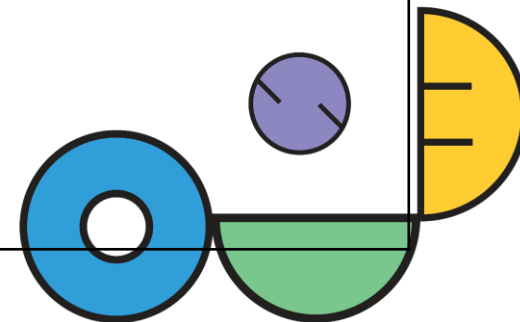


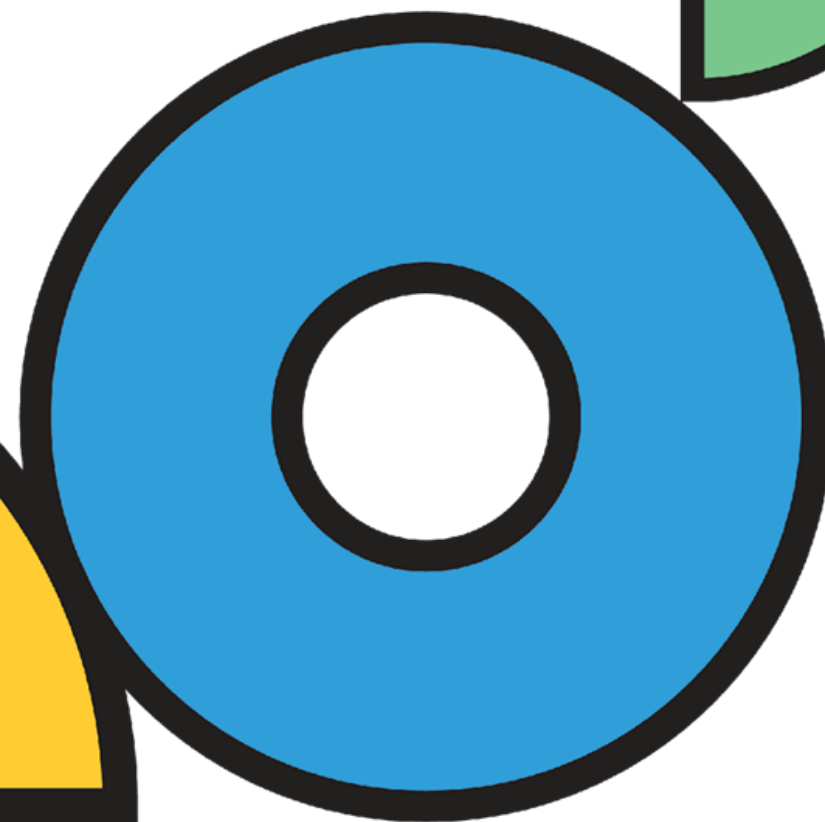
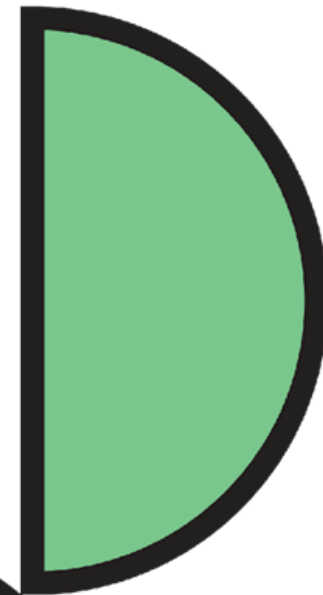
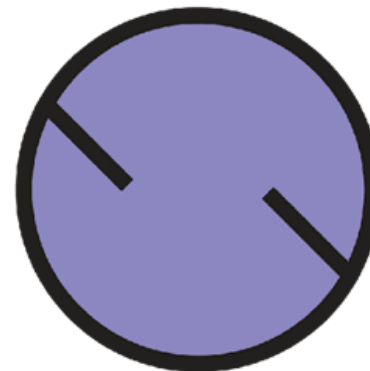


# Inquiry-based education and challenge-based education

Description of the activity:	Theoretical explanation with practical examples. Theoretical part includes the brainstorming sessions and sharing experience.
Target group(s):	Primary schools teachers and basic school STEAM subject teachers
Keywords:	Inquiry, challenge-based education, active learning, critical thinking, ICT
Duration of activity:	2 h
Description of activity environment and materials needed:	<p>In this activity you will learn about inquiry-based education and challenge-based education, what it is, and how to organise it. Activity includes:</p> <ul style="list-style-type: none"><li>• presentation and explanation of the topic,</li><li>• presentation and analysis of practical examples,</li><li>• brainstorming session,</li><li>• sharing experience</li><li>• creation of lesson activity (lesson plan).</li><li>• practical work using ICT</li></ul> <p>For implementation needed: computer with internet connection, multimedia.</p>

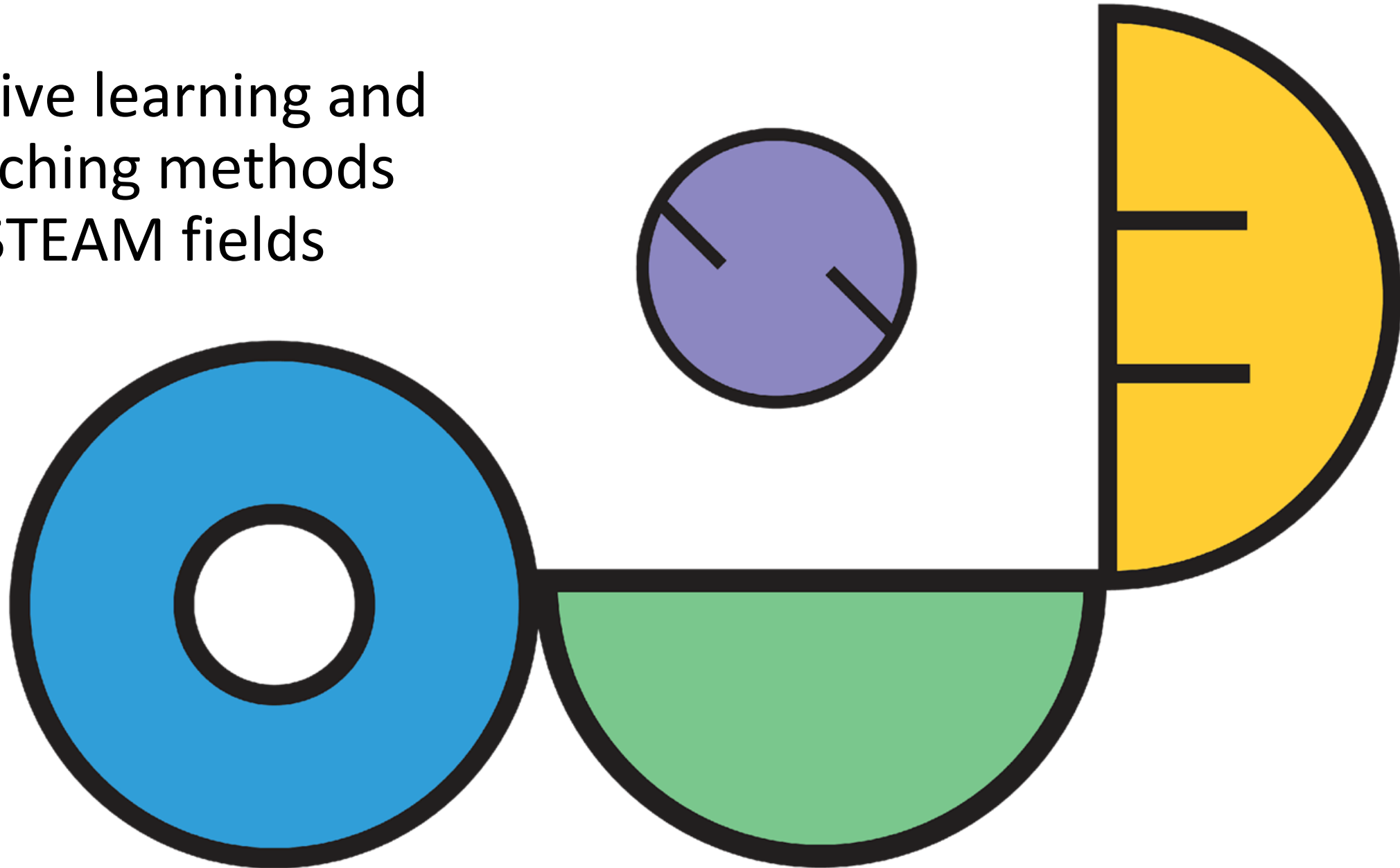


# Inquiry-based & challenge-based education





# Active learning and teaching methods in STEAM fields



Funded by the Erasmus+ Programme of the European Union



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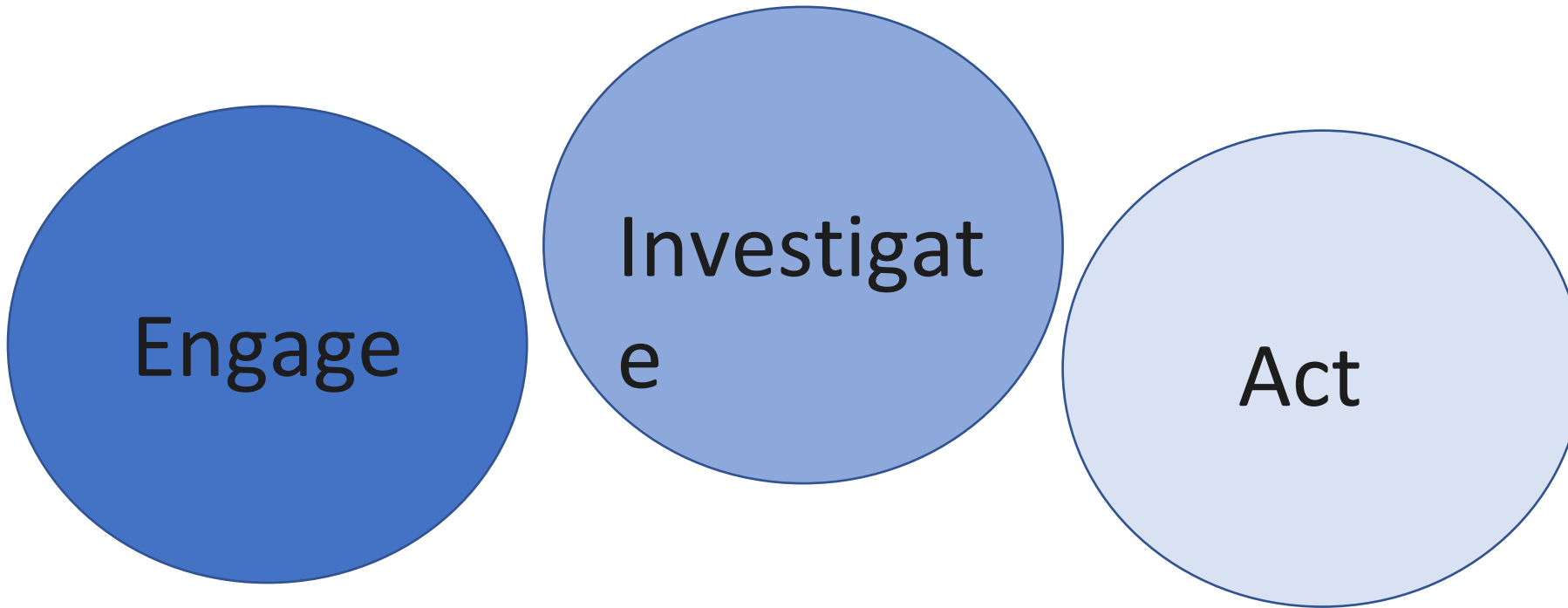
# Challenge-based education (CBL)

CBL provides an efficient and effective framework for learning while solving real-world challenges, and is based on main Learners action steps:

- **Engage.** The usage of essential questioning to develop a personal and actionable challenge – real-world problems that can be solved in their school or their community.
- **Investigate.** The development of contextualized learning experiences and conduct rigorous, content- and concept-based research to create a foundation for the solutions they choose.
- **Act.** The implementation of learner’s solutions in authentic settings, receive feedback and learn from their successes and failures. *Take Action. Make a Difference!*



# Challenge-based education



# CHALLENGE = PROBLEM





The secret of being a bore... is to tell everything.

(Voltaire)

# SOLUTION

—

# ACTIVE LEARNING ! ....?



# Let's start from examples:

- **Inquiry-based education,**
- **Challenge-based education**

# Inquiry-based education

- is a **learning and teaching approach** that emphasizes students' questions, ideas and observations. This form of **learning** enhances comprehension – rather than memorizing facts and taking notes, students are now encouraged to discuss ideas among their peers.
- **Inquiry-oriented lesson format is a WebQuest** in which most or all the information that learners work with comes from the web. These can be created using various programs, including a simple word processing document that includes links to websites.



# Examples and useful information:

- [Create WebQuest](#)
- [WebQuest template](#)
- [The Road to Santiago](#)
- [Edutopia. Examples of WebQuests for Science By Rola Abuhasnah](#)
- [Romanesque](#)
- <http://zunal.com/>
- References:
  - <https://resources4rethinking.ca/en/toolbox/real-world-connections>



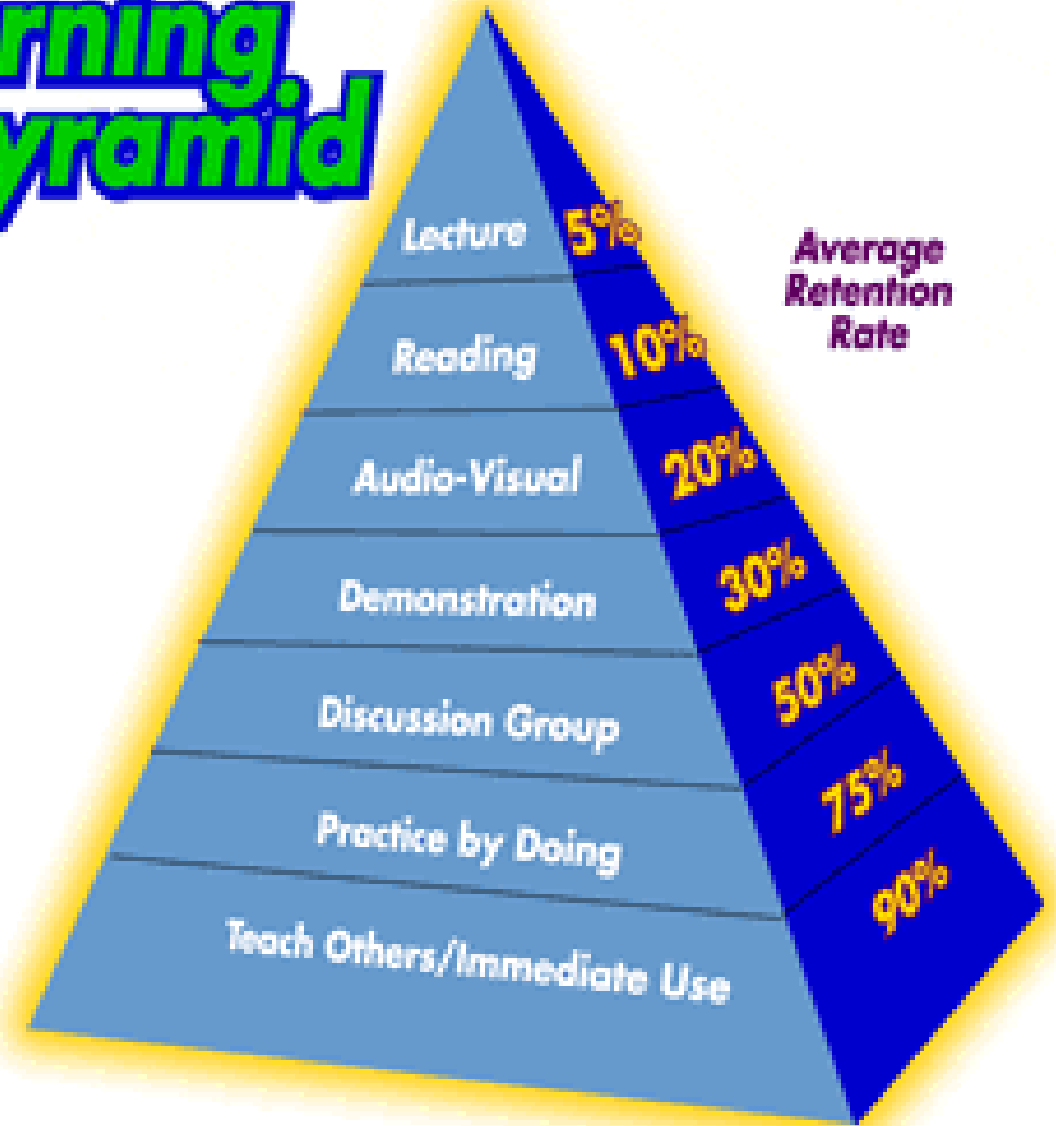
# Why use active learning?

- “Tell me, I forget. Show me, I remember. Involve me, I understand.”  
*Chinese Proverb*
- “Give a man a fish; you have fed him for today. Teach a man to fish; and you have fed him for a lifetime.”
- *Author unknown*
- “What is the most effective method of teaching?”
- Students teaching other students.”  
*McKeachie, Pintrich, Lin, & Smith, 1986*



- An important learning principle, supported by extensive research is that students learn best when they are actively involved in the learning process
- This is illustrated using the learning pyramid
- The further down the pyramid students go, the more information they learn and retain

# Learning Pyramid



*Source: National Teaching Laboratory Institute*

# Teaching HOW to THINK, not WHAT to THINK

Teachers should teach in a way that helps a learner become *innovative, engaged, confident, reflective and responsible.*

In a developing country, the real investment is its people, likewise, for innovative teaching ideas, the real investment are pupils.

If a teacher trains the learners to take responsibility for their own learning and make them a part of the **active learning journey**, the perfect results can be achieved in less time, with zero investment. A concept can be taught sitting under a tree with the same effect of sitting in an AC room.



# How to involve the kids in their own learning through Active Learning?

- Learning is no longer confined to the walls of the classrooms. A friendly classroom setting can **motivate learners to take more interest in learning**. A good atmosphere in classroom motivates every student to express freely and share their ideas. The class should be student led and highly motivated. The learners must be inspired to use every opportunity to learn.
- The main purpose of teaching is facilitating learning by the learners. If we as facilitators can motivate them to learn, then we can achieve our goal.
- A good way would be to note down the area of weaknesses and plan a new course of action for the next session with them. The outcome of the lesson should match the learning objective of the lesson.







**Why are active learning classrooms useful?** In the STEM disciplines (science, technology, engineering, mathematics), active learning instruction, defined as practice that “engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert,” is known to be more effective than traditional lecturing for student learning and student success (Freeman et al., 2014). The research is clear: If your instruction involves “continuous exposition by the teacher,” there’s a better way to teach. That’s true in the STEM disciplines, and it’s likely true in other fields, too, although there’s not as much research on active learning in, say, the humanities. Active learning classrooms are useful, then, because research shows that the affordances of ALCs facilitate adoption of active learning instruction, which leads to greater student learning (Whiteside, Brooks, & Walker, 2010; Baepler, Walker, & Driessen, 2014).



# Active Learning Strategies

- **Inquiry-based education,**
- **Challenge-based**
- **Group projects**
- **Role playing**
- **Research**
- **Think-Pair-Share**
- **Four-step review**
- Table quizzes
- Crosswords
- Word-search
- **Mind-maps** .....

## Ideal topics for group projects

- **Experiments**
- Genetics
- Animal Identification
- Plant identification
- **Mind mapping of any topic**
- The environment and agriculture
- Grassland Management
- Cultivation Machinery



# Teacher Motivation

For many teachers there is always more to do and they are always striving to find ways of doing it better – the area of effective learning and teaching is certainly no exception. It is important that you take the time to ask yourself:

- Where are you now in terms of your learning and teaching practice?
- What is your motivation behind integrating active learning and teaching methods into your existing classroom practice?
- How can you build on your existing practice?
- What do you hope to achieve?



# Pupil Motivation

By using active learning methodologies it is hoped that pupils will not only come to a deeper understanding of the issues involved, but also that their motivation and enthusiasm will be heightened. You may wish to think about the following points in order to increase pupils' motivation:

- Is the activity age-appropriate?
- Are pupils completely aware of the aims and objectives?
- Are there opportunities for pupils themselves to facilitate the activity?
- Will everybody have an equal chance to participate in the activity?
- Is there enough variety?



# Preparedness

- Many teachers and pupils will be at different stages of experience, confidence and skill development in relation to active methodologies. This needs to be factored into the planning of lessons. Some questions to think about:
- Has the class engaged in this type of learning before?
- Have you employed active learning strategies before in your teaching? – if yes, how confident do you feel?
- How do you see your role changing?
- How comfortable do you feel/think you will feel in this type of classroom environment?



# Teacher's Role

- In active learning, the teacher moves from being the “sage on the stage” to the “guide on the side”
- Teaching methods are student-centred, and should move away from using lecturing, individual reading assignments and isolated work
- Teachers become coaches, guides, sources of information, experience and encouragement



# When we work in groups we:

G – **g**ive encouragement

R – **r**espect one another

O – stay **o**n task

U – **u**se quiet voices

P – **p**articipate actively

S – **s**tay in our group



## An example

- Kept group size small. It takes a lot of skill to manage a group of 6 or more. Group size of 5 or 4 is best.
- Used short segments of time e.g. “5-10 minutes to complete the description of experiment”.
- Carefully monitored groups while they worked.

20min for introduction: samples and theory



## Activity

1. Divided into groups: small groups of 4 participants, all different, learning differently.
2. Creative Task: Develop a design for how your group will teach the chosen subject to suit all members of the group. For example lesson „Energy“

**30min Creative Task - reflection**

# 30min Creative Task - Reflection

**"Education is not  
the learning of  
facts, but the  
training of the mind  
to think."  
-Albert Einstein**

