Number Bonds

One of the most important sets of number facts for the children to learn early on in their mathematics education is 'Number Bonds'. The phrase, number bonds is not commonly known in the UK to anyone not involved in the teaching of maths to young children and this is something that we need to be aware of when using this terminology, however, number bonds just involve simple addition and subtraction.

A number bond is simply a pair of numbers that add up to another number. For example the number bonds for 8 are:
0 + 8, 1 + 7, 2 + 6, 3 + 5, 4 + 4
A child who learns these sums add up to 8 will quickly see that if you reverse them to 8 + 0, 7 + 1, 6 + 2, 5 + 3, 4 + 4 they also make 8.

Number bonds provide a mental picture of the relationship between two numbers. These mental pictures are key to enabling a child to complete mental arithmetic. Knowing addition number bonds means that a child will understand subtraction with ease.

If a child knows that 2 + 6 = 8 they will quickly realise that when they see 8 – 6 = ? the answer is 2 because by process of elimination 2 is the missing number in this number bond. It helps children to see that subtraction is the inverse to addition. They begin to see the patterns in numbers and to learn the mathematical principles rather than having to memorise each individual sum.

Number bonds are the foundation blocks that children need to make progress with mathematics. Once they know all the number bonds for 1-20, they will have the information they need to subtract using the numbers 1-20.

Teaching Number Bonds

At DSJ the children are taught number bonds through various approaches:
Concrete, Pictorial & Abstract

Concrete
Children start by counting familiar real-world objects that they can interact with in the classroom. They then progress to use counters to represent the real-world objects. From here, they progress to grouping counters into two groups.

By putting 7 counters into two groups, children learn the different ways that seven can be made. With further exploration, children work out other ways to partition/break numbers into two groups.

Pictorial

Now that children understand the concept with hands-on objects and experience, children progress to writing number bonds in their mathematics work. Early number bond explorations might simply reflect the two groups of counters that they created during the concrete step, along with the other combinations that they found.

Abstract

With the concrete and pictorial steps completed, children progress to representing abstract problems using correct mathematical notation:
 0 + 7 = 7, 1 + 6 = 7, 2 + 5 = 7, 3 + 4 = 7
7 – 0 = 7, 7 – 1 = 6, 7 – 2 = 5, 7 – 3 = 4 etc.

Number Bond Awards

At DSJ the children in EYFS and Y1 will work towards achieving Number Bond Certificates. The children will be awarded these certificates once they are secure in these number facts and can recall these accurately 90% of the time.

These certificates will be awarded in a school celebration assembly and it is expected that there will be a strong emphasis on these certificates during the reception and Y1 year in school before progressing on to the special certificate for times tables (see times tables policy).

Number Bonds to 10

To achieve this certificate the children need to be secure in all number bonds to 10, 90% of the time. This will be assessed through the teacher assessment of the pupils in their work in mathematics and ability to recall these facts mentally in various situations in the classroom. This is to include the following:

Number	Number Bonds **(to include related subtraction facts for each number)**
2	0 + 2 = 2, 1 + 1 = 2
3	0 + 3 = 3, 1 + 2 = 3
4	0 + 4 = 4, 1 + 3 = 4, 2 + 2 = 4
5	0 + 5 = 5, 1 + 4 = 5, 2 + 3 = 5
6	0 + 6 = 6, 1 + 5 = 6, 2 + 4 = 6, 3 + 3 = 6
7	0 + 7 = 7, 1 + 6 = 7, 2 + 5 = 7, 3 + 4 = 7
8	0 + 8 = 8, 1 + 7 = 8, 2 + 6 = 8, 3 + 5 = 8, 4 + 4 = 8
9	0 + 9 = 9, 1 + 8 = 9, 2 + 7 = 9, 3 + 6 = 9, 4 + 5 = 9
10	0 + 10 = 10, 1 + 9 = 10, 2 + 8 = 10, 3 + 7 = 10, 4 + 6 = 10, 5 + 5 = 10

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Number Bonds to 20

To achieve this certificate the children need to be secure in all number bonds to 20 and have already been awarded the Number Bonds to 10 certificate. This will be assessed through the teacher assessment of the pupils in their work in mathematics and ability to recall these facts mentally in various situations in the classroom. This is to include the following:

Number	Number Bonds **(to include related subtraction facts for each number)**
1 -10	Known through achieving Number Bonds to 10 certificate
11	0 + 11 = 11, 1 + 10 = 11, 2 + 9 = 11, 3 + 8 = 11, 4 + 7 = 11, 5 + 6 = 11
12	0 + 12 = 12, 1 + 11 = 12, 2 + 10 = 12, 3 + 9 = 12, 4 + 8 = 12, 5 + 7 = 12, 6 + 6 = 12
13	0 + 13 = 13, 1 + 12 = 13, 2 + 11 = 13, 3 + 10 = 13, 4 + 9 = 13, 5 + 8 = 13, 6 + 7 = 13
14	0 + 14 = 14, 1 + 13 = 14, 2 + 12 = 14, 3 + 11 = 14, 4 + 10 = 14, 5 + 9 = 14, 6 + 8 = 14, 7 + 7 = 14
15	0 + 15 = 15, 1 + 14 = 15, 2 + 13 = 15, 3 + 12 = 15, 4 + 11 = 15, 5 + 10 = 15, 6 + 9 = 15, 7 + 8 = 15
16	0 + 16 = 16, 1 + 15 = 16, 2 + 14 = 16, 3 + 13 = 16, 4 + 12 = 16, 5 + 11 = 16, 6 + 10 = 16, 7 + 9 = 16, 8 + 8 = 16
17	0 + 17 = 17, 1 + 16 = 17, 2 + 15 = 17, 3 + 14 = 17, 4 + 13 = 17, 5 + 12 = 17, 6 + 11 = 17, 7 + 10 = 17, 8 + 9 = 17
18	0 + 18 = 18, 1 + 17 = 18, 2 + 16 = 18, 3 + 15 = 18, 4 + 14 = 18, 5 + 13 = 18, 6 + 12 = 18, 7 + 11 = 18, 8 + 10 = 18, 9 + 9 = 18
19	0 + 19 = 19, 1 + 18 = 19, 2 + 17 = 19, 3 + 16 = 19, 4 + 15 = 19, 5 + 14 = 19, 6 + 13 = 19, 7 + 12 = 19, 8 + 11 = 19, 9 + 10 = 19
20	0 + 20 = 20, 1 + 19 = 20, 2 + 18 = 20, 3 + 17 = 20, 4 + 16 = 20, 5 + 15 = 20, 6 + 14 = 20, 7 + 13 = 20, 8 + 12 = 20, 9 + 11 = 20, 10 + 10 = 20

Support At Home

Learning number bonds is key to a child's future maths success. The children that do best at learning number bonds have the support of their parents at home. They are given the chance to practice basic addition and subtraction, which is really all number bonds are, in their daily life.

The best way for parents to support their child to learn number bonds at home is through games. Which games work best is dependent on the age of the child and their understanding of numbers and their relationship to each other. The more familiar children are with numbers the easier it is for them to learn any form of mathematics. So, the number one rule is to make numbers a daily part of even very young children's lives. Singing counting songs,

showing them cartoons with number recognition and counting weaved into stories helps a lot. However, far more effective is to build numbers into play. For example using blocks:

Block Games for Number Bonds
To teach number bonds for 5 lay out 5 blocks on the floor and ask your child how many blocks there are? Then tell the child you are going to move some blocks, move 2 aside and ask the child how many blocks have moved. When they answer correctly ask them how many blocks are left? Finally move the 2 blocks back into the original pile and ask them:-
How many blocks are in the pile now?
By doing this you have just shown the child that 5 – 2 = 3 and 3 + 2 = 5. Repeat the process removing and adding back different amounts of blocks until all bonds for that number have been covered. When your child can follow this block game and answer correctly you will have successfully taught your child the number bonds to 5.

Other Games for Number Bonds
Children could roll 2 dice and ask them to add the dice together – this is a good way for children to practice their number bonds. As is getting them to help you lay the table, but only give them enough plates for some of the guests. Then ask them to work out how many more plates are needed and tell you.

Below you will also find web based activities for helping your child to learn their number bonds at home, these can be used alongside activities on Education City:

Save The Whale – Number Bonds to 10

Funky Mummy – Number Bonds to 20

Safe Cracker – Number Bonds to 20