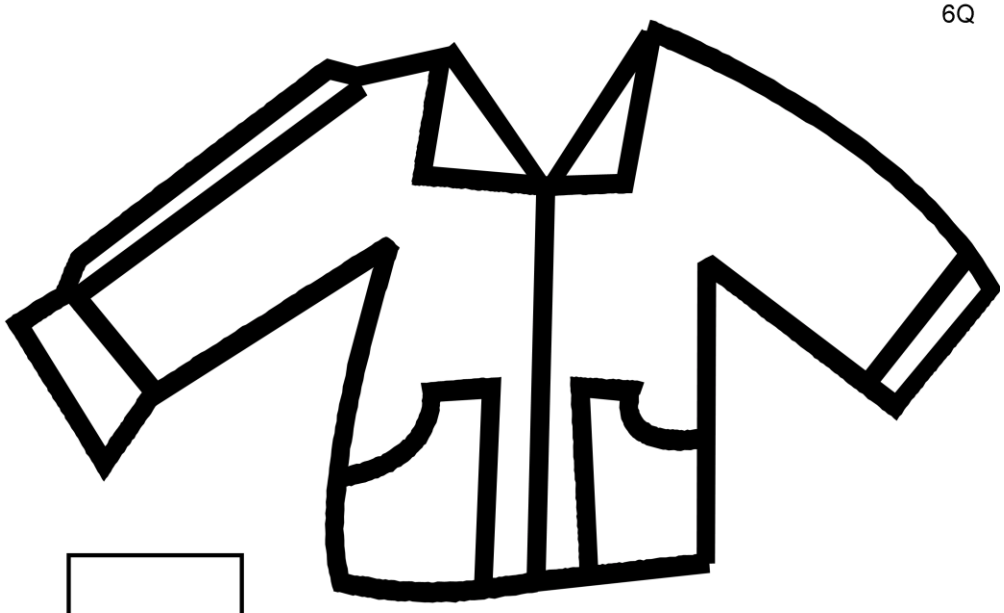


Cakes

Mum made some cakes for the school fayre. She puts four cakes into each box how many cakes did she make altogether?

☐ Balls

I have 12 balls to put on 3 Christmas trees. How many balls will go on each tree?

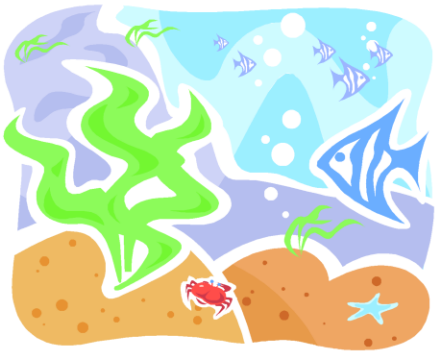


Conkers

We picked some conkers and I put 5 in each pocket, how many conkers do I have altogether?

Maths session 7

BK 7

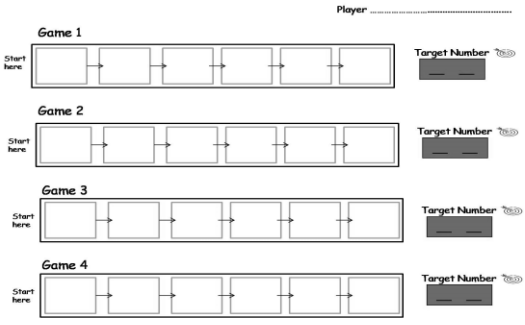


Child's name: _____

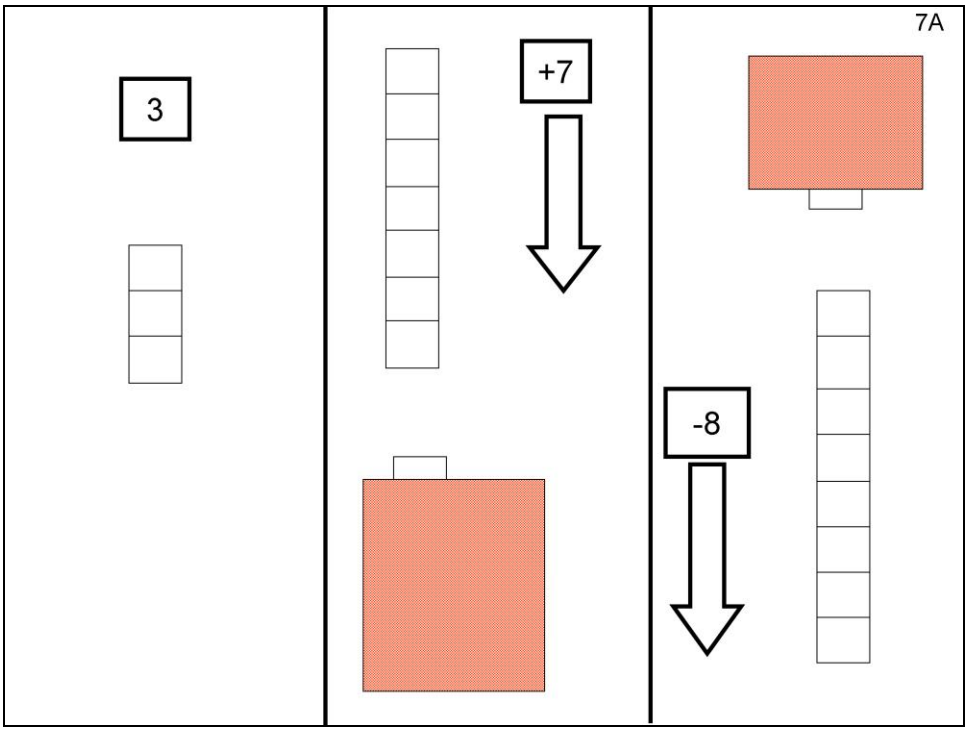
Date: _____

School: _____

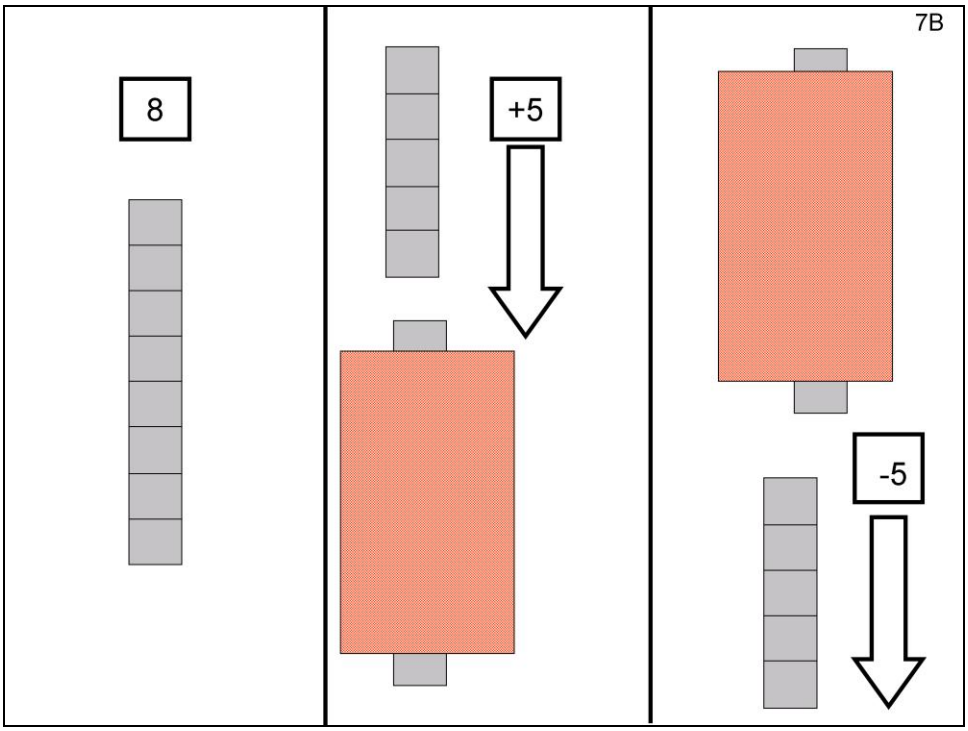
Note:

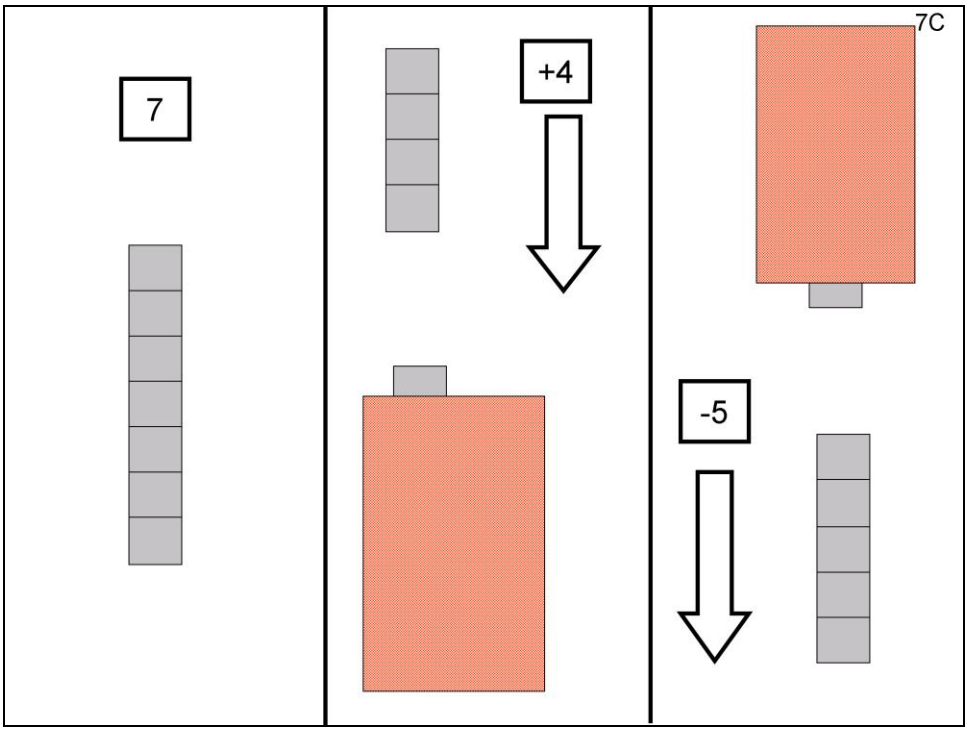


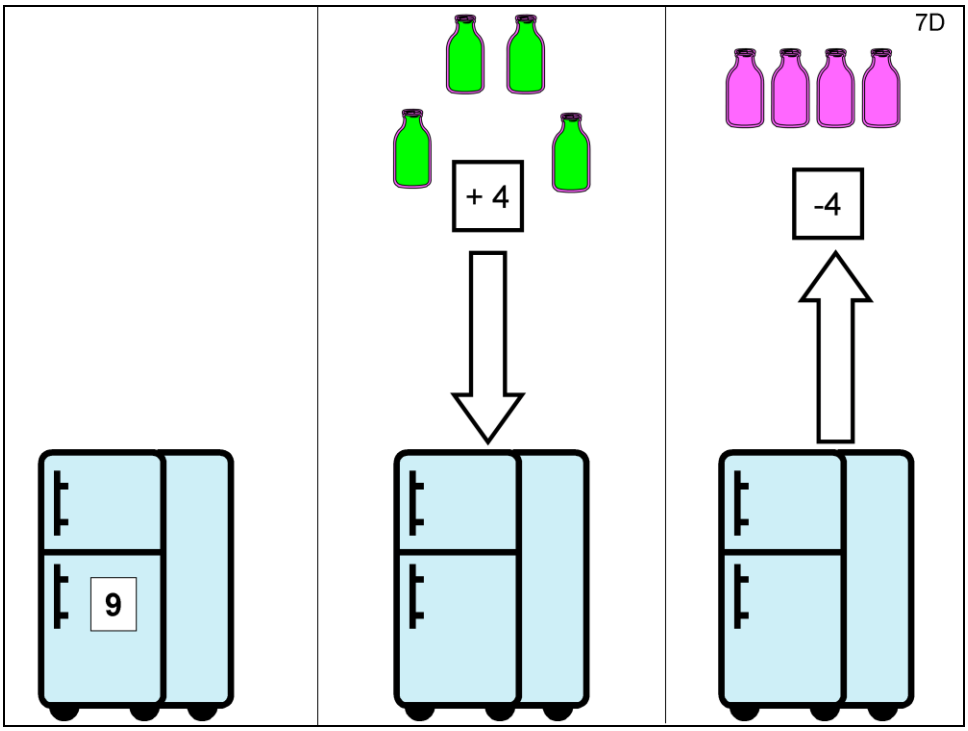
It's time for the children to start playing Board game 4, 'Get your target number!'
Now they have FOUR board games to play and play again!!
Also remind them to go to the Games corner at
http://www.education.ox.ac.uk/research/resgroup/cl/ndcs/



YELLOW


7B
8
+5
-5


7
+4
7C
-5

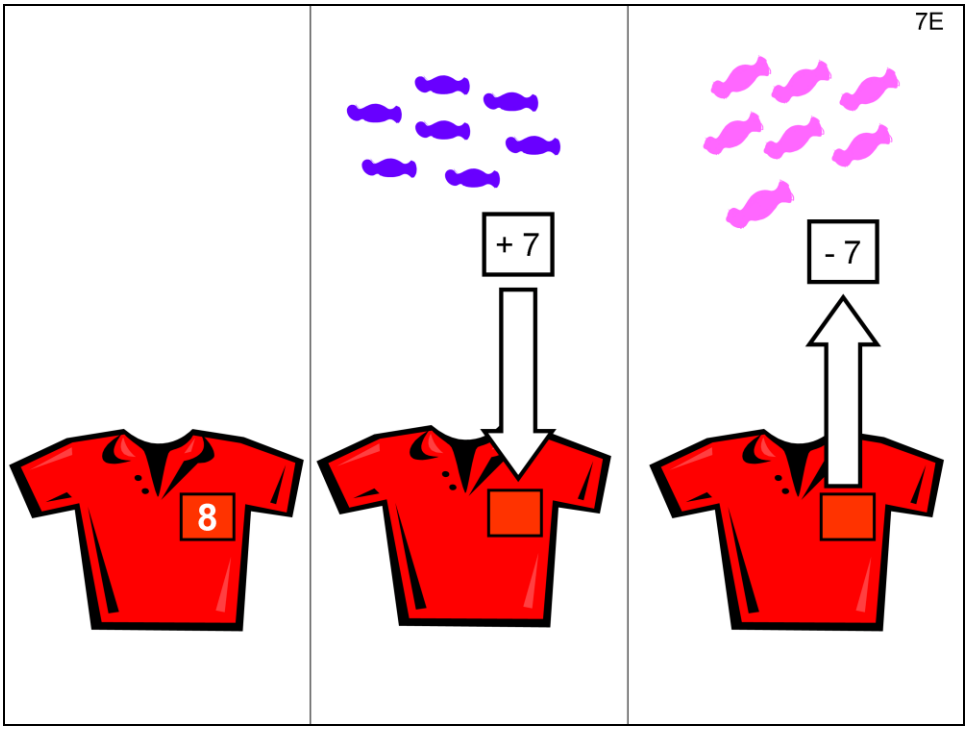


There were 9 drinks in the fridge.

The boy put 4 drinks in the fridge.

Then the girl took 4 drinks out.

How many drinks are in the fridge now?

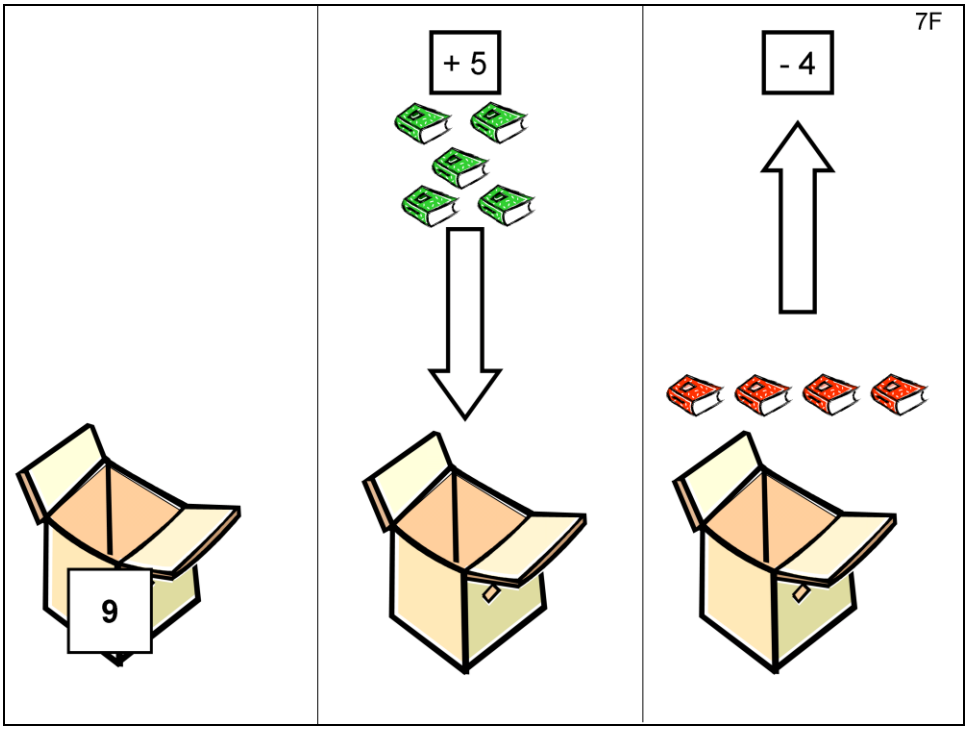


A boy had 8 sweets in his pocket.

Then he put 7 blue sweets in.

Later he took 7 pink sweets out.

How many sweets does he have in his pocket now?

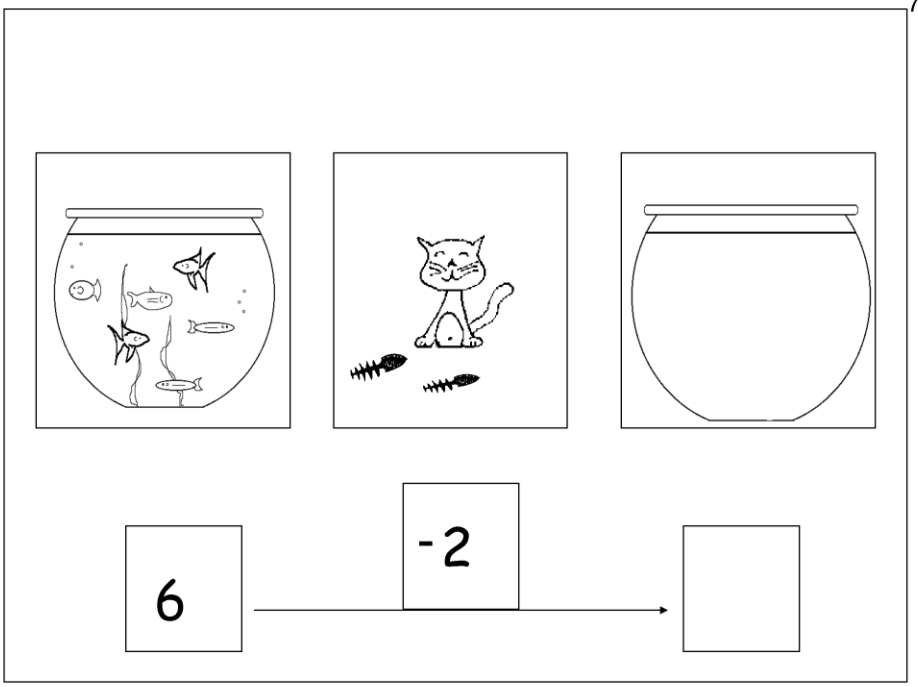


There are 9 books in a box.

A girl put in 5 books.

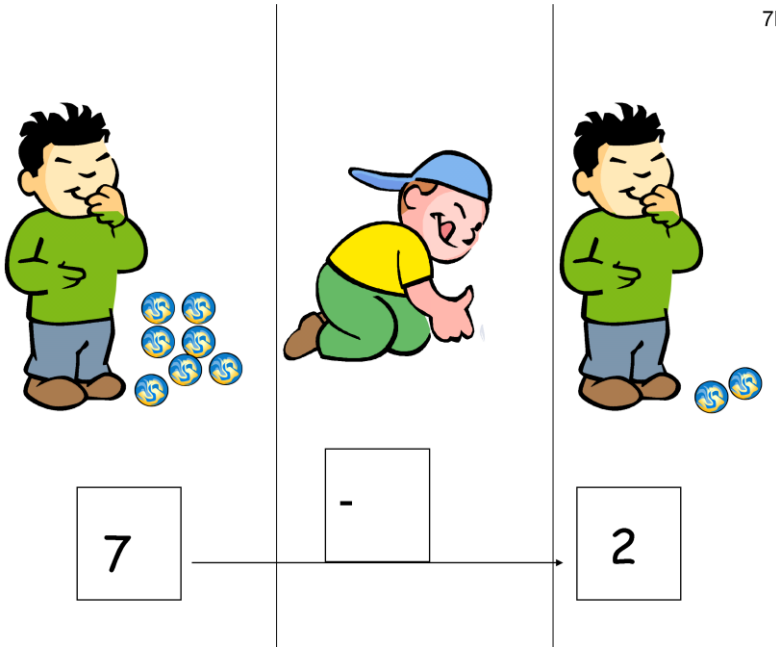
A boy took out 4 book.

How many books are in the box now?

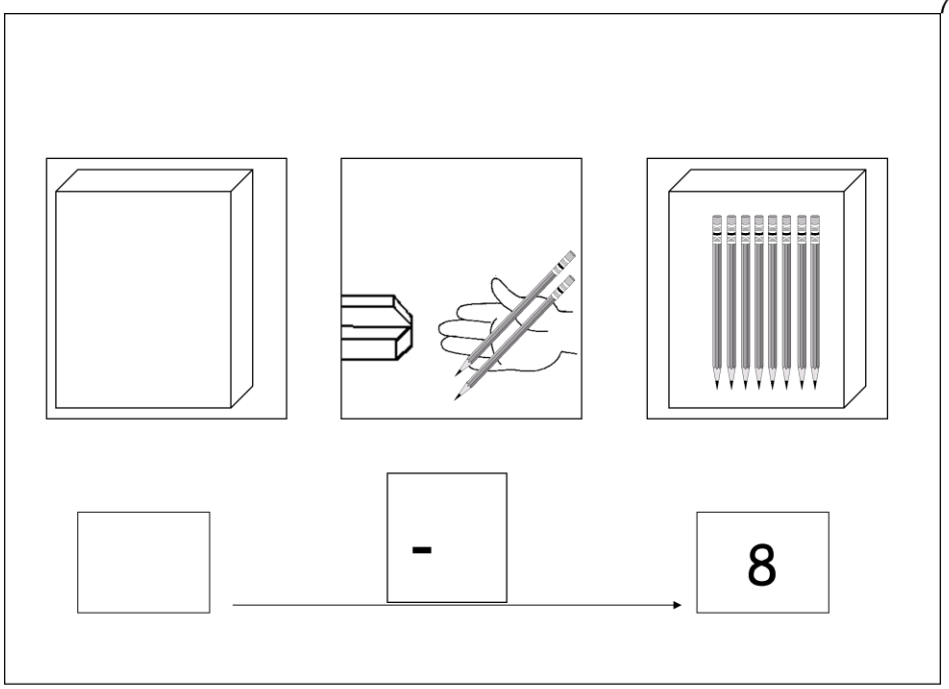


ORANGE

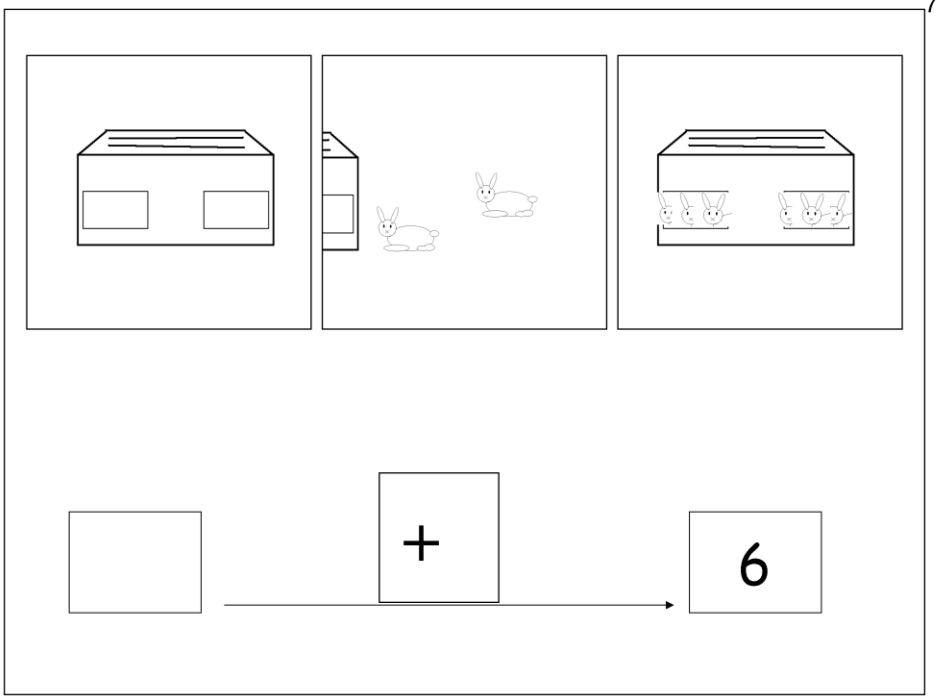
There were 6 fishes in a bowl.
The cat ate 2 fishes.
How many fishes are in the bowl now?
Draw them in the empty bowl. Write your answer in the box.



A boy had 7 marbles. He played a game with his friend and lost some marbles. Now he only has 2. How many did he loose?



Yesterday there were some pencils in the box.
Today the teacher took 2 pencils.
Now there are 8 pencils.
Show what happened in the story by filling in the boxes.
How many pencils did the teacher take?
How many pencils were in the box yesterday?



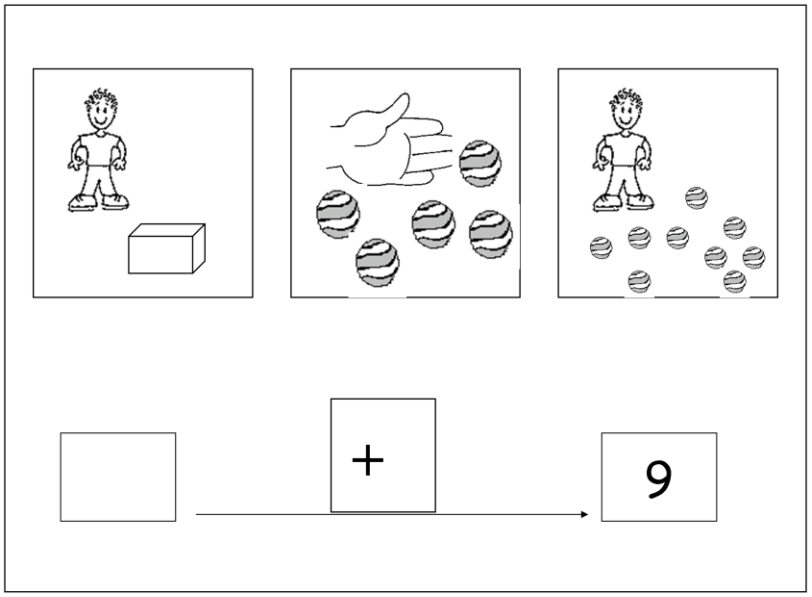
There were some rabbits in the hutch.

Two rabbits went into the hutch.

Now there are 6 rabbits in the hutch.

How many rabbits were in the hutch before? Draw the rabbits that were in the hutch before.

Fill the boxes with the numbers that tell the story.

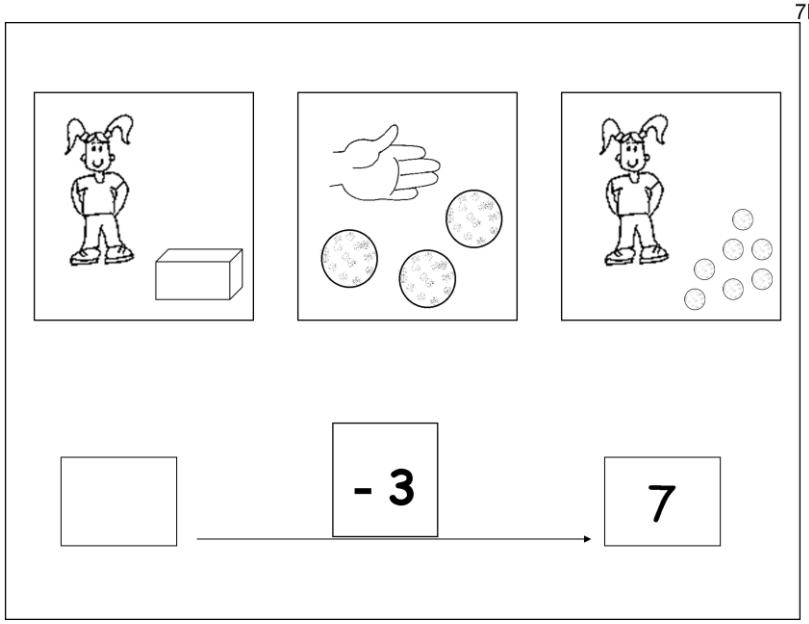


The boy had some marbles in a box.

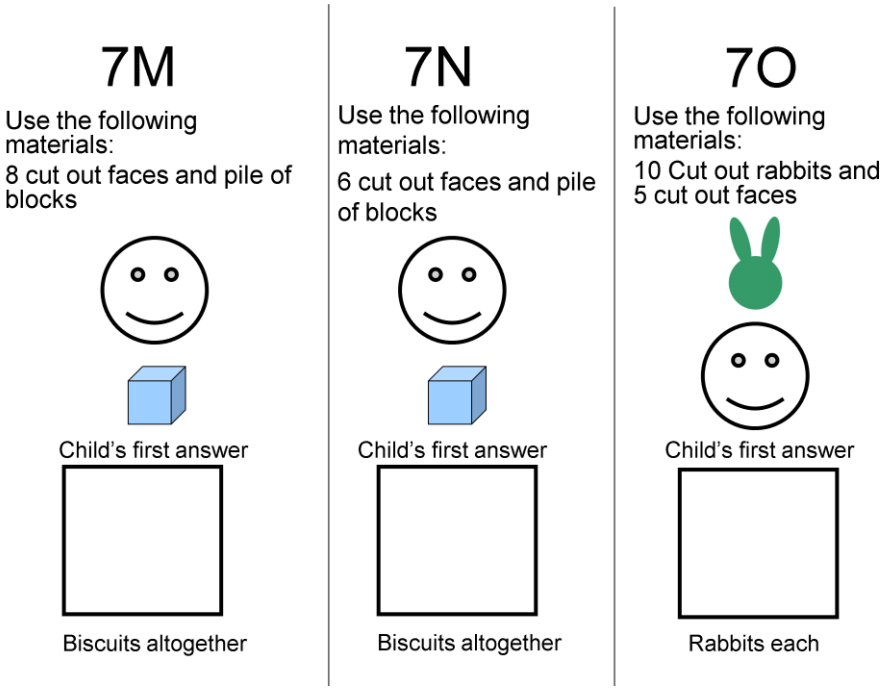
He played a game and won 5 marbles.

Now the boy has 9 marbles.

Write the numbers in the boxes to tell the story.



The girl has some biscuits in the box.
She gives 3 biscuits to Mummy.
Now she has 7 biscuits.
How many biscuits did she have before she gave 3 to Mummy?
Write the number in the box.

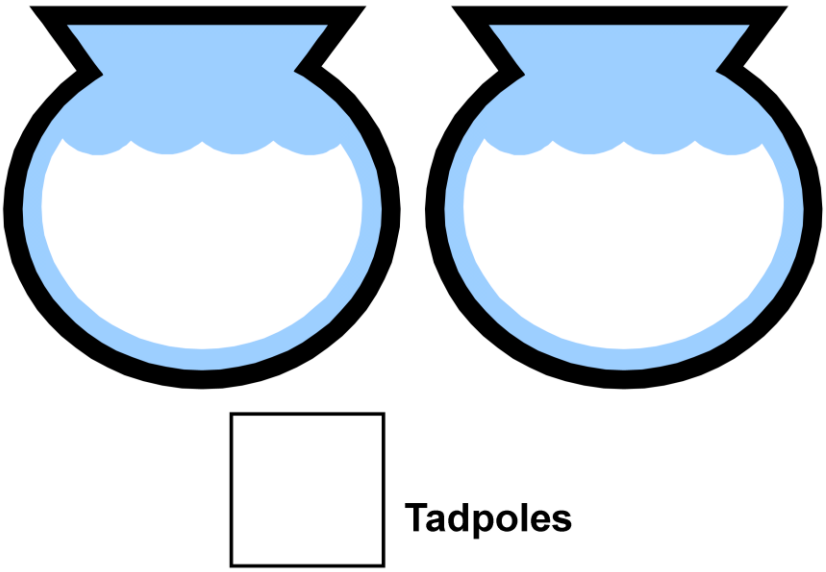


GREEN

7M The teacher is giving biscuits to the children. There are 8 children in her group. Each one is going to get 4 biscuits. How many biscuits does she need?

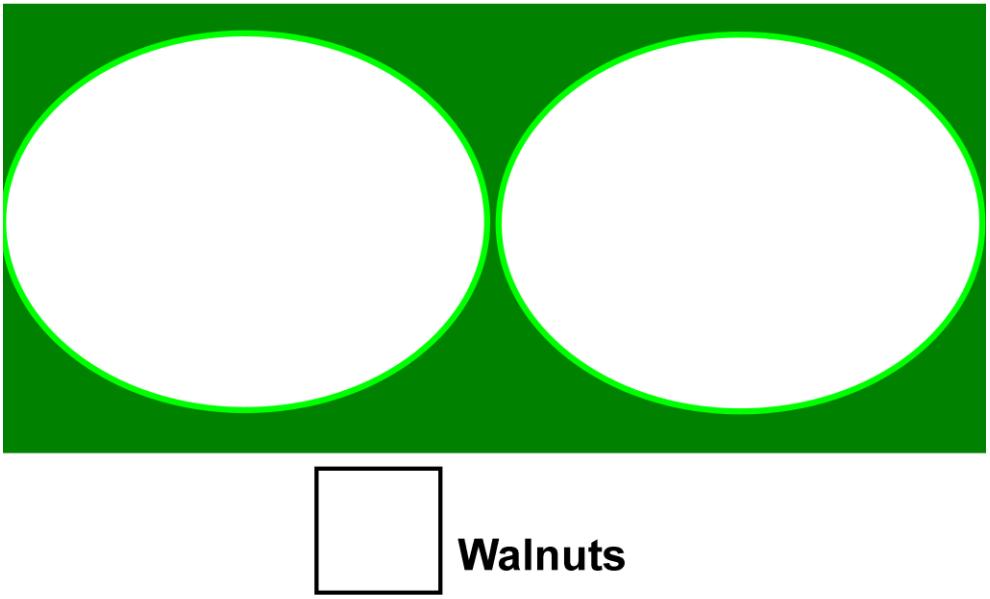
7N There are 6 boys in a class. The teacher is going to have birthday so each boy is going to bring the teacher 3 biscuits. How many biscuits is the teacher going to have?

7O A girl was going to have a party. She had 10 furry rabbits. Five girls came to her party. How many rabbits will each one get?



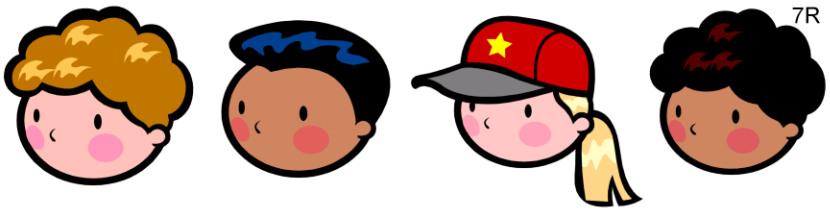
Tadpoles

We collected tadpoles from our garden pond. I put 6 into each bowl. How many did I have altogether?



Walnuts

The squirrel buried walnuts in two holes. He buried seven walnuts in each hole how many walnuts would he have altogether?



☐ Cookies

4 children share 20 cookies. How many cookies will each child get?

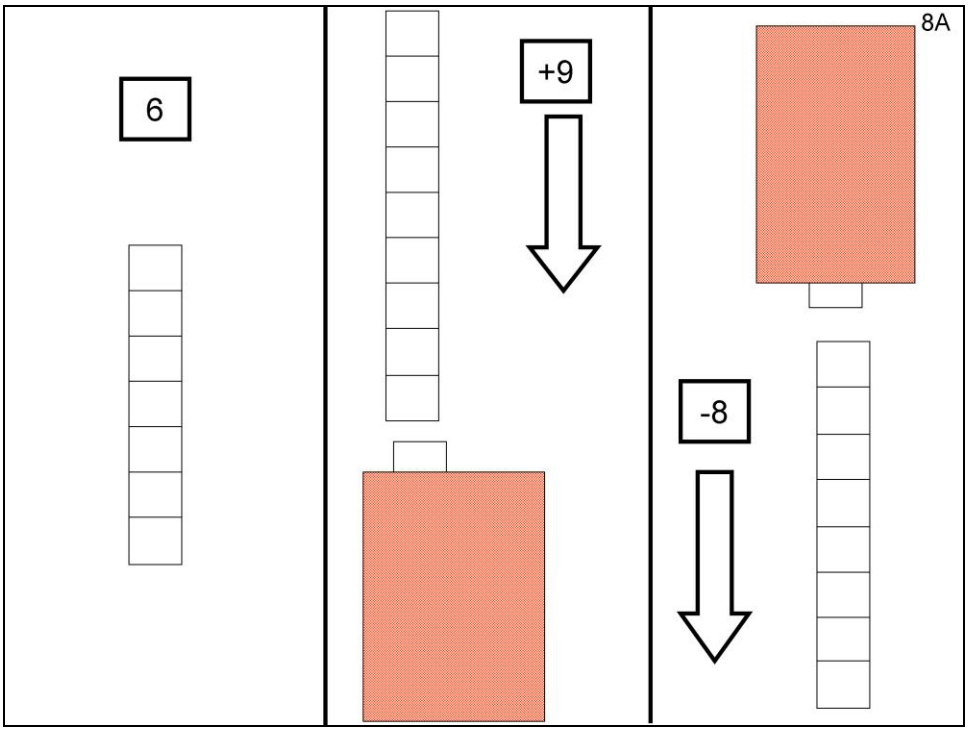
Maths session 8

BK 8

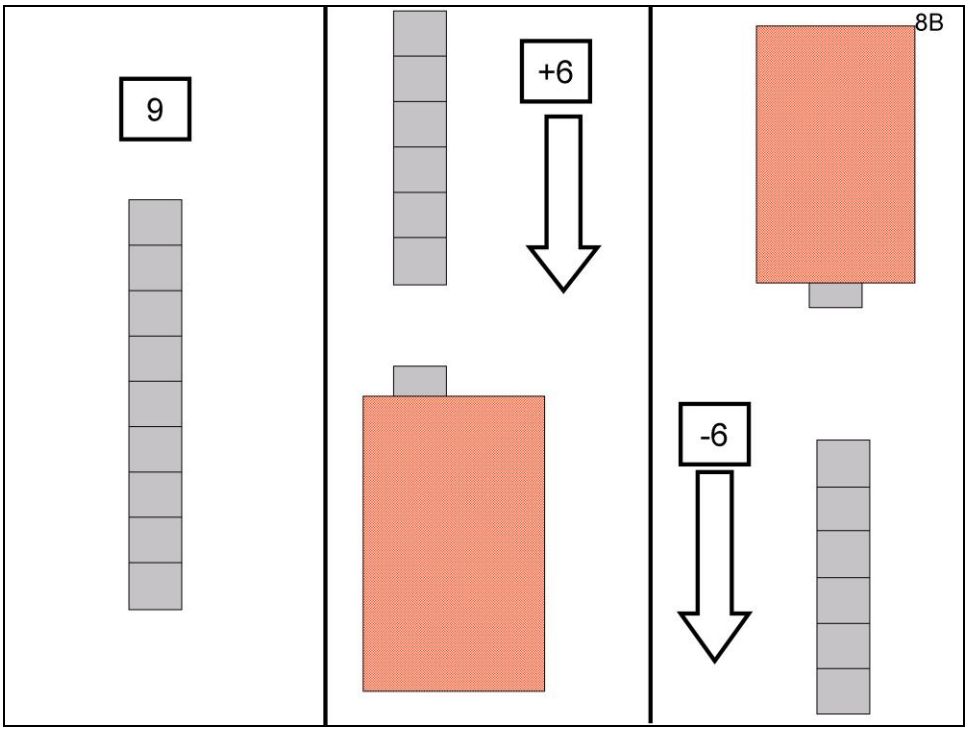
Child's name: _____

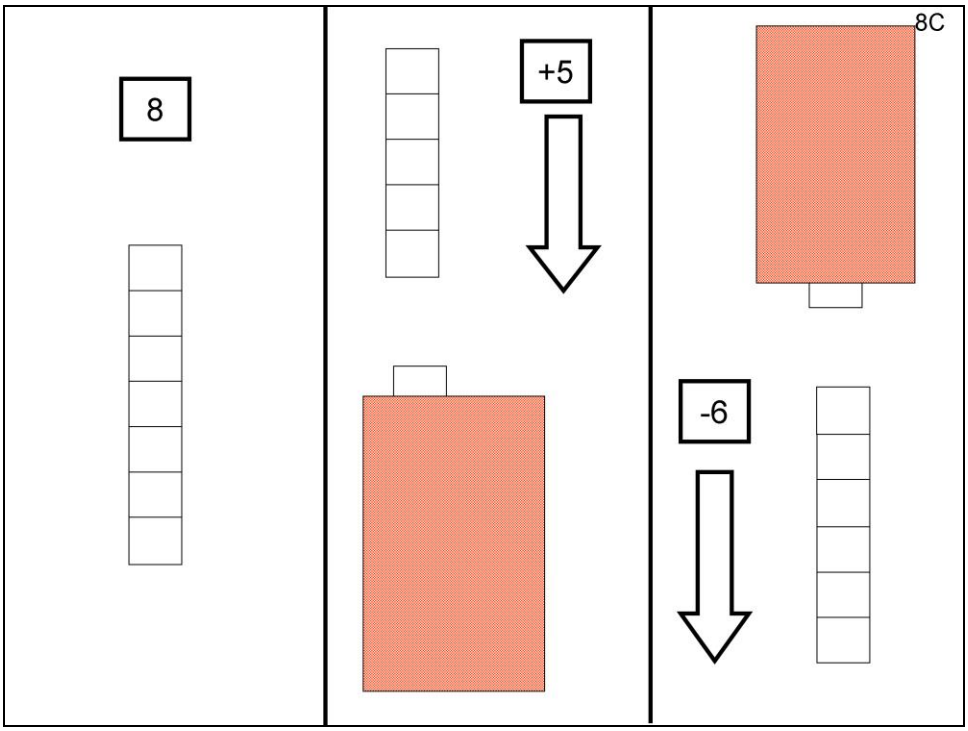
Date: _____

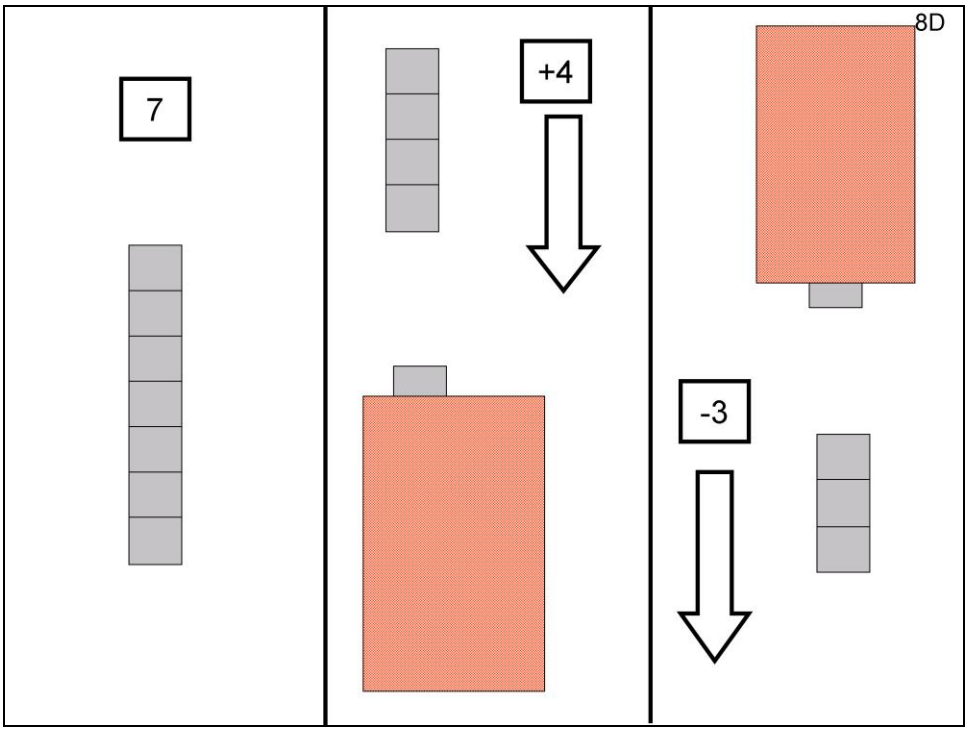
School:_____

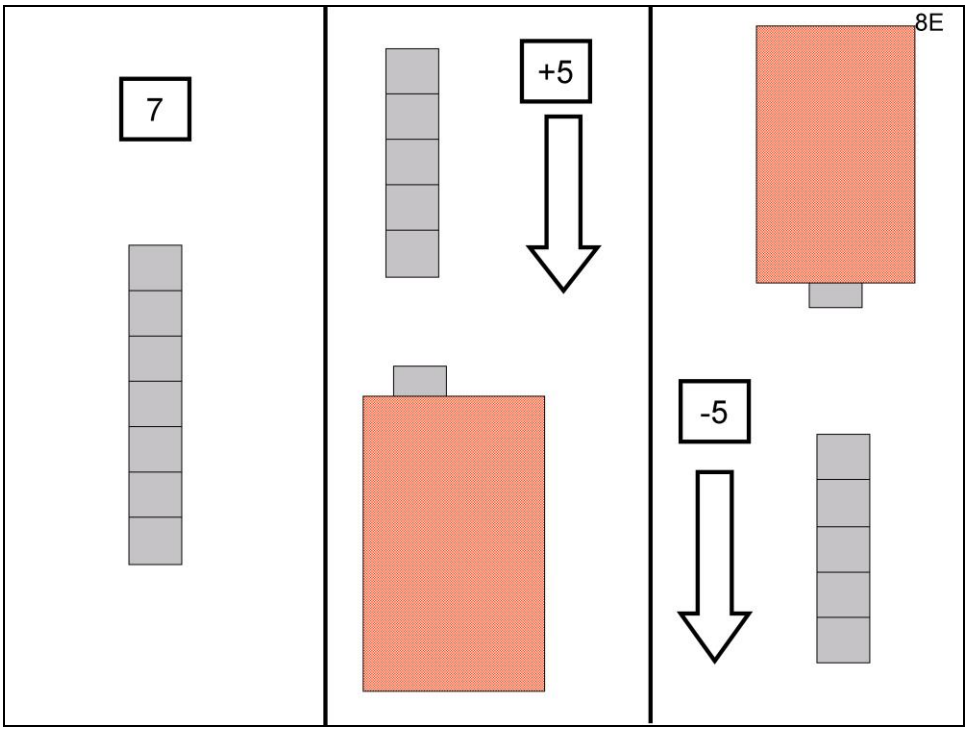


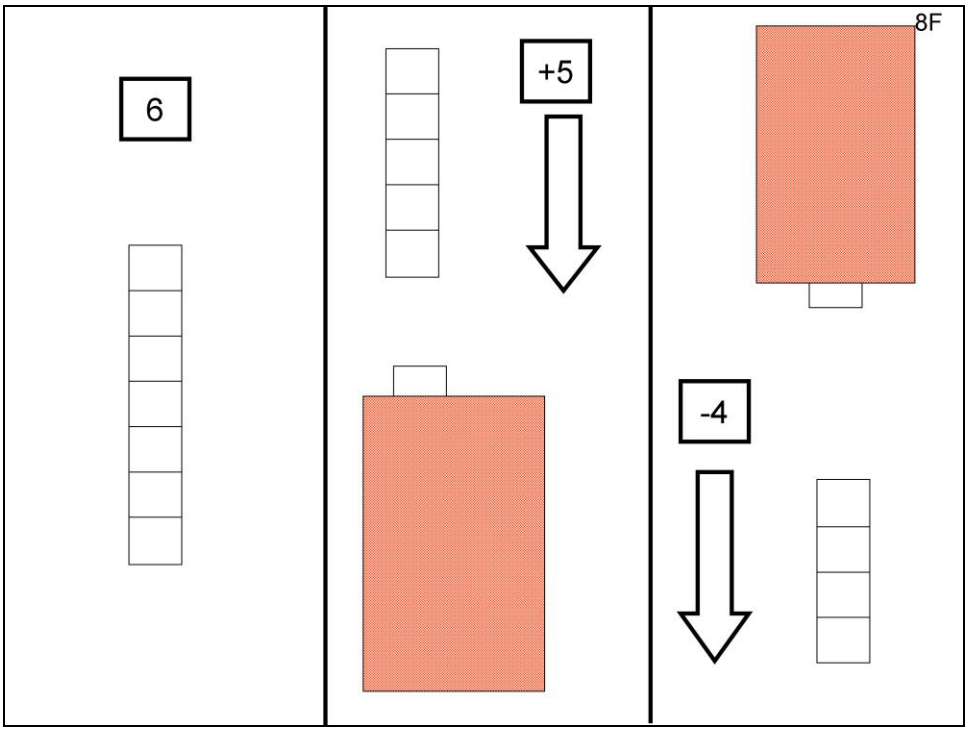
YELLOW

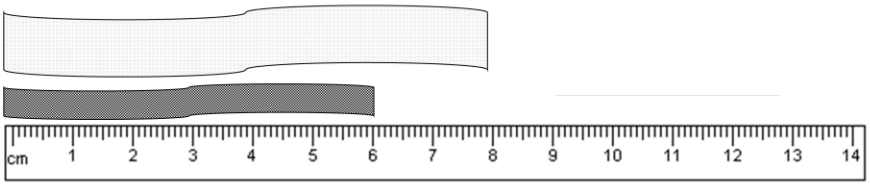

9
+6
8B
-6


8
+5
8C
-6


7
+4
8D
-3


7
+5
8E
-5


6
+5
8F
-4



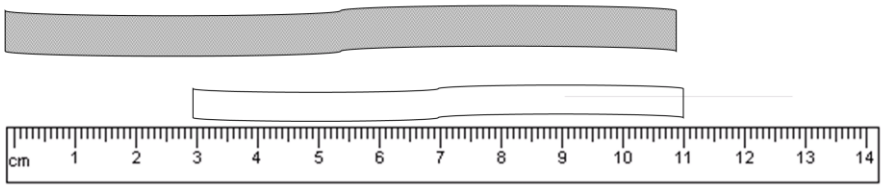
ORANGE

Serena has a polka-dot ribbon. Ali has a chequered ribbon.

Which one is longer? Tick the longer ribbon.

How many centimetres longer is it?

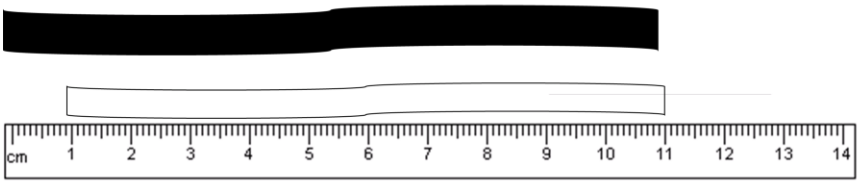
Put your answer in the box.

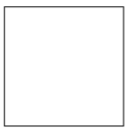


Sonia has a striped ribbon. Beth has a plain white ribbon.

Which one is longer? Tick the longer ribbon.

How many centimetres longer is it? Put your answer in the box.





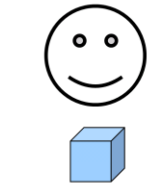
Sonia has a black ribbon. Beth has a plain white ribbon.

Which one is shorter? Tick the shorter ribbon.

How many centimetres shorter is it? Put your answer in the box.

8J

Use the following materials:
16 blocks to represent sweets and 4 cut out faces

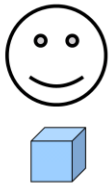


Child's first answer

Sweets for each child

8K

Use the following materials:
Pile of blocks to represent biscuits and 8 cut out faces



Child's first answer

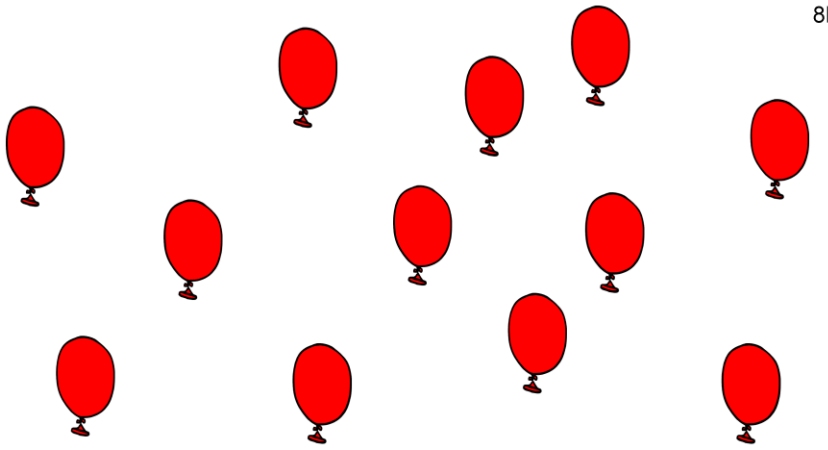
Biscuits

GREEN

8J Four girls are sharing 16 sweets. How many sweets will each one get?

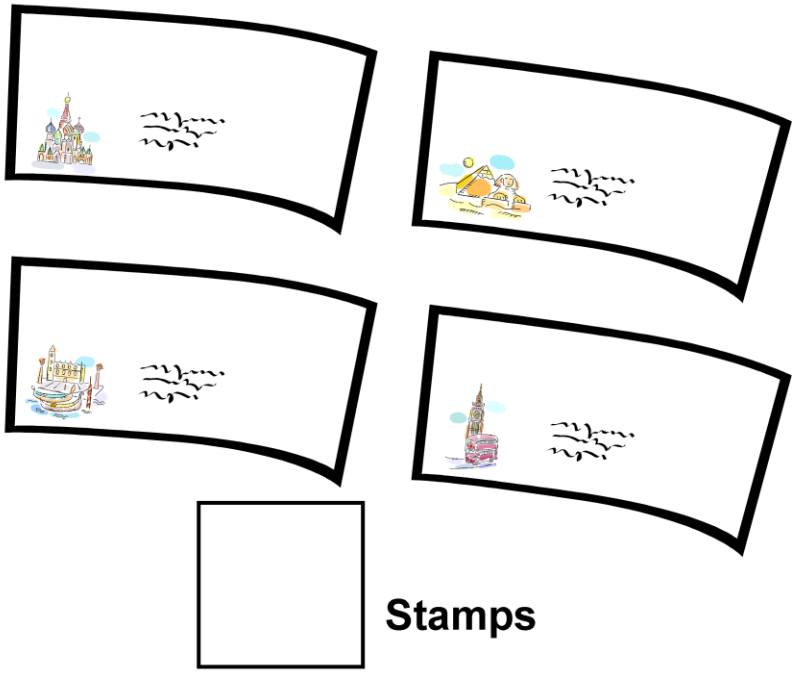
8K The teacher giving biscuits to the children. There are 8 children in her group. Each one is going to get 2 biscuits. How many biscuits does she need?

8L

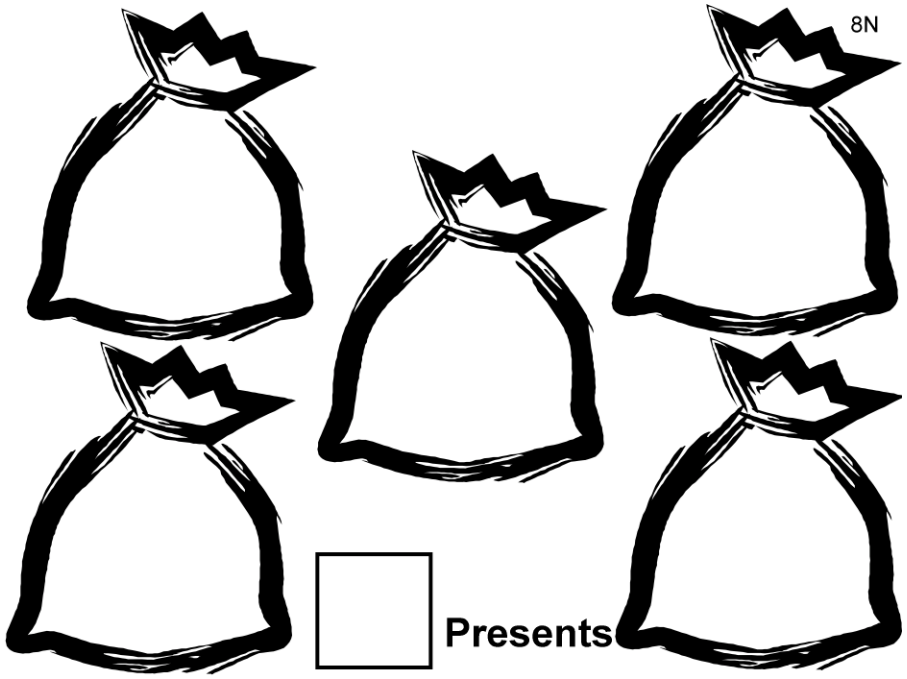


Friends

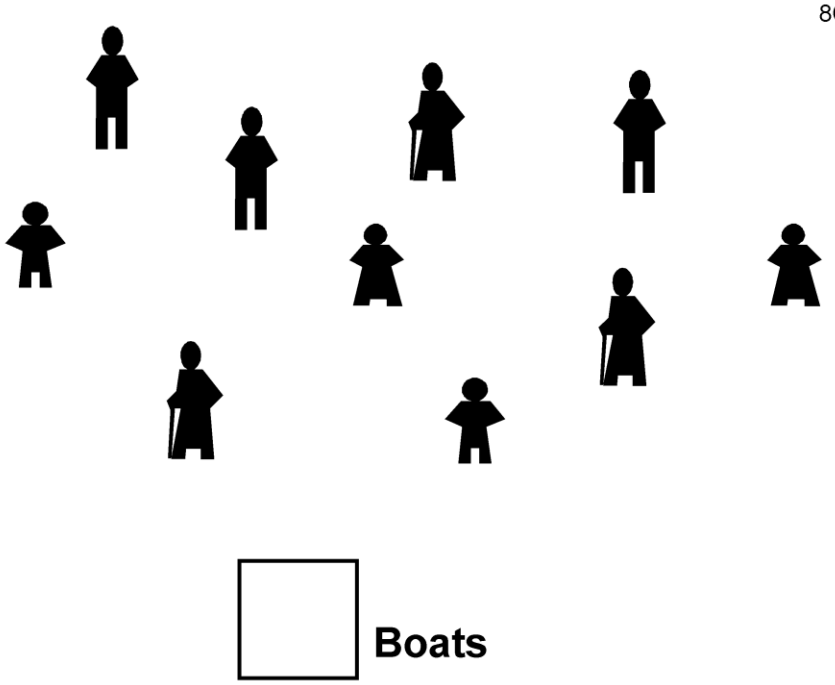
4C A boy is having a party. He has 12 balloons. He gives 2 balloons to each friend at his party. How many friends are at the party? (encourage the child to circle the balloons in pairs)



We posted our Christmas cards to our friends and needed 2 stamps on each card. We posted 4 cards, how many stamps did we need to buy?



5 presents are put in each sack, how many presents will there be altogether?



10 people need to cross the pond. 2 people can fit in each boat, how many boats are needed?

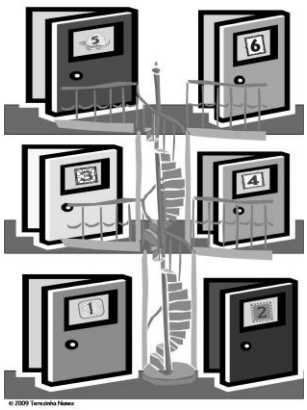
Maths session 9 BK 9

Child's name: _____

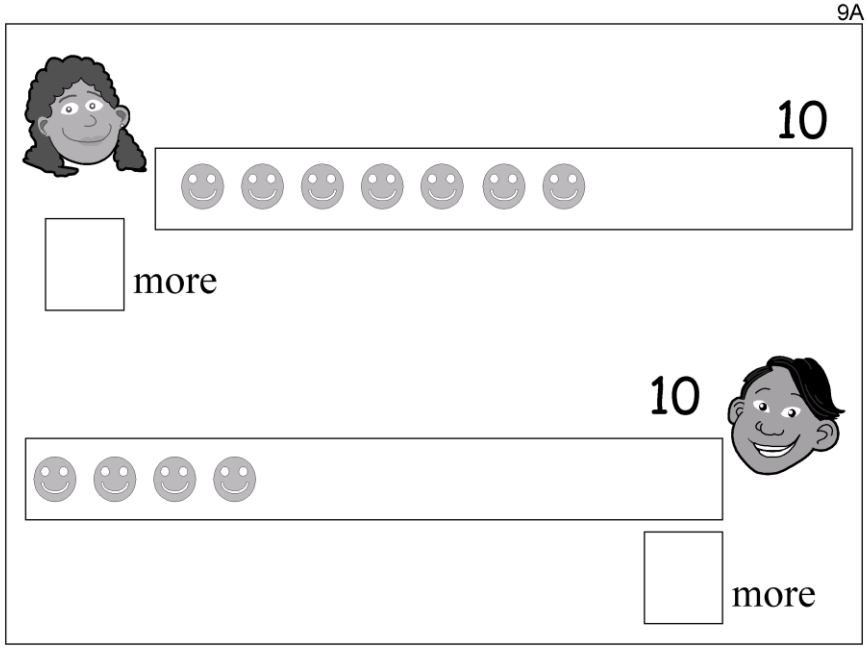
Date: _____

School: _____

Note:



It's time for the children to start playing Board game 5, 'Answer the door!'
Now they have FIVE board games to play and play again!!
Also remind them to go to the Games corner at
http://www.education.ox.ac.uk/research/resgroup/cl/ndcs/



ORANGE

The girl has 7 stickers.

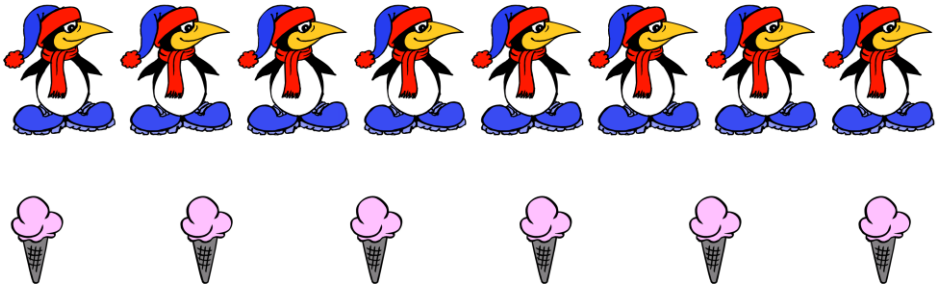
The boy has 4 stickers.

When they have 10 stickers they will get a special prize.

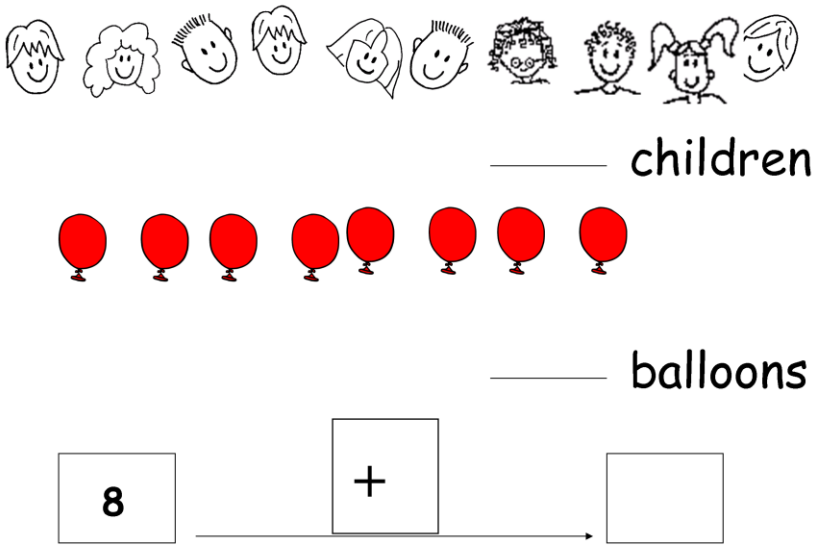
Draw the stickers that they need to get to 10.

How many more does the girl need to get her prize? Put your your answer in the box next to the girl.

How many more does the boy need to get his prize? Put your your answer in the box next to the boy.



8 penguins are having a party. There are 6 ice-creams for the party. Each penguin wants an ice-cream. Are there more penguins or ice-creams? How many ice-creams do they need to buy so each penguin has one ice-cream. Write your answer in the box.



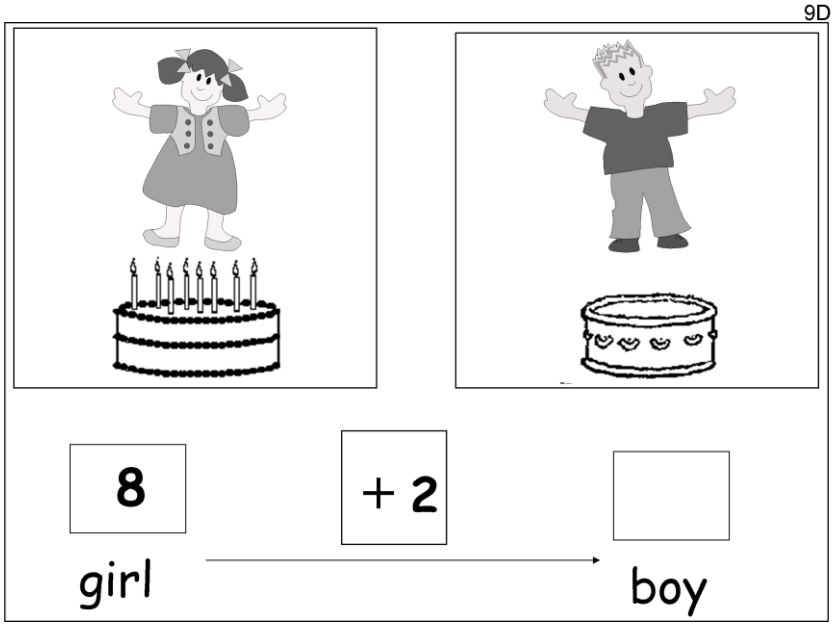
All the children here want to have a balloon. How many children are here? How many balloons do we have? Write the numbers on the lines.

Are there more children or more balloons? Circle the bigger number.

How many balloons de we need to buy so all the children have balloons?

Write the numbers to tell the story.

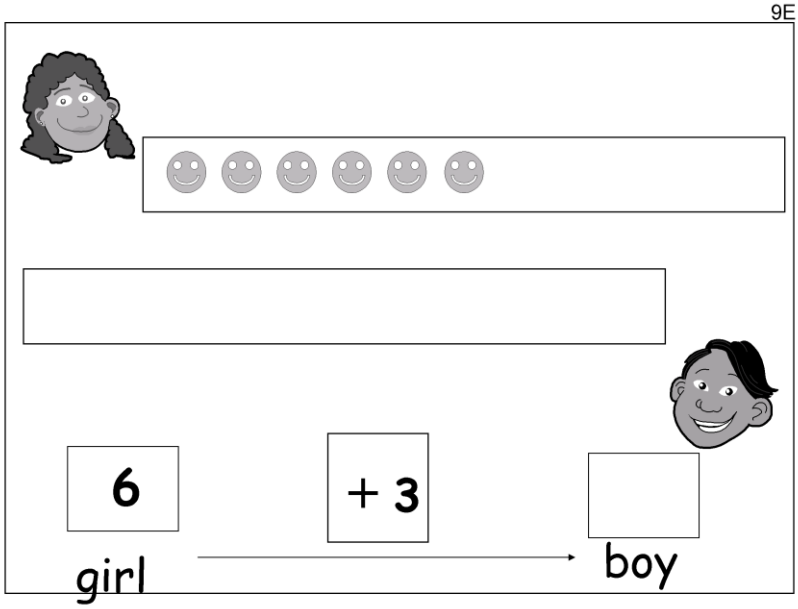
9D



The girl is 8 years old.
There are 8 candles on her cake.
The boy is 2 years older than the girl.
Can you draw the boy's candles on his cake?

How old is he? Write you answer in the box?

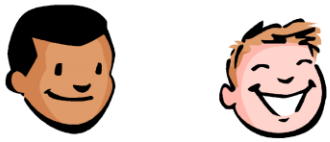
9E



Look at the girl's stickers.

The girl says to the boy 'You have three more stickers than me!'

Can you draw the boy's stickers?
Write the number of stickers for the boy.

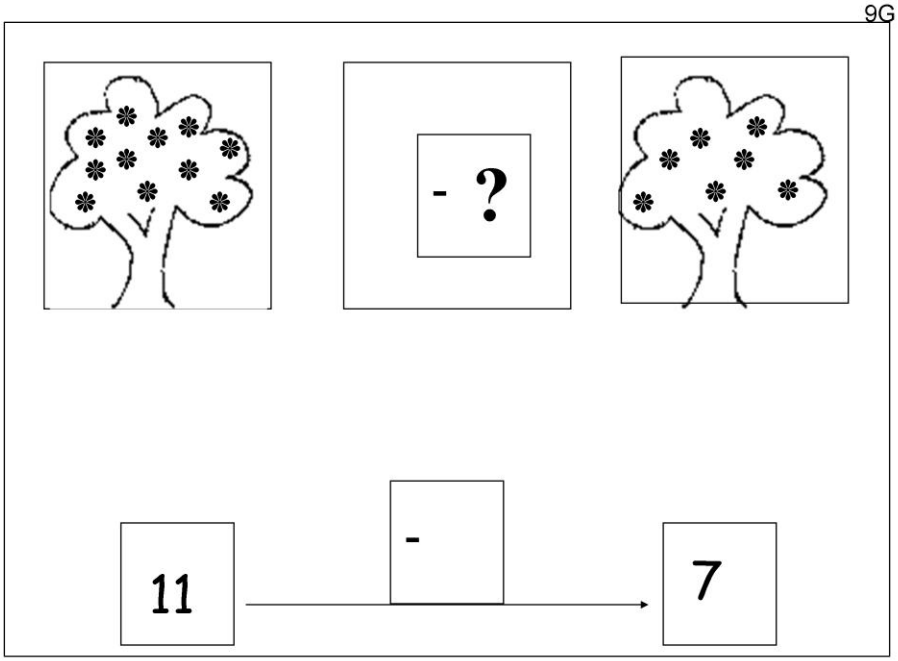


Paul

Jim

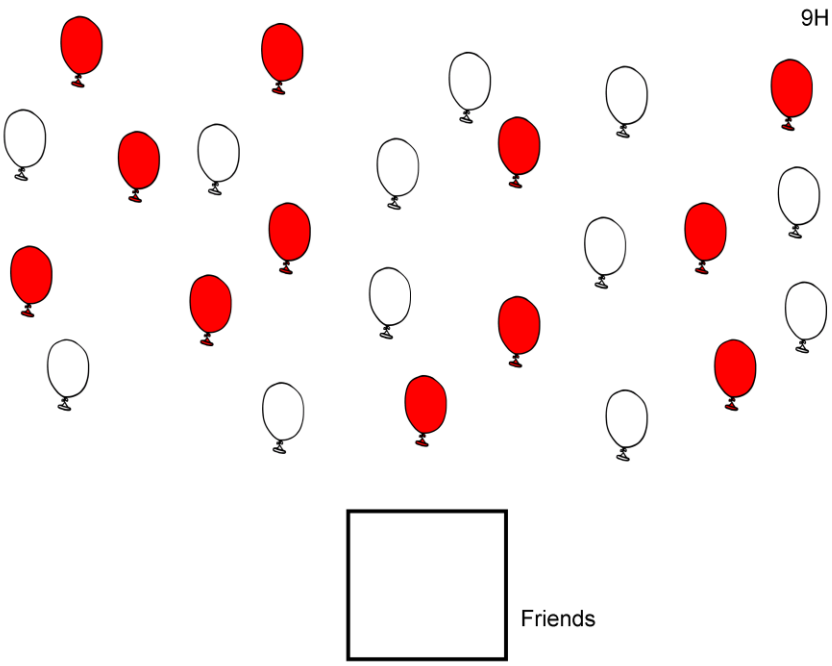
Paul has 5 t-shirts. He says to Jim: You have 2 t-shirts less than me.

Draw the right number of t-shirts for Jim. Make sure that Jim has 2 less than Paul.



There were 11 flowers on a tree.
Some flowers fell off.
Now there are 7 flowers on the tree.
How many flowers fell off?
Write the number in the box.

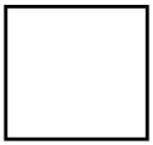
9H



Friends

GREEN

A girl is having a party. She has 24 balloons. She will give 4 balloons to each friend at her party. How many friends are at the party?



pence

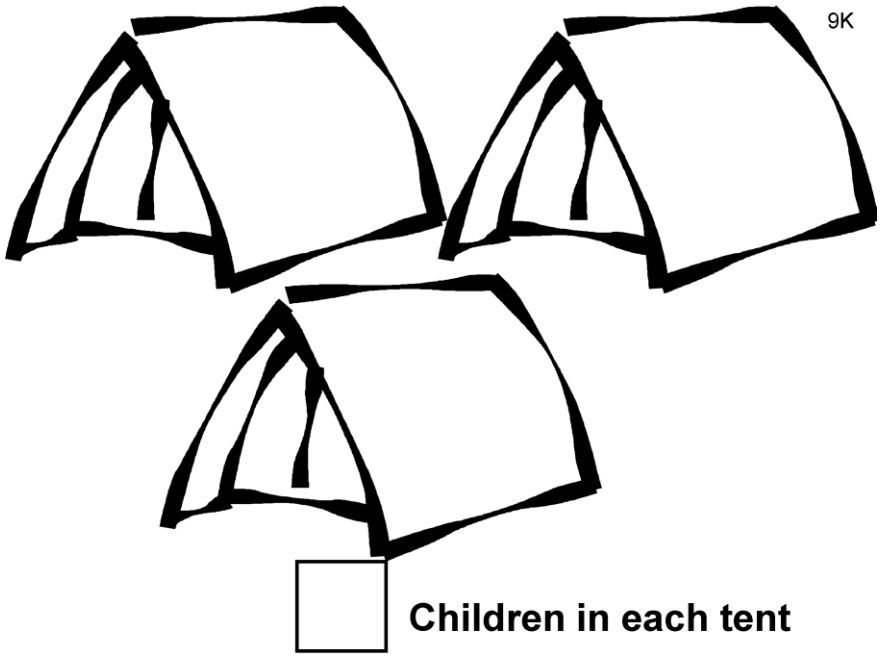
Each apple costs 3p. You want to buy 5 apples. How much money do you have to pay?

9J

pence

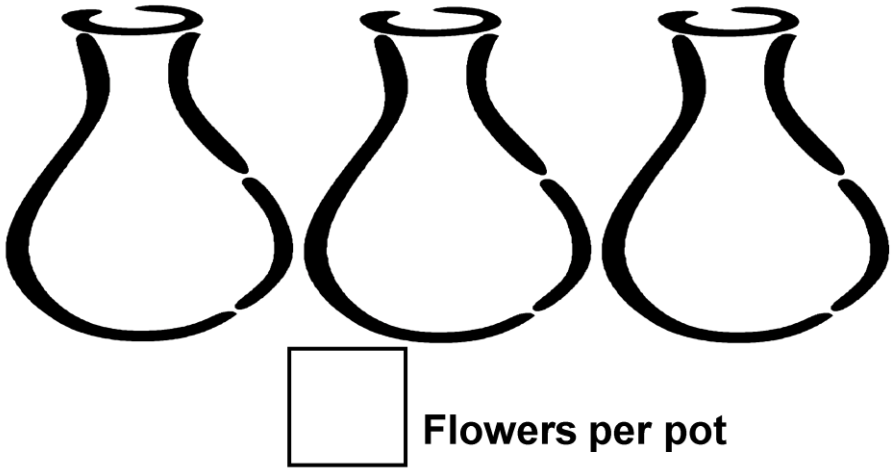
The shop is selling party hats for 4 p each. A lady wants to buy 6 hats for a birthday party. How much money does she have to pay?

9K

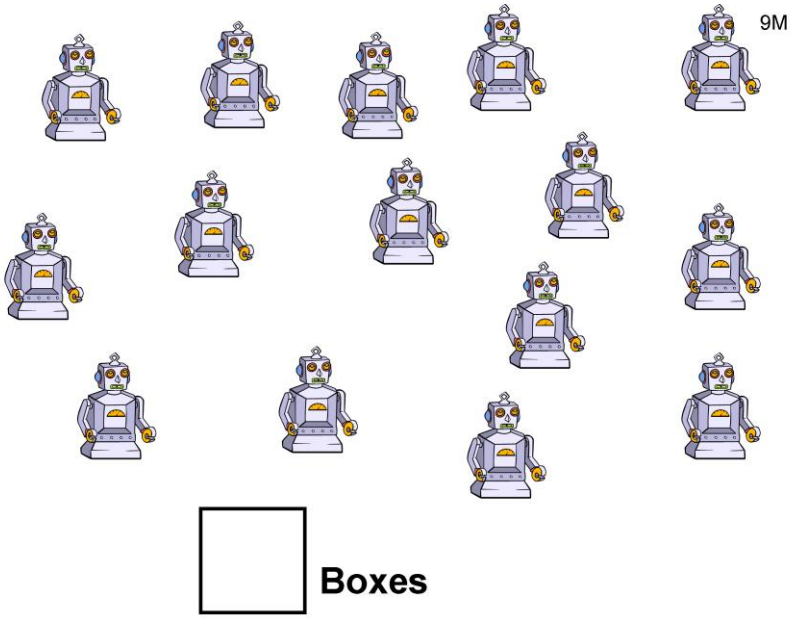


Children in each tent

We went on a school camping trip and stayed in 3 tents. There are 12 people in my class. How many children went in each tent?



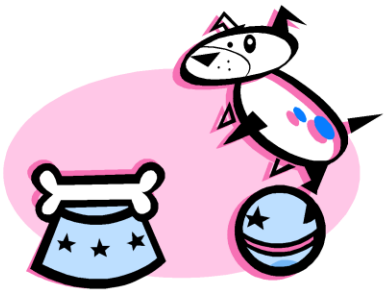
Grandma put flowers from her garden into 3 vases. She picked 15 flowers, how many will go in each vase?



Five toys are but into each box. How many boxes do we need?

Maths session 10

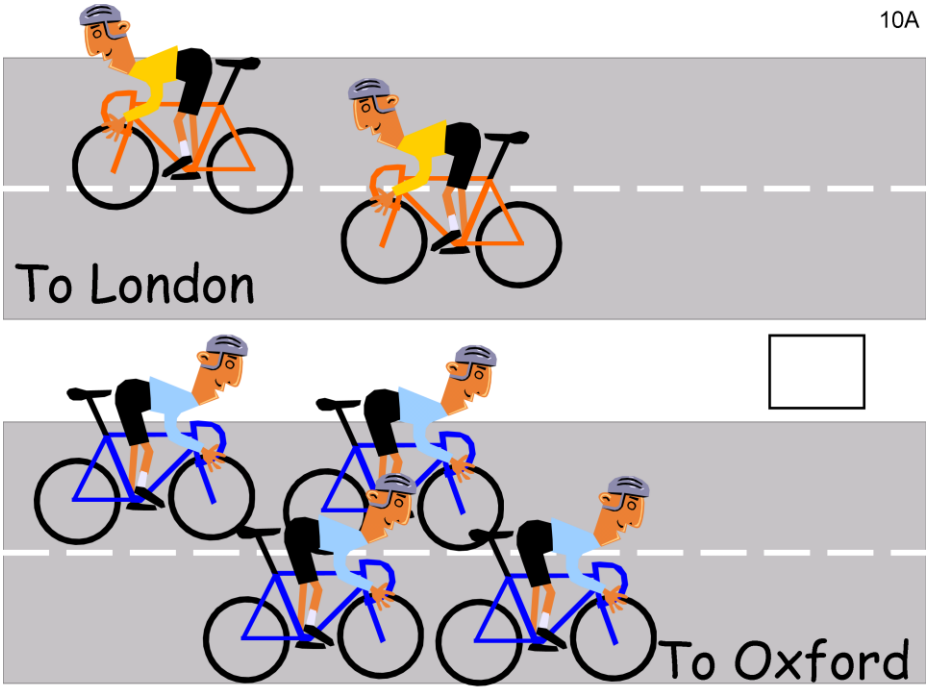
BK 10



Child's name: _____

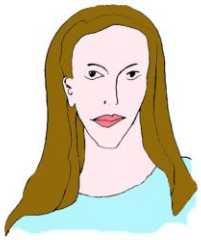
Date: _____

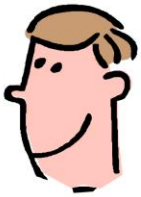
School: _____

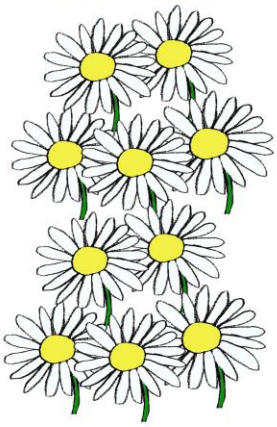


ORANGE

Two cyclists are going to London. Four cyclists are going to Oxford. Are there more cyclists going to London or Oxford? How many fewer cyclists are going to London? Write the number in the box.

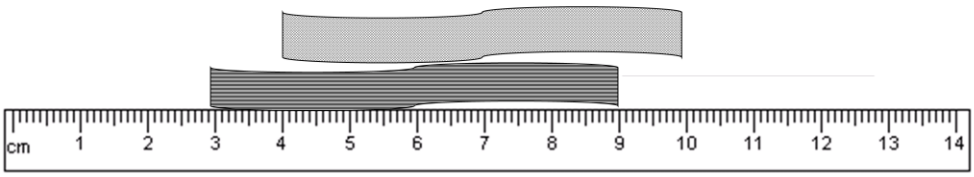






_____ flowers

The man said to the woman: I have 6 flowers less than you. Draw his flowers. How many flowers does he have? Write the number on the line.



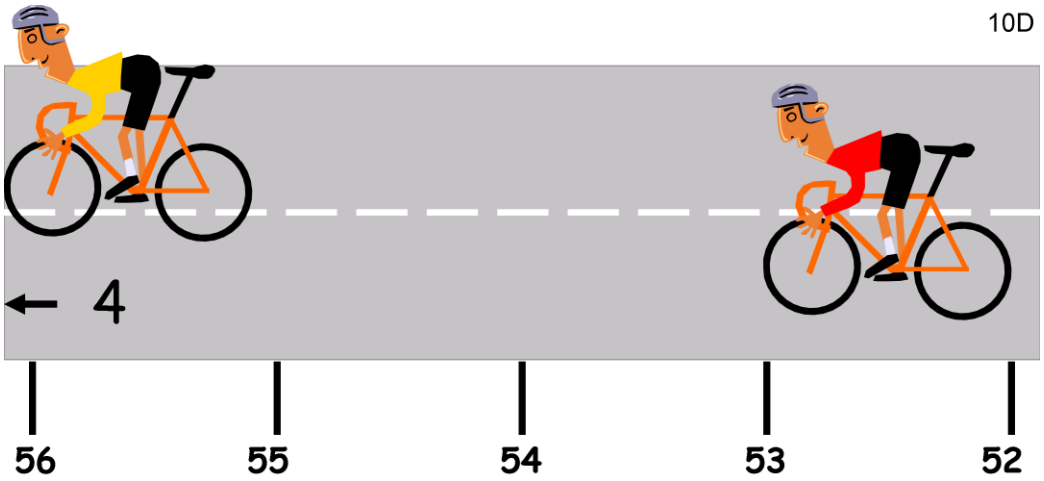
Ali Sam the same

_____ _____

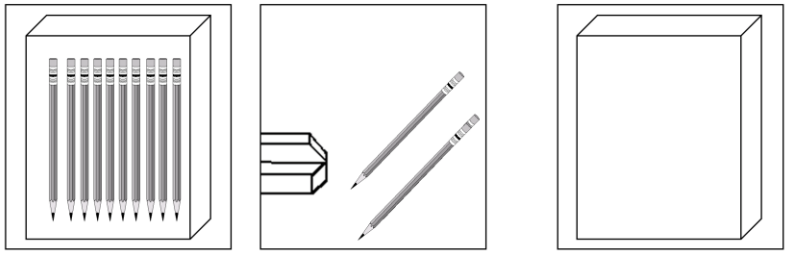
Ali and Sam have a ribbon each. Ali's is striped, Sam's is chequered. Are their ribbons the same length or not? Circle the right answer: Ali's is longer, Sam's is longer, they are both the same.

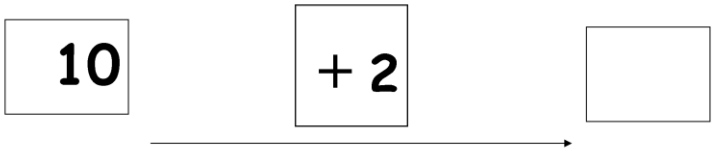
Look at the ruler. How many centimetres long is Ali's? How many centimetres long is Sam's?

Put your answers on the lines.

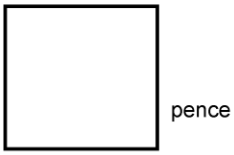


The cyclist in the yellow shirt is winning the race. He has to go 4 more meters to finish the race. You can see the meters marked on the road. How many more meters does the cyclist in red have to go to finish? Write the answer in the box.



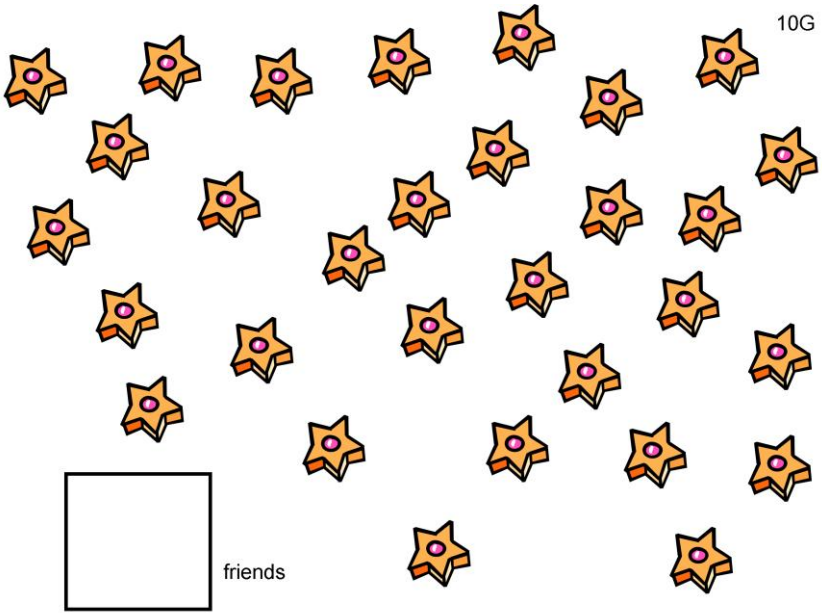


10 pencils are inside the box. The teacher put 2 more pencils in the box. How many pencils now? Draw all the pencils in the last box. Write the number in the box.

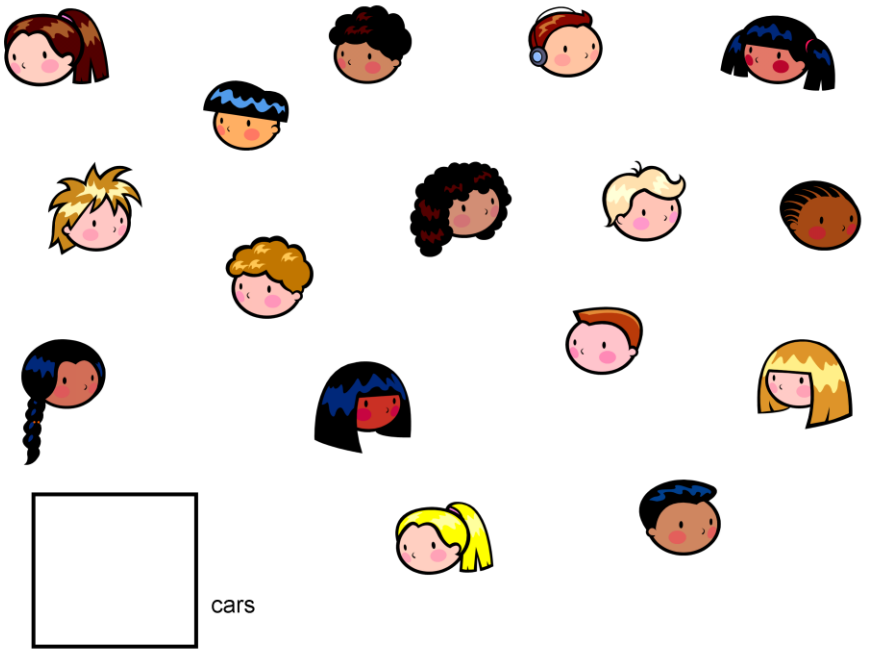


GREEN

You want to buy 3 pencils. Each pencil costs 7 p. How much money do you have to pay altogether?

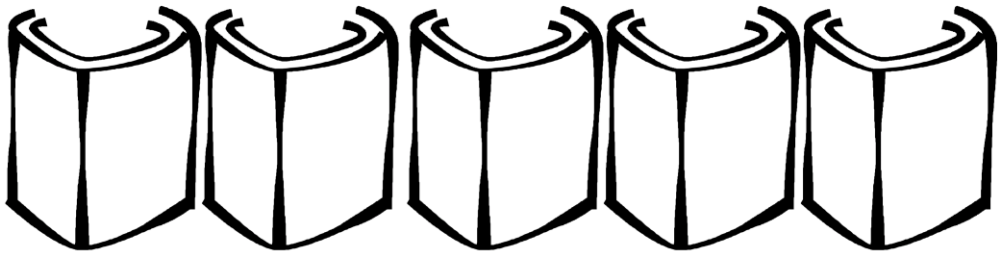


A girl had 30 biscuits. She was going to have a tea party and wanted to give 3 biscuits to each friend that comes. How many friends can she invite?



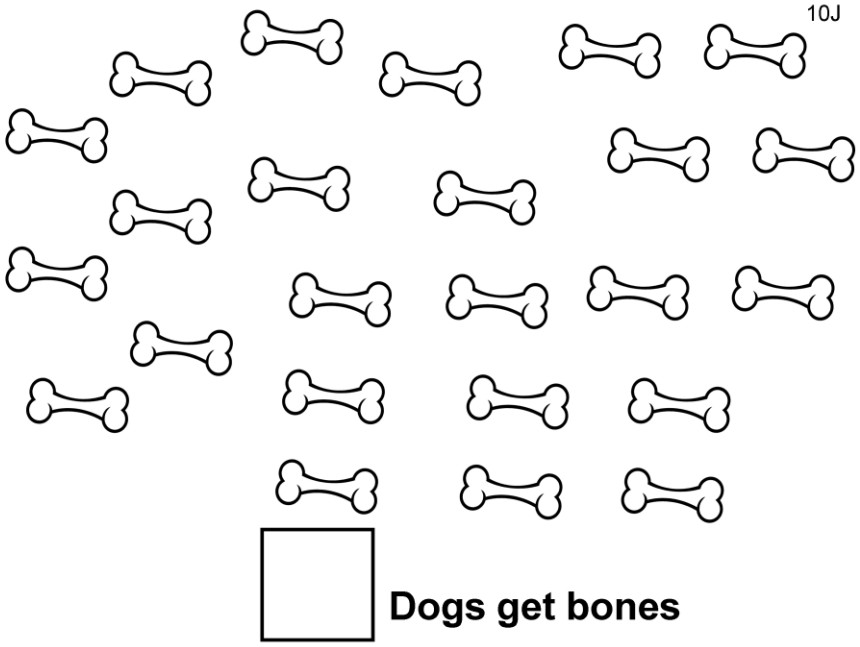
cars

This story is about a trip to the zoo. The teacher is going to take 16 children to the zoo. The teacher is going to drive one car and the mothers of some children are going to drive other cars. Each car can take 8 children. How many cars do they need so that all the children can get to the zoo?

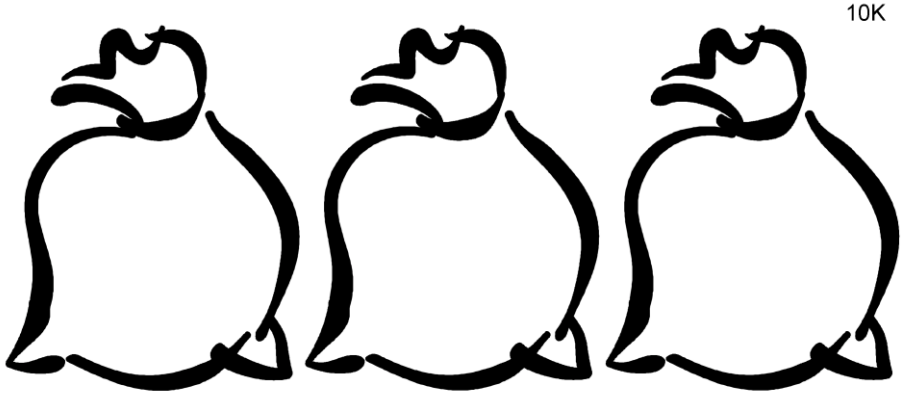


☐ Pencils per pot

The children are putting pencils into pots. They have 20 pencils and 5 pots. How many pencils will go in each pot?



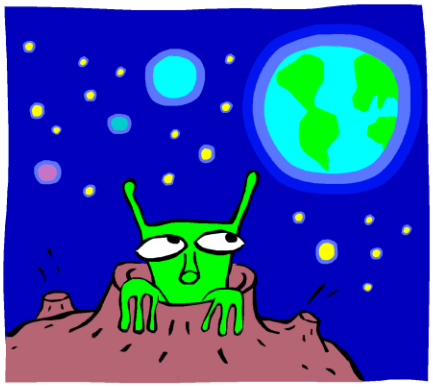
We have 24 bones. We are going to put 6 bones into each bag and then give the bag to a dog. How many dogs will get bones?



☐ Sweets

The shopkeeper has 3 bags he puts 5 sweets into each bag. How many sweets is that altogether?

Maths session 11

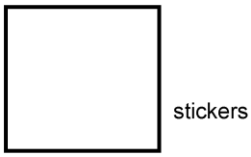


BK 11

Child's name: _____

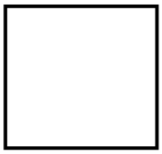
Date: _____

School: _____



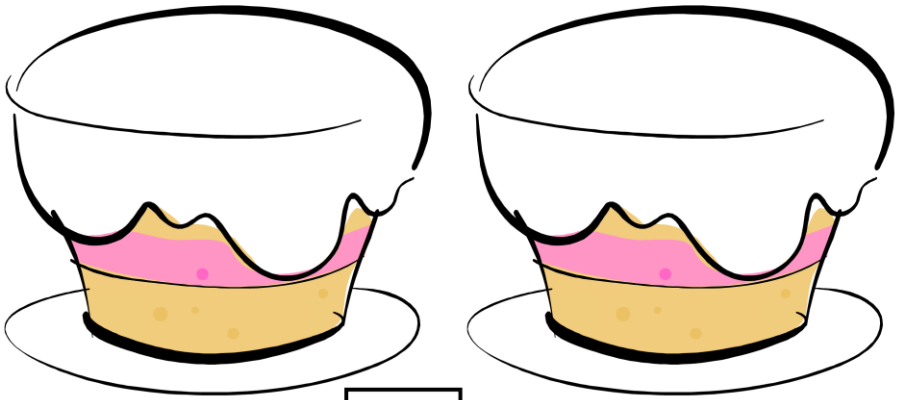
GREEN

This is a story about 7 little girls. They were very good and the teacher gave each one of them 3 stickers. How many stickers did the teacher use up?



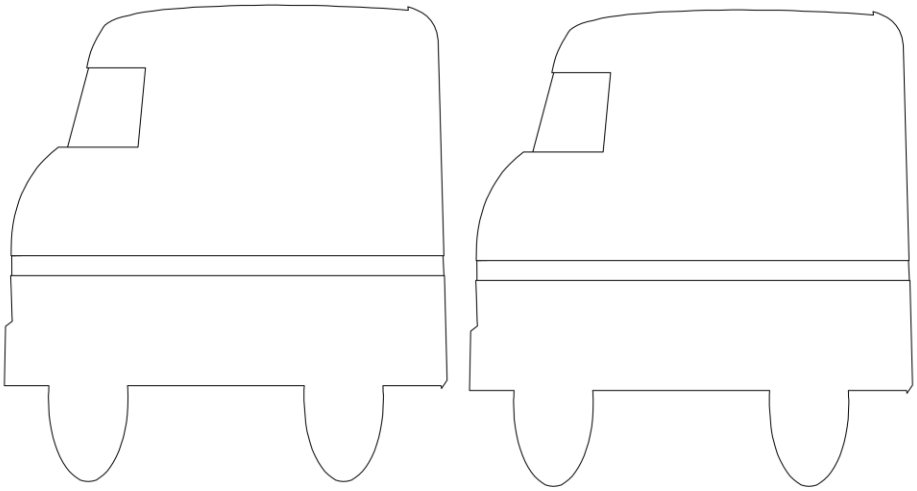
Books

The Mayor of this city went to visit the children in a school. She brought 24 story books with her for the classes in Year 1. There are 2 year 1 classes. How many books can she give to each class?



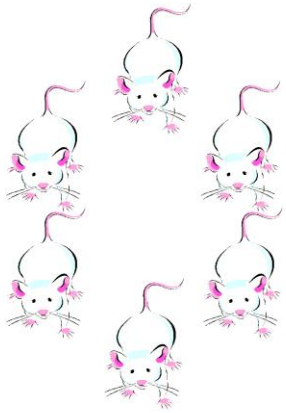
☐ Candles

It was the twin's birthday, they were 9. They each have a cake. How many candles are needed altogether?



Children on each bus

The school takes 18 children to the football match on 2 minibuses. How many children will go in each bus?



☐ cages

2 mice are put in each cage, how many cages do we need?