PRINCETON UNIVERSITY

IN THE CITY OF NEW YORK

美国 天才班介绍和美国 Math League 夏令营安排（1-6年级）

目录

官方人工客服

CHAPTER 01

美国 天才班
课程–概述

分享

美国“天才班”课程

“天才班” 课程 (Gifted Program) 旨在为在认知与学业测试中展现出卓越能力、并具备优异学业表现的学生而设立。

这类学生通常以非传统的方式看待世界; 他们是发散性思维者，在完成任务时往往采用更加抽象和复杂的思考方式。

分享

美国“天才班”课程

Ⅰ,在“天才班” 课堂中，学习不仅停留在知识和操作层面， 学生还能够获得对学科内容更为概念化、深入的理解。

Ⅱ,课程设置与教学进度通常比同年级水平提前一至数年

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"天才班"课程（Gifted Programs）-整体框架（Big Picture）

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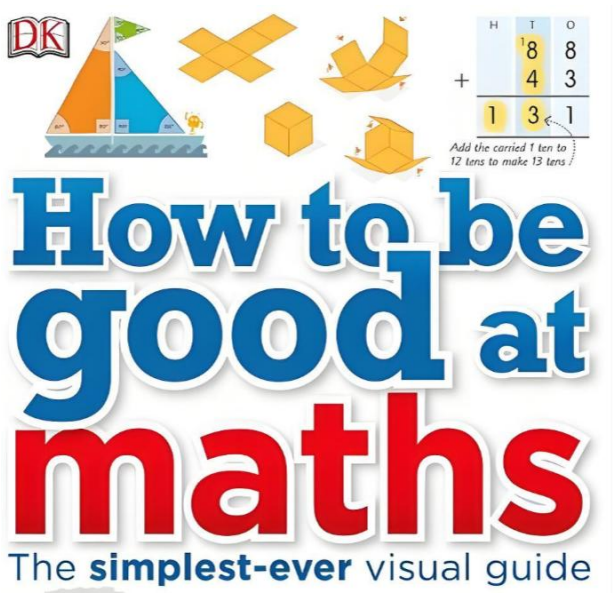
1-6年级组



展开

说说

美国天才班的学生

在接触哪些题目

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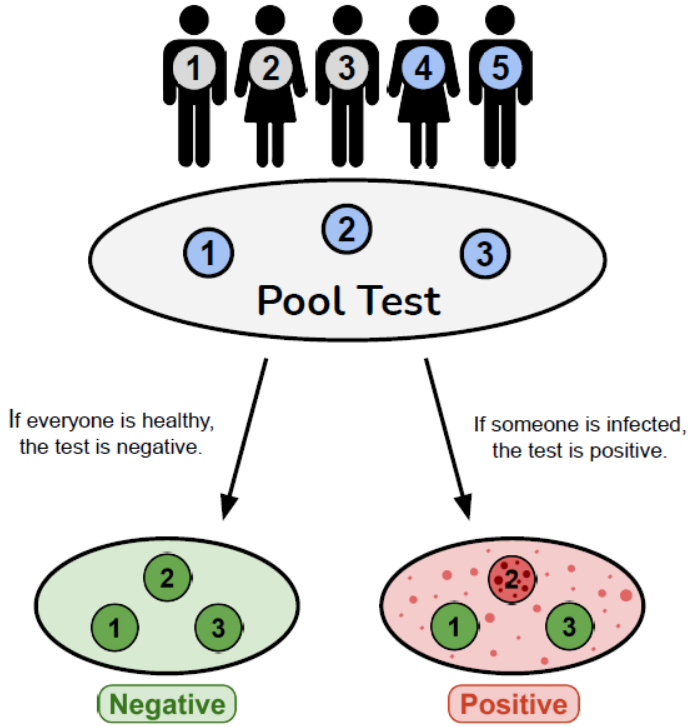
Pool Testing

Suppose someone is infected with a virus. If there aren't enough tests to test each person individually, a pool test can be used to test many people at the same time. In this example below, three people are tested at the same time.



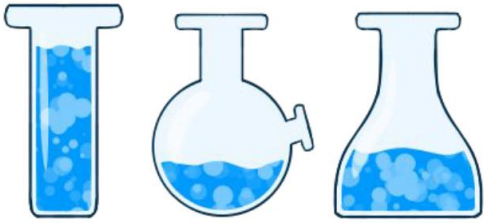
1. If everyone in a pool test is healthy, the pool test is negative. In the example above on the left, Person 1, Person 2, and Person 3 are all healthy, so the pool test is negative.
2. If the infected person is in a pool test, the pool test is positive. In the example above on the right, Person 1 and Person 3 are healthy, Person 2 is infected, so the pool test is positive.
3. A pool test does not usually tell you who is infected, but it does tell you who might be infected.

Goal:

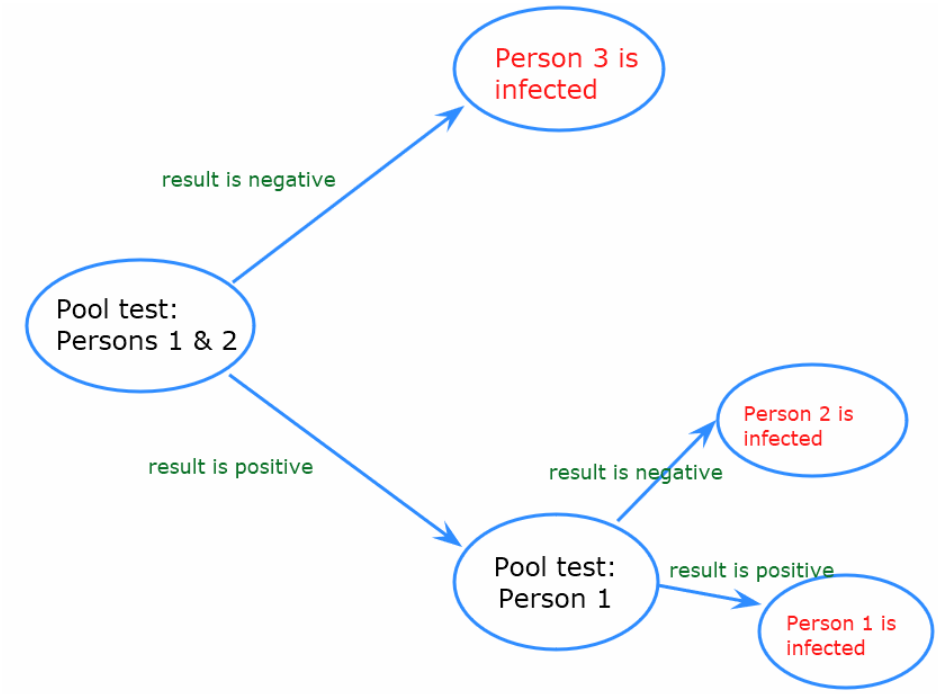
- Find the infected person using as few pool tests as possible.

Rules:

- Exactly one person is infected.
- You can do pool tests of any size (including a pool of just one person).
- You will usually need to do more than one pool test to find the infected person. You can test the same person any number of times.



For example, in a group of three persons, exactly one person is infected. The fewest number of tests that you need to guarantee that you will always be able to find the infected person is 2. And this is how. Assume the three persons are Person 1, Person 2, and Person 3. First, you test Person 1 and Person 2. If the result is negative, you know Person 3 is infected. If the result is positive, then you know either Person 1 or Person 2 is infected. Then you test Person 1. If the result is negative, Person 2 is infected. If the result is positive, Person 1 is infected. So the fewest number of tests that you need to guarantee that you will always be able to find the infected person is 2. The process is illustrated in the figure below. (Please note this is not the only solution to this problem. But the fewest number of tests that you need stays the same.)



Questions:

(1) There are 6 persons and exactly 1 person is infected. What is the fewest number of tests that you need to guarantee that you will always be able to find the infected person?

(2) There are 1000 persons and exactly 1 person is infected. What is the fewest number of tests that you need to guarantee that you will always be able to find the infected person?

1.
Continuing the previous question, if you are only able to do 1 test, the largest number of persons you can test so that you can always find the infected person is 2. That is there are two persons, Person 1 and Person 2, and exactly one person is infected. You can do 1 test and find the infected person. You test Person 1. If the result is negative, you know Person 2 is infected. Otherwise, Person 1 is infected.

If you are only able to do 11 tests, what is the largest number of persons you can test so that you can always find the infected person? (Again assuming exactly one person is infected.)

2.
Parallel Testing
Continuing the previous two questions, one day, you only have enough time to do one round of pool testing. You can do as many pool tests as you want, but you must do all of the tests *at the same time*. **You cannot use the result of one pool test to decide how you'll do another pool test.**

For example, there are 3 persons and exactly one person is infected. You can do 2 tests at the same time to find the infected person. For test 1, you test Person 1 and Person 2. For test 2, you test Person 1 and Person 3. If only test 1 is positive, Person 2 is infected. If only test 2 is positive, Person 3 is infected. If both test 1 and test 2 are positive, Person 1 is infected. So in this case, the fewest number of pool tests that you need to guarantee that you will always be able to find the infected person is 2. (Please note this is not the only solution to this problem. But the fewest number of pool tests that you need stays the same.)

Questions:

(1) If there are 9 persons and exactly 1 person is infected, what is the fewest number of pool tests that you need to guarantee that you will always be able to find the infected person?
(2) If there are 2000 persons and exactly 1 person is infected, what is the fewest number of pool tests that you need to guarantee that you will always be able to find the infected person?

3.
Continuing the previous parallel testing problem, if you are only able to do 12 tests at the same time, what is the largest number of persons that you can test so that you can always find the infected one? (Again assuming exactly one person is infected.)

CHAPTER 02

美国 Math League
和
天才班

美国 Math League 历史

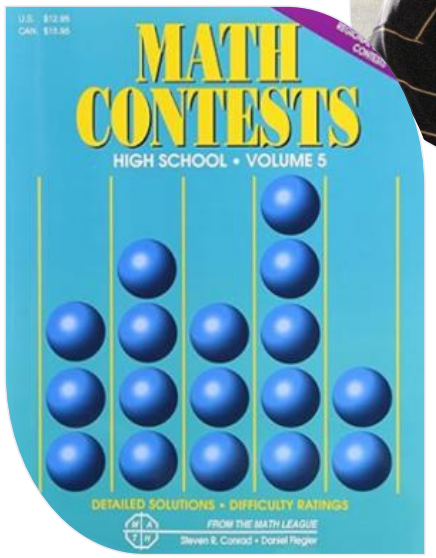
历史悠久：自1977年起，每年持续举办

卓越影响力：美国及北美地区具有卓越影响力的中小学数学思维探索活动

创始人：Mr. Steven R. Conrad 和 Mr. Daniel Flegler
美国著名数学教育家

创始人荣誉奖项：

- 1977年Mr. Daniel Flegler获得普林斯顿大学颁发的“卓越中学教育奖”
- 1985年荣获由里根总统颁发的“杰出数学和科学教育总统奖”(PAEMST), 全美国数学和科学教育最高奖
- 担任了很多数学杂志的主编和审阅人
- 美国十五个州和地区的数学竞赛组委会主任委员或委员
- 六年美国SAT 组委会会员
- 共同出版了24本书



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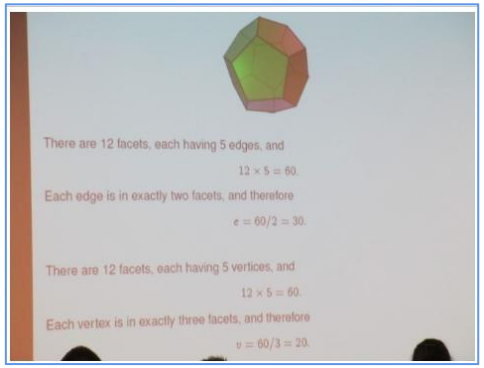
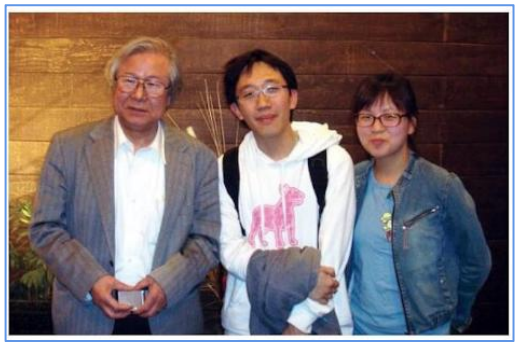
过去30年获得菲尔茨奖的美国数学家

获奖年份	获奖者	获奖者获奖时所在的大学、研究院
2022年	June Huh	美国普林斯顿大学 (Princeton University)
2018年	Akshay Venkatesh	美国斯坦福大学 (Stanford University)
2014年	Maryam Mirzakhani	美国斯坦福大学 (Stanford University)
2014年	Manjul Bhargava	美国普林斯顿大学 (Princeton Univeristy)
2010年	Ngô Bảo Châu	美国高等研究院 (Institute for Advanced Study)
2010年	Elon Lindenstrauss	美国普林斯顿大学 (Princeton Univeristy)
2006年	Terence Tao	美国加州大学 (University of California, Los Angeles)
2006年	Andrei Okounkov	美国普林斯顿大学 (Princeton Univeristy)
2002年	Vladimir Voevodsky	美国高等研究院 (Institute for Advanced Study)
1998年	Maxim Kontsevich	美国 Rutgers University
1998年	Curtis T. McMullen	美国哈佛大学 (Harvard University)
1998年	Richard Borcherds	美国加州大学 (University of California, Berkeley)
1994年	Efim Zelmanov	美国芝加哥大学 (University of Chicago)
1990年	Edward Witten	美国高等研究院 (Institute for Advanced Study)
1990年	Vaughan Jones	美国加州大学 (University of California, Berkeley)

注: 以上数据来自维基百科。

注: 2022年获得菲尔茨奖(Fields Award)的美国普林斯顿大学 (Princeton University) 的 Professor June Huh 教授在2019年给参加美国 Math League 决赛和数学夏令营的学生授课。





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什么是"好的"数学题目？

“低门槛、高天花板”

易于理解，但有挑战性

学在当下，保持热爱

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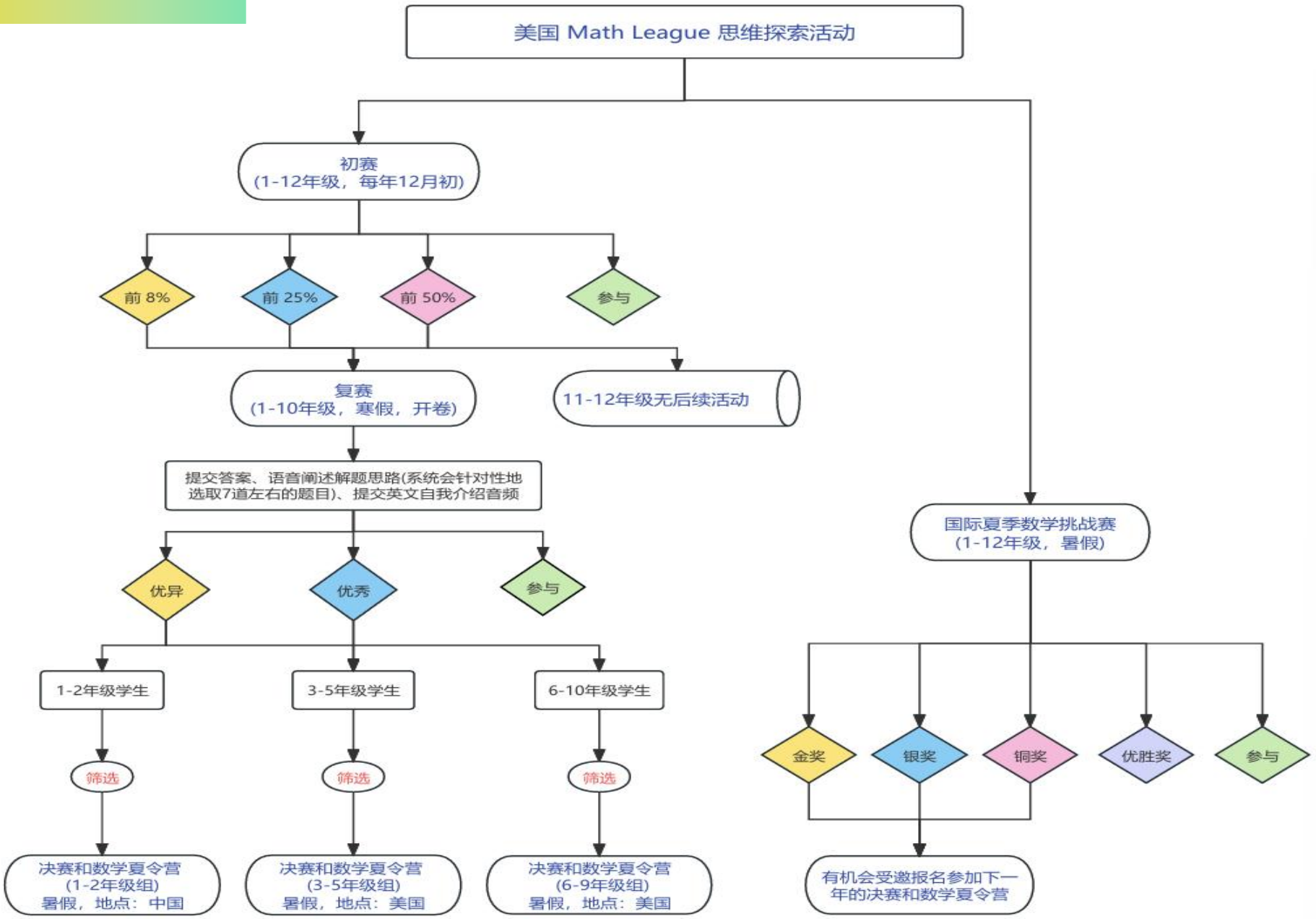
美国 Math League 思维探索活动
初赛
(1-12年级，每年12月初)
前 8%
前 25%
前 50%
参与
复赛
(1-10年级，寒假，开卷)
11-12年级无后续活动
提交答案、语音阐述解题思路(系统会针对性地选取7道左右的题目)、提交英文自我介绍音频
优异
优秀
参与
1-2年级学生
3-5年级学生
6-10年级学生
筛选
筛选
筛选
决赛和数学夏令营
(1-2年级组)
暑假，地点：中国
决赛和数学夏令营
(3-5年级组)
暑假，地点：美国
决赛和数学夏令营
(6-9年级组)
暑假，地点：美国
国际夏季数学挑战赛
(1-12年级，暑假)
金奖
银奖
铜奖
优胜奖
参与
有机会受邀报名参加下一年的决赛和数学夏令营

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决赛和数学夏令营概述

2026年美国 Math League 决赛和数学夏令营 由美国 Math League 思维探索活动和普林斯顿大学数学系 (Princeton University Mathematics Department)、 哥伦比亚大学数学系 (Columbia University Mathematics Department)、 威廉姆斯学院 (Williams College)、 Swarthmore College 等美国著名大学的教授指导参加决赛和夏令营的学生学习数学。

日期安排：

1-2年级组：2026年7月11日(check-in date)到7月13日(check-out date)

3-5 年级组：2026年7月11日(check-in date)到7月18日(check-out date)

6-10 年级组：2026年7月19日(check-in date)到7月27日(check-out date)

参与学生：

来自美国、 加拿大、中国等世界各地成绩优异的学生

活动内容：

美国”天才班”课程，决赛、数学讲座、夏令营活动等

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纽约时报(The New York Times)报道

关于美国 Math League 决赛和数学夏令营的报道

The New York Times

NUMBERPLAY

Breaking the Grip of the Gaokao, China's SAT

By GARY ANTONICK *August 31, 2015 12:00 pm*

Gary Antonick (center front) with the China Math League team outside Wallenberg Hall at Stanford University on Aug. 19, 2015. Gary Antonick

The notorious *Gaokao*, (高考, or "High Test") is China's SAT on steroids, with a score on the nine-hour test being the sole criterion for admission to Chinese universities. Preparing for the test is a years-long obsession for both students and parents. (In case you missed it: Brook Larmer's *Inside a Chinese Test-Prep Factory*.) And for many, the unfortunate consequence is that the lengthy preparation destroys, rather than enhances, academic ability. Student enthusiasm and curiosity are crushed.

Although many in China are aware of the Gaokao's impact, the test has a 1,300-year history and will not be easily killed. Instead, perhaps the best way to break the Gaokao's life-draining grasp is indirectly, through clubs and activities that rejuvenate kids' sense of curiosity and fun. And two weeks ago I discovered one such extra-curricular activity that's becoming popular among Chinese math-lovers: The Math League, an organization based in New Jersey committed to having kids worldwide enjoy math and discussions about problem-solving.

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适合参与的学生

A. 热爱数学和科学、愿意挑战自己的1-6年级学生。

b. 愿意开拓视野、将来成为国际化人才的学生。

c. 愿意结交各地朋友的学生。

d. 有意向将来去美国(和其他国家)留学的学生。

如果我想参加，如何报名？

获得复赛报名资格的学生，可以登录官网：www.mathleague.world，点击“会员登录”按钮报名。

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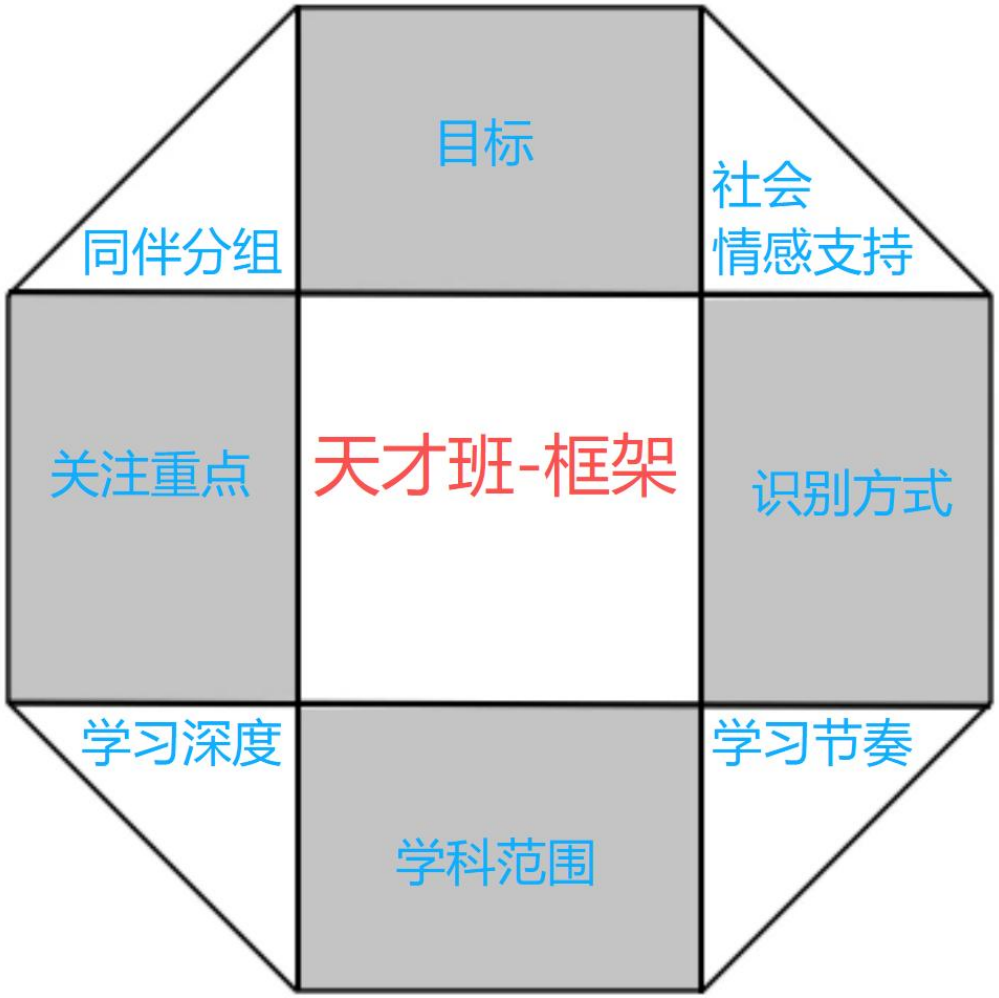
"天才班"课程（Gifted Programs）-整体框架（Big Picture）



方面	"天才班"课程
目标	满足学生独特的认知需求
关注重点	学生如何思考与学习
学科范围	所有核心学科
识别方式	正式测评 + 综合标准
学习节奏	更快且更深入
学习深度	高度概念化、深入
同伴分组	与智力同伴一起
社会情感支持	明确纳入课程设计

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学生收获

①可以参加原汁原味的美式数学竞赛

②可以了解美国“天才班”课程框架

Gifted ≠ high grades only

天赋≠仅仅获得高分

③可以结识来自各地和不同地区的优秀数学爱好者

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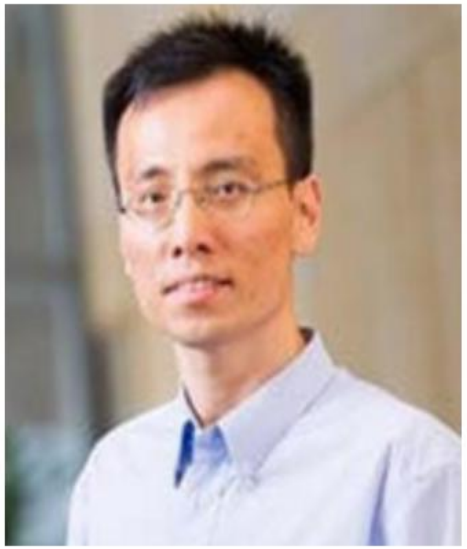
Paul Ellis

Rutgers University

Nick Rauh

Seattle Universal

Math Museum



Chee Wei Tan

Nanyang Technological University,

Singapore

授课教授(2018年暑假&2019年暑假)

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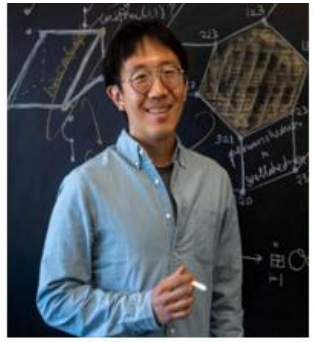
授课教授（部分）



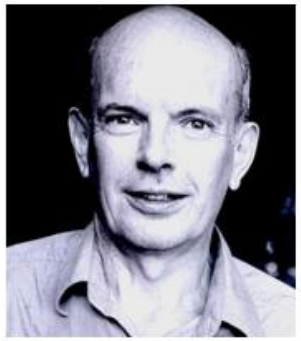
June Huh
Princeton University

Matt Weinberg
Princeton University

Jacob Shapiro
Princeton University

Mark Saul
Mathematical Association
of America

Doron Zeilberger
Rutgers University



Neil Sloane
AT&T Bell Labs

Steven Miller
Williams College

Glen Whitney
National Museum of Math

Pat Devlin
Swarthmore College

Michael Thaddeus
Columbia University

Arthur Benjamin
Harvey Mudd College

Pravesh Kothari
Princeton University

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往届授课内容

1. From the Quadratic Formula to Differentiation (从二次公式到微分)
2. Mathematics in History, Applications, and Enjoyment (数学的历史、应用和乐趣)
3. Mathematics and Music (数学与音乐)
4. The Wonderful World of Permutations (奇妙的排列世界)
5. Using Randomness in Proofs (在证明中使用随机性)
6. Mathematics and Games (数学与游戏)
7. Stable Machine (稳定的机器)
8. Famous Sequence (著名序列)
9. Tensegrity Polyhedra (张力多面体)
10. Grundy's Game (格兰迪游戏)
11. Apollonian Circle Packings (阿波罗尼安圆填充)
12. Diving into Dimensions (维度探索)
13. How to Use Math to Build a Safe World? (如何用数学构建一个安全的世界？)
14. What's Your Favorite Number? (你最喜欢的数字是什么？)
15. The Art of Problem Solving (解题的艺术)
16. Unlocking Math Magic: Exploring Numbers with AR & VR (揭开数学魔法：用AR和VR探索数字)
17. Knot Theory (结理论)
18. Checking Divisibility Using Finite Automata (使用有限自动机检查可除性)
19. NIM and JIM
20. Introduction to Mathematical Physics (数学物理导论)
21. Modular Origami (模块折纸)

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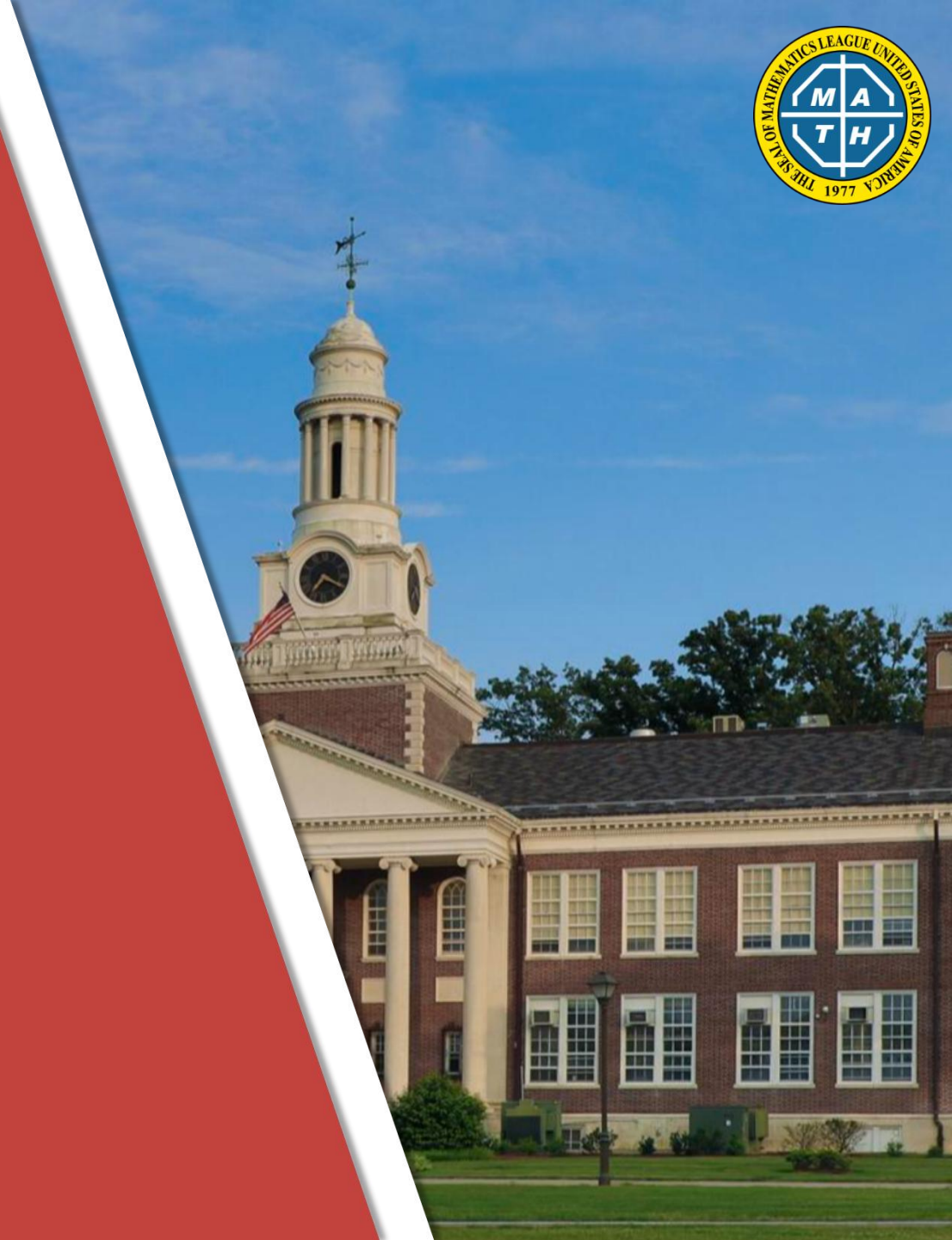
CHAPTER 03

互动答疑



互动答疑

1，
2，
3，
4，上课是用全英语吗?
5，看往年的照片中，去参加的都是中国孩子

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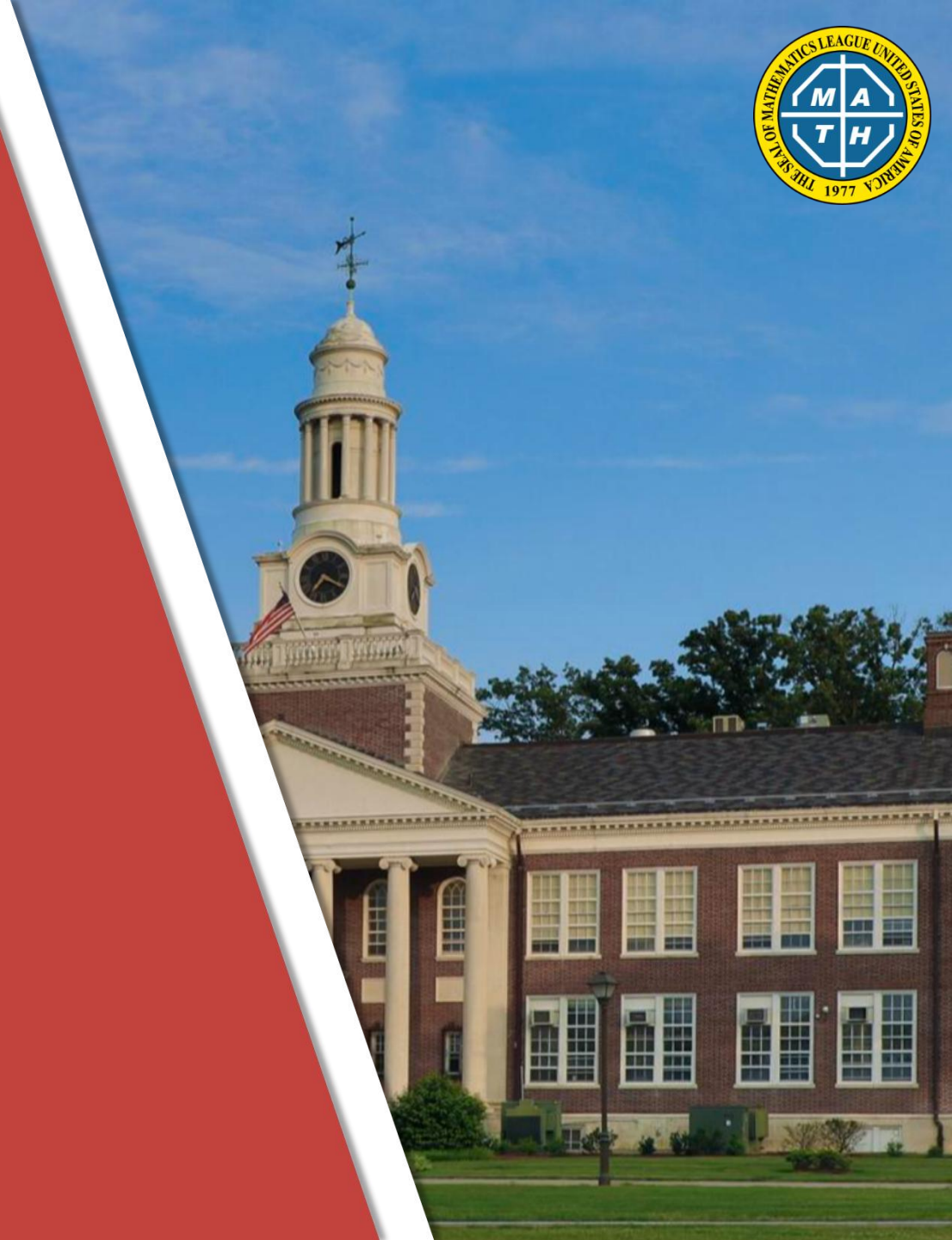
CHAPTER 04

联系我们



联系我们

- 美国 Math League 组委会邮箱:
  INFO@LTHOUGHTS.COM

- 官方人工客服 - 官方服务号 - 官方视频号

- 美国 Math League 官网: www.mathleague.world

感谢聆听，感谢你的时间，期待下次与大家相聚！