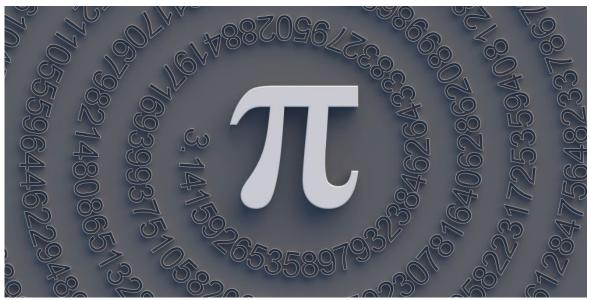
Let's Play with Math!

written by Hazrul | 29/05/2024

Did you know March 14^{th} (3/14) is celebrated as Pi Day? This date was chosen because π (pi), one of the most famous mathematical constants, can be rounded to 3.14. In recognition of this math element, the 40^{th} UNESCO General Conference declared March 14^{th} as International Mathematics Day in November 2019.



The pi symbol.

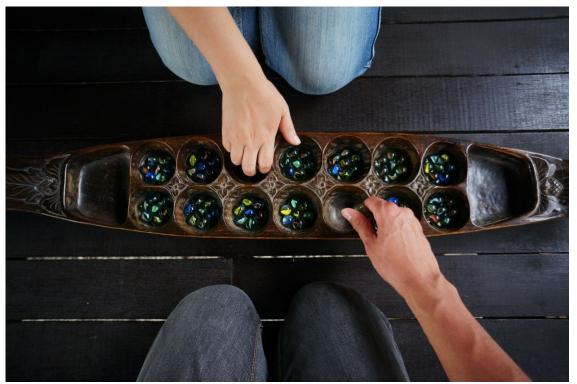
This year's theme is "Playing with Math." The theme is perfect because many students find mathematics intimidating, often seeing it as complex and formula-heavy. Students can engage more actively and enjoyably with the subject by incorporating play into math learning, both inside and outside the classroom. This approach is emphasised in many educational documents, including the Malaysian mathematics curriculum.

Playing with Math is an activity or experience that involves exploring, experimenting with, and interacting with mathematical concepts creatively and pleasantly. This usually consists of practical activities such as problem-solving, puzzles, games, or even informal research into mathematical ideas.

Contrary to conventional methods like lectures or workbooks, this approach promotes active involvement and knowledge of mathematical concepts by encouraging individuals to become more familiar with them. "Playing with Math" stimulates curiosity, critical thinking, and a positive attitude towards mathematics, making it more accessible and enjoyable for students of all ages. "Playing with Math" is a learning process, not focusing on the product. Mistakes made by students while playing are not to be judged but rather serve as important information for their improvement purposes. They play with mathematics, so they do not feel intimidated by math, thus dispelling the idea that it's a difficult subject.

Discovering the value of Pi can also be a playful adventure through game-based learning. Teachers and students can use manipulatives, applications, and software to explore Pi. With manipulatives, students can collaborate by cutting cards, measuring with rulers, and communicating. Using applications and software like GeoGebra, they can manipulate values to witness the magic of Pi first-hand.

Traditional Malaysian games, for example, are also involving mathematics. Among them, "Congkak" is the most famous. "Congkak" is a traditional Malay game played with a wooden board and rubber seeds. As players count the number of seeds in each hole, this game requires strategic thinking, calculation and basic arithmetics.



A game of congkak requires strategic thinking, calculation and basic arithmetics.

"<u>Batu Seremban</u>" is a game in which small objects, mostly rubber seeds, are thrown, and different stages of catches and throws occur. The game involves addition, subtraction and sometimes multiplication as players calculate their scores by assigning numerical values to their performing sequences.



Source

"Gasing" is a traditional game where players spin tops and compete to make them spin for the longest time. Physical principles (like momentum and balance, which can be understood by mathematics) are at the heart of this game.



Physical principles (like momentum and balance, which can be understood by mathematics) are at the heart of playing gasing.

"Sepak takraw" is a popular sport in Southeast Asia, including Malaysia. "Sepak takraw", where players kick a rattan ball over the net using various acrobatic movements, involves calculating angles, forces and precise trajectory.



Sepak takraw involves calculating angles, forces and precise trajectory.

The Kolam tradition, popular among Indian communities in Malaysia, beautifully introduces the

concept of ethnomathematics in Malaysia's diverse cultural landscape. These intricate designs blend artistic expression with mathematical principles, showcasing elaborate patterns, symmetrical features, and elements of number theory. This highlights the deep connection between this cultural tradition and mathematical concepts.



Kolam highlights the deep connection between this cultural tradition and mathematical concepts.

In Chinese culture, the game of <u>Go</u> can be a fun and engaging way to teach mathematics. Go offers a range of activities that can make learning math more enjoyable. By exploring Go's strategies, students grasp the underlying mathematical ideas. Regular practice makes it a familiar and exciting part of their learning routine. As they play, students uncover mathematical treasures, experimenting and learning from trial and error to improve their skills and achieve higher scores.



Playing go allows students to uncover mathematical treasures, experimenting and learning from trial and error to improve their skills and achieve higher scores.

In particular, in the area of Mathematics, game-based learning is supported by a variety of theories. According to <u>Piaget's theory of cognitive development</u>, children acquire knowledge through social interaction with the environment. This knowledge is gained during activities that explore the physical world through learning by playing. Piaget stressed the importance of play for children's cognitive and social development because it involves active participation and continuous interaction with the environment.

The sociocultural theory of Vygotsky describes how children develop their knowledge through social interaction by playing games with friends and being supported by adults. In addition to acquiring knowledge, children who play in groups or pairs can develop communication skills, personality, and core values. The game plays a fundamental role in developing strategies and a feeling of responsibility for all actions involving each participant's mental, emotional, or physical involvement. The game-based learning of mathematics is founded on Howard Gardner's theory of multiple intelligences. Taking into account students' different strengths in a classroom makes learning experiences more inclusive, interactive and easy to understand. These intelligences include linguistic, logical-mathematical, spatial, bodily-kinaesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligences. Therefore, taking into account students' different strengths in a class will make learning more inclusive, engaging and easy to comprehend.

Lastly, the International Day of Mathematics aims to show that mathematics has a key role in attaining the Sustainable Development Goals (SDGs) set up by the UN, such as quality education and reducing inequalities. "Learning with Math" is not only improving individual cognitive skills, it is also developing psychomotor and emotional abilities. In education, playing with mathematics is aligned with the <code>Falsafah Pendidikan Kebangsaan</code> (FPK), which aims to produce holistic individuals in terms of physical, emotional, spiritual, intellectual, and character aspects.

So, let's celebrate Pi Day by playing with math and making <u>learning</u> an exciting experience!

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