



# Thinking Mathematically

# 数学地思考

Léman Workshop Series Léman讨会系列

10 - 18 - 2020

# Program of Workshop 研讨会计划

- ▶ What is Mathematics? 什么是数学?
- ▶ How did contemporary math instruction evolve?  
当代数学教学是如何演变的?
- ▶ How has modern living changed the way children experience Math, and how can parents give mathematic learning opportunities to their children?  
现代生活是如何改变孩子们学习数学的方式的?  
父母又该如何给孩子们提供学习数学的机会?
- ▶ How an ability to identify and interpret patterns improves logic and reasoning skills in Mathematics.  
识别和解释模式的能力是如何提高数学中的逻辑和推理能力的。
- ▶ Procedure and problem solving; how can one improve the other?  
程序和问题解决;一个如何改进另一个?
- ▶ Strategies to improve critical thinking skills.  
提高批判性思维技能的策略

# What is Math? 什么是数学?

- Mathematics has always been. It is really a subset of Physics and explains our natural world. It gives meaning to the patterns, or laws, which surround us and dictate our daily lives.

数学一直都是，它实际上是物理的一个分支，解释了我们的自然世界。它赋予围绕着我们并支配着我们日常生活的模式或规律以意义。

- For thousands of years Mathematics has been understood and **experienced** by humans, usually subconsciously, and informed all advances of humanity and dictates the evolution and survival of all species.

几千年来，数学一直被人类理解和体验，通常是下意识的，并告知了人类的所有进步，并决定了所有物种的进化和生存。

- Learning of math was typically experiential and divided people into two groups; labourers and professionals.

数学学习是典型的体验式学习，它把人们分成两组：劳动者和专业人士。

- Labourers;** were the farmers, fishermen, hunters etc, who learned skills passed down from their parents. The vast bulk of humanity. They usually only possessed the knowledge which was necessary for survival and were usually illiterate.

**劳动者：**农民，渔民，猎人等，他们从父母那里学到了技能。人类的绝大部分。他们通常只掌握生存所必需的知识，通常是文盲。

- Professionals;** were the tradespeople, civil service, artists, government etc, who typically served an apprenticeship under the tutelage of others who had attained mastery in their area. Literacy was necessary for studying their profession and passing on knowledge.

**专业人员：**是商人、公务员、艺术家、政府人员等，他们通常在其他在他们的领域中取得成功的人的指导下做学徒。识字对于学习他们的专业和传递知识是必要的。

# How did contemporary math teaching evolve?

## 当代数学教学是如何演变的？

- ▶ Modern education seeks to educate the masses. Access to education is taken as a human right and is open to all in developed countries.

现代教育致力于教育大众。在发达国家，受教育被视为一项人权，并向所有人开放。

- ▶ Mathematical Instruction has developed as a bank of generally agreed skills and knowledge which is accessible to the majority, can be taught in a given time-frame (an hour a day usually), and can enable students to successfully enter the job market and provide service to the state.

数学教学已经发展成为一种普遍认可的技能和知识的银行，大多数人都可以获得，可以在给定的时间范围内教授(通常每天一小时)，并能使学生成功地进入就业市场，为国家提供服务。

- ▶ It is based on developmental steps and the progression is generally the same in most countries and cultures. It has evolved slowly to changes in modern society and doesn't necessarily prepare children for a quickly changing world.

它是建立在发展步骤的基础上的，在大多数国家和文化中，发展的过程大体上是相同的。它随着现代社会的变化而慢慢演变，并不一定让孩子们为快速变化的世界做好准备。

- ▶ It is often based upon assumptions and generalisations eg all pupils will have come from a similar background, with a common language and skillset.

它通常是建立在假设和归纳的基础上，例如所有的学生都来自相似的背景，拥有相同的语言和技能。

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# How has modern living changed the way children experience Math? 现代生活如何改变了孩子们学习数学的方式?

- Since public education began about two centuries ago a huge amount of people have moved to an urban environment. 自从大约两个世纪前公共教育开始以来，大量的人搬到了城市环境中。
- Children nowadays are generally not involved in their parents' work doing chores such as farming. 现在的孩子一般不参与他们父母的工作，做家务，如农活。
- Living at a remove from the natural world has reduced experience of natural patterns.

远离自然世界的生活减少了对自然模式的体验。

- Technology has made some problem-solving skills appear “obsolete”, and children feel they no longer need to have abilities such as estimation when their phone can tell them so much.

科技使得一些解决问题的技能显得“过时”了，孩子们觉得他们不再需要像估计这样的能力，他们的手机可以告诉他们这么多。

- Modern games and activities often no longer require creativity, resilience, engineering, strategy or concentration, but are a clever package of colour and sounds designed to stimulate our shorter attention spans giving immediate rather than delayed gratification.

现代游戏和活动通常不再需要创造性、弹性、工程、策略或专注力，而是巧妙地将颜色和声音组合在一起，旨在刺激我们短暂的注意力持续时间，给予即时而非延迟的满足感。

- Motivation is not the same as mistakes are not “punished” in our modern cossitted world. Children are more protected and have less need to assess the world around them for danger, or strategise to avoid future hardship eg(budgeting pocket money).

在我们这个被宠爱的现代世界里，动机并不等同于错误不会被“惩罚”。孩子们得到了更多的保护，不再需要评估他们周围的世界是否有危险，或者制定战略以避免未来的困难，例如(预算零用钱)。