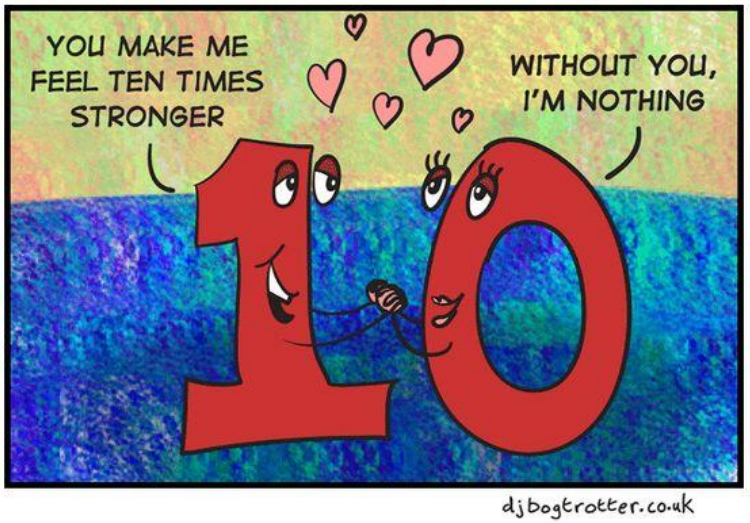
MATHS IN DEED!



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ILSA SPRING CONFERENCE 2019

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Approaches to Maths Teaching

- **Concrete –> Representational –> Abstract**

- **Direct Instruction (Dominant)**
  - **Explicit, carefully structured and planned instruction. Target an objective, specify sub-skills needed, identify what sub-skills student has, sequence the steps needed to achieve each sub-skill, drill and practice. Algorithms**

- **Constructive Learning**
  - **Evolution of learning, deeper understanding, interaction between material and student, concept development**

Is maths learning linear?

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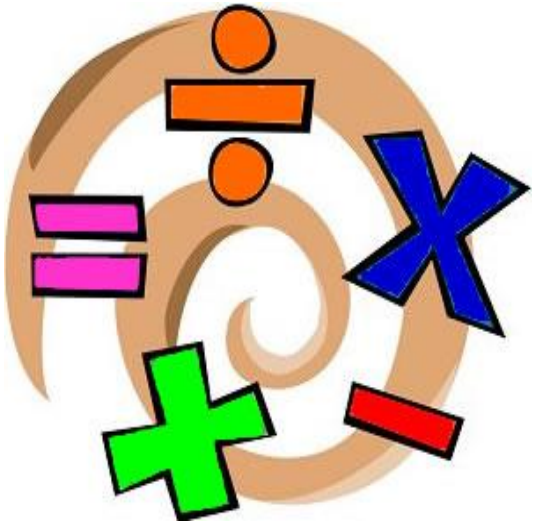

Pre-Learning

- Self image as a learner? As a learner of maths?
- How does a pupil approach to a task/problem.
- What concepts/ language has a s/he?
- The Basics?
- Self-Talk, asking questions, coming up with solutions to a mathematical problems
- The kind of thinking needed to work out word problems in Maths

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Teacher's Role … in Maths

The teacher's role is to provide learning activities and create an environment that engages children, facilitating and leading their development of mathematical concepts, skills and confidence.

Social Cognitive Curriculum

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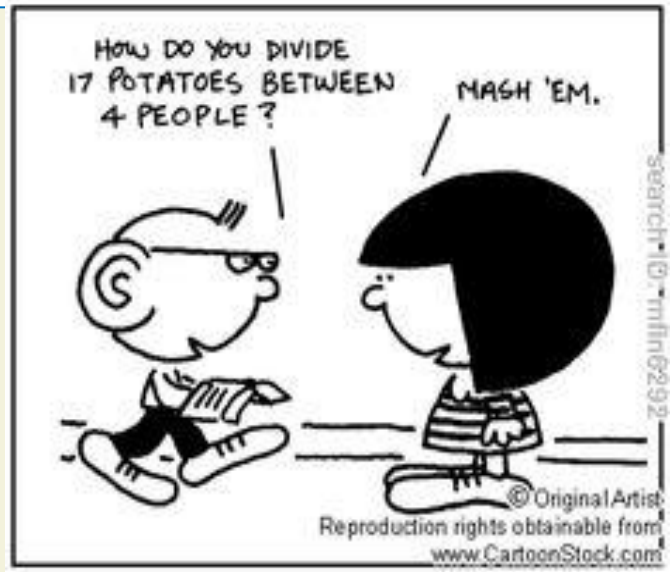
WHAT IS NUMERACY?

NALA defines numeracy as a **lifeskill** that gives adults 'the confidence to manage the mathematical demands of real-life situations'.



"… two attributes. The first of these is 'at homeness' with numbers and an ability to make use of mathematical skills which enable an individual to cope with the practical mathematical demands of his/her everyday life….and understanding of information which is presented in mathematical terms, for instance in graphs, charts or table or by reference to percentage increase or decrease" Croft

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PISA 2015

- Ireland has ranked 15th highest out of 76 countries for mathematics and science test scores… OECD report.
- The report warns, however, that a significant proportion of Irish students are still failing to attain basic skill levels, which is not only hindering their life chances but undermining economic growth.
- Problem solving skills a problem area!

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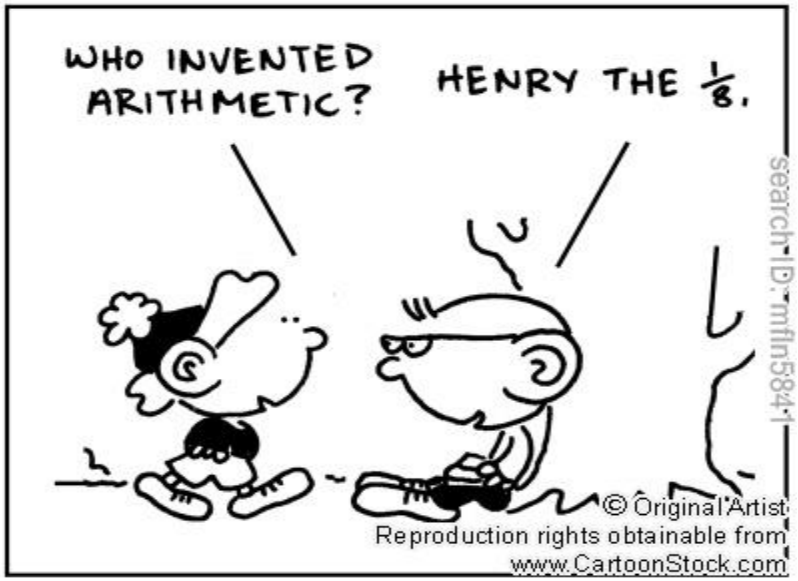
7 Fundamental mathematical capabilities

- **Communication:** Mathematical literacy involves communication.
- **Mathematising**: transforming a problem defined in the real world to a strictly mathematical form
- **Representation**: representations of mathematical objects and situations…include graphs, tables, diagrams, pictures, equations, formulae, and concrete materials.

- **Reasoning and argument:** logically rooted thought processes.
- **Devising strategies** for solving problems mathematically. Effectively recognise, formulate and solve problems.
- Using symbolic, formal and technical **language** and operations.
- M**athematical tools**: using mathematical tools… physical tools such as measuring instruments, calculators and computer-based tools.

Assessment: formative and summative, screening and diagnostic

- **Norm referenced – limited information**
- **Criterion referenced**
  - **Teacher generated: linked to the classroom**
  - **Fallon end of term/ year**
    - **Or whatever scheme you use**
    - **Roughwork NB**
- **Maths interview with the child**
  - **Tell me how you did that?**
- **Error analysis**
- **Observations**



Maths

Recent research in NQTs.

- 80% found Maths intimidating at school.
- Likely to follow the general patterns of teaching that they so disliked when they were pupils.
- Anxiety around maths stayed with them and turned into anxiety about teaching mathematics.

Competencies: Social numeracy

- Counting.
- Four Operations (+,-,x,÷)
- Money.
- Time.
- Measurement.
- Percentages.
- Fractions.
- Simple graphs.
- Calculator skills (phone)
- Medication.

- NB Mental maths
- Find the maths
  - Eg time?
- Maths eyes and ears

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See where these overlap with curriculum

Strands

The 5 Primary maths strands

1. Number
2. Algebra
3. Shape and space
4. Measures
5. Data

Approaches

- Hands on experiences
- Active learning
- Discovery learning
- Development of maths language
- Practice / teaching others

fyi

Junior Cert
PROJECT MATHS

5 STRANDS

1. Statistics and Probability
2. Geometry and Trigonometry
3. Number
4. Algebra
5. Functions

Primary Maths

5 STRANDS

1. Number
2. Algebra
3. Shape and space
4. Measures
5. Data

What is the message here?

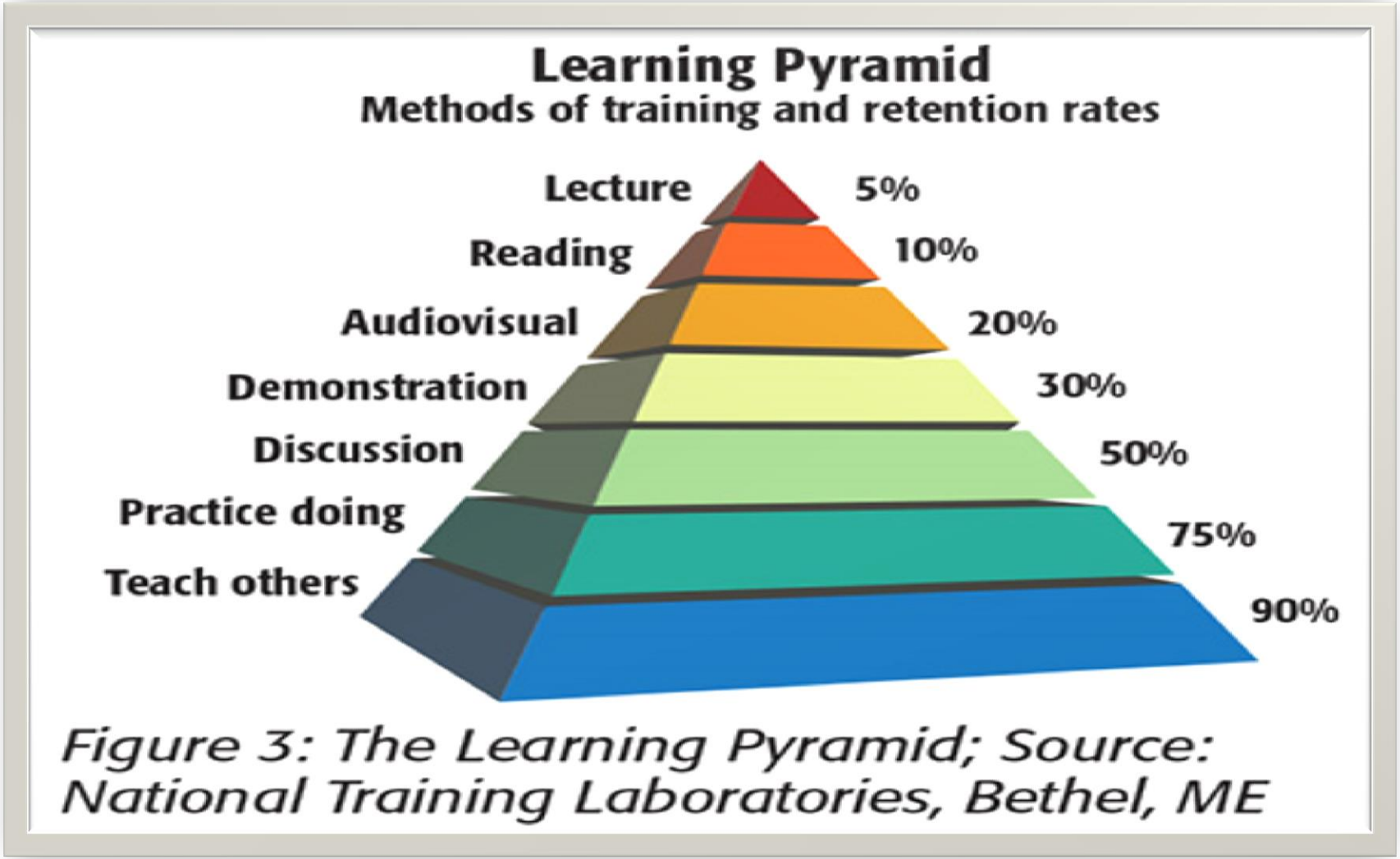
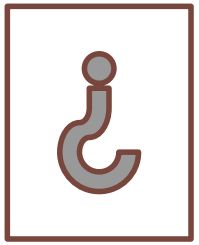


Figure 3: The Learning Pyramid; Source: National Training Laboratories, Bethel, ME

Active Learning

- To develop skills
- To acquire knowledge
- To make sense of Maths
- To develop confidence, to be successful
- To problem solve
- To learn some aspects of logic
- To work collaboratively
- To experience enjoyment in doing Maths

- Need for hooks…



- The big picture
- Remember more if…
- Vision of success

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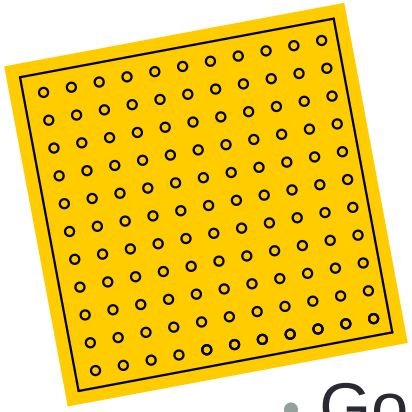
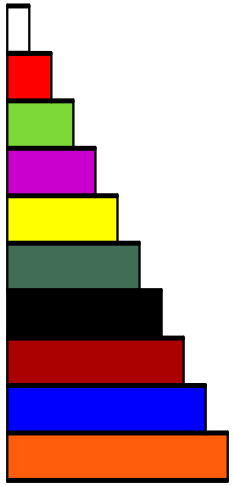


TEACHING STRATEGIES

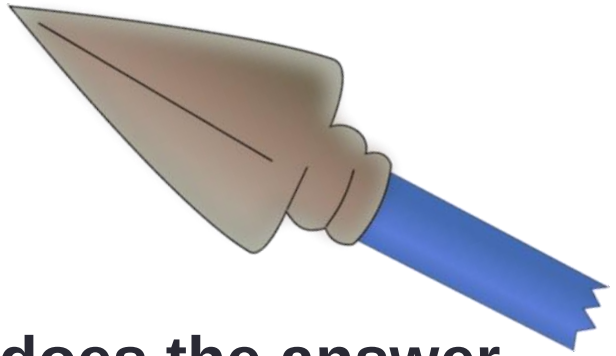


- Go from *concrete* to the *representational* to the *abstract*.
- Give time to practice & review *frequently*.
- Teach students to *generalize* to new situations.

- Teach the *language of Maths* (& check what language they have).
- Provide a *balanced* programme (concepts, skills, problem-solving).

PROBLEM SOLVING: SPEAR

- **Try to make Sense the problem**. Focus attention on relevant information by questioning. **S**ketch or some visual aid (representational) may help.
- Plan to solve the problem. Consider possible ways to tackle the problem. "**P**icture" the problem.
- Estimate
- Attempt a solution. **Trial and error.**
- Review the problem and solution:- **does the answer make sense**?



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Maths Tests

- Address anxiety
- Familiarize children with vocabulary, layout of questions, diagrams, etc (Anxiety, Language of Maths)
- Do a maths test to show how to present work (Exam Technique, Direct Instruction
- Write out strategies eg Area = L X B (Compensatory Skills)
- Problem solving techniques (Strategies) eg SPEAR, visualising
- Parts of questions (related to each other)

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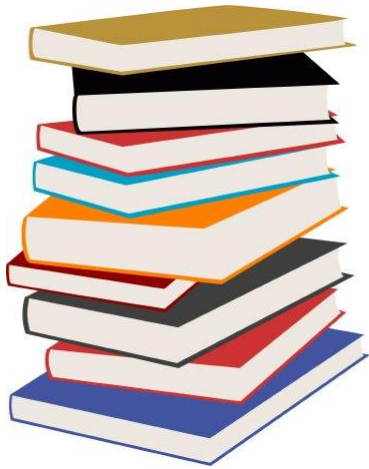
MATERIALS & RESOURCES

- Different types of materials suit different types of learners
- Some textbooks do not supply enough practice
- Most operate at abstract level too soon
- Problem of terminology/reading difficulties
- ICT materials provide practice & reinforcement…not the sun, moon & stars!



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ICT MATERIALS

Websites:

- Maths4life.com
- Scoilnet.ie
- Khanacademy

wehavemathseyes.com

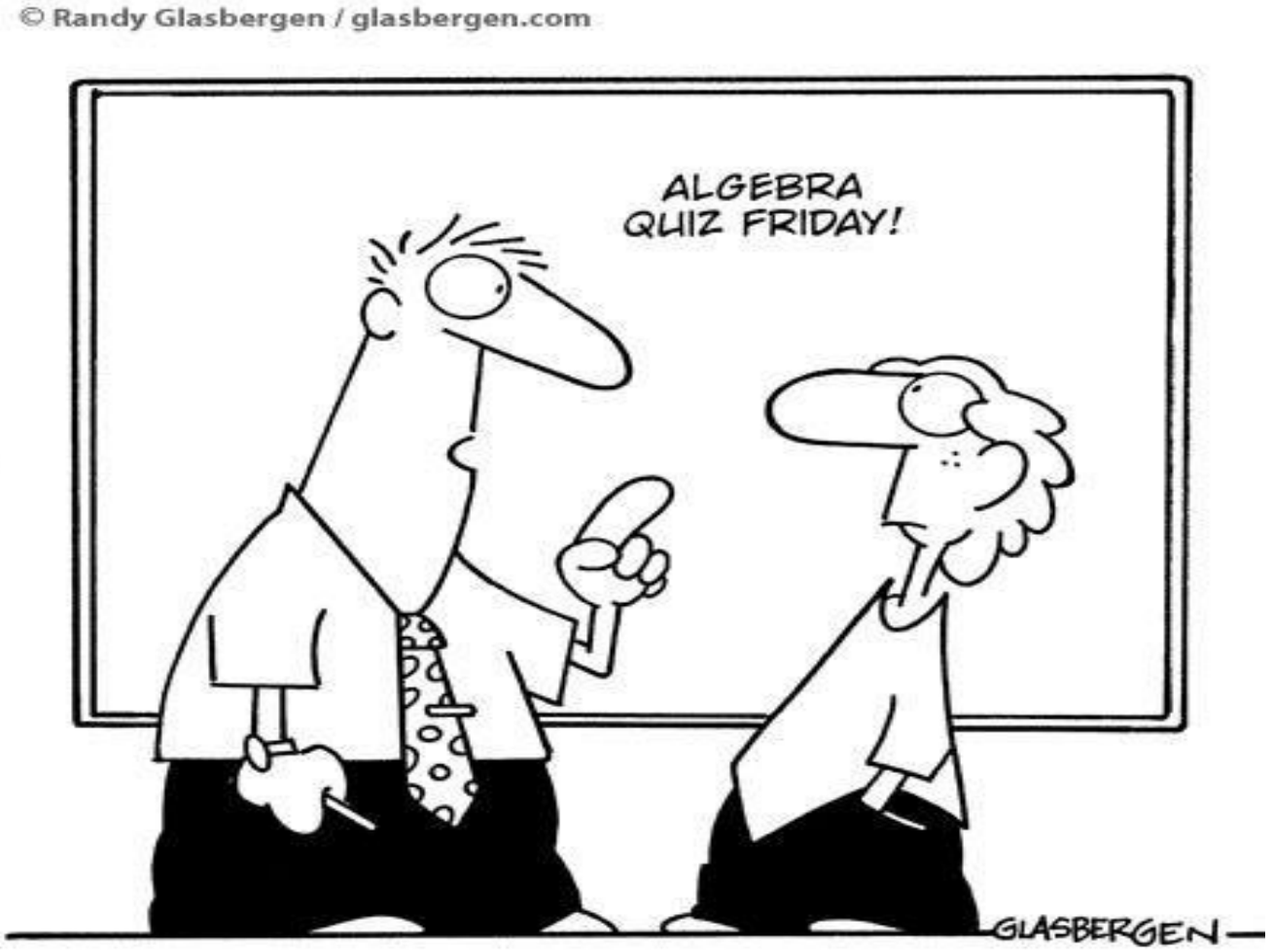
https://ie.ixl.com/maths

bbc maths

- Just Google ‘Maths games’ or ‘Maths puzzles’ or ‘Maths worksheets’ etc

- Maths Made Easy

Finally:



"It's important to learn math because someday you might accidentally buy a phone without a calculator."