



WORKING MEMORY

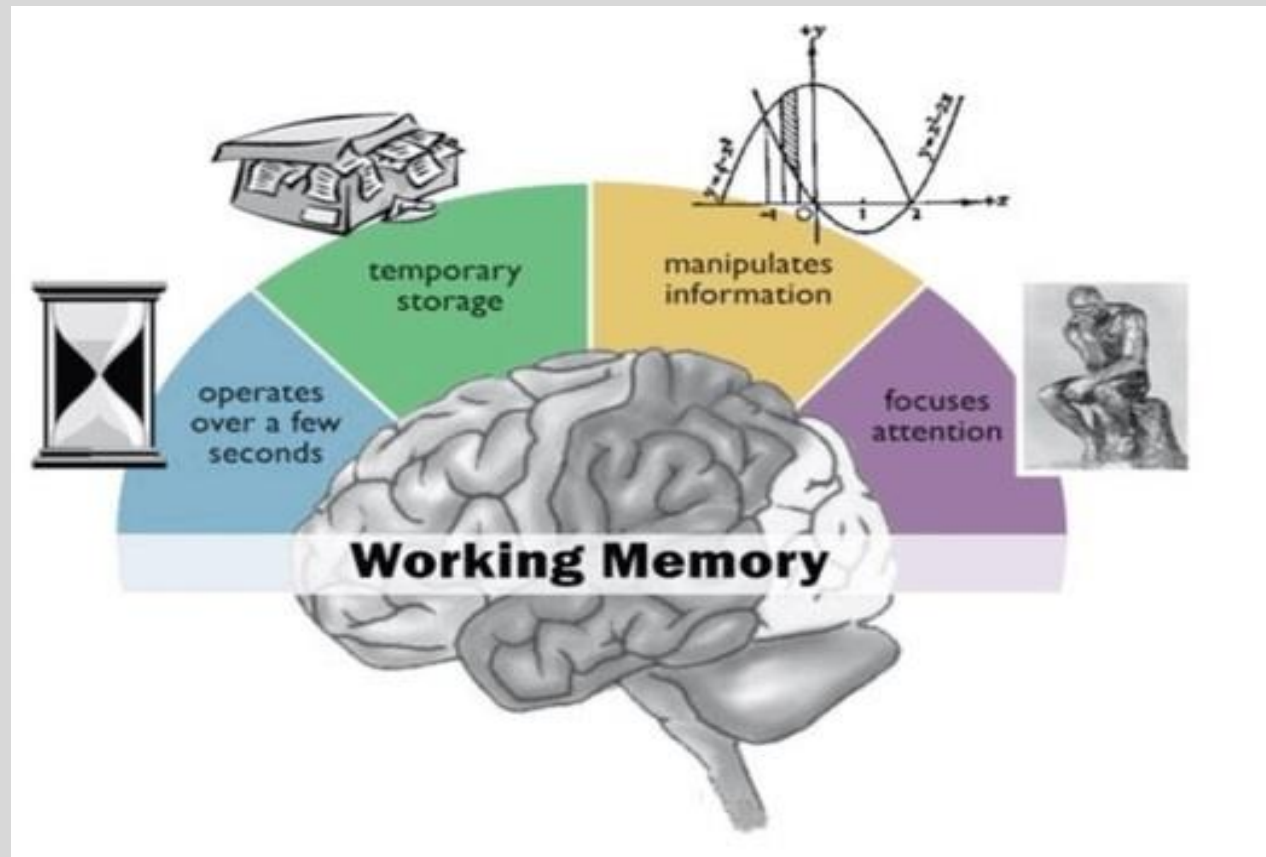


What is working memory ?



Working memory refers to the ability to hold information in short-term memory while simultaneously processing it. We use working memory to meaningfully participate in everyday activities such as conversations, to decode unknown words when reading, and to do mental arithmetic.

Along with reading, other classroom activities that involve working memory include the following of multiple-step instructions, copying sentences from the board, spelling, maths and participation in discussions and debates.



Children with working memory difficulties have a reduced capacity to temporarily store and process information in this short-term 'mental workspace'

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Working
memory
issues are
associated
with :

poor phonological awareness ²

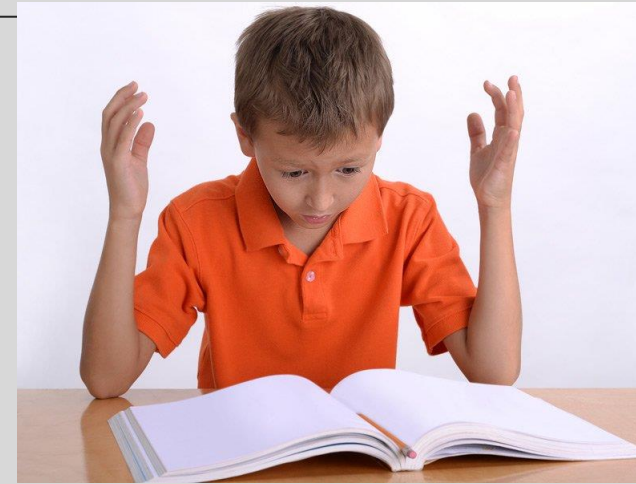
learning disorders and
learning difficulties ³

attentional issues ⁴

anxiety, worry and
trauma. ⁵

How do children with Working memory issues appear in the classroom ?

- Appear inattentive or not to be listening
- daydream
- forget what they have been taught (because it wasn't actually learned)
- lack confidence in themselves as learners
- have difficulty solving problems
- can't fully remember what they are supposed to be doing
- have low academic achievement in numeracy and literacy
- have difficulty following instructions with two or more parts
- have difficulty copying sentences from the board
- do not contribute to class discussions or volunteer to answer questions
- feel highly frustrated, which may lead to acting-out behaviours
- demonstrate erratic performance—appearing to remember some things one day, but not the next
- do not start or complete their work or homework independently.
- Children with working memory difficulties often feel frustration and anxiety around their academic performance. This may arise as a result of forgetting what to do next or forgetting parts of a question, story or instruction.
- They are often very poor at organizing their bags , they forget things and lose things like PE kit



- **An example of a working memory issue**

- Consider this scenario.
- A boy in Year 5 is asked to mentally solve the following question, presented verbally.

'Fred picked 10 apples from his dad's apple tree. He gave three apples to Van and four apples to Pete. How many apples did Fred have left after he ate one?'

The boy either asks for the question to be repeated, or he answers incorrectly.

The same boy is then given a similar question, but this time the problem is written. He answers it correctly the first time.

- This occurs because a child with working memory difficulties is likely to answer incorrectly or not at all to a spoken question with no visual or written supports, as they do not have the memory capacity to mentally hold all of the information about the apples while simultaneously solving the problem.
- When the question is written, the boy may answer it correctly because he did not need to remember the number of apples each person had.
- Being able to re-read the information relieves the burden on working memory, allowing the child to work out the answer without needing to store the relevant information in their memory.



Strategies to support students

- 1) **Be clear and concise when giving instructions.** Make sure you have the child's full attention when giving instructions. Remove distractions, get down to their level, and look them in the eye when speaking. Remember to keep instructions short, and to break them down into manageable tasks that won't cause feelings of overwhelm.
- 2) **Ask the child to repeat directions back to you.** After providing instructions, ask the child to repeat what you've said back to you to ensure they heard you correctly. This extra step is a great way to improve retention, and allows you to fill in any gaps if the child forgot one or more of the things you said.
- 3) **Teach visualization.** Teaching the child to create a mental picture of the things you ask him or her to do is a great way to improve working memory. You may need to take it a step further at first and have the child draw his or her mental picture for you, but the more you practice, the better able the child will be at visualizing the things asked of him or her.
- 4) **Break tasks down.** Take the time to write out what needs to be done (and when) so the child can visually see what's expected of him or her, and then work together to ensure each step is completed along the way. This will require more upfront help on your part, but the child will eventually learn how to break large tasks and assignments into bite-sized pieces that are less overwhelming.
- 5) **Encourage note taking and highlighting of key words.** Teaching the child to write down homework assignments, create 'to do' lists, and take notes while working on school assignments can have a huge impact on improving his or her working memory.
- 6) **Use praise.** Children who struggle to focus and pay attention often receive a lot of negative feedback throughout the day.
- 7) **Use graphic organizers** to help the child plan and visually see their work in progress.
- 8) **Use memory aids** like wall charts, posters, key words, number lines, memory cards, visual diagrams
- 9) **Don't put too much information on a power point** eg lots of maths sums or they will struggle to work out where they are up to. Give students a print out of the power point and highlight what they need to do.
- 10) **Alternate the use of colours** when writing on a board so it is easier to distinguish between each line.
- 11) Use now, then and next sheets or lists where they can tick what they have done.
- 12) **Use lots of repetition !**

Bell tasks and plenaries

Sample Cloze

A cloze or cloze passage is a reading _____ that increases reading comprehension. A _____ passage is a piece of _____ in which _____ have been _____ throughout.

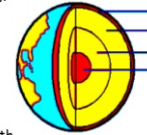
Name _____ Class _____ PLATE TECTONICS

Review

Inside the Earth

The Earth is divided into four main layers:

1. _____
2. _____
3. _____
4. _____



The Crust

- The crust makes up _____ of the Earth.
- The crust of the Earth is broken into many pieces called _____.
- Two types of crust:
 1. _____ (made of basalt)
 2. _____ (made of granite)

The Mantle

- The upper part of the mantle and the crust make up the _____.
- The mantle is the _____ layer of the Earth.
- The mantle can be divided into two regions: the _____ and _____ mantle.

Lithosphere

- The _____ ridge of the Earth.



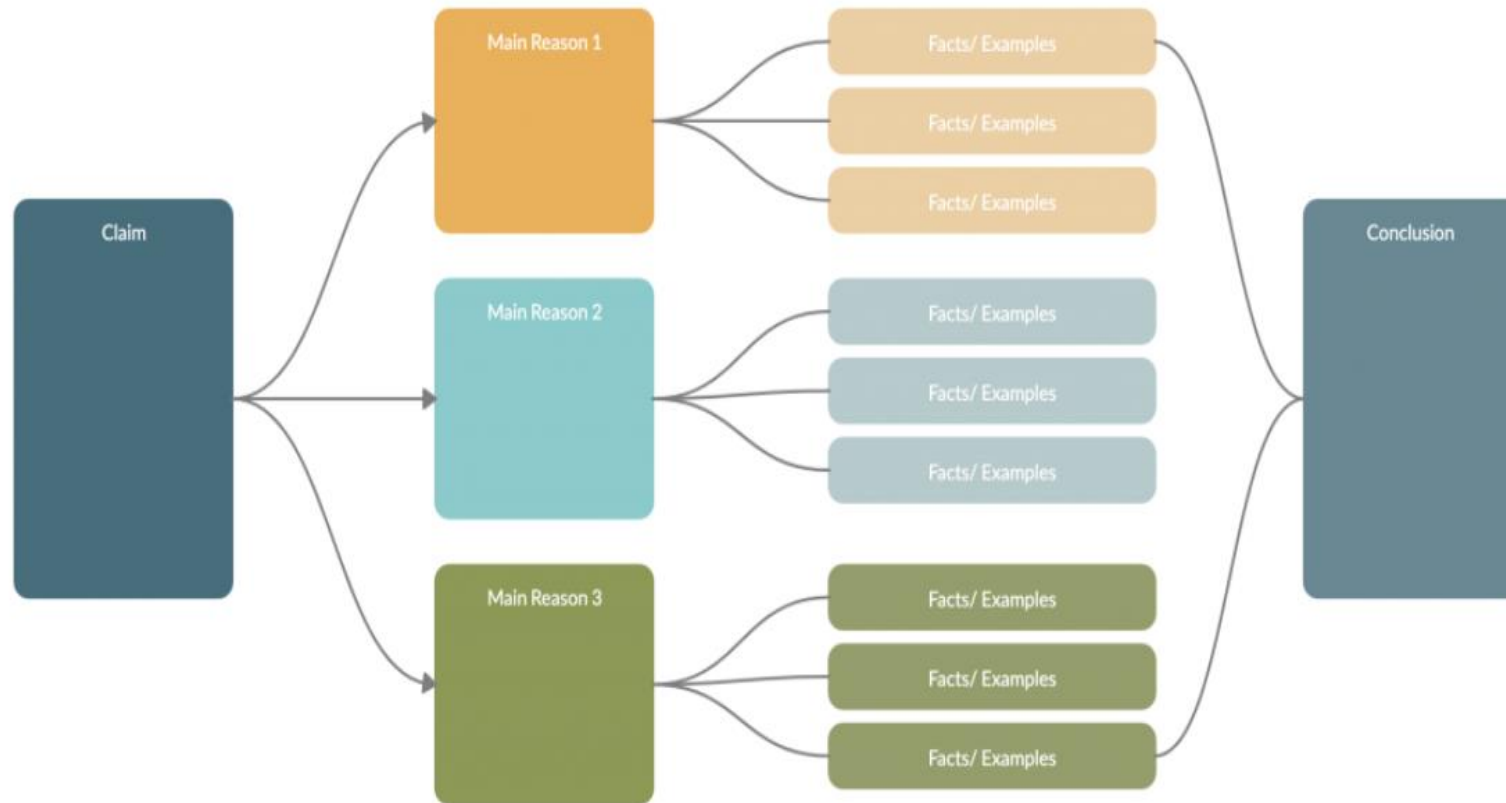
Asthenosphere

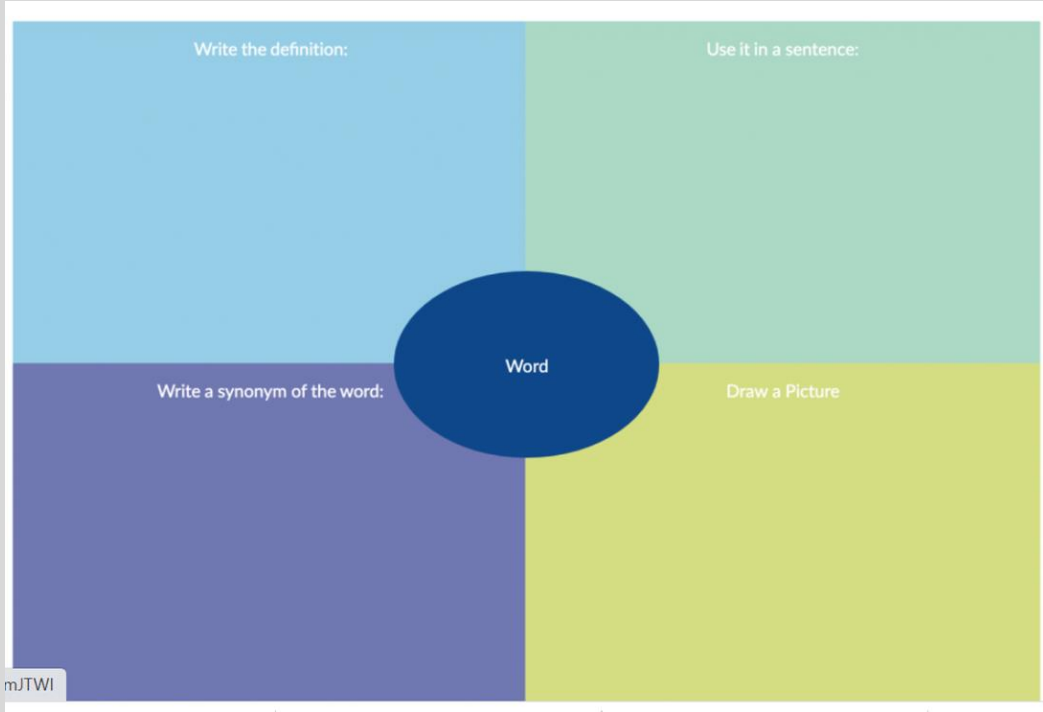
- Soft layer of the mantle _____

Graphic organisers.

<https://creately.com/blog/diagrams/types-of-graphic-organizers/>

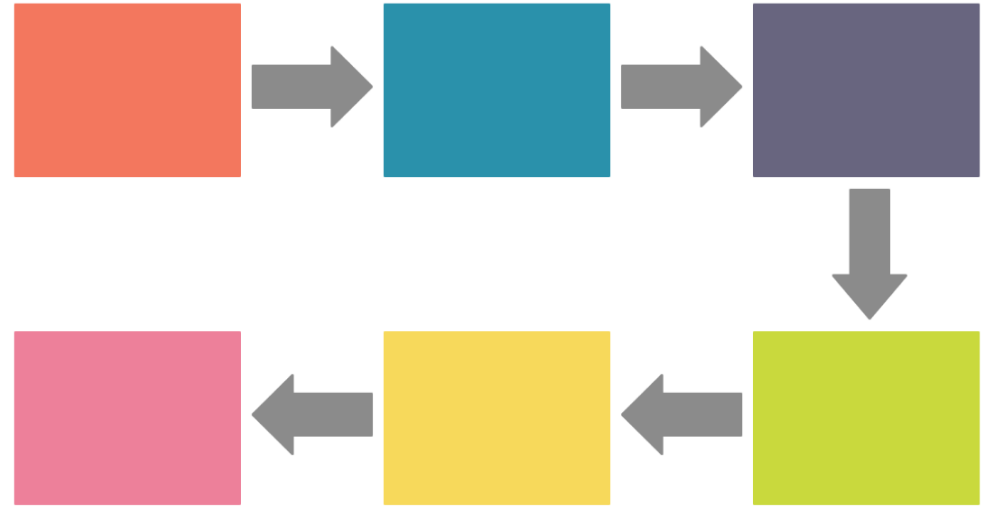
These will help students to plan what they have to do and see how they are progressing . When they return to the work it is easy to see all the components .



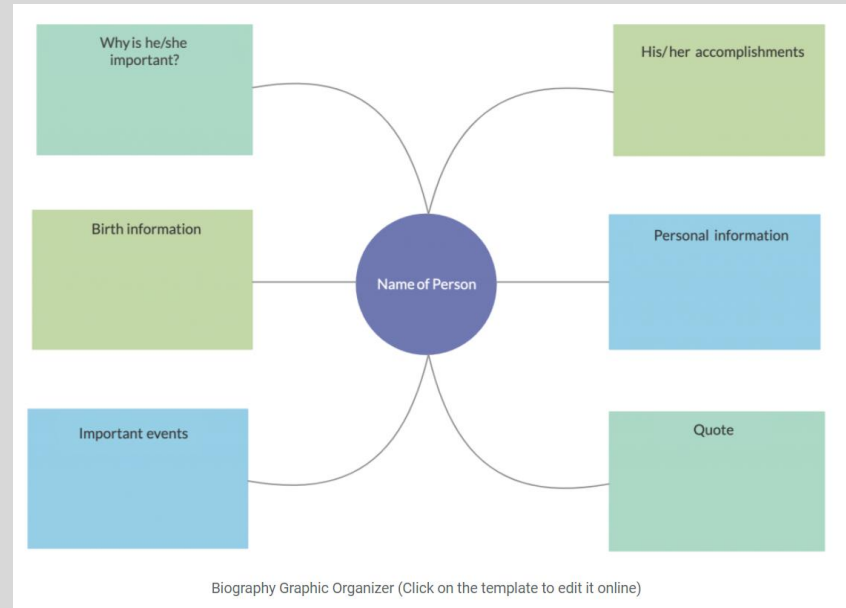
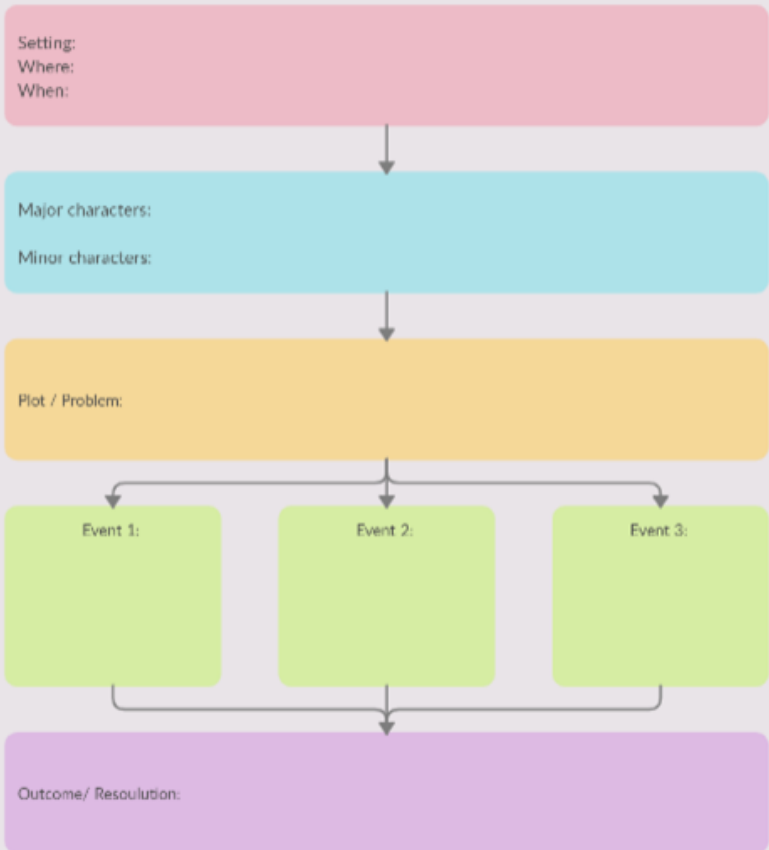


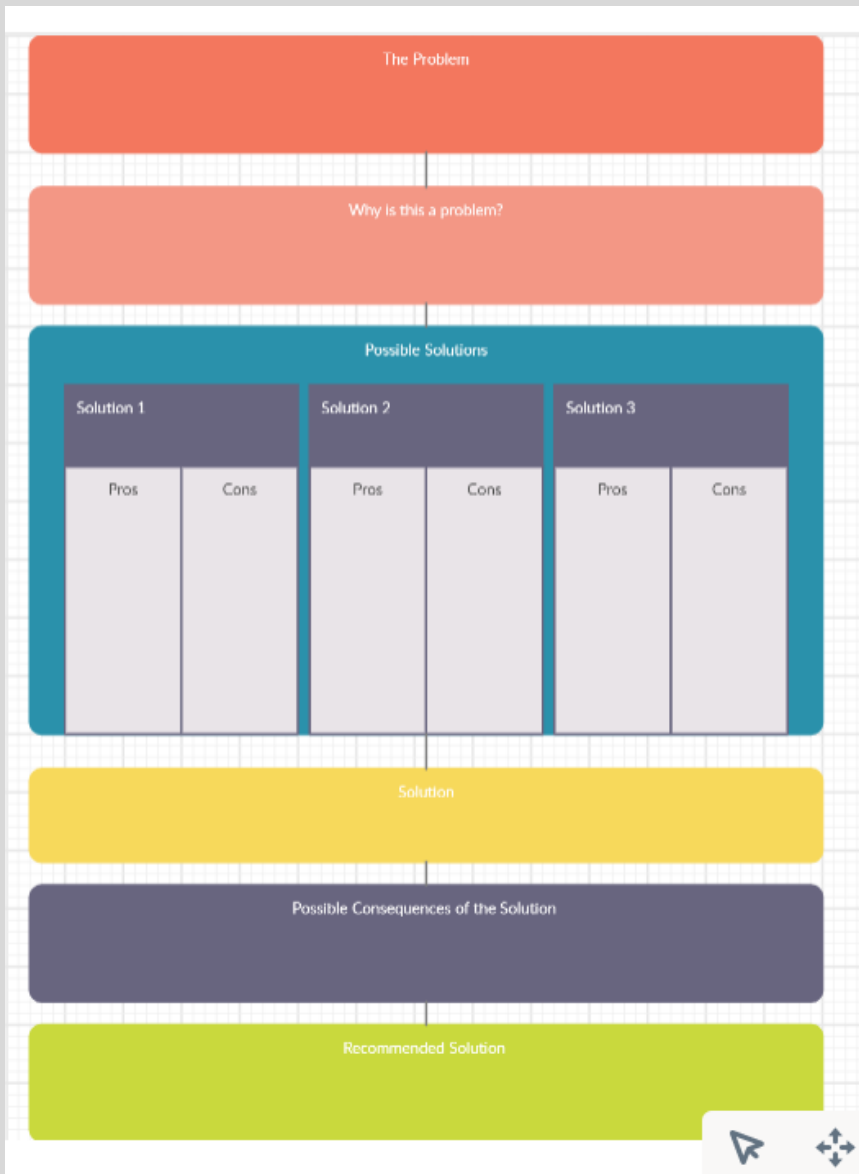
Step 2: Using a sequence chart, arrange these steps in sequential order.

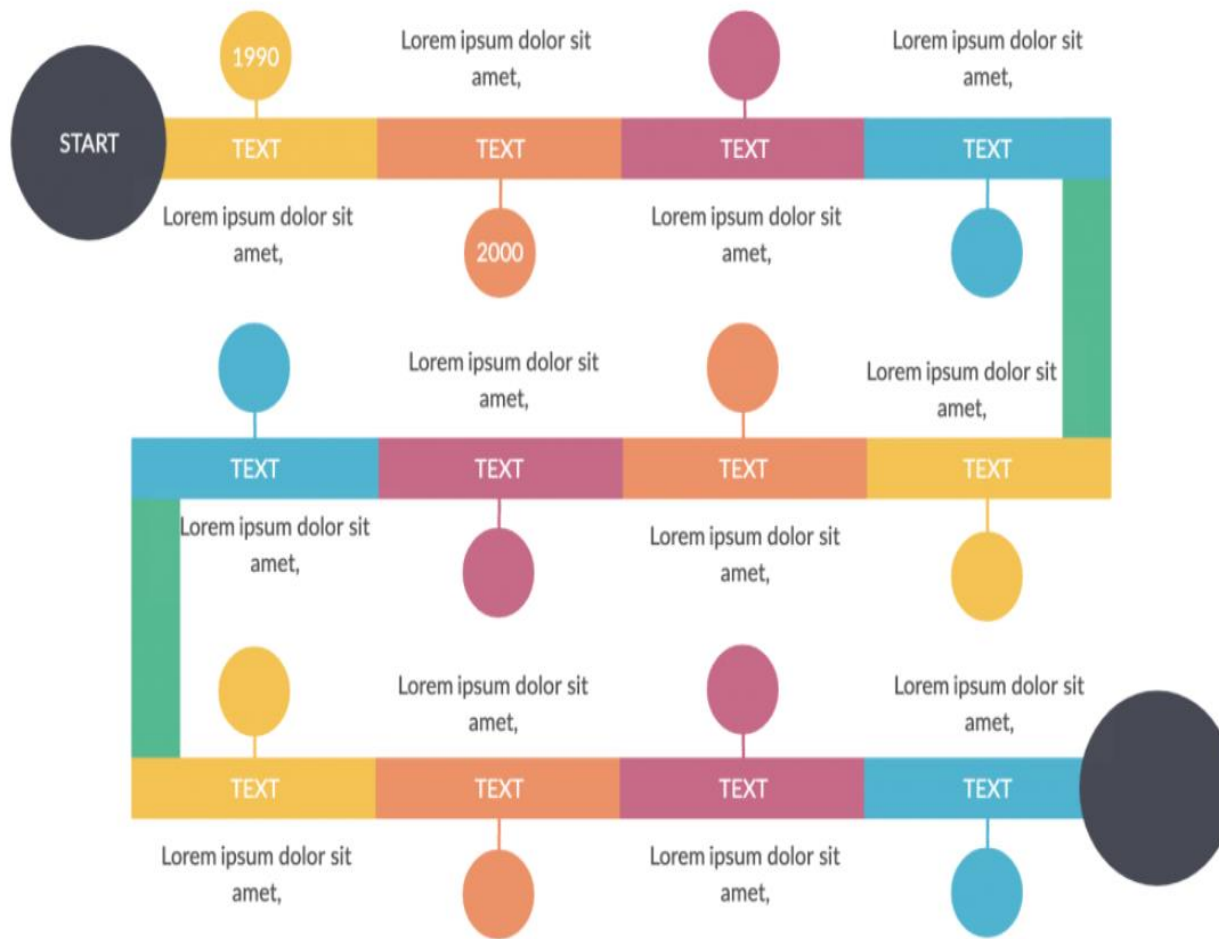
Template

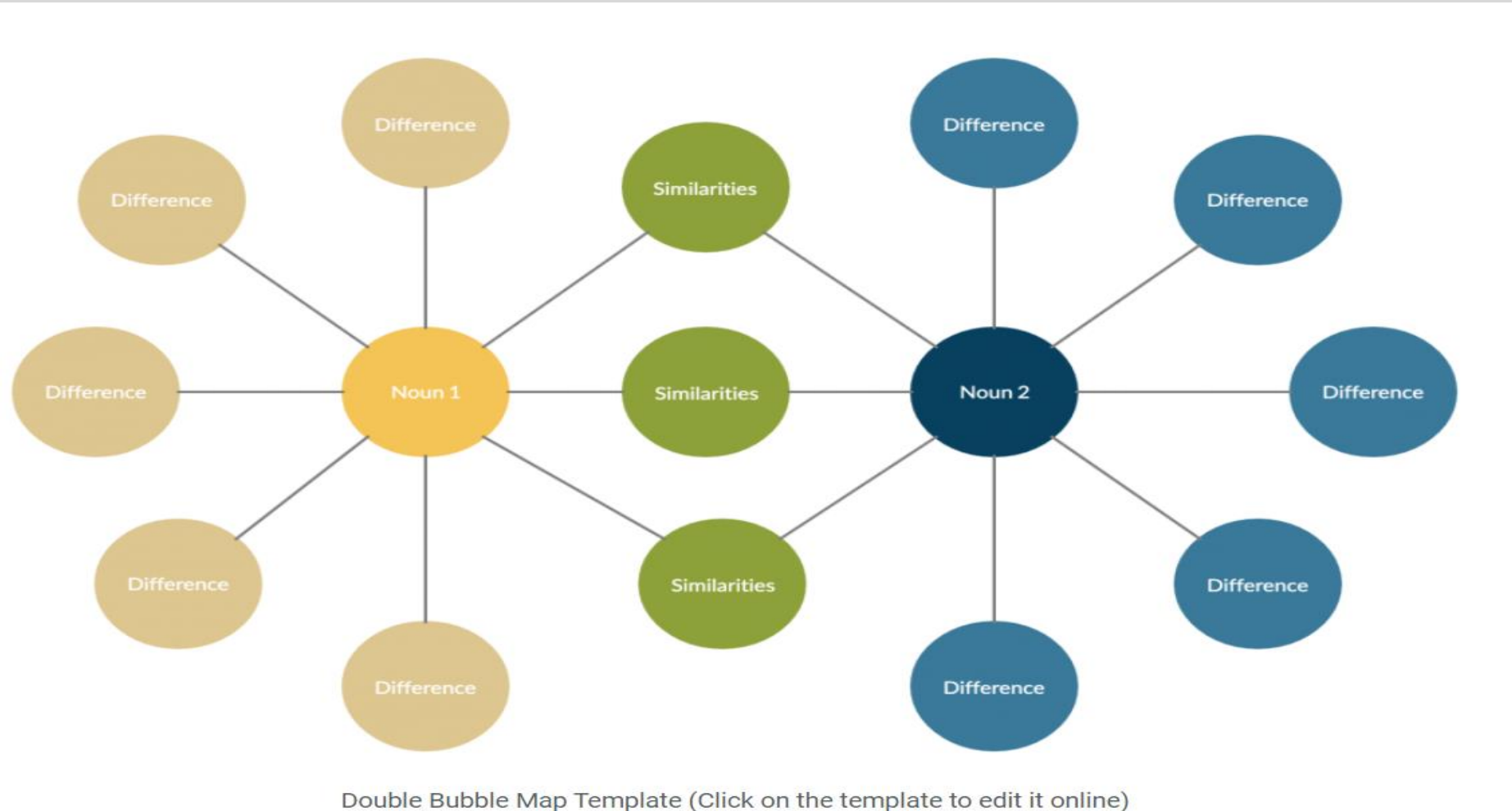


Story Map









Double Bubble Map Template (Click on the template to edit it online)

Memory activities

- These can be used to support the child to improve their working memory in class and at home .

Creating mental images by highlighting key points. Students could also draw the image.

The image shows a handwritten poem titled "My Mental Image" and "Green Giant" by Jack Prelutsky. The text is written in a cursive font and is enclosed in a dashed-line border. The key words in the poem are highlighted in yellow.

My Mental Image

Green Giant
BY Jack Prelutsky

There lived a green giant whose name was Sam.
His hair was the color of strawberry jam.
He had one brown and one blue eye.
And a beard the color of pumpkin pie.
His coat and pants were oh so bright,
Like a peppermint stick all red and white.
His socks were as yellow as lemon pop.
His shoes were as brown as a chocolate drop.
His hat was the color of gingerbread,
with a tall, tall feather of raspberry red.

Annotating paragraphs

Give each paragraph a title, or one key word that describes the overall content

Lieberman's [new book](#) *Social: Why Our Brains Are Wired to Connect* hits the shelves this month. It's a book about relationships and why relationships are a central—though increasingly absent—part of a flourishing life. Lieberman draws on psychology and neuroscience research to confirm what Aristotle asserted long ago in his *Politics*: "Man is by nature a social animal ... Anyone who either cannot lead the common life or is so self-sufficient as not to need to, and therefore does not partake of society, is either a beast or a god."

New book uses recent research to confirm Aristotle's theory that people need to be social.

Just as human beings have a basic need for food and shelter, we also have a basic need to belong to a group and form relationships. The desire to be in a loving relationship, to fit in at school, to join a fraternity or sorority, to avoid rejection and loss, to see your friends do well and be cared for, to share good news with your family, to cheer on your sports team, and to check in on Facebook—these things motivate an incredibly impressive array of our thoughts, actions, and feelings.

Basic needs do not only consist of food and shelter. Relationships are a basic need, too.

Lieberman sees the brain as the center of the social self. Its primary purpose is social thinking. One of the great mysteries of evolutionary science is how and why the human brain got to be so large. Brain size generally increases with body size across the animal kingdom. Elephants have huge brains while mice have tiny ones. But humans are the great exception to this rule. Given the size of our bodies, our brains should be much smaller—but they are by far the largest in the animal kingdom relative to our body size. The question is why.

The brain is the key to socializing. Larger animals usually have larger brains, but based on body size, people should have smaller brains. Research suggests our brains are larger in order to socialize.

Scientists have debated this question for a long time, but the research of anthropologist Robin Dunbar is fairly conclusive on this point. Dunbar has found that the strongest predictor of a species' brain size—specifically, the size of its neocortex, the outermost layer—is the size of its social group. We have big brains in order to socialize. Scientists think the first hominids with brains as large as ours appeared about 600,000-700,000 years ago in Africa. Known as *Homo heidelbergensis*, they are believed to be the ancestors of *Homo sapiens* and the Neanderthals. Revealingly, they appear to be the first hominids to have had division of labor (they worked together to hunt), central campsites, and they may have been the first to bury their dead.

Kibin

Write a small summary of each paragraph

When the teacher gives a task based on the above paragraph, the child can quickly see: key words in the right hand side, highlighted words in the paragraph and the small summary on the left. This means the child does not have to hold lots of information in their memory

My favourite dish

Pasta with bacon and tomato sauce

Ingredients

- 1 red onion
- 2 red peppers
- 120 g bacon
- 1 can (450 g) tomatoes
- 1 cup water
- olive oil
- garlic
- oregano
- 50 g pasta per person



Method

- 1 Cut the onion, red peppers and bacon into small pieces.
- 2 Heat some olive oil in a pan and fry the onion, red peppers and bacon.
- 3 Add oregano, garlic, tomatoes and water and cook for 20 minutes.
- 4 Cook the pasta in a big pot of boiling water.
- 5 Serve the pasta with the sauce, and enjoy!

Top Tips for writing

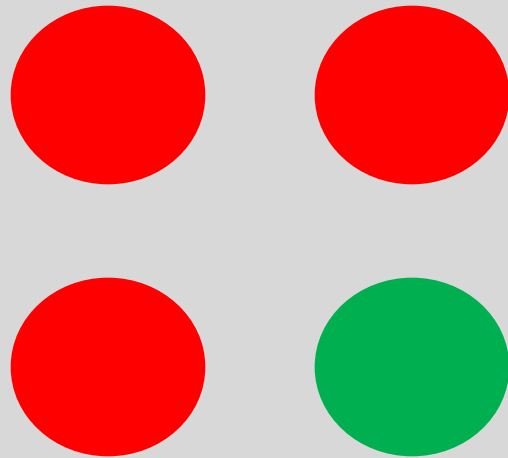
1. When writing a recipe or instructions, use numbers to indicate the stages and use the base form of the verb (imperative) to give instructions.
2. Use commas between things in a list. Use 'and' between the last two things.

Use recipes to show the stages and steps . That are required .

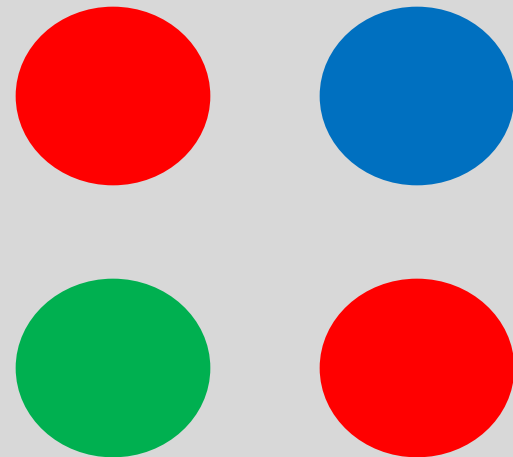
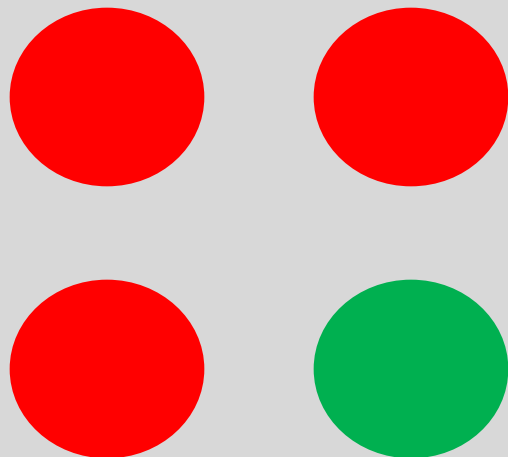
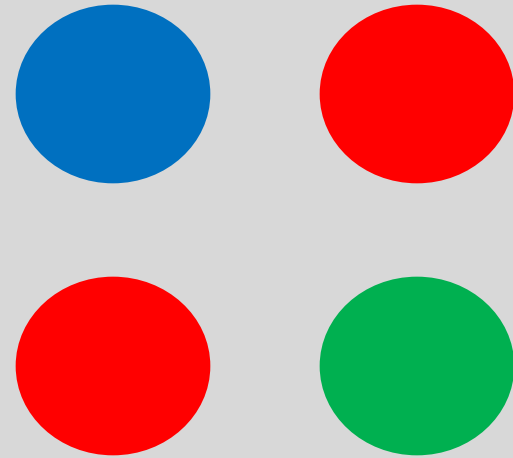
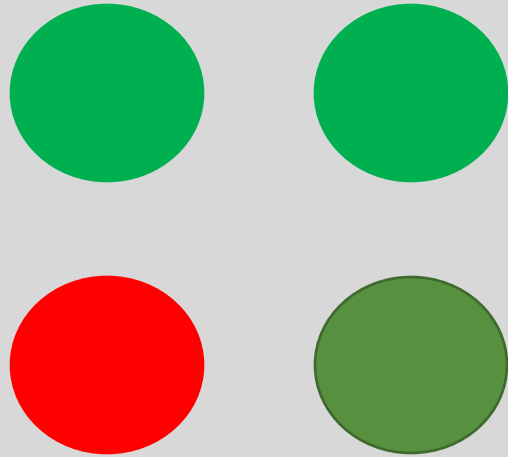
Students can tick off what they have done at each stage.

Memory games – recognising patterns, start simple

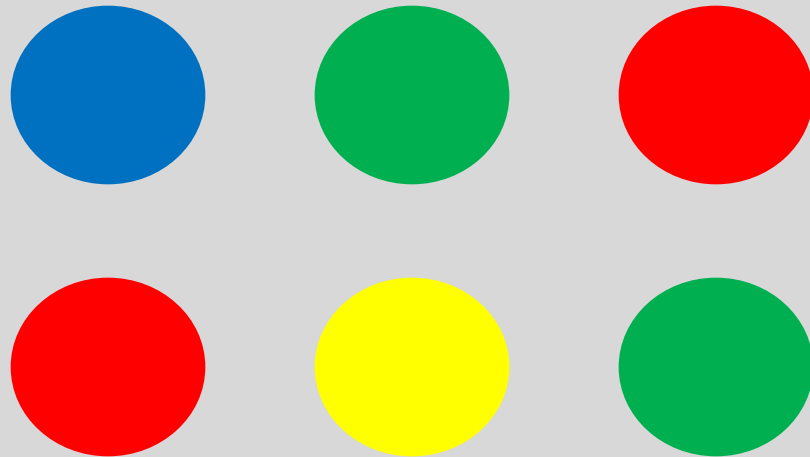
Look at the pattern below:



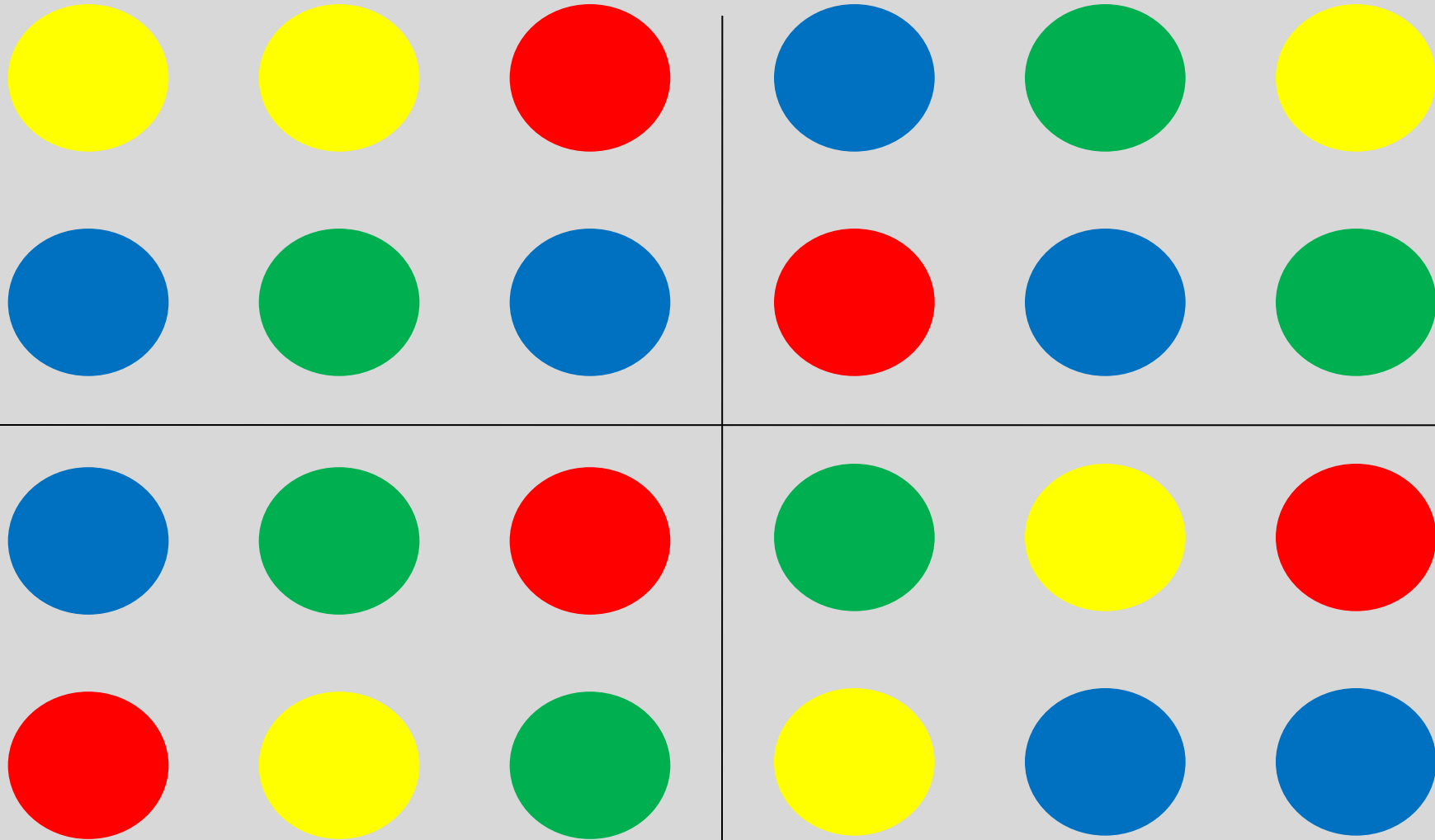
Which pattern did you see?



Memorize this pattern

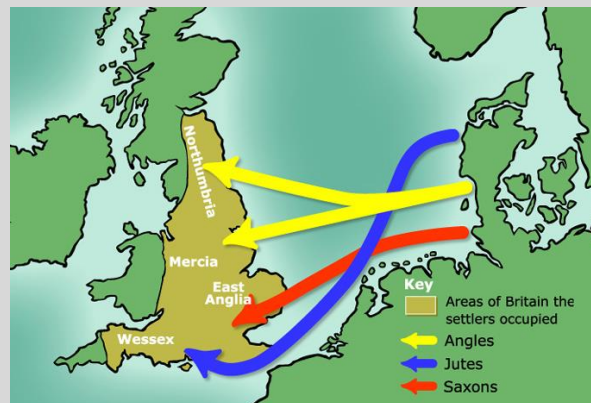
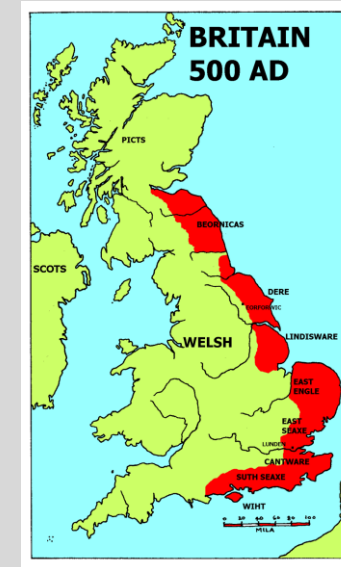


Which pattern did you see?






Recall information

- Give students a sheet with number of pictures (these can be related to a topic)
- Spend time looking at the picture, cover it over and look again .
- Cover the picture and ask questions to check their recall. (can be done in pairs)
- Students may be given a life line to look at the picture



Mnemonics

Never 
Eat
Cakes
Eat 
Salmon
Sandwiches
And
Raspberry
Yoghurts 

Memory Words

Say the following to students:

"I am going to tell you a list of items that I want you to remember. I will then ask you about them later"

Tell student the list of items

Ask the student the questions listed with the items.

After student has answered the questions ask them to tell you the items you told them to remember. Students are having to recall from their memory after answering questions.

Group 1:

Word list

Blanc

Vert

Noir

Rose

Bleu

Rouge

Orange

jaune

Questions

What is your favorite color?

Why do you like that color?

Group 2:

Word list

Lundi

Mardi

Mercredi

jeudi

Vendredi

Samedi

Dimanche

Questions

What day were you born ?

What do you like to do on a Saturday?