



Getting to know your fingers and how to use them

A guide for parents/carers of children with Apert
syndrome

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Why are fingers so important?

I am writing this both as a teacher and as a mother of a child with Apert syndrome. I recently completed some research on the mathematical development of children with Apert syndrome. What struck me when I was observing children in school, was that the children with Apert syndrome tended not to use their fingers to help when doing work in maths. This made some aspects of the work more challenging and led me to explore the reasons for this and to think about what could be done to help. Some of the children tried the activities outlined in this booklet and they found that it made a real difference.

Children with Apert syndrome are born with their fingers fused (syndactyly). In order to separate the fingers, a number of complex surgical procedures need to be carried out. Headlines (<https://www.headlines.org.uk/>), a charity that supports families affected by craniosynostosis, has produced a very useful resource explaining what surgery is carried out. If you've not seen this, you may find it helpful.

The activities described here have been designed to develop finger awareness. Children explore and experience much of the world with their fingers, so the better they are able to use them, the easier this will be. In typically developing children, finger awareness develops rapidly up to the age of 6 years and then continues to develop more slowly up to the age of 12 years.

Brain scans on an adult with Apert Syndrome showed that before fingers are separated the brain sees the whole hand as just one unit. This means that when children with Apert syndrome have their fingers separated, their brains have to undergo a lot of changes. It takes a long time to build the right pathways in the brain and this will only happen if the fingers are used in a range of activities. Consequently, children with Apert syndrome could benefit from activities that really focus on the development of individual finger awareness and fine motor skills. It makes sense that if your brain thinks you've got one finger and suddenly, following surgery, you have two, three, four or five fingers, your brain and your body have got a lot to do to get to know where your fingers are and how to use them. The new fingers need to learn

how to do all the things that one finger just can't do. This takes time and needs lots of practice.

When children with Apert syndrome have their fingers separated, they have a lot to learn to get their fingers working well and for the brain to develop new pathways to be able to identify and control each individual finger. Children also need to practise using their fingers, to build up muscle strength and coordination.

This booklet has been developed in order to give you some ideas of activities for children with Apert syndrome, to help develop their finger awareness and fine motor skills. Evidence suggests that if children regularly practise activities such as these, there are huge benefits. In fact developing finger awareness and fine motor skills can even help children with their learning, especially in areas such as mathematics, where finger use is so important in work on early arithmetic. Finger use is also important for learning to write.

In my research, I found that there was a strong link between children's finger awareness and their achievements in areas of mathematics involving arithmetic and numbers. If children did not use their fingers, they had to rely entirely on known number facts and their ability to do calculations in their head. As adults, we use our fingers frequently when we are doing calculations and we also use our fingers to help us keep track of things like items we need to get from the shops. When we use our fingers in these tasks we often find that we touch our fingers as we work through the problem – in other words, we 'label' each finger as a single item or number. We know our fingers so well, that we don't need to be able to see them because we can *feel* them and we know what each one feels like. In my research, one of the teachers commented that after the child had been doing the exercises described in this booklet for 6 months, she could *"visualise the numbers much better and seems to have a better sense of numbers"*. For this child, the activities made a very big difference and she could confidently use her fingers to help with solving calculations in maths.

As well as the activities described in detail in this booklet, you might want to think about how to get your child to do more with their fingers and hands as part of your everyday activities. If your child didn't crawl, s/he may be helped to develop strength and endurance in her/his palms by doing activities that stretch the hands, such as crawling, push-ups, patting, clapping and other activities where the hand is pushing against something, to provide resistance.

Messy play and activities that encourage your child to experience different sensations and textures, such as playing with playdoh, sand, pebbles, squishy balls and water can also be very helpful to develop hand strength. Encouraging your child to put on their own socks and shoes can be very useful, even if it takes a long time. This was something I discovered when my own daughter was encouraged to learn how to put on her own socks and shoes by her father, while I was away! We had to make sure that she had plenty of time in the mornings before we left for school, but it did encourage her to be independent.

To develop finger strength, you might get your child to try some finger painting or practise squeezing clothes pegs. Action songs involving finger movements and encouraging her/him to play with construction toys and engage with puzzles can also help with this.

If you want to know more about activities to strengthen the hand, talk to your child's physiotherapist or occupational therapist.

The activities described in this booklet have been tried with children between the ages of 6 and 11 years. You will need to see if the activities are right for your child, but if they are not, just try to adapt them to make them more appropriate and more fun.

Some of the activities in the booklet have been adapted from Gracia-Bafalluy, M., & Noël, M. P. (2008). Does finger training increase young children's numerical performance? *Cortex*, 44(4), 368-375.

I would very much welcome any feedback and any new ideas for more activities, so if you have time, please get in touch.

You can contact me with any comments or questions by emailing caroline.hilton@ucl.ac.uk

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Introduction to the activities

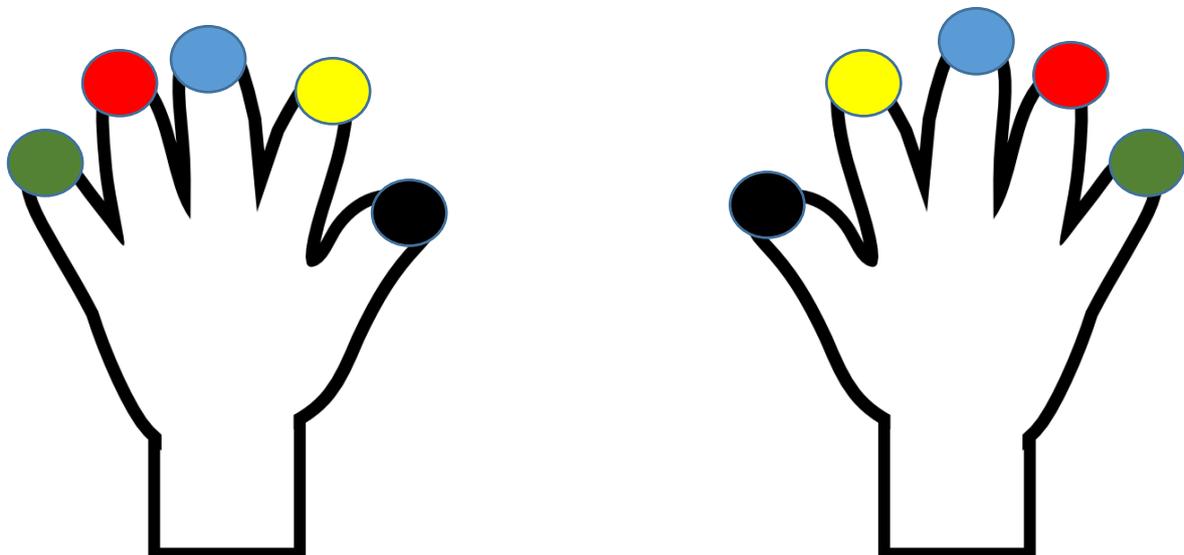
The activities outlined here can be done at home, at nursery or at school. The activities build in increasing difficulty. They should be done 3 to 5 times a week, for about 10 minutes. If you don't think the activity is quite right for your child, see if you can adapt it, so that the same skills are still being practised. It is important to continue with these activities for at least 6 months. If you have a break, don't worry, just pick up from where you left off, or go back to some of the earlier activities, if your child is struggling.

There are three types of activity:

- Mazes
- Dot patterns
- Piano playing

For each of the activities your child should have stickers on their finger nails so that they know which finger to use. The colours could be used as shown below, but you can change this depending on the number of fingers your child has and the level of difficulty. When putting the stickers on, start with the thumb and move round, so that each finger has a different sticker. If, for example, your child has 4 fingers (including the thumb), you won't need the red sticker and you can adapt the activities as needed.

Once you have tried the activities with your child, you might like to make up some of your own. I have added some templates for some of the activities which may help.



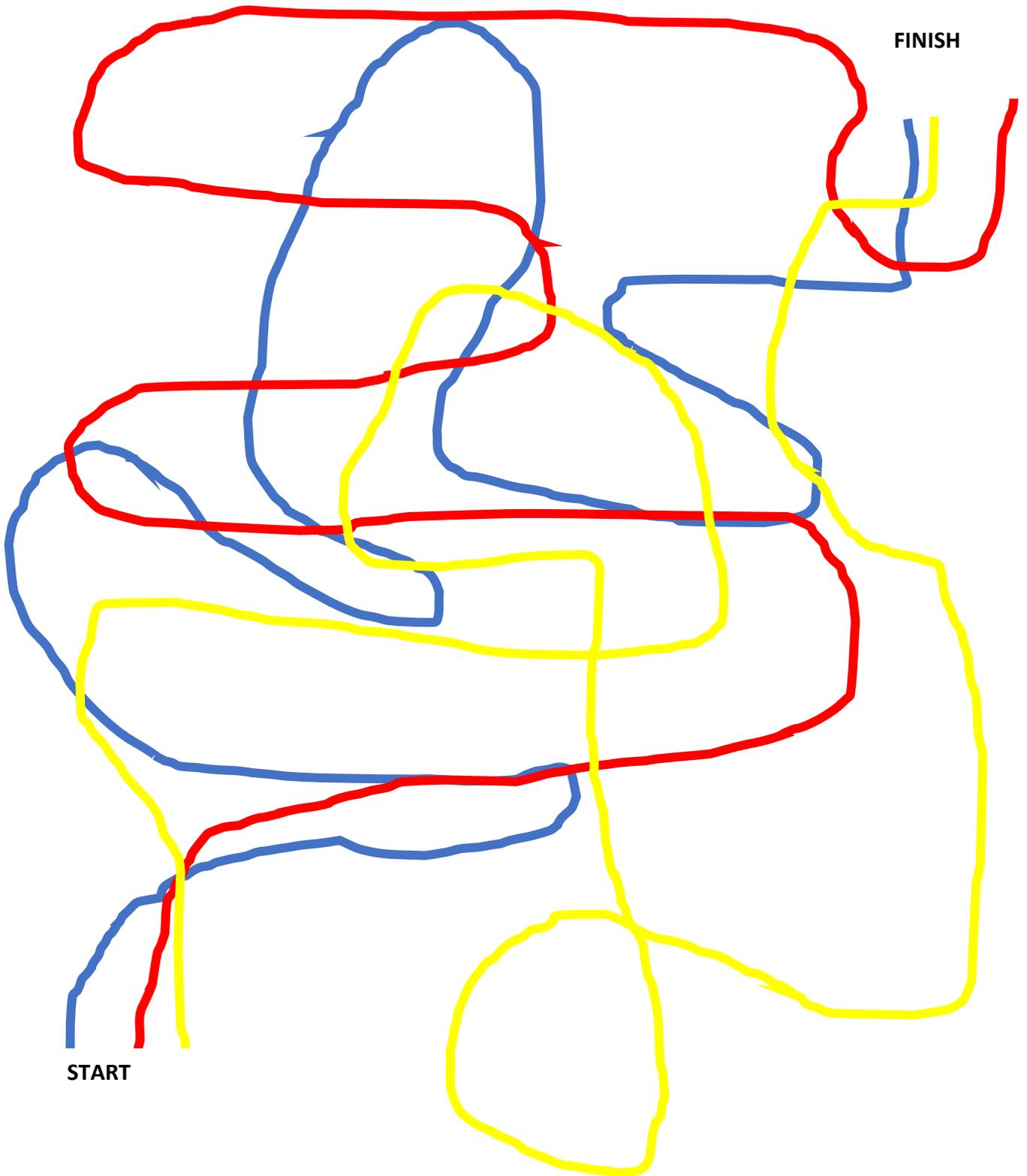
Mazes

Ask your child to trace the path with any finger. It may help for your child to try first with their dominant hand (the hand they use for most things) – if they have one. Once your child has traced with one hand, get them to repeat using the other hand.

After a bit of practice, try the mazes over the page. Each maze is colour-coded for the fingers and the mazes should be done with both hands (one hand at a time).



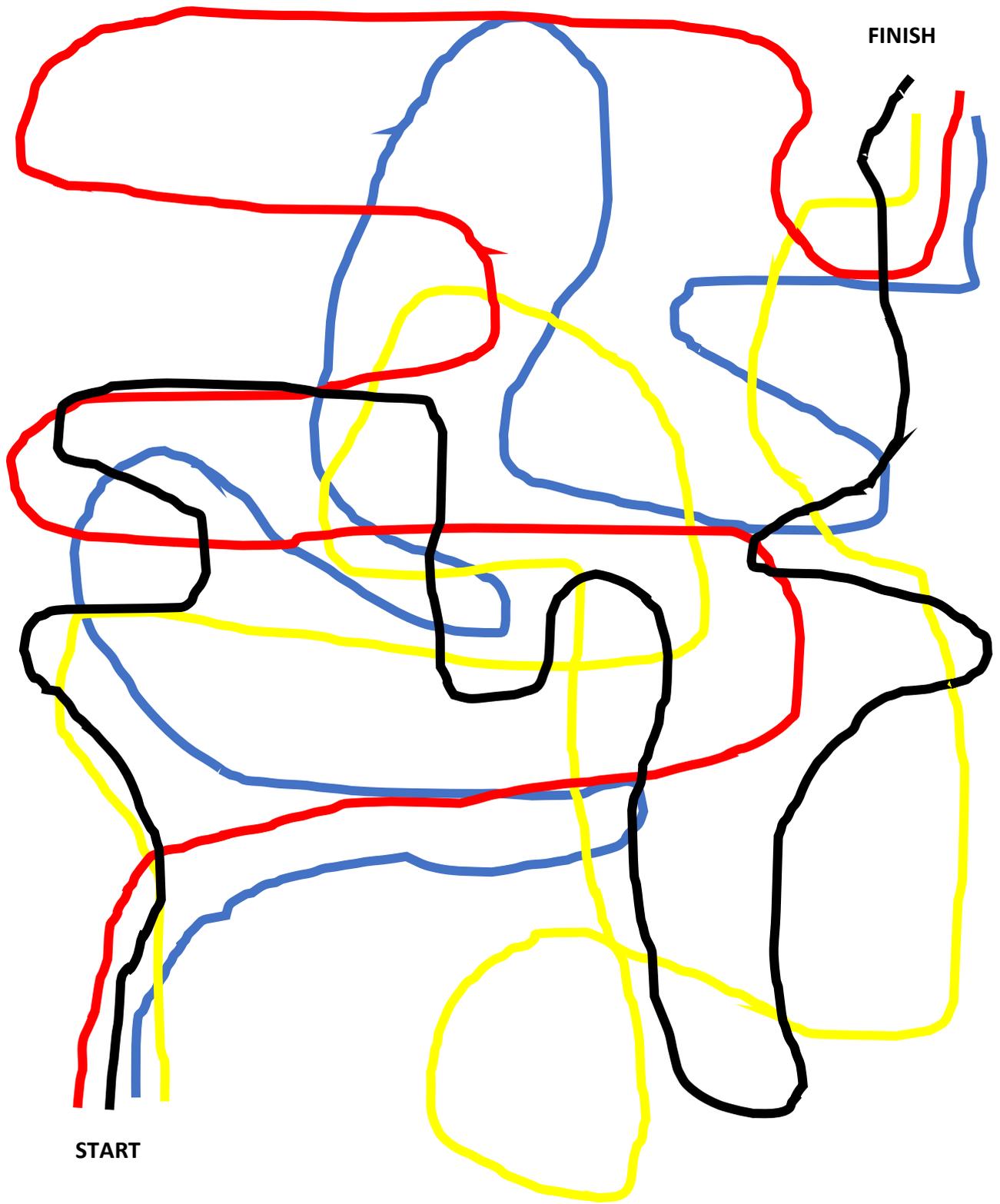
3 coloured maze



START

FINISH

4 coloured maze



5 coloured maze

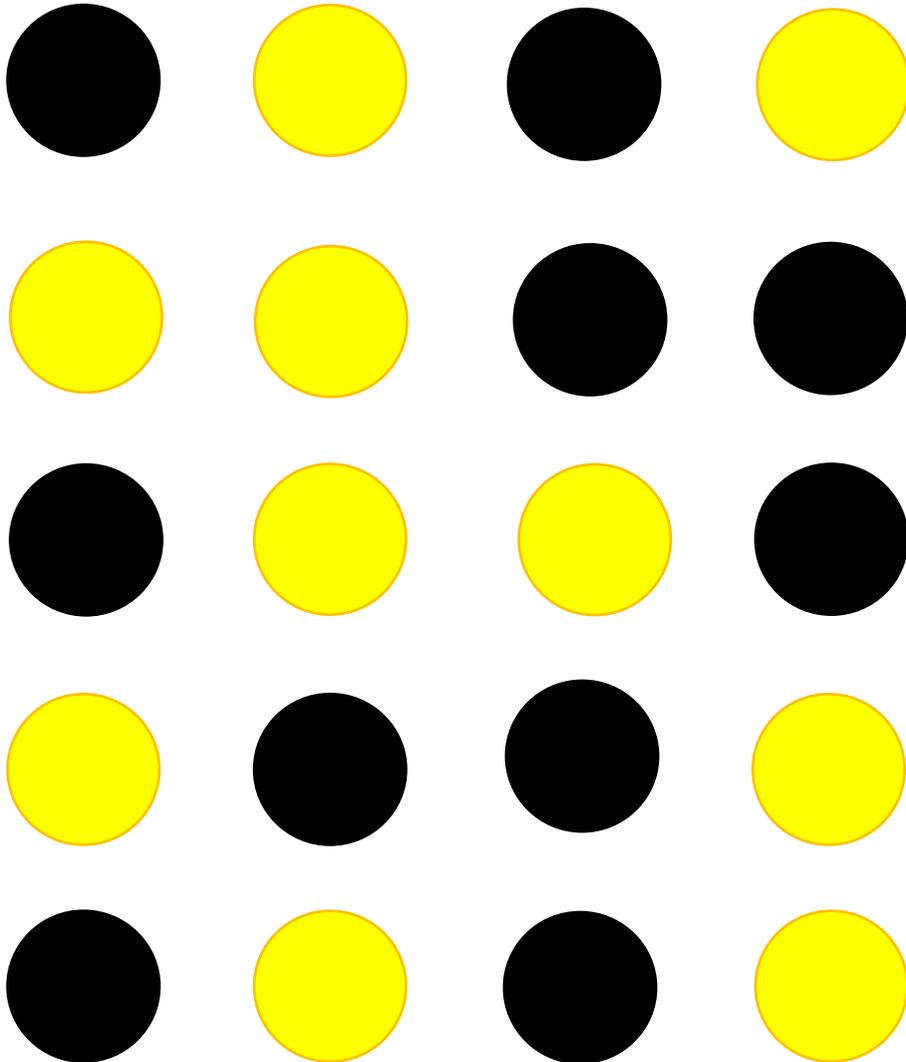


START

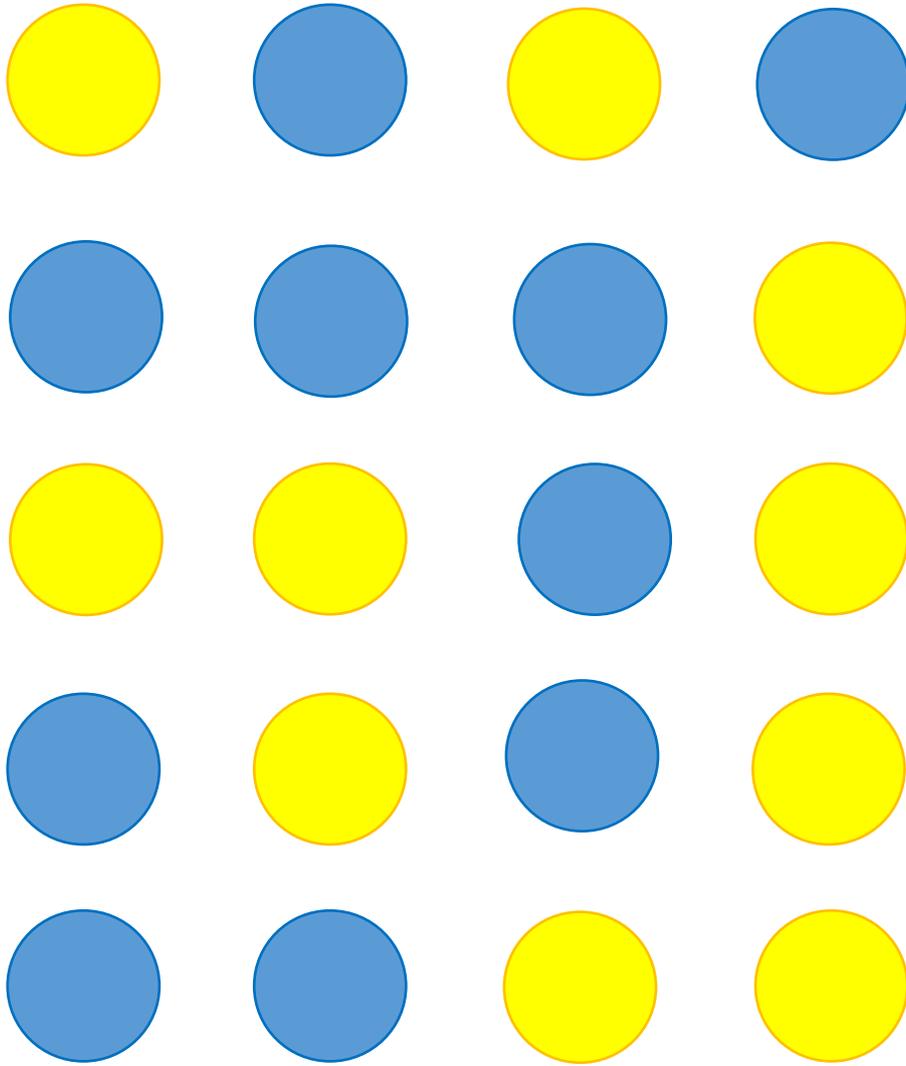
FINISH

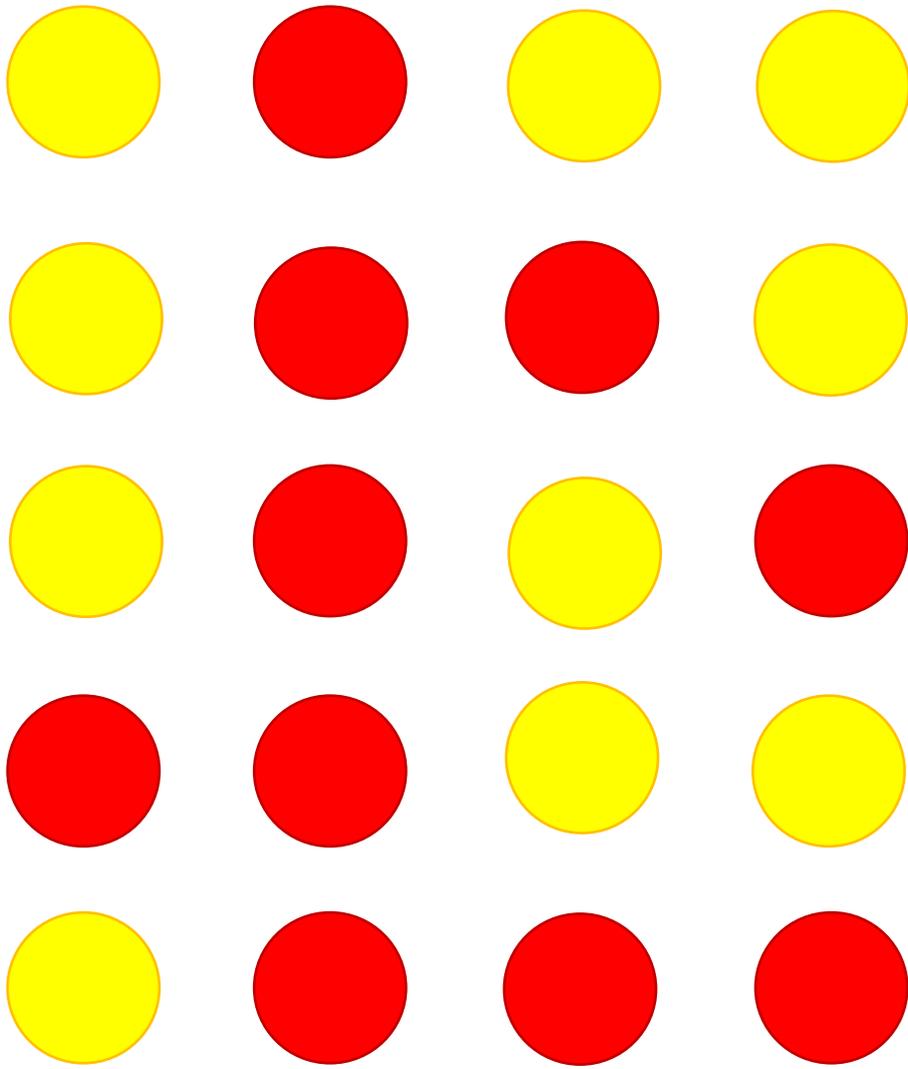
Dot patterns

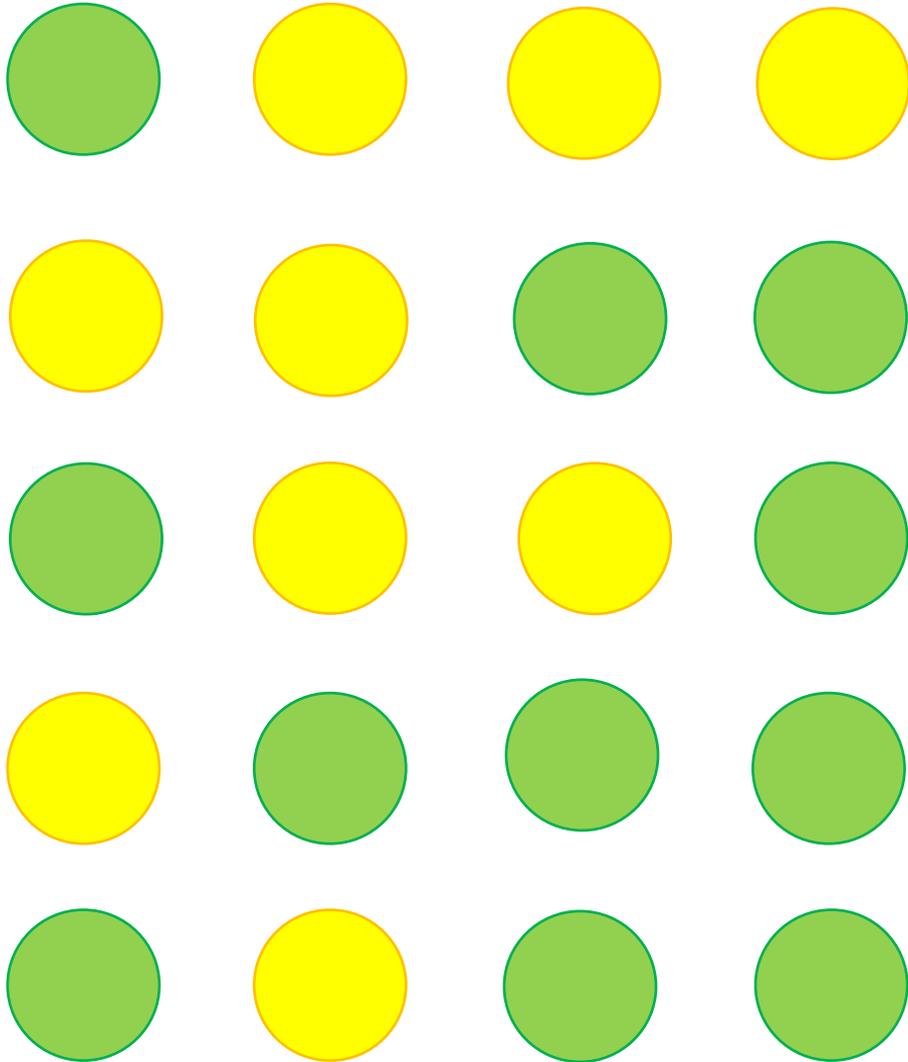
Working from right to left or left to right, ask your child to move along the line using the fingers with the colours that match the dots. Again, your child might start with their dominant hand and then repeat with their other hand. It is important to try each pattern with both hands (one hand at a time).



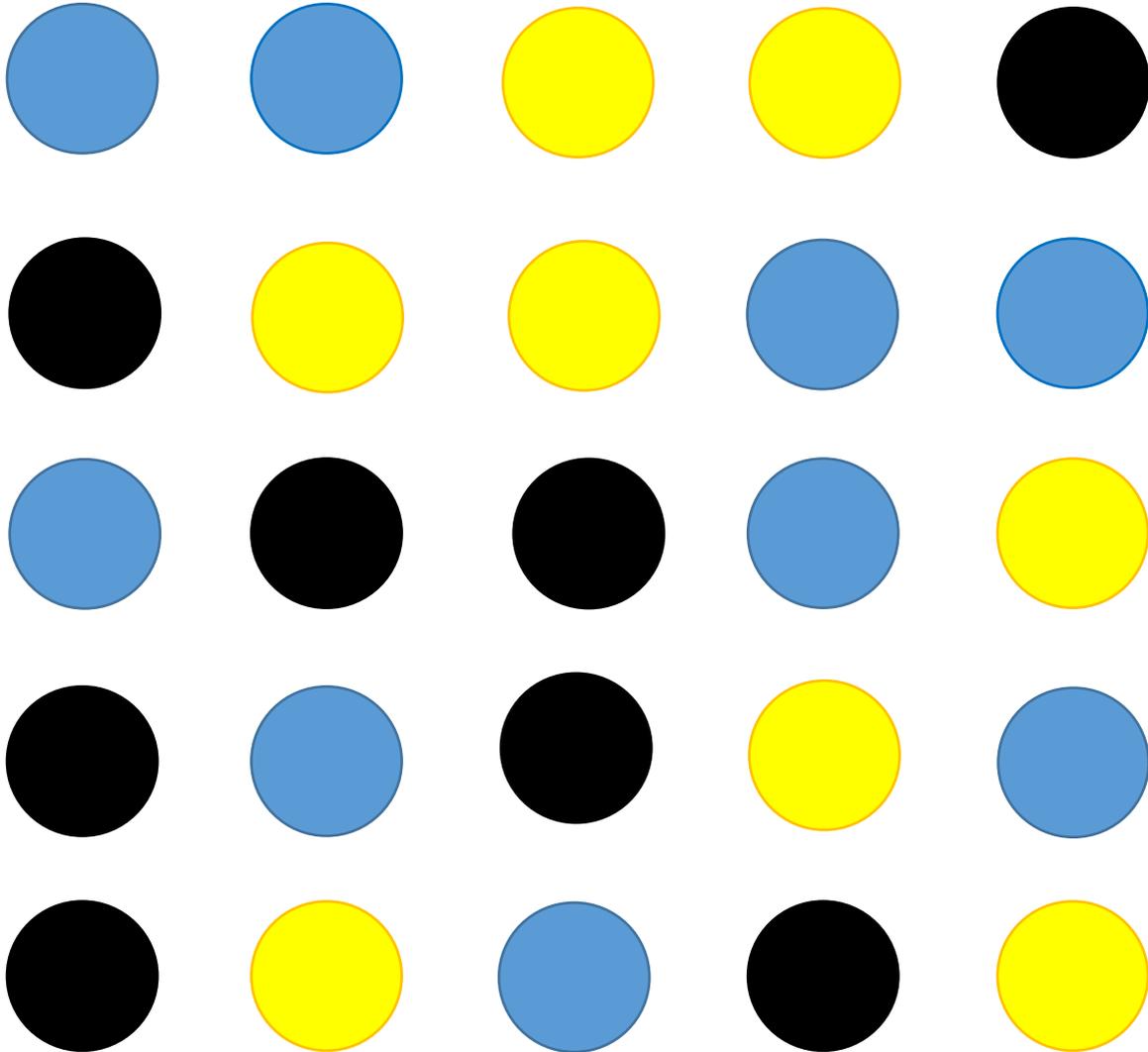
2 colour dot patterns

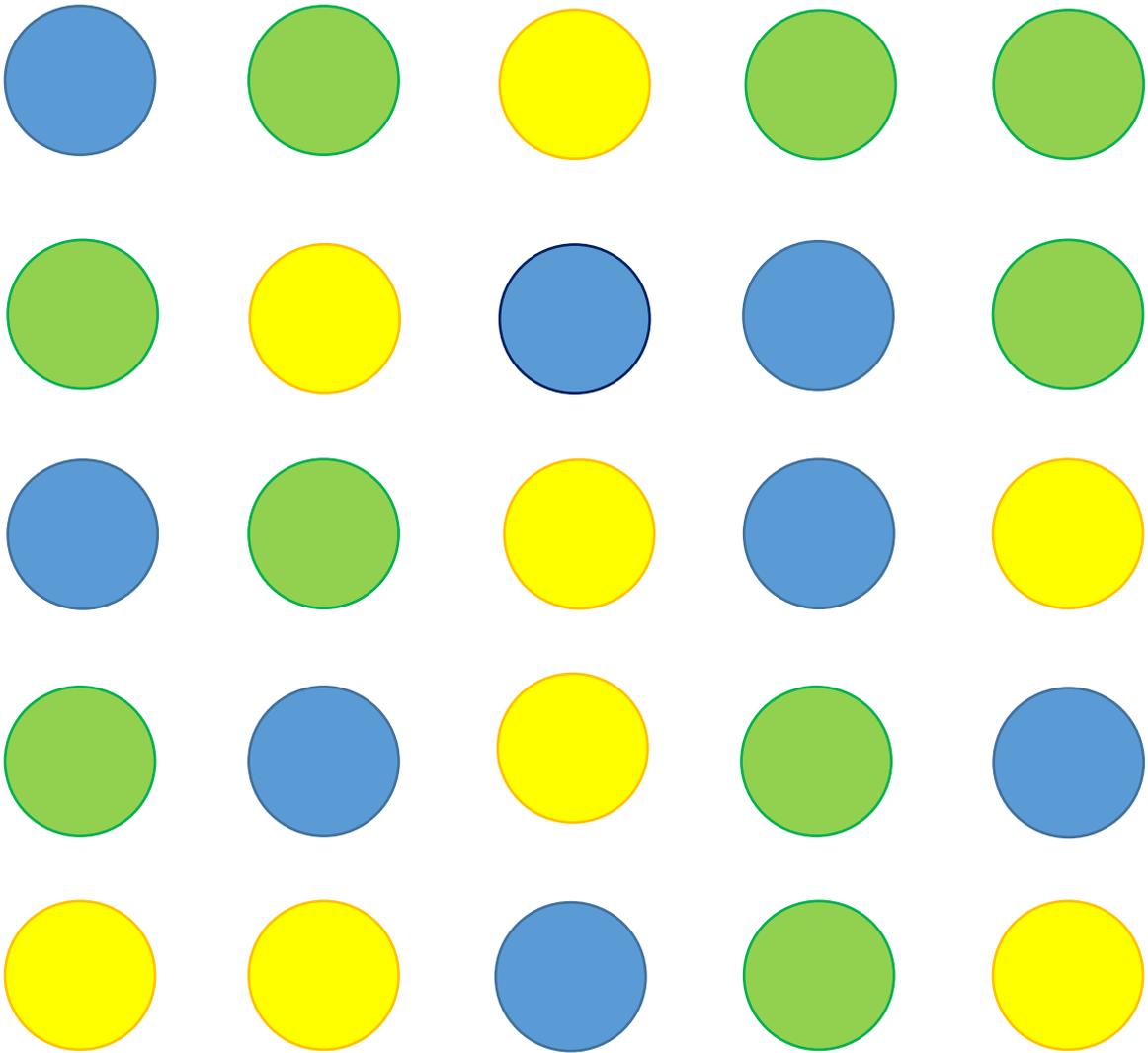


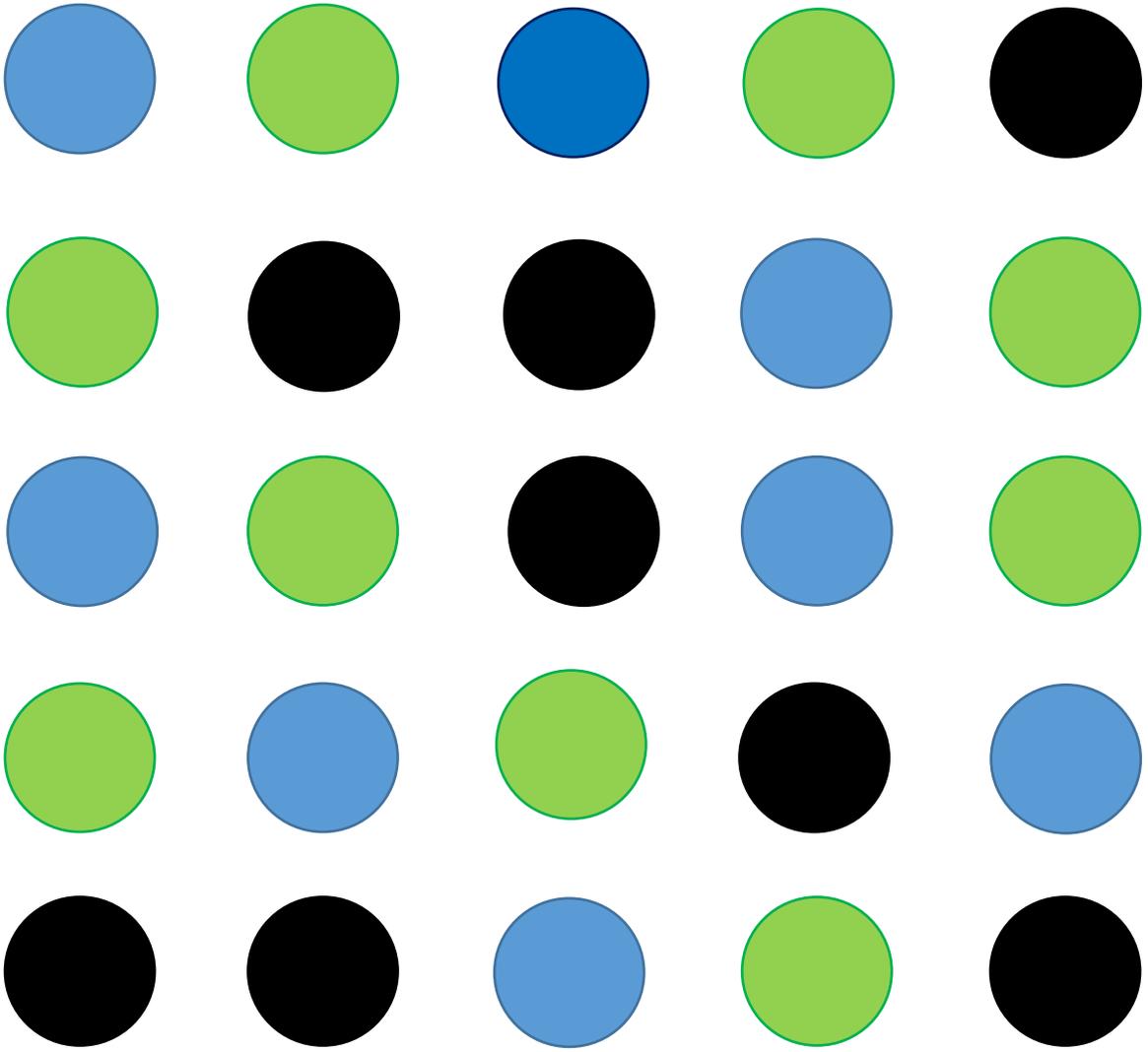


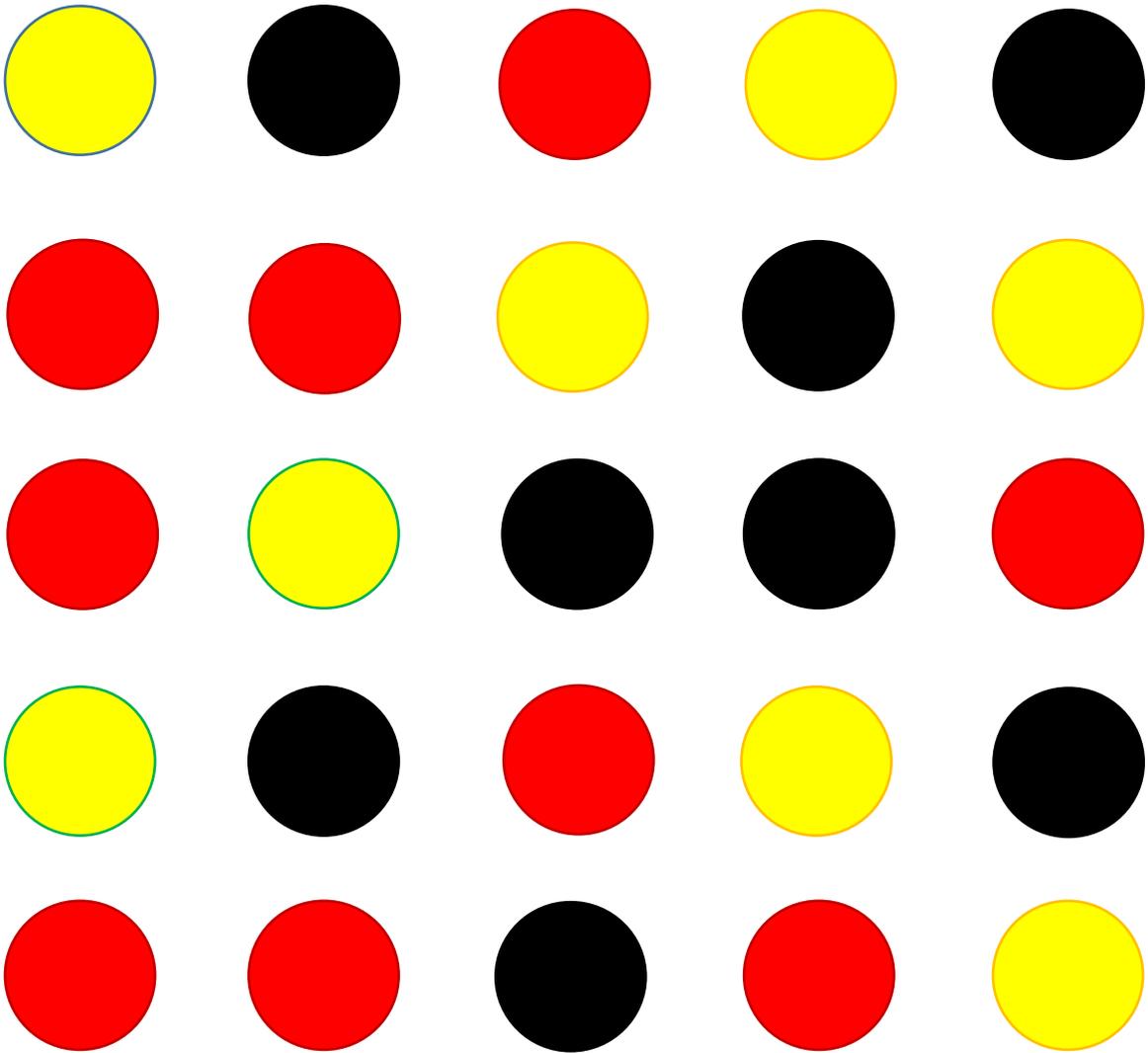


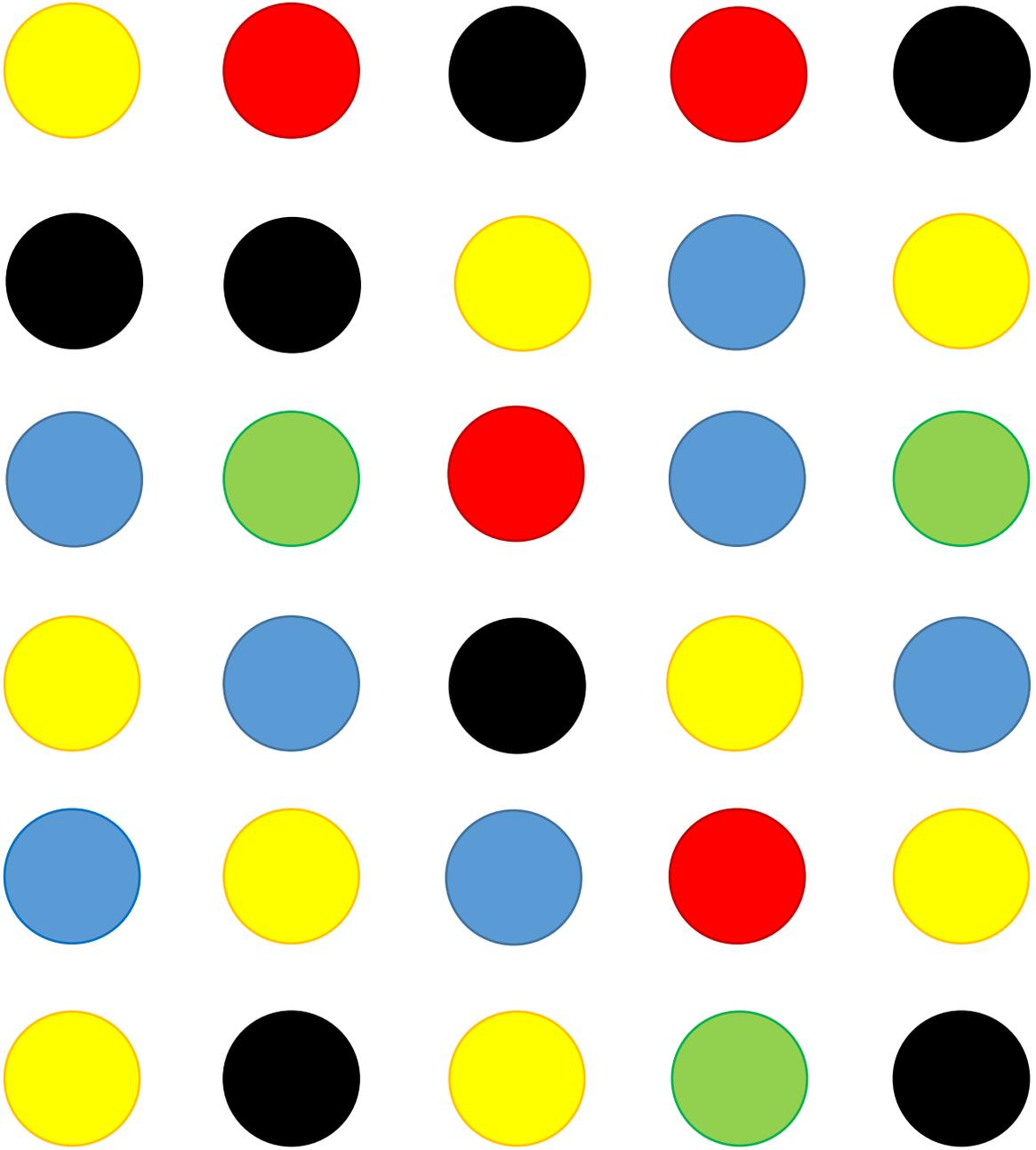
3 colour dot patterns



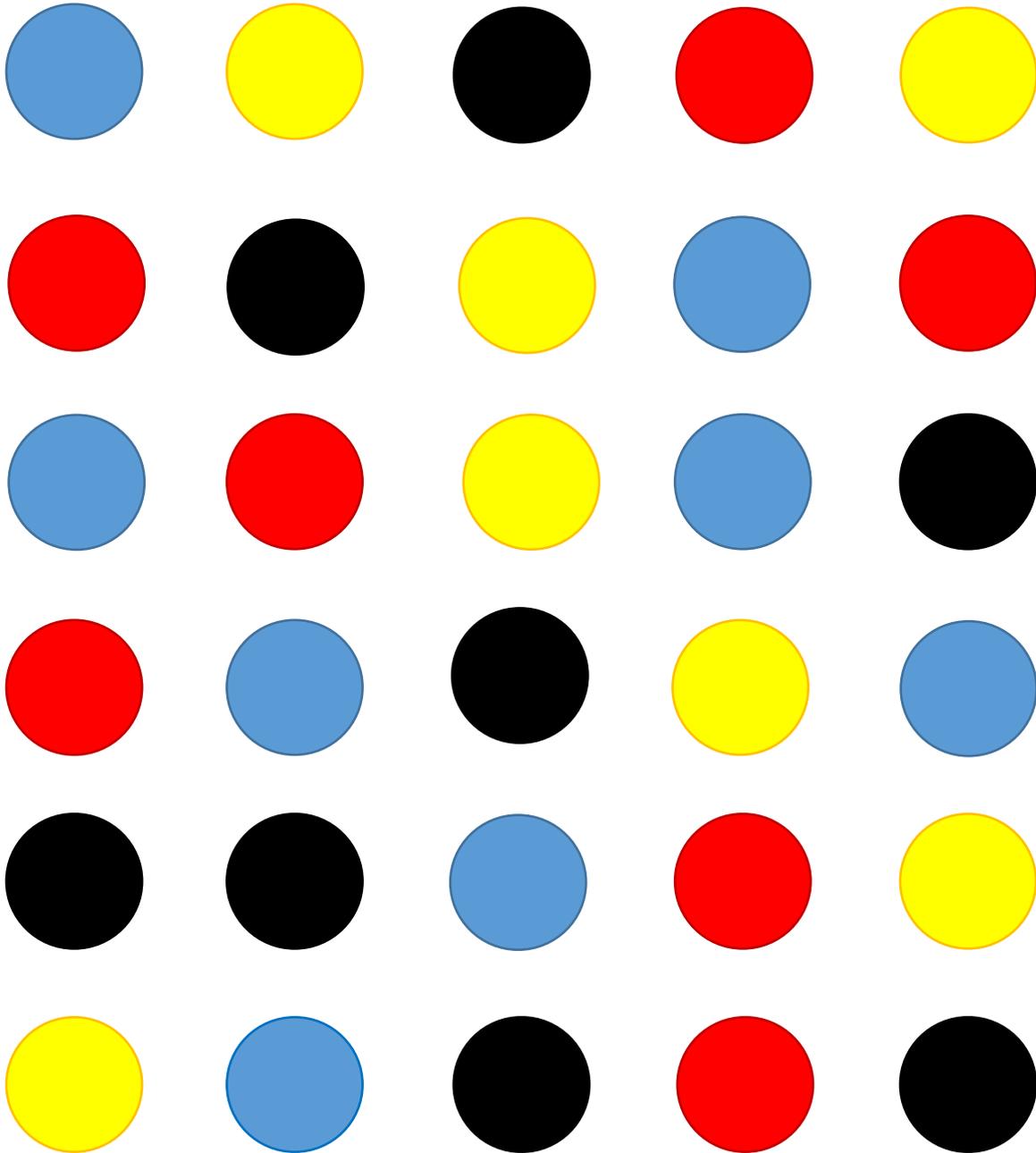


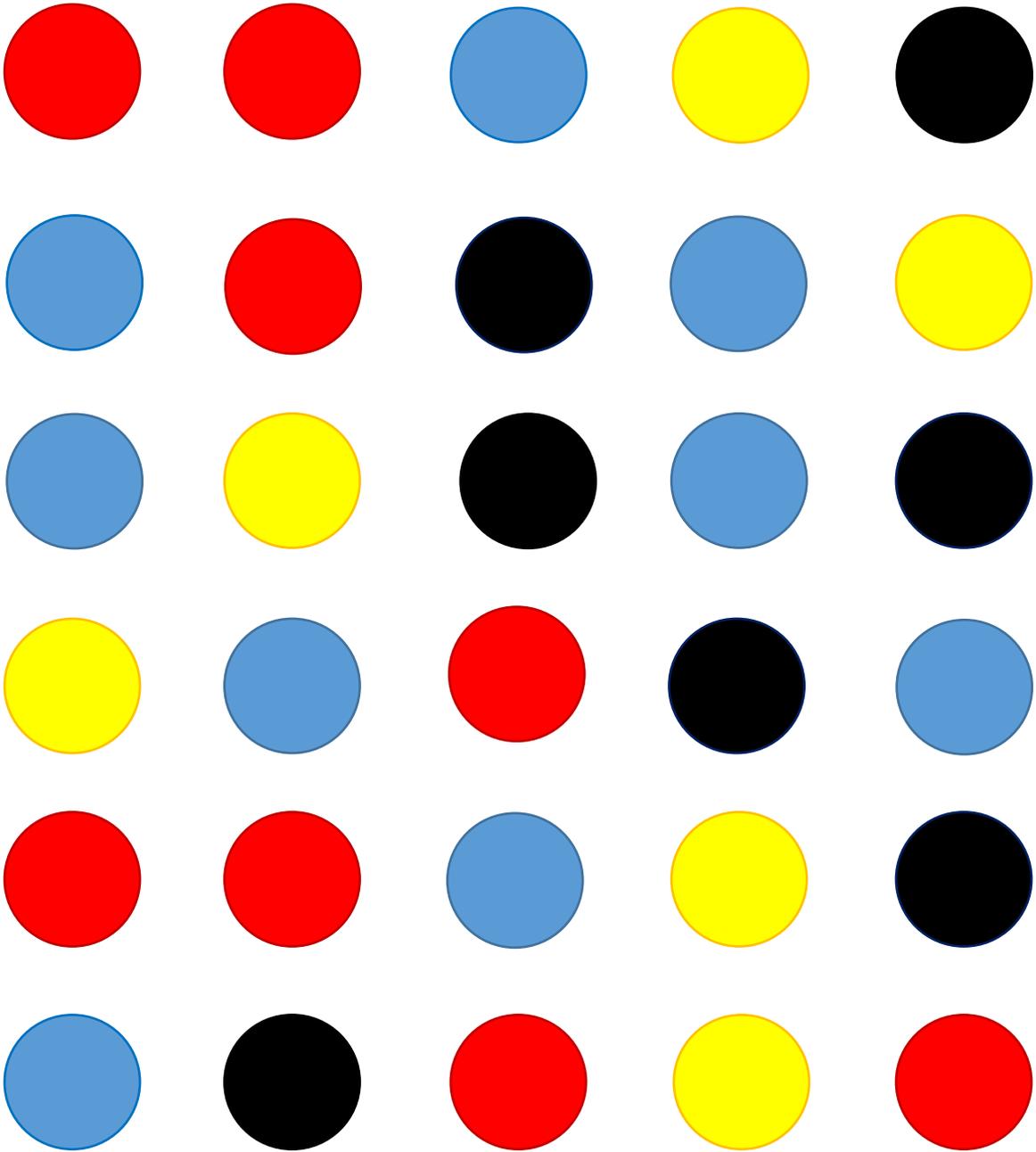


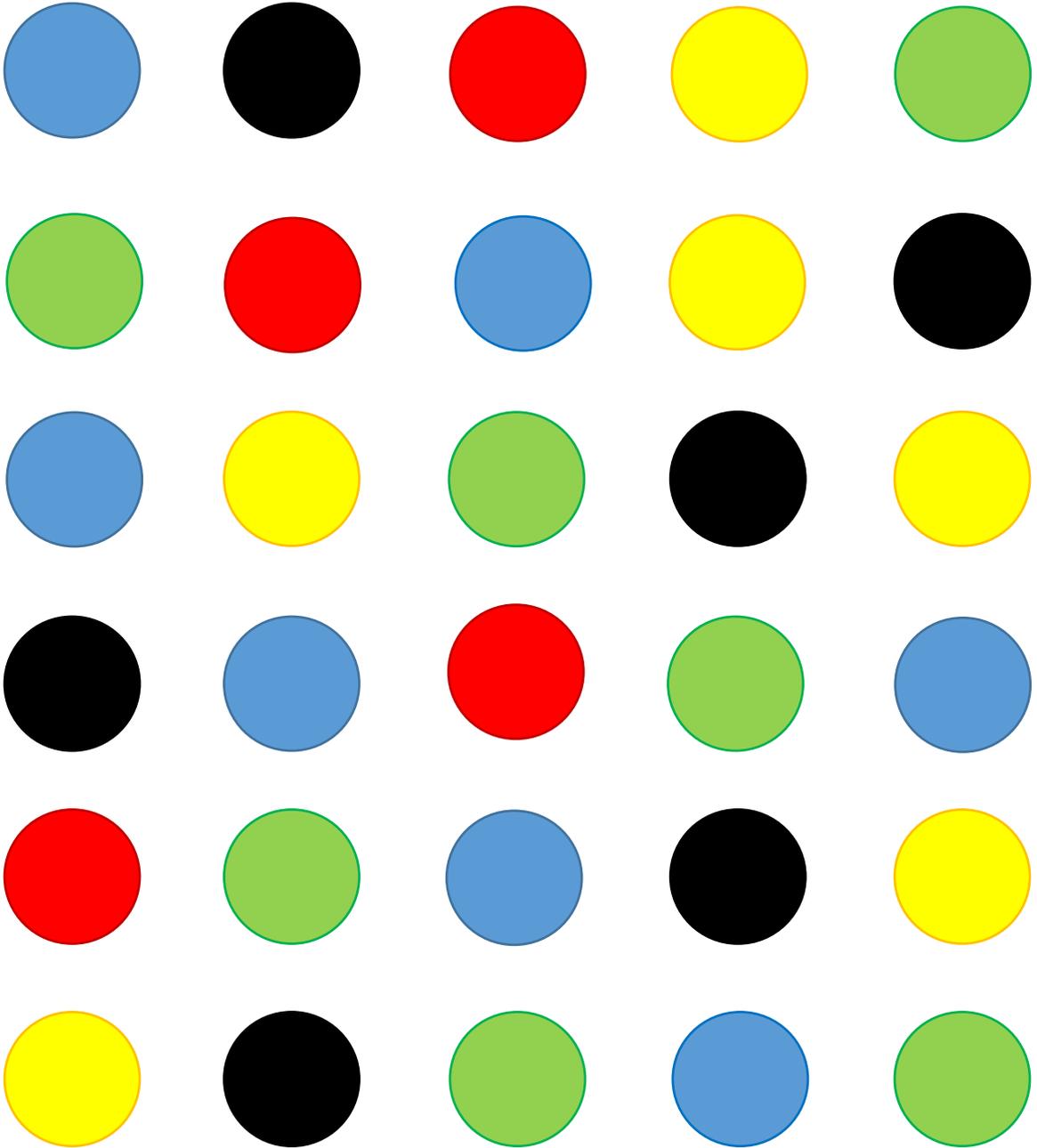




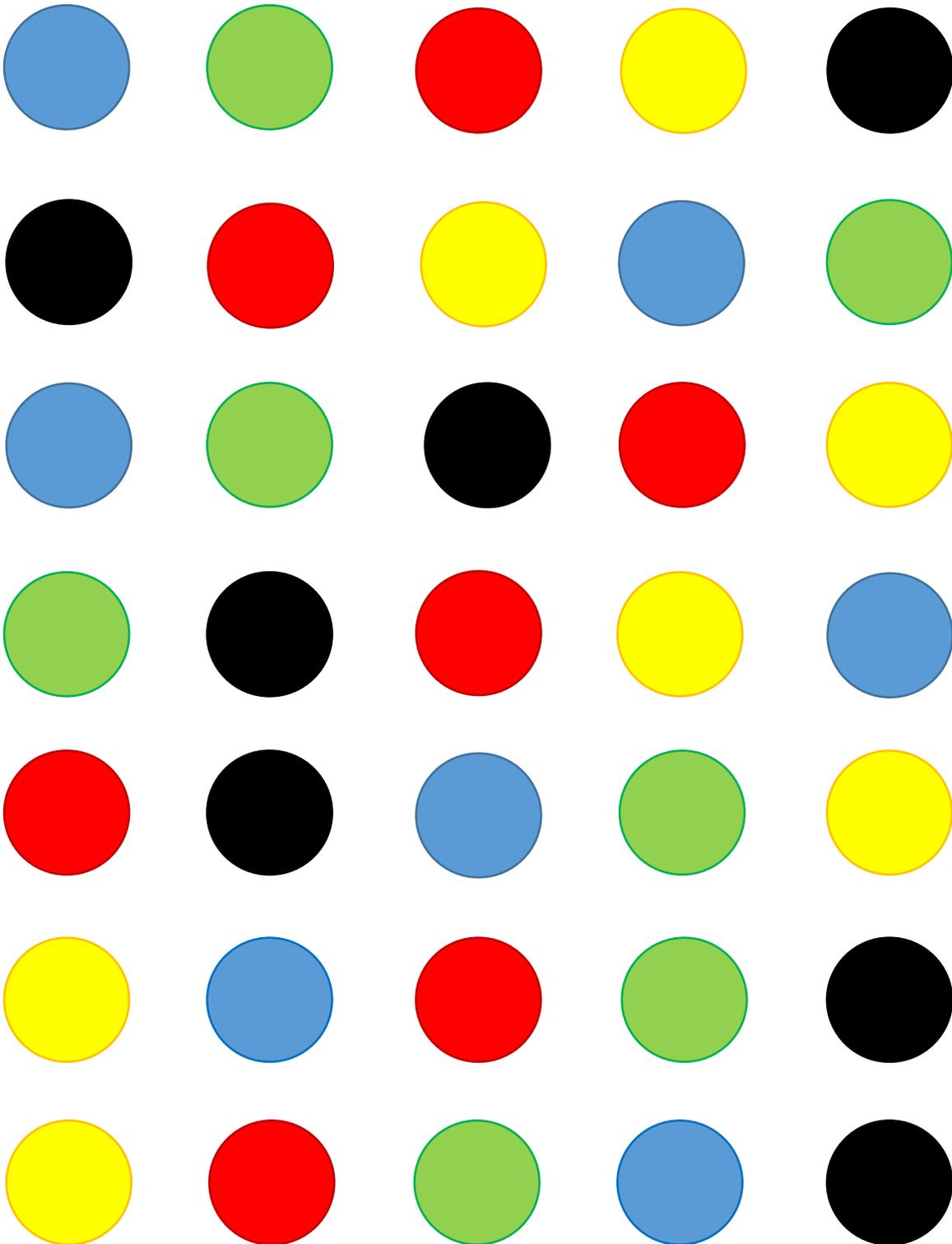
4 colour dot patterns

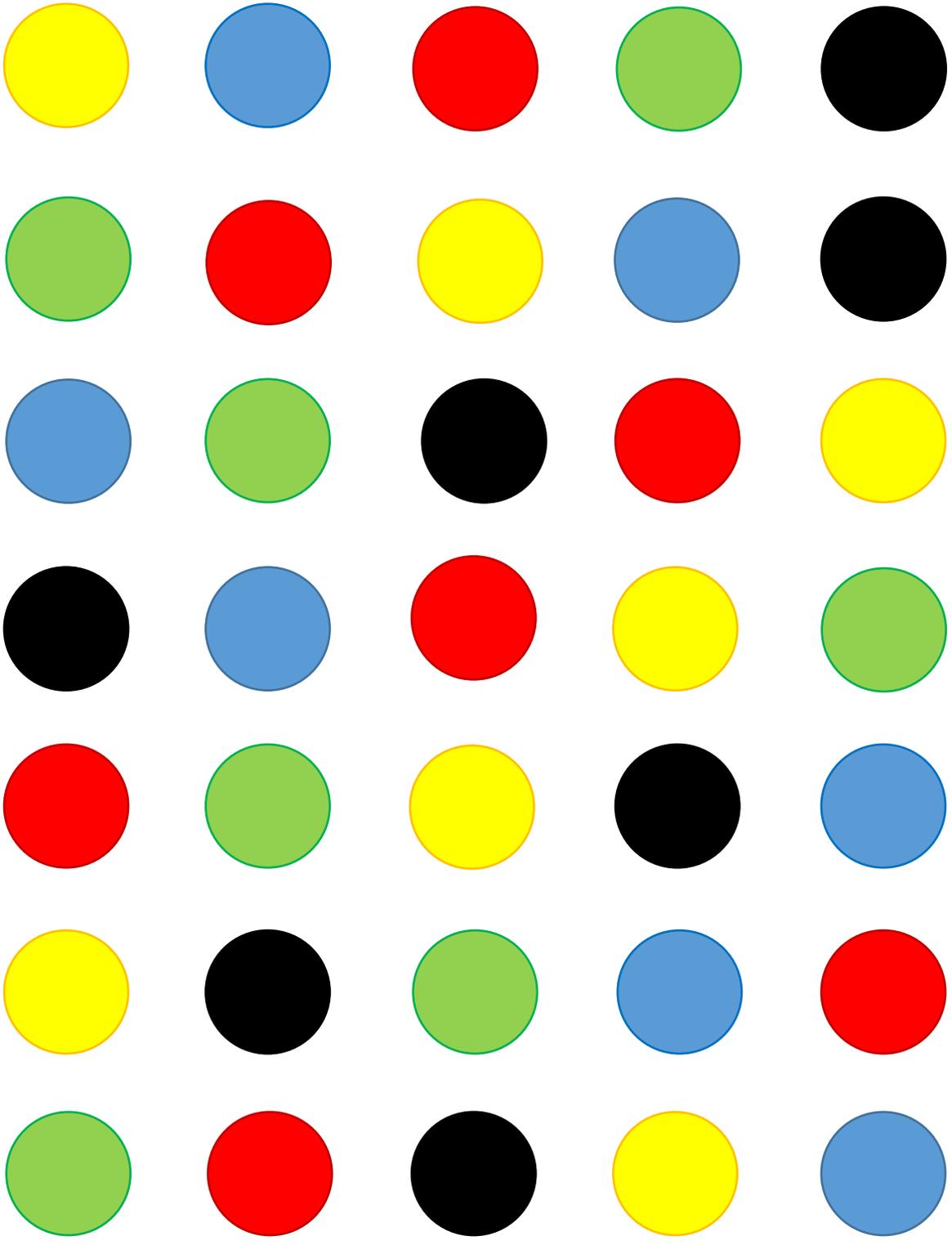






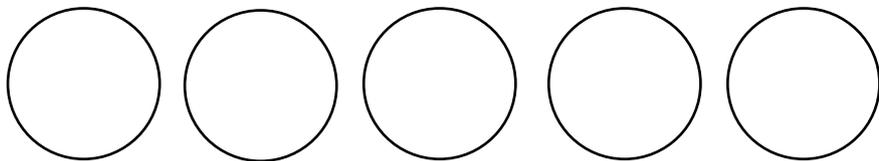
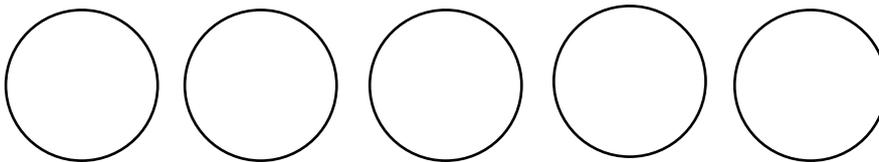
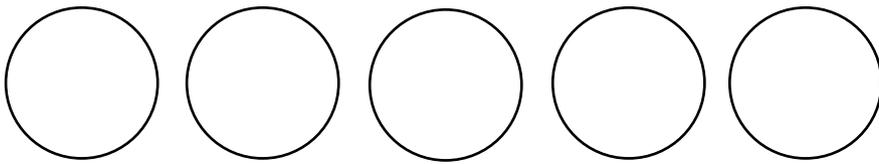
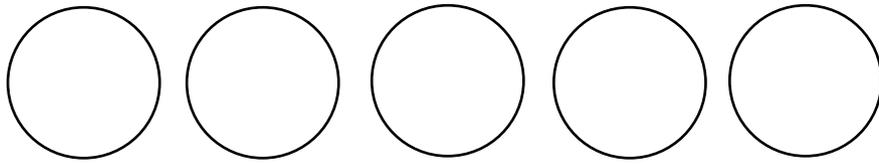
5 colour dot patterns





Dot pattern templates

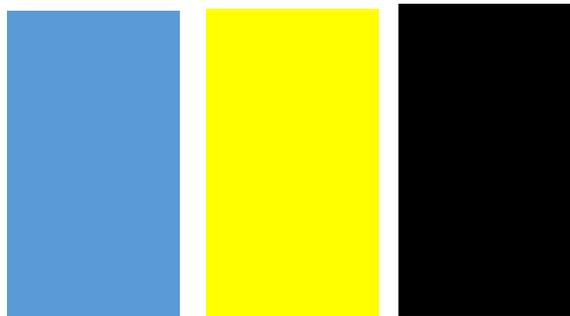
Now have some fun and make up some of your own



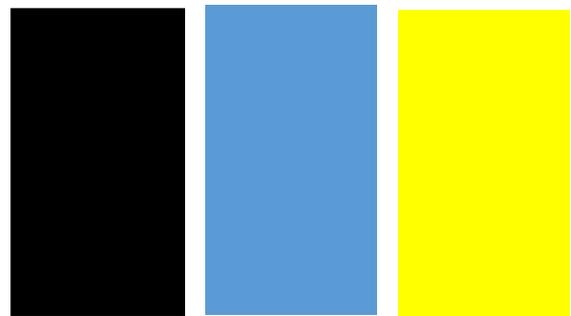
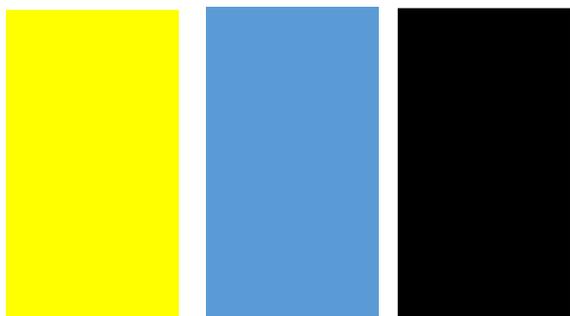
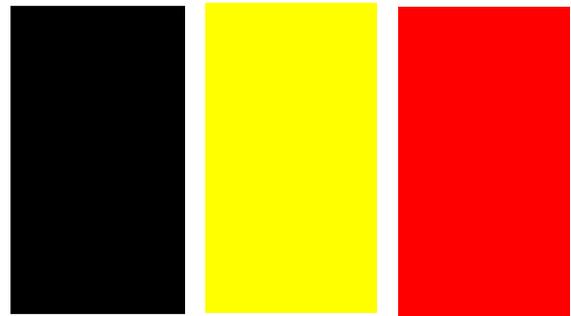
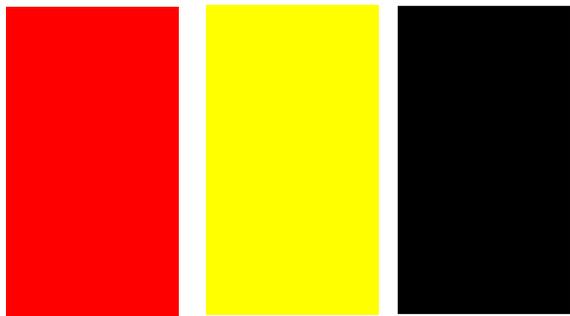
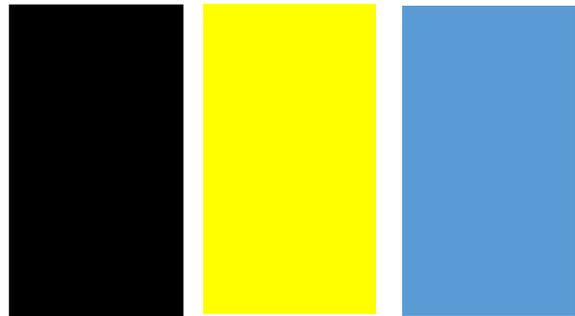
Piano Playing

This time ask your child to use both hands as if they were playing the piano. Ask your child to hold their hands over 'the keys' (coloured rectangles). They should then touch the 'keys' moving either out from the middle OR from the outside in (towards the middle). When your child has tried all the pianos here, you may want to create some of your own.

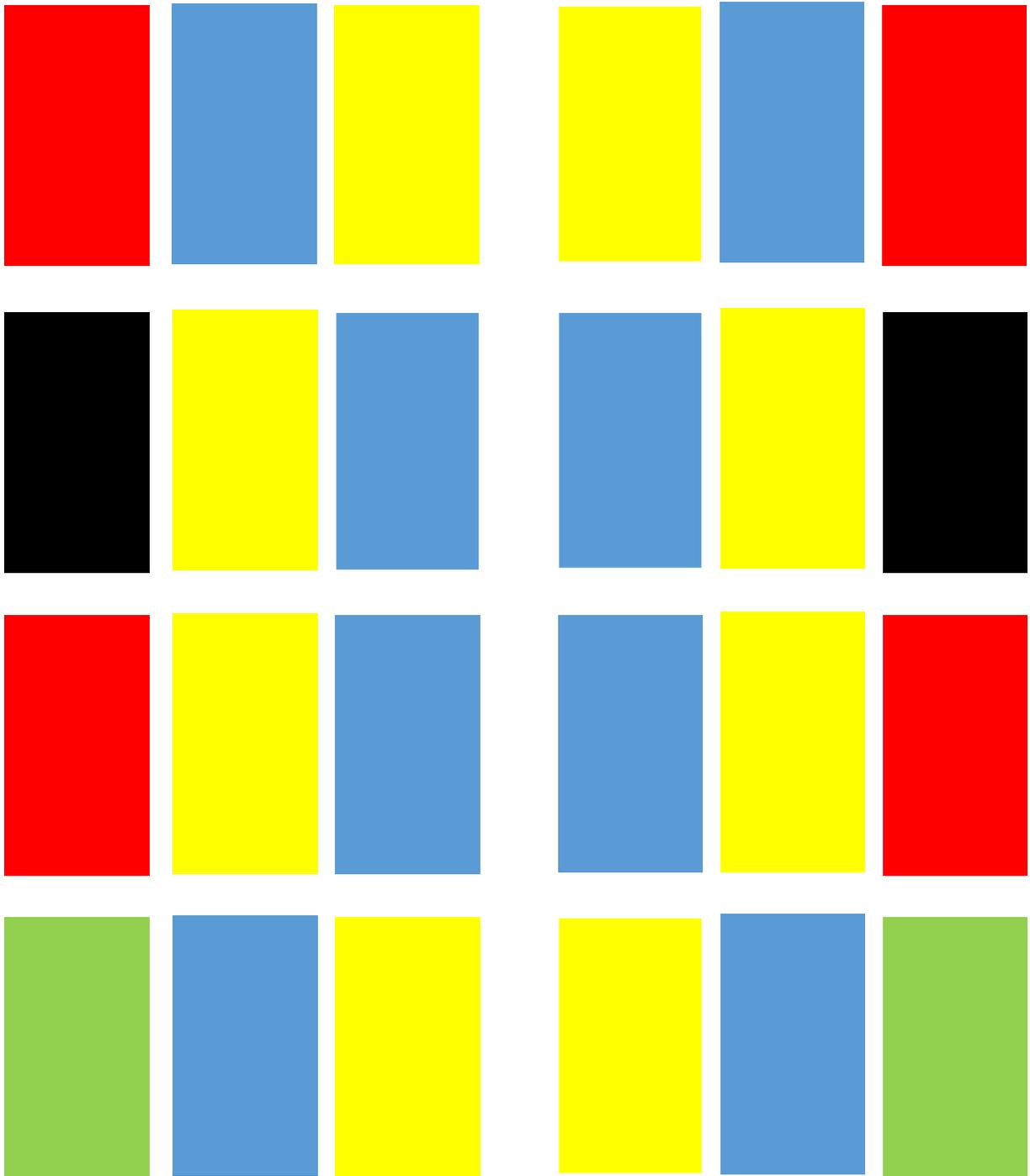
Left Hand



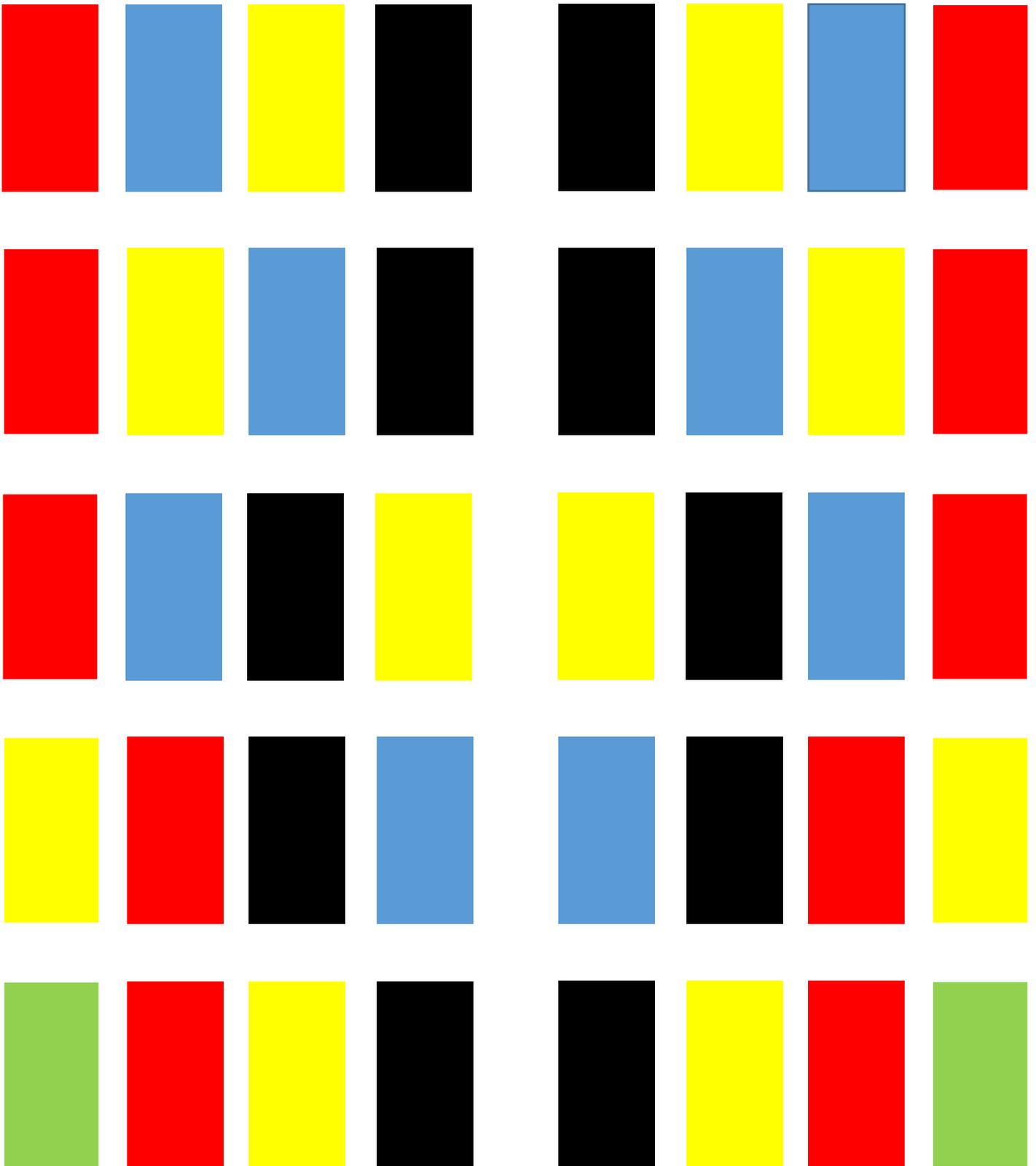
Right Hand



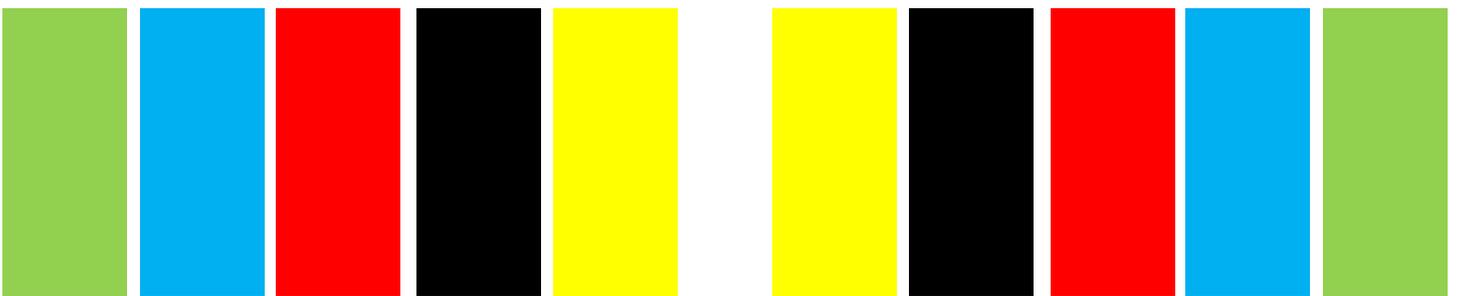
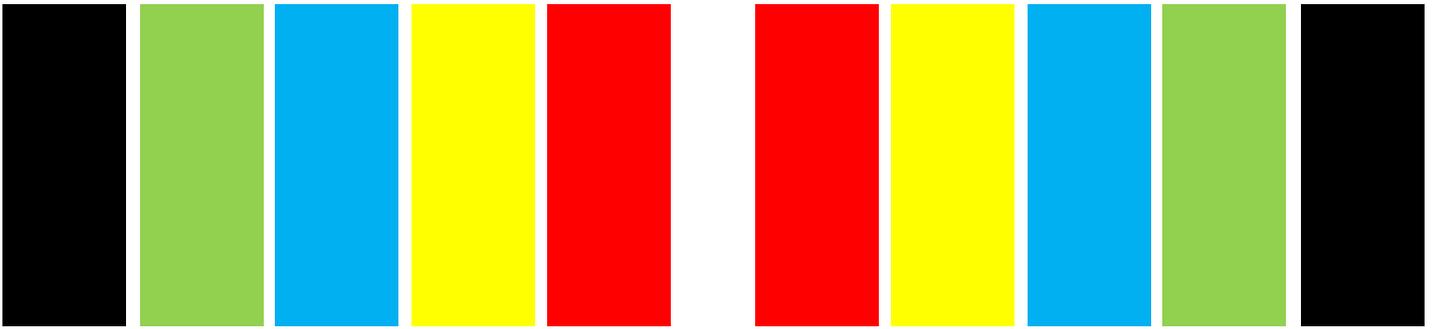
3 colour piano playing



4 colour piano playing



5 colour piano playing

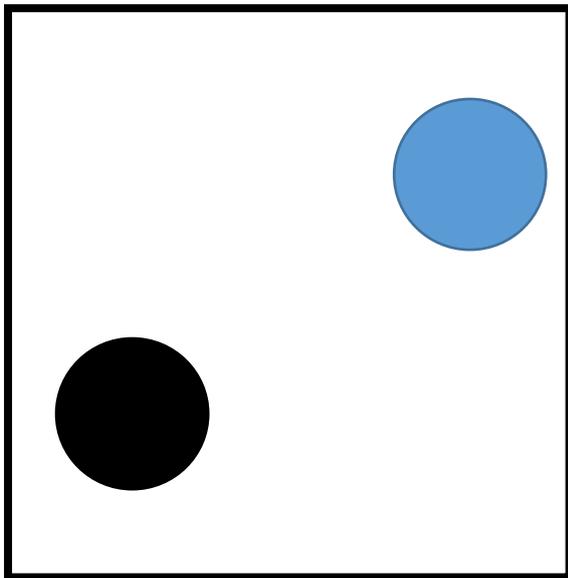


Colourful finger patterns

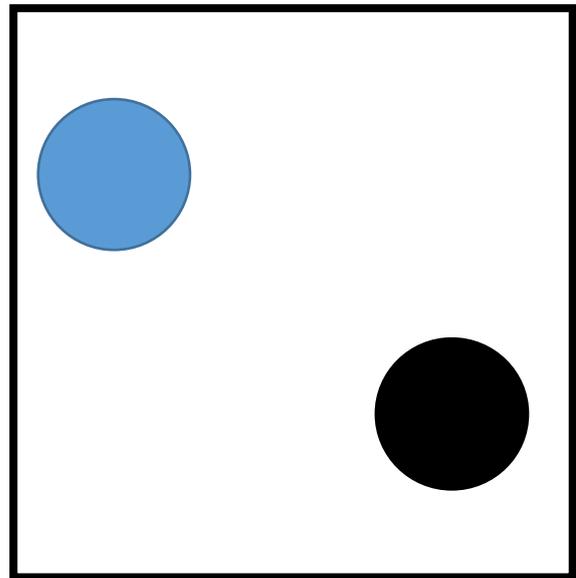
For this activity, your child will use several fingers at once. Each card has several dots on it. Ask your child to place the correct fingers on the dot pattern, starting again with the dominant hand. Ask your child to try each pattern with both hands, if possible. If you find that the patterns are too much of a stretch for your child, make up some of your own that your child can do more easily.

When your child has tried all the patterns here, you can ask your child to make the patterns with any fingers or you might want to create some of your own.

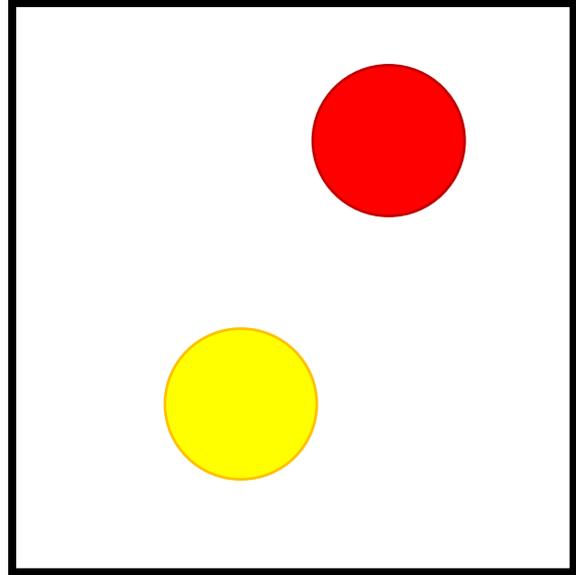
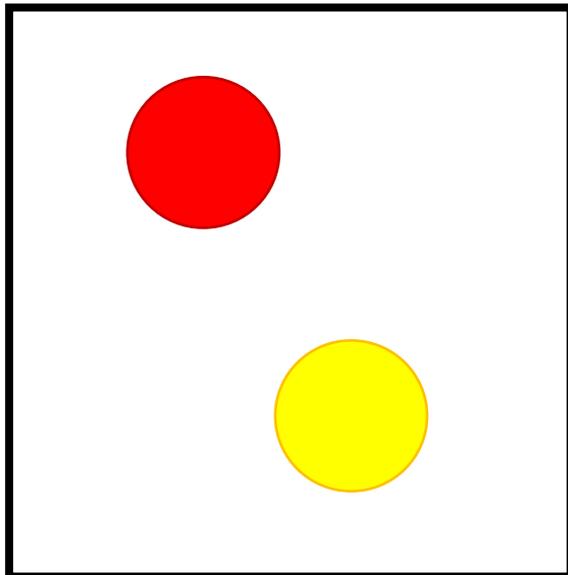
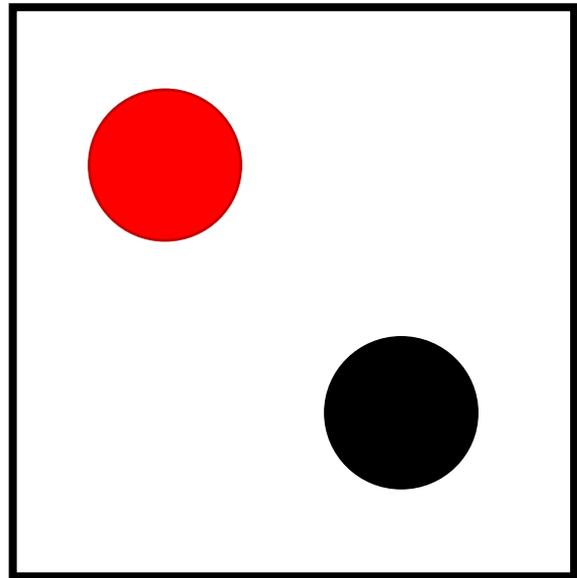
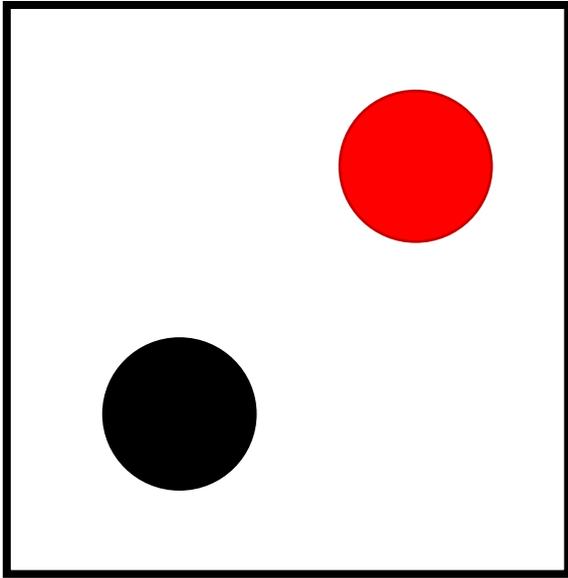
Left Hand

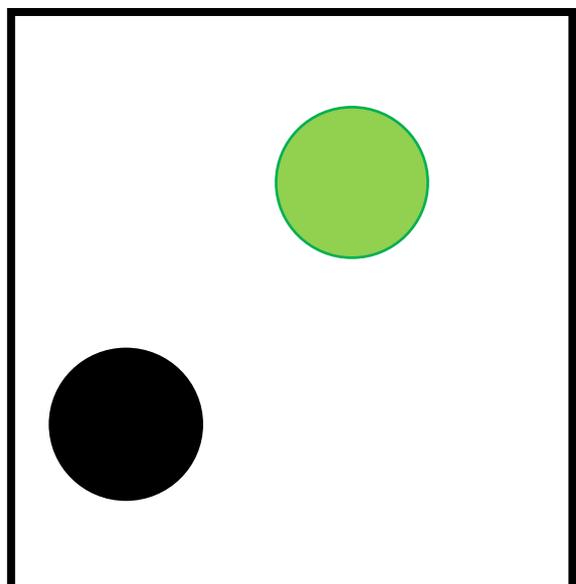
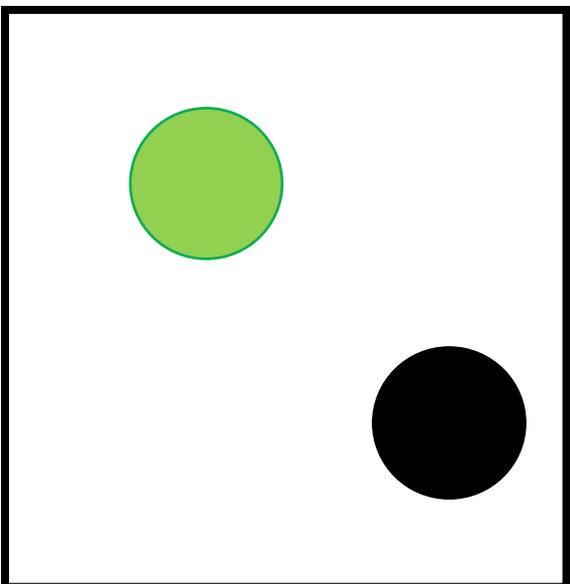
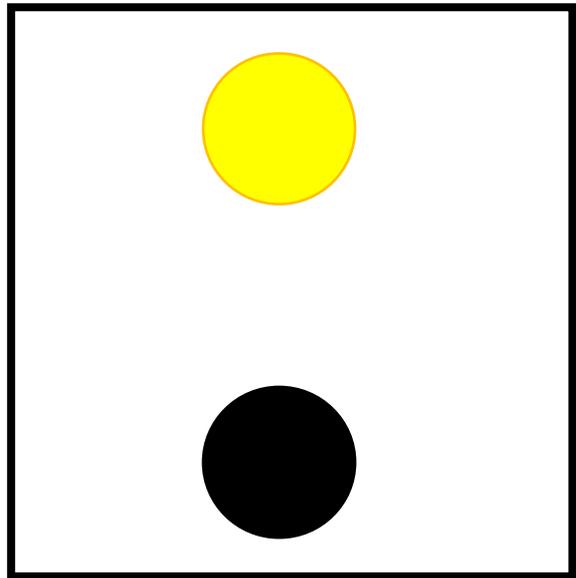
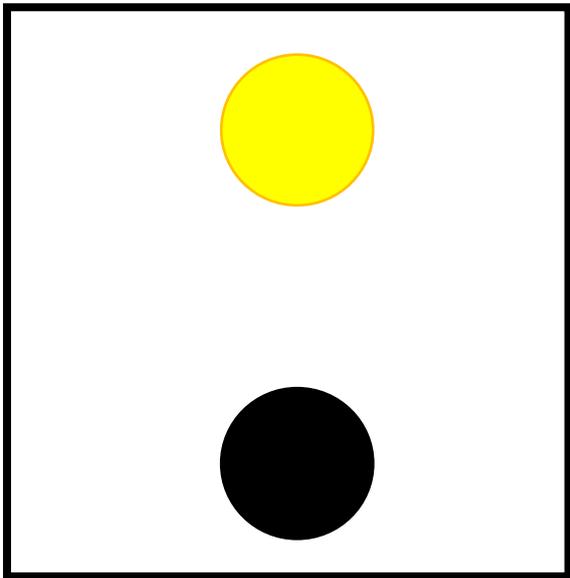


Right Hand

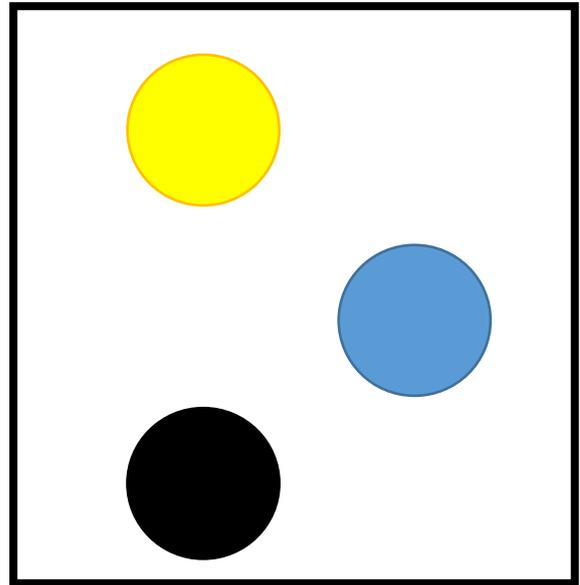
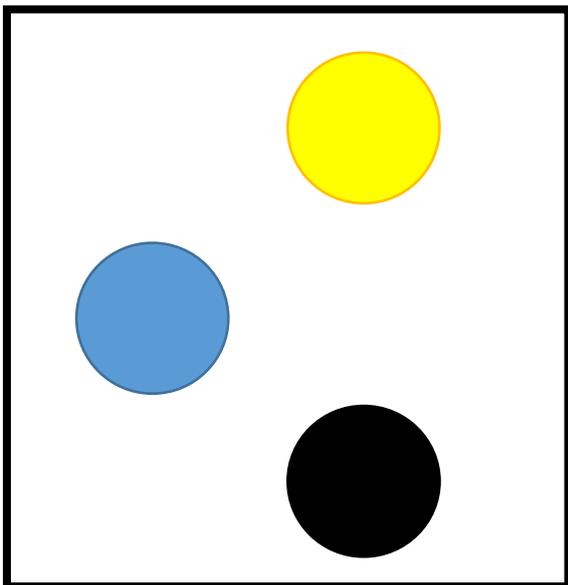
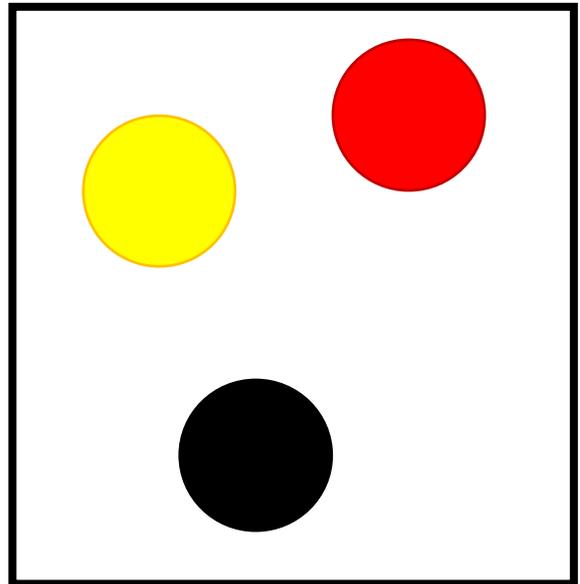
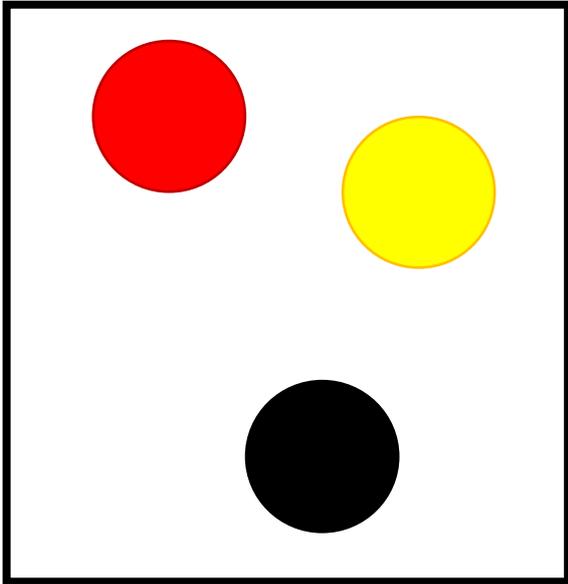


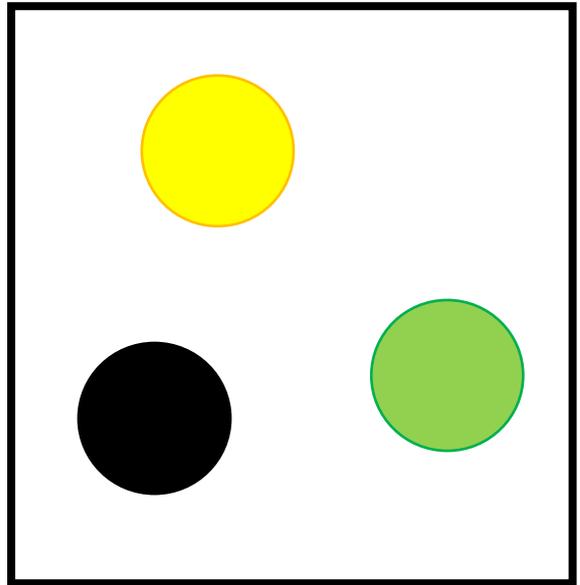
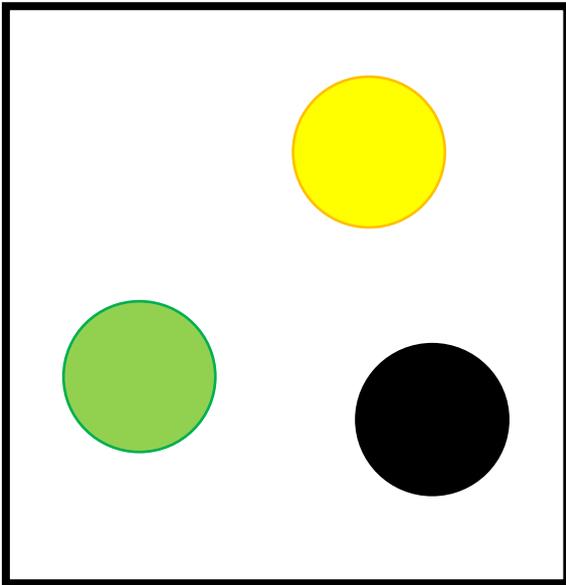
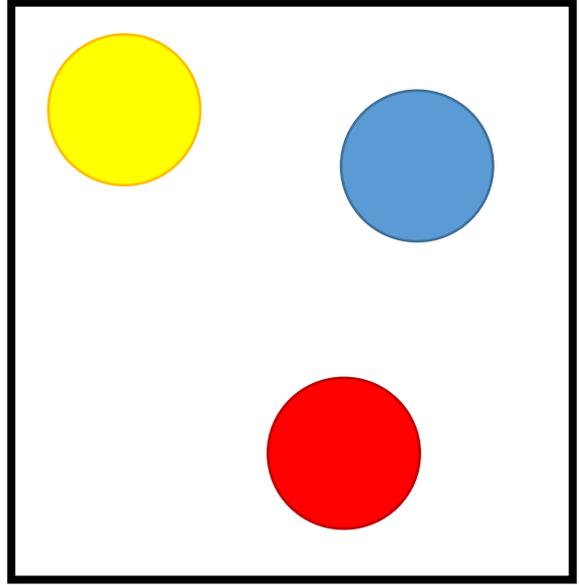
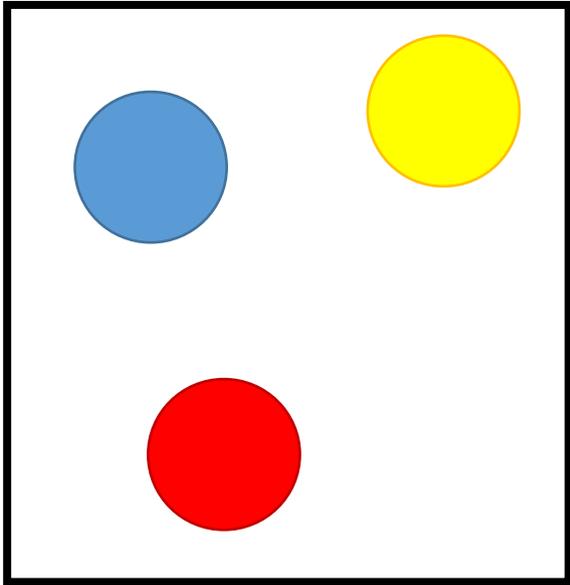
2 colour finger patterns



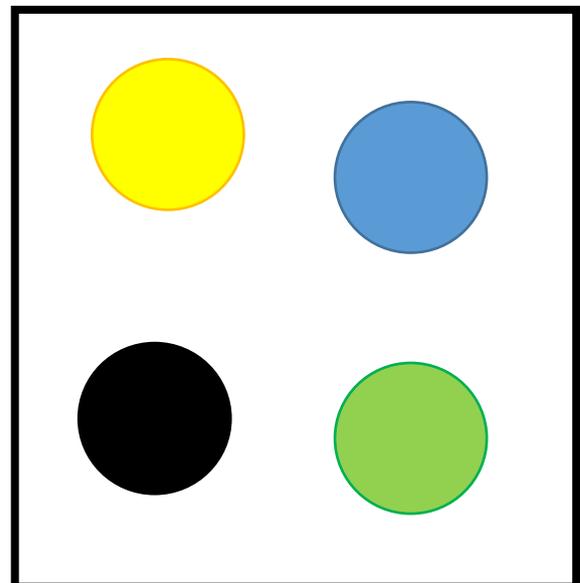
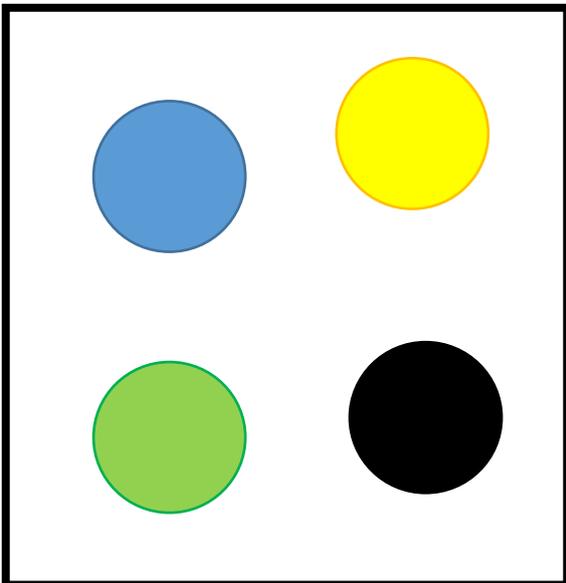
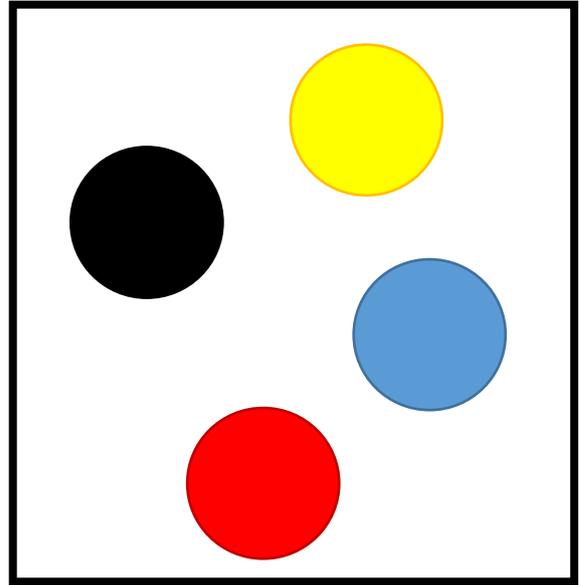
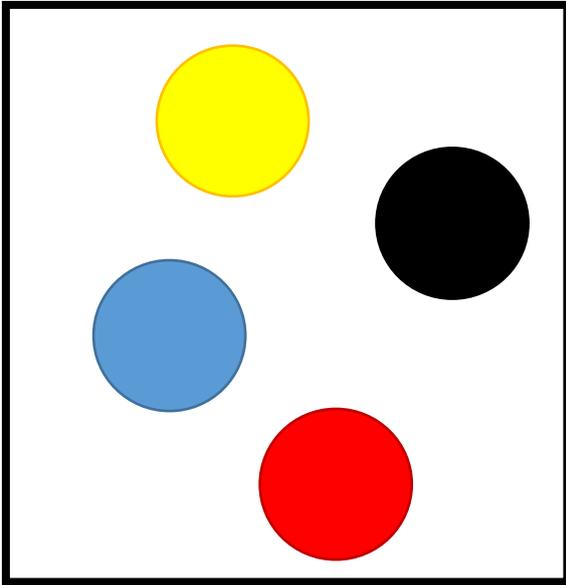


3 colour finger patterns



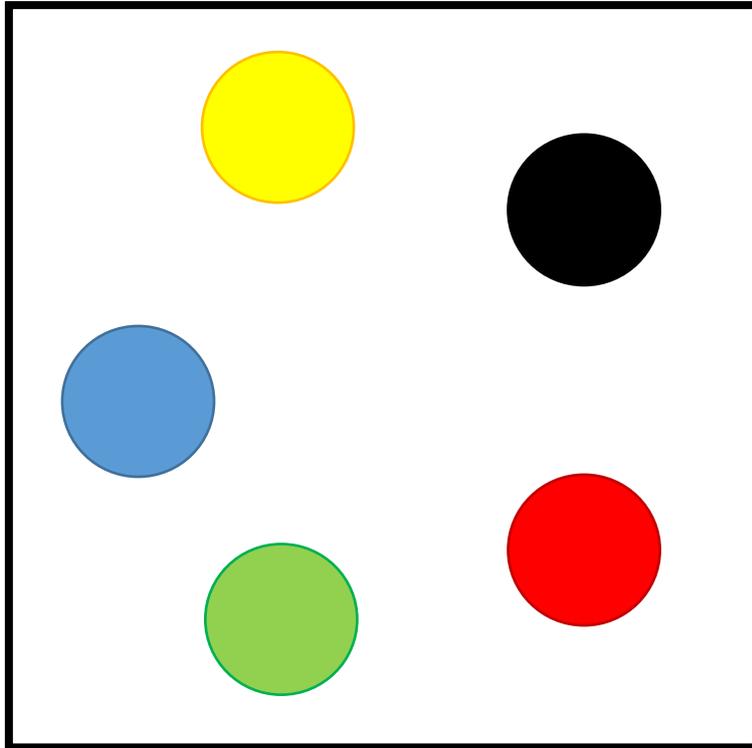


4 colour finger patterns

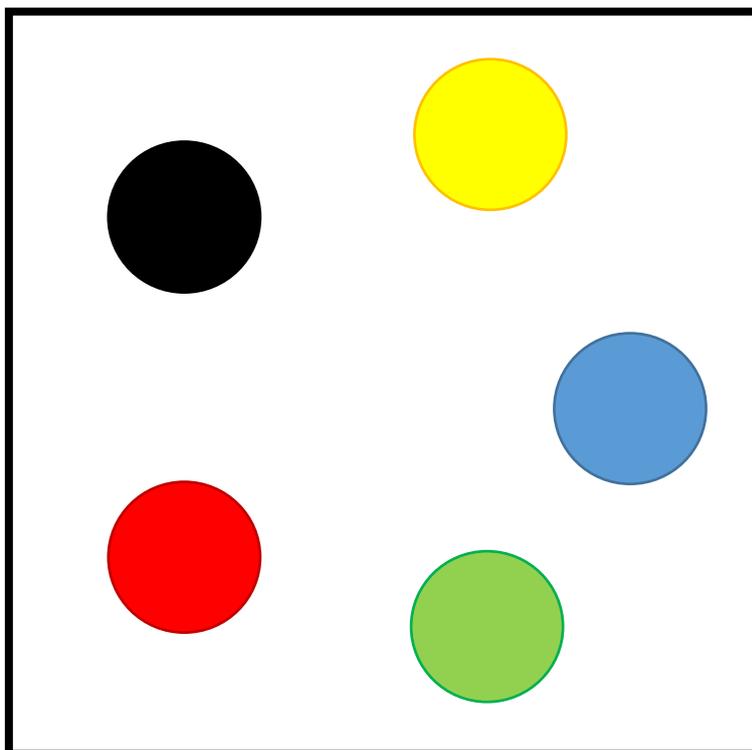


5 colour finger pattern

Left Hand



Right Hand



I hope you that you and your child have enjoyed these activities. Please continue to practise and create some of your own games to play to keep those fingers moving!