

30 Minute Lesson – PLAY TO LEARN

WARMUP – ROCK PAPER SCISSORS SIDE SPLITS GAME (5 minutes)



For the 3 hand-actions shown on the right: Rock beats Scissors, Scissors beats Paper and Paper beats Rock.

Everyone stands up with, if possible, some space around them.

Everyone plays against the teacher who, on each round, randomly signals scissors, paper or rock. Otherwise the teacher does not take part in the game.

In the Side-splits game winners stay still for that round, and losers step to one side with one foot. Players drop out when they lose their balance.



Follow-up: [5 and 7 action games](#). Learn to use contingency tables

MATHGO

This game is like Bingo but players do calculations to make the numbers and the winner is the first player to get 5 numbers in a line and to explain how the numbers were calculated. Each player makes their own gamecard by drawing a grid and choosing to write on their gamecard 25 numbers between 0 and 100, not repeating any numbers. They cannot change the numbers once they are written on their gamecard.

Each round the caller draws 2 cards at random from a bag containing 2 sets of cards numbered 1 to 10, replacing the first before drawing the second, and makes a note of the numbers so the winning card can be checked.

Players try to make some of the numbers on their card by combining the two numbers called using one of the operations $+$, $-$, \times or \div . If they succeed, they mark the numbers on their gamecard e.g. 5 and 10 make 15, 5, 50 and 2.

Young learners can play with one rather than four operations on a 4 by 4 grid aiming to make 4 in a line, or on a 5 by 5 board aiming to make 5 in a line, using addition to combine the numbers on the cards drawn.

Before you play again discuss these questions and encourage players to make a better choice of numbers to put on their cards.

QUESTIONS TO DISCUSS

1. On the grid, which squares have 3 or 4 lines through them and which have only two?
2. To make a good choice of numbers for a Mathgo gamecard, can you find how many ways each number from 1 to 100 is formed by combining two numbers using $+$, $-$, \times or \div ?
3. Which numbers is it impossible to make this way?
4. Are prime numbers a good choice or are some prime numbers a good choice and others a bad choice? Why or why not?
5. What is the best way to make your own gamecard that gives you the best chance of winning every time you play the game?

MATHGO				
Players choose 25 numbers to write on their gamecards.				
Pick 2 numbers each round.				
Combine the numbers by $+$, $-$, \times and \div . For example 8 and 4 give 12, 4, 32 and 2.				
Some numbers like 46 and 65 cannot occur.				

Numbers called	Results:			
	Sum	Difference	Product	Quotient
8 and 4	12	4	32	2
9 and 10	19	1	90	-

FOLLOW UP

See the collection of [AIMING HIGH games](#)

Rock Scissors Paper Game with 5 elements and with 7 elements. This leads to using 2-way tables and showing that the games are fair. <https://aiminghigh.aimssec.ac.za/rock-scissors-paper-game/>

Mathgo Learners should try to find the best numbers to put on their gamecards and the best arrangement of those numbers. Some learners could write computer code to find the frequencies of results arising as the combinations of two numbers. See the Notes for Teachers in <https://aiminghigh.aimssec.ac.za/mathgo/>

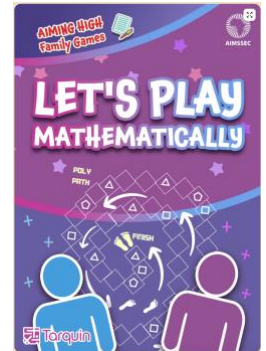
Holding Mathgo Game played with 3 sets of number cards. Players use combinations of 3 numbers to make numbers to write on their gamecards.

Teachers who adopt playful learning in their teaching repertoire find that their students' attitudes to mathematics change, their fear of the subject disappears, and they better remember number facts and understand mathematical methods and concepts.

See the AIMSSEC **Let's Play Mathematically** book with 36 collections of games including variations to suit different age groups and to help beginners to learn the rules and the skills involved.

<https://www.tarquingroup.com/products/aiming-high-lets-play-mathematically>

See also <https://aiminghigh.aimssec.ac.za/mathematical-games/>



Some are games of skill, others are games of pure chance so that the youngest players are not at a disadvantage, and some games involve a mix of luck and skill. There are novel variants and extensions of old favourites like Splits for the Rock-Scissors-Paper game with extensions that lead to thinking about cyclic sequences and probability, and to finding all possible outcomes of a sequence of events and recording them in two-way probability tables.

Games provide useful lesson starters that serve to introduce the learning objective for the lesson, to develop numeracy, to provide drill and practice and to develop important transferable skills. Many of the games suggested by AIMSSEC comprise a game-frame and a set of rules for play, within which the mathematical content can be varied. When the learners know the rules from earlier lessons, this has the advantage that a lesson starter game can serve its purpose and take no longer than five minutes.

The freely downloadable book, 'A Pedagogy of Play' (Ben Mardell et al. 2023) is the culmination of eight years of research involving educators around the world. It has been written with the objective that more children worldwide will have

“the experience of leading their own learning, exploring the unknown, and finding joy in school. Why? Because such playful learning can help students learn fundamental concepts and skills, as well as develop their abilities to collaborate, solve problems, and navigate uncertainty. Because using play as a strategy for learning — asking ‘What if?’ in order to explore, adapt, and create — is vital in addressing complex local and global issues.”

Like the authors of 'The Pedagogy of Play' we want our Let's Play series to support educators and others concerned with education, including parents, and to build cultures of playful learning in classrooms and schools, and also in homes.

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All AIMING HIGH and GTEN resources are created by unpaid volunteers and they are free. Please help AIMSSEC to improve the skills and life chances of disadvantaged children in developing countries through the empowerment of teachers with training, resources and support.

AIMSSEC is a not-for-profit organisation, dependent on volunteers and donations, motivated by the belief that the best hope for children to escape poverty, and have a better future, is a good education that gives them the skills that they will need to get good jobs and to thrive in every way in this rapidly changing world. In the belief that educational opportunities should be equal for all, AIMSSEC works with teachers in the most disadvantaged areas to empower them to improve education in their own communities.