
STEM IN PE

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體育與STEM教育之融合

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體育能為學習者提供終身學習所需的重要經驗，以達致全人發展。體育不單提升學習者的身體活動能力和健康體適能，同時亦提供一個融合學與教環境，讓學習者從體育活動和運動中體現與STEM(科學、科技、工程以及數學)相關的知識，強化他們綜合和應用知識和技巧的能力，並培養對學習、創意和創新的好奇，發展他們的明辨性思考、協作和解難能力。這些是21世紀所需的技能和素質。

體育活動和運動涉及不同身體部分的協調技巧。學習者可透過綜合各科學、科技以及數學的知識，以改善技巧和提升技術效率。學習者亦可透過不同的工具，如心率追蹤儀，並配合應用程式以評估運動表現和運動強度。

以籃球為例，射球角度是取決於球員出手時手指的力量和角度。拋物線的弧度越大，入籃的機會越高。學習者可攝錄有關動作，並利用應用程式進行技術分析，以改善投籃技術。

其他例子包括:

運動項目	應用科學	《STEM》之應用
田徑	例如:力、能量系統、重心、釋出角度	牛頓運動定律 短跑及長跑之不同能量系統 推鉛球、擲標槍及鐵餅等項目之最佳釋出角度
游泳	例如: 軸向旋轉、水阻力、能量守恆定律	以軸向旋轉產生水中拉力 泳池內之能量轉移 游泳衣物與水阻之關係
羽毛球	例如:力、角與線移動	牛頓運動定律 羽毛球和塑膠球之軌跡分別 握拍位置之力學原理

參考資料:

1 推動STEM教育 - 發揮創意潛能

資源:

本校分享:「體育與STEM教育之融合」

e-resource platform

STEM Education in PE



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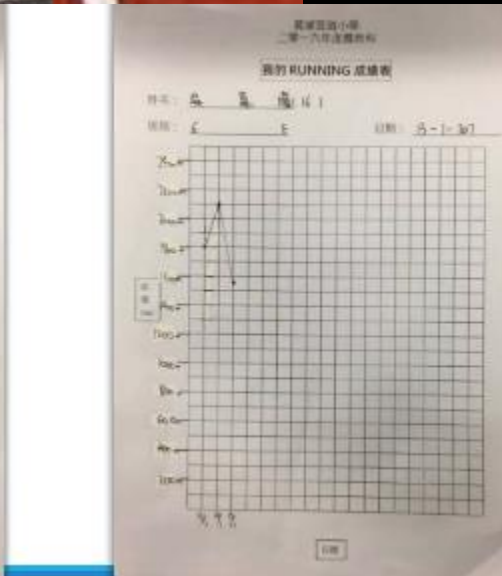
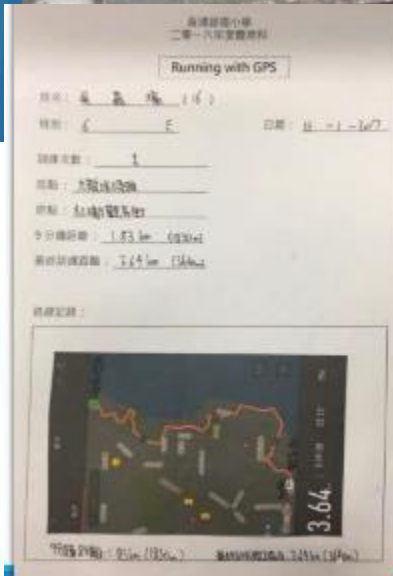
Mr. Lee Yue Ting (Cumberland Presbyterian Church Yao Dao Secondary School)



Mr. Tam Ka Hei Jonathan (Alliance Primary School, Whampoa)



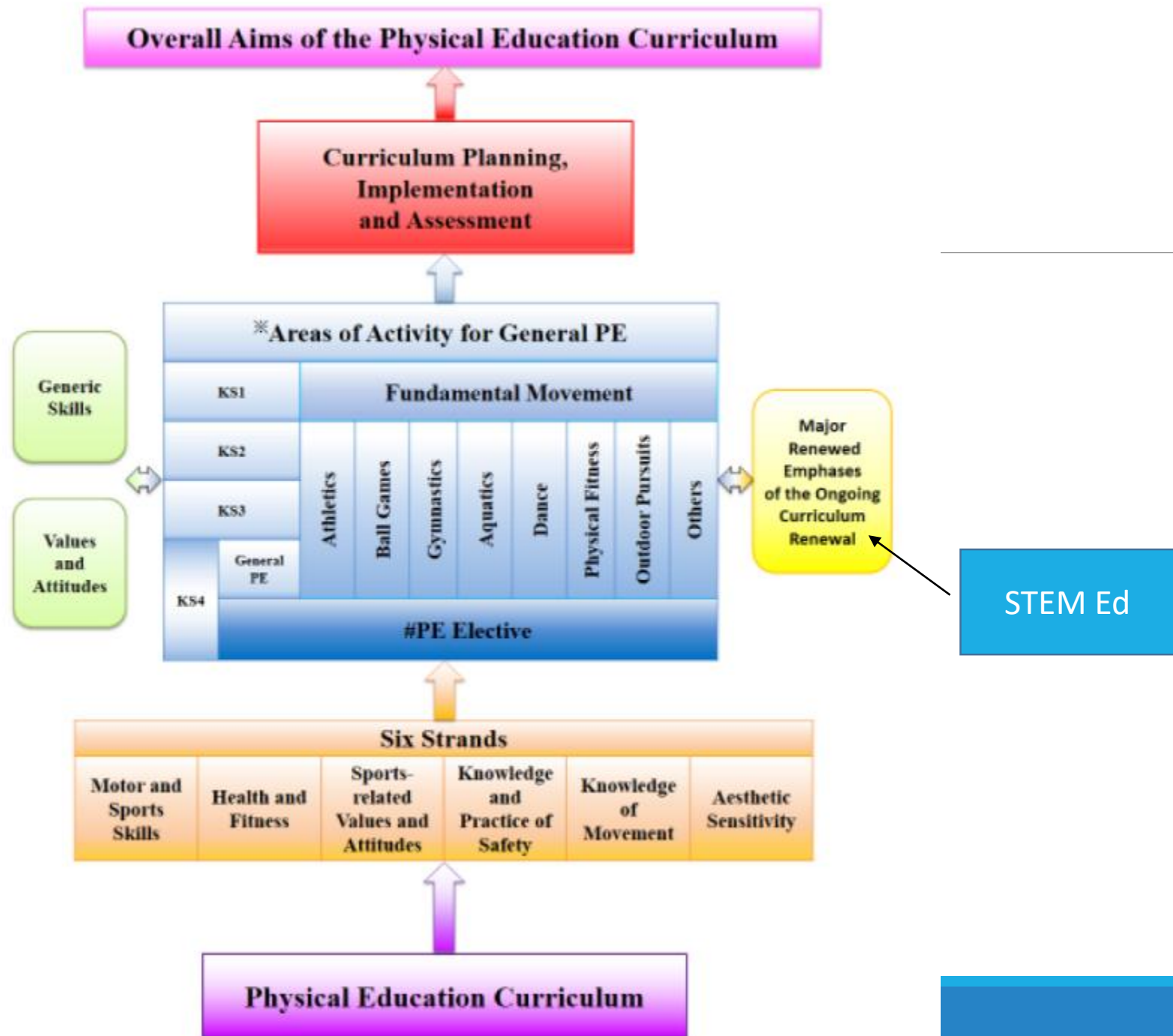
Mr. Wu Sui Cheong (SKH Leung Kwai Yee Secondary School)



Coach's Eye APP



測試活動 <https://goo.gl/vW2WIE>



STEM課程：

- （一）綜合及統整性
- （二）以解決真實世界
（或日常生活）問題
- （三）具創新及動手的機會

*STEM理論

體育課程：

以體育活動為中心
學習「體育技能」作主線
提升體適能為要務」

Sailing + STEM

LAND YACHT MODEL MAKING



WHY STEM AND SAILING?





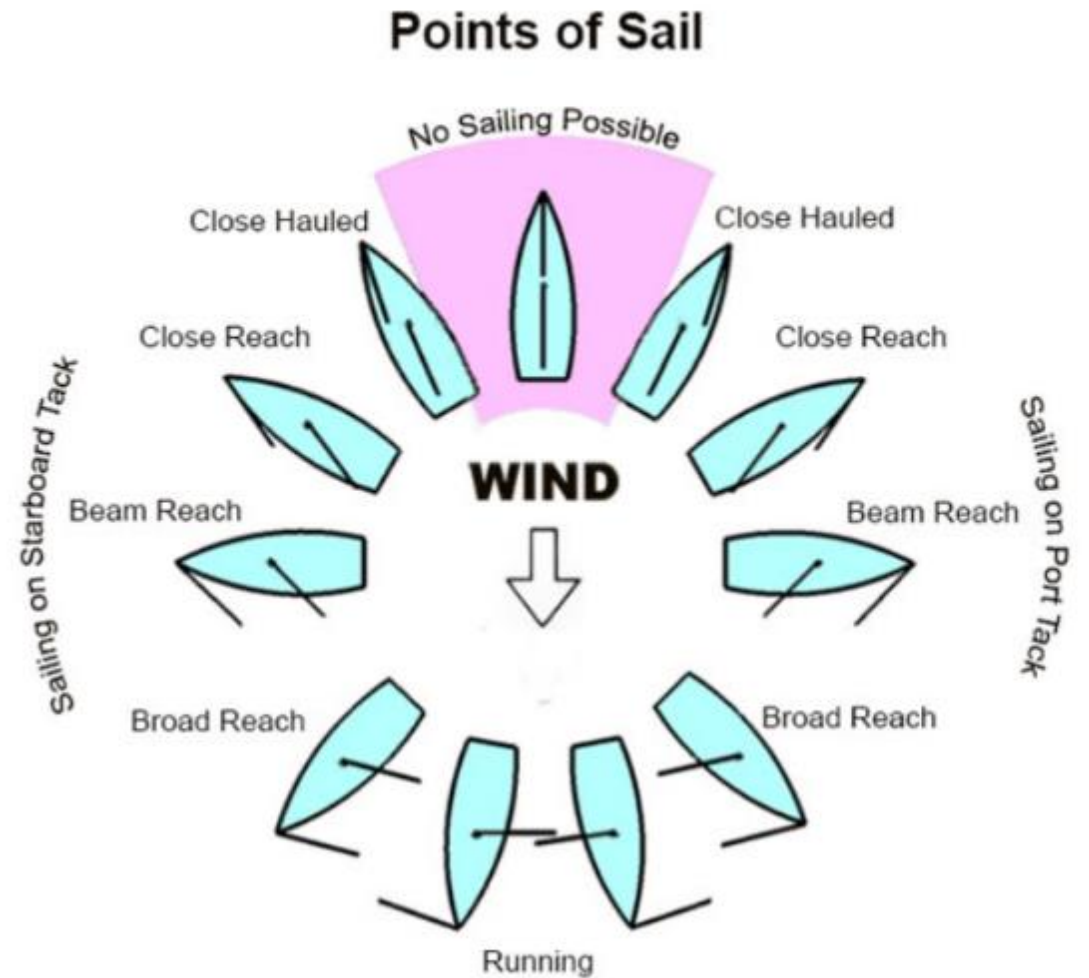
REACH



Why STEM and Sailing?

Above the Boat	Atmosphere, Wind, Weather Patterns and Systems, Air Flow, Cloud Structures, Celestial Navigation, Sail Design, speed calculations, GPS Navigation, Radio Communications, Apparent Wind vs True Wind, Fluid dynamics	Earth Science, Environmental Science, Physics, Engineering, Technology, Geometry, Mathematics
In the Boat	Simple Machines, Buoyancy, Sail Trim, Boat Design, Hull Shape, Materials, Navigation Chart Reading, Communication, Sailing Angles,	Physical Science, Chemistry, Engineering, Trigonometry, Technology
Below the Boat	Tide, Current, Water Quality Testing, Life Cycles, Watersheds, Underwater topography, Invasive Species, Marine Debris, Hydrodynamics, Underwater Exploration,	Chemistry, Life Science, Geology, Ocean Science, Environmental Science, Engineering, Technology

1. **NO GO ZONE (正迎風)**
(Head to wind)
2. Reaching(貼風/橫風)
3. Running/
downwind(順風))



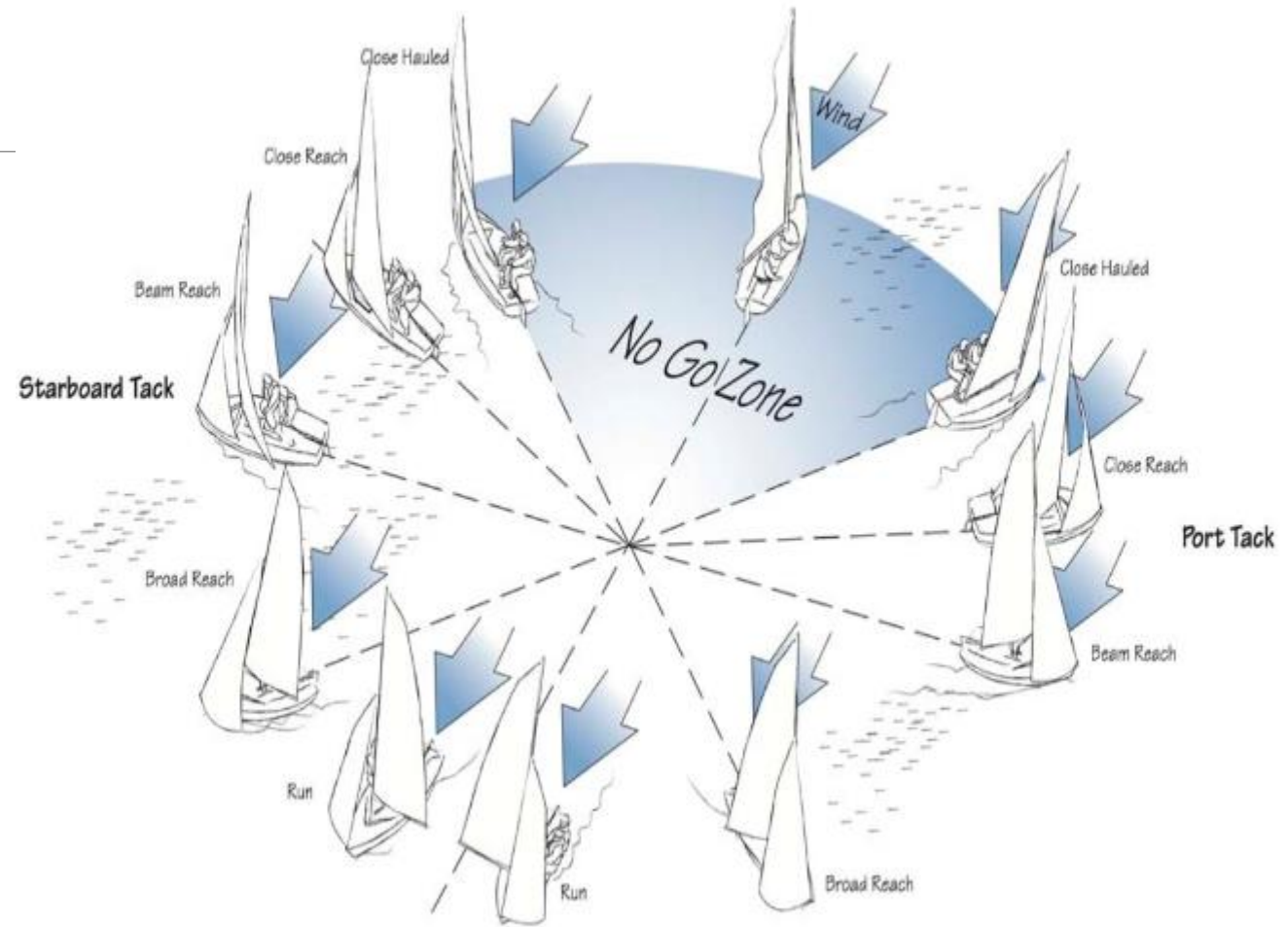
Running (downwind-6 o'clock)

Reaching

Broad Reach: 4 o'clock or 8 o'clock

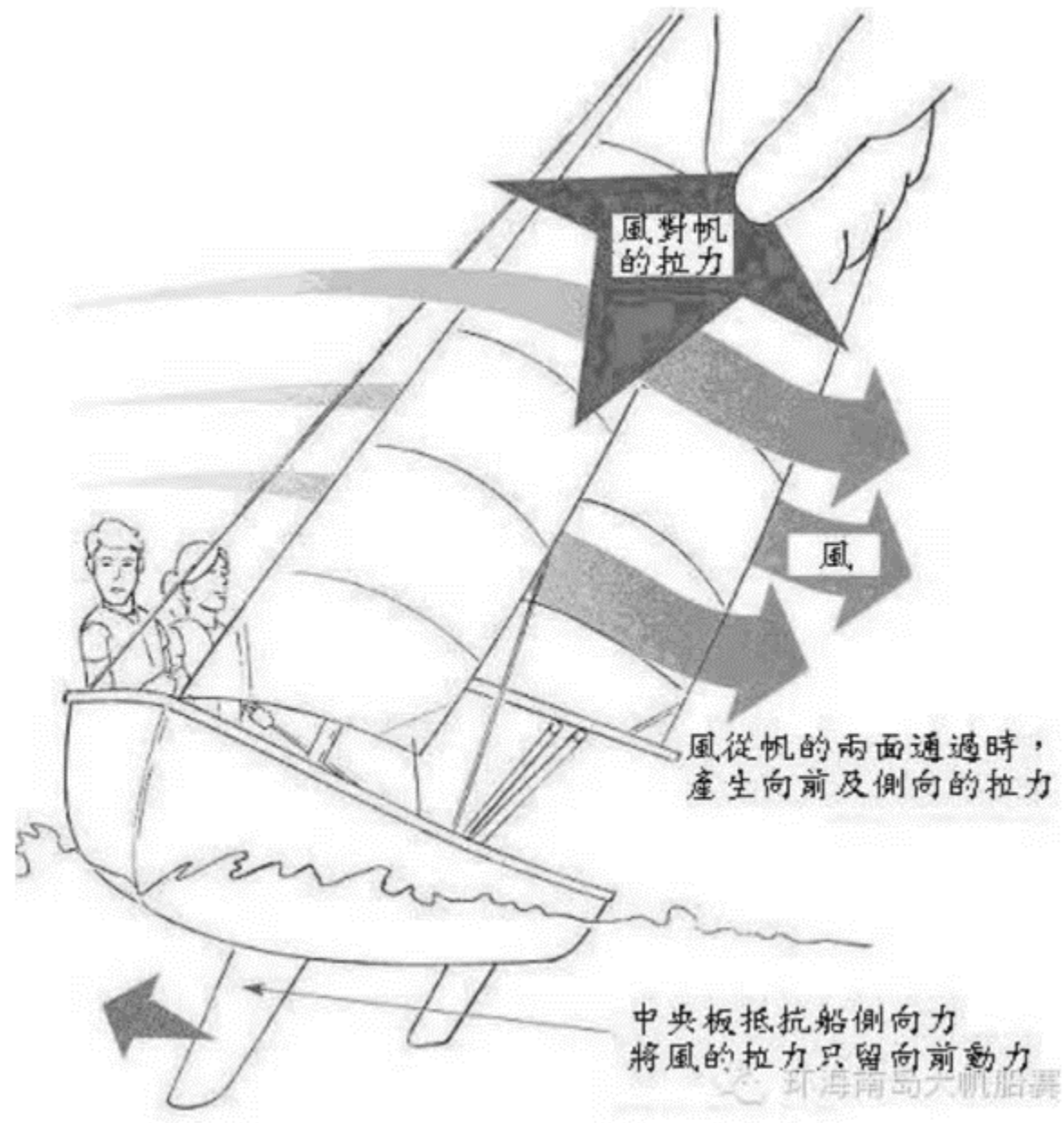
Beam Reach: 3 o'clock or 9 o'clock.

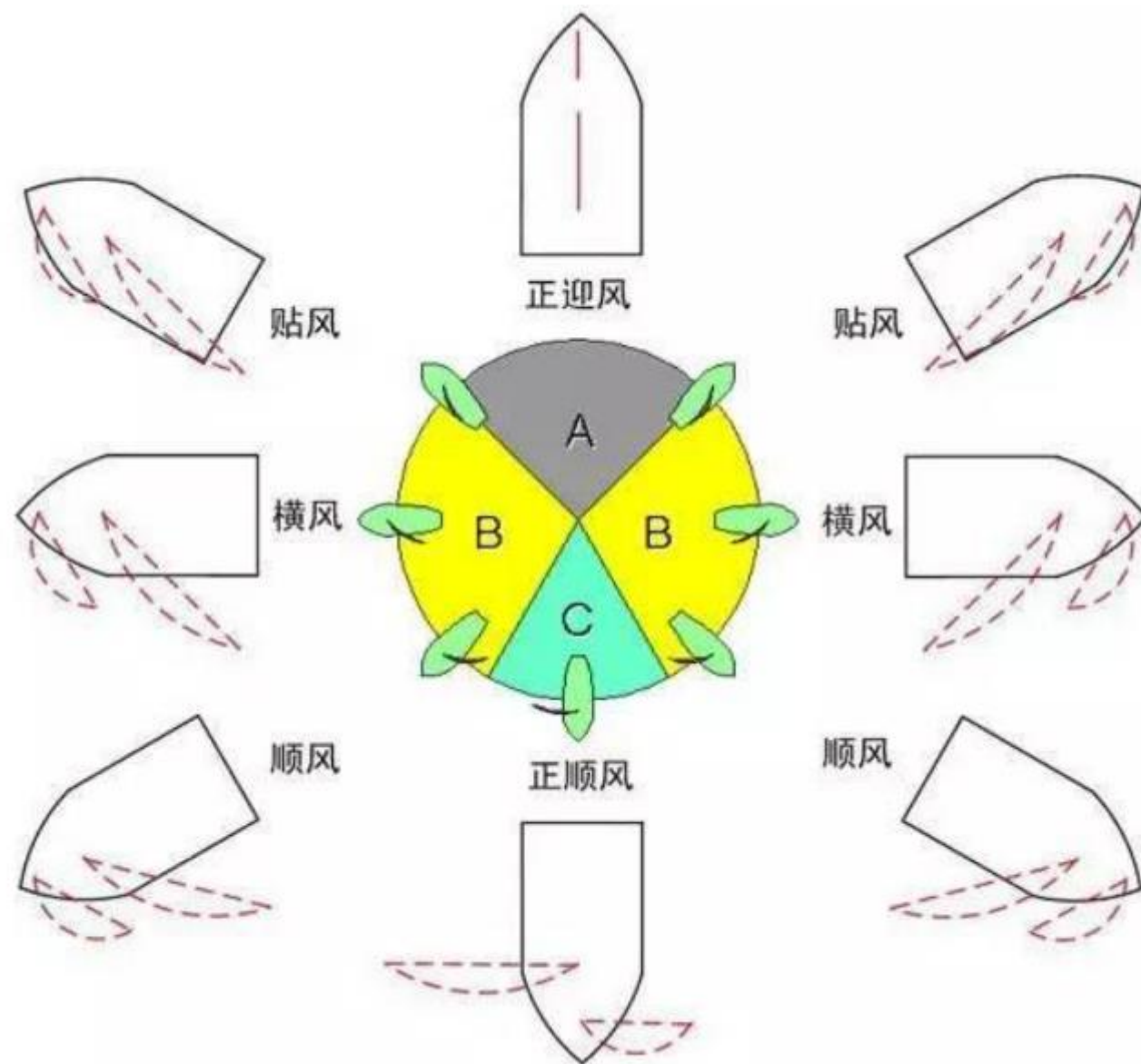
Close Reach: 2 o'clock or 10 o'clock ***



伯努利效應

Bernoulli's principle





WHY/HOW DO WE INCORPORATE
"STEM" into "SAILING"?





⌘ wheels



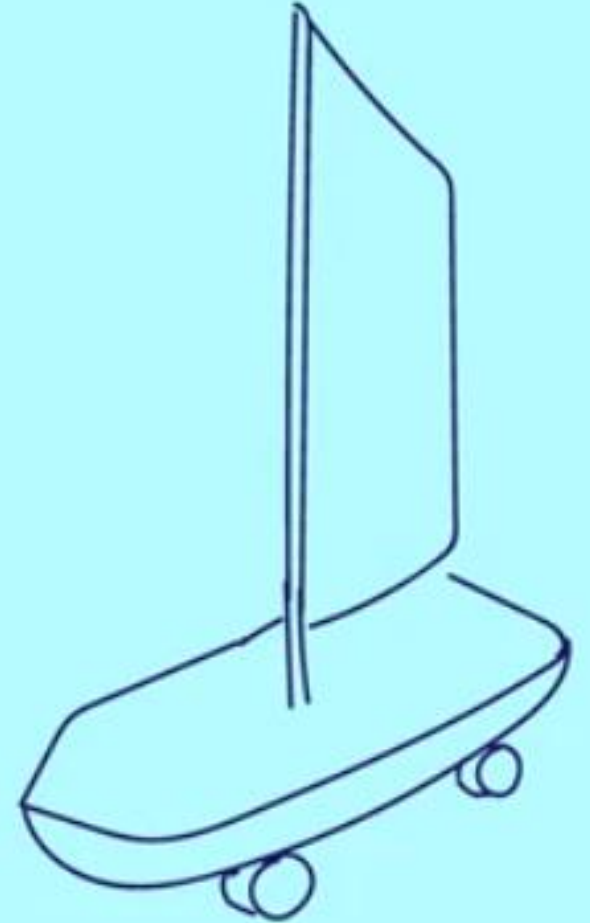
MATERIAL



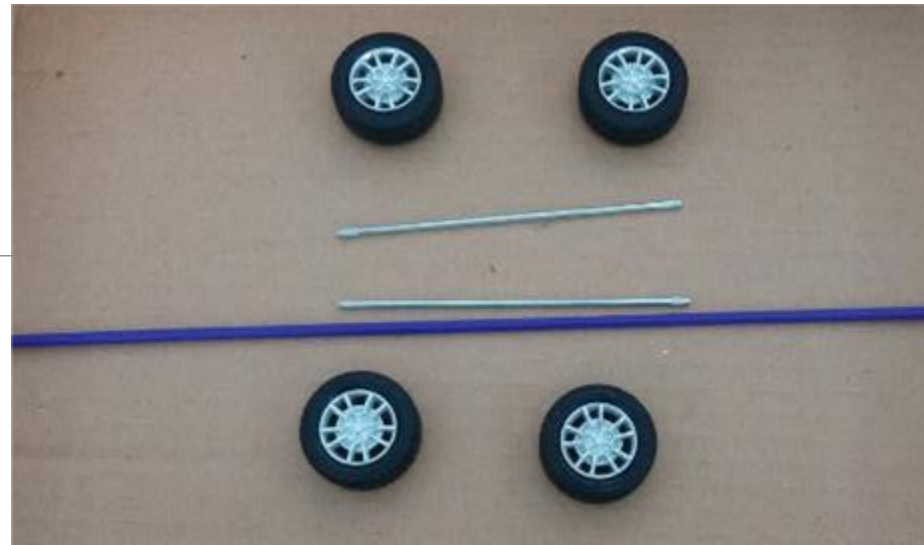
sticks



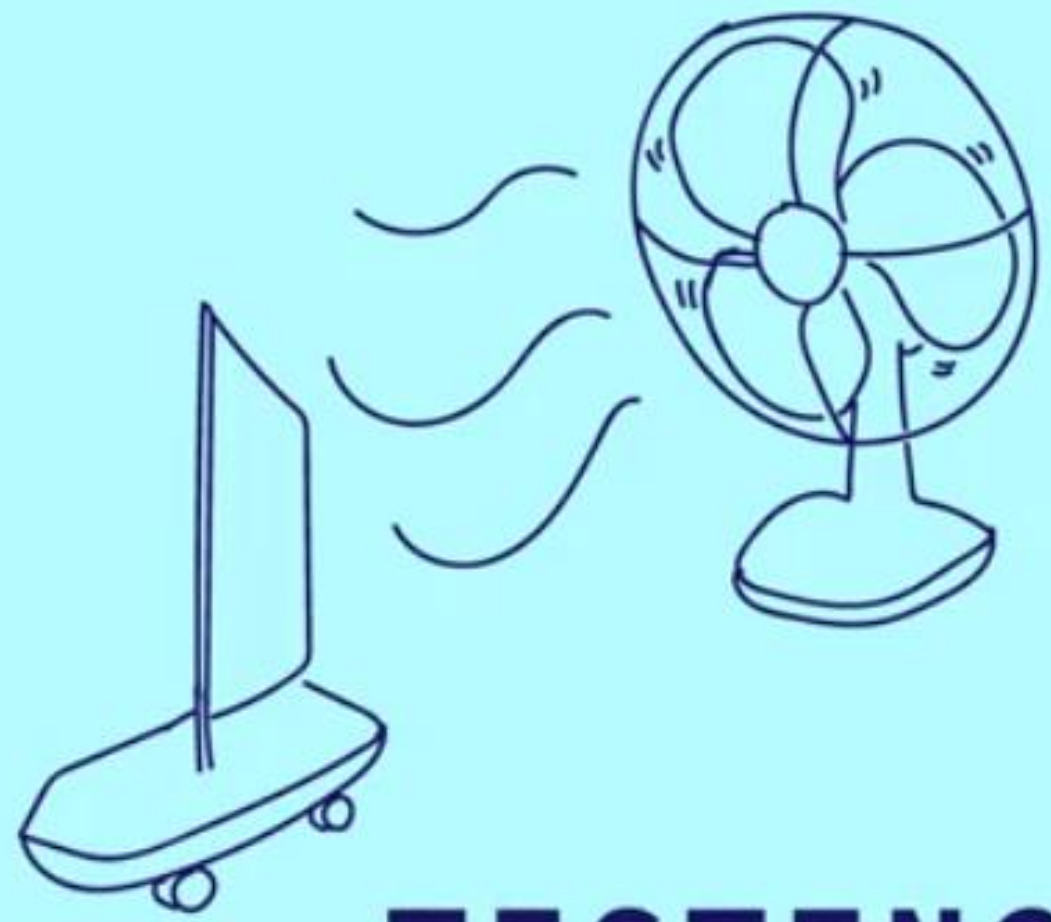
straw



PRODUCT



GAIN KNOWLEDGE



TESTING





Application of STEM principles in PE /Sailing

- Increase student knowledge and interest in PE
- Nurture creativity and innovation
- Enhance problem-solving skills
- Increase motivation
- Facilitate students to ask questions for development
- Ultimately enhance students' PE /Sailing skills!



How can make use such concepts in sprint training?
如何利用相關概念應用於短跑訓練中?



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以體育活動為中心
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提升體適能為要務」

