40 Boardgames to teach Math, Chemistry, Biology and Physics in School

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**Type of tool:**
Activity

**Duration:**
30-60 min

**Topics addressed:**
Environment
Group dynamics
Participation

40 Boardgame system for grade 7-12 high-school students in Math, Chemistry, Biology and Physics as well as Social skills. To be used in classroom both for increasing efficiency of teaching, repetition as well as for raising interest in the subject.

**Aim:**

Improved quality of the learning process.
Improved student involvement and concentration during the class.
Increased motivation of students to acquire knowledge and skills.
Increased interactivity and dynamics in the classroom.
Raising retention rate
Increase of students interest for the given subject or science as such

**Methodology:**

“Big Games”. Duration: 30-40 minutes. Grade 6-9, possible use in high school grades 10-12. Contents - Key concepts in each subject
“Small Games”. Duration: 10-20 minutes. Grade 9-12. Contents - Teaching a specific topic in each subject
Each game is design for 4-6 players. Multiple games for one class run simultaneously.
Usage of games: 1)In the classroom - before introducing a new topic or As a summary to a topic or As a revision at the end of semester or As a tool to work in hobby groups at school 2)In different school events

**Step by step process:**

Each game has its own rules and materials

**Materials and resources:**

Mathematics: Geometric Pattern
“Geometric Patterns” is mathematics/geometry game that deepens understanding of different
geometric transformations: central symmetry, reflection, rotation, translation and dilation. Teams are given a picture card; they have to recognize and explain the depicted geometric transformation they see. Then they must recreate these transformations by using symbol cards they have. The first team who does that scores victory points. Key outcome is that students learn to discern and recognize geometric transformations as well as use them to create different geometric patterns. It can be used to introduce the subject before teaching geometric transformations or for review after teaching it. The game also develops creativity, teamwork and communication skills.

Mathematics: Mathrimino

“Mathrimino” is mathematics/algebra game that teaches various ways of interval notations, inequalities and number lines. During the turn, a player puts one of his „triminos“ on the board in which one of its sides would match with a side of „trimino“ already on the board. It is important that only intervals not the types of representation must be equal. That player who first gets rid of all of his “triminos” wins. Game increases student motivation to study intervals, raises their involvement, concentration and dynamics in the classroom. It can be best used for review, after teaching interval notations, inequalities and number lines.

Mathematics: Solve It

“Solve It” is mathematics/algebra/geometry game that deepens understanding of operations with rational numbers, adding of similar members, operations with powers and basic geometry concepts. Game format is dynamic quiz played with the whole class. Players individually or in teams have to respond to a variety of algebra and geometry questions and challenges and score points for correct answers. That player or team that scores the most points at the end wins. Teacher can use either the big set of all questions or play just separate algebra or geometry. Best use of this game is for review, after teaching operations with rational numbers, adding of similar members, operations with powers and basic geometry concepts.

Mathematics: Symmetrix

“Symmetrix” is mathematics/geometry game that helps students to form symmetrical figures on a board with a point of symmetry or symmetry lines. Players have to build symmetry using game pieces of different shapes. There are three different variations of the game: 1) Players build symmetry about any axis on the board. 2) Players build symmetry about any point on the board. 3) Players build symmetry both about an axis and a point. The first player who makes at least 4 cell figure, which is symmetric about the axis or a point, wins. Key outcomes are deepened understanding of symmetry and increased motivation to study symmetry. It can be used to introduce the subject before teaching symmetry or for review after teaching it.

Mathematics: Shepherd

“Shepherd” is mathematics game that explains the linear function, its position on the coordinate plane. It also teaches graphing and analyzing linear functions. Each player gets 5 dogs and 4 function graph cards. Players make their moves using different available function graph cards. They need to move dogs on the game board to herd sheep following 3 possible strategies (rectangle, triangle and straight line). When all the sheep are herded, players count victory points and determine the winner. The game also develops strategic thinking and communication skills. It can be used to introduce the subject before teaching linear functions or for review after teaching it.

Mathematics: ROOFER

“Roofer” is mathematics/geometry game that makes students calculate space for polygons and teaches geometric shapes: their types, qualities and joint arrangement. Players also learn to form different geometric shapes. At the beginning each player gets a stack of geometric shapes in his own color as well as 3 location cards. Everybody makes its move by playing one of the location cards and accordingly placing one of his shapes on the game board on one of 5 different areas. The task is to
create the biggest polygon possible in each area. After player places his shape he draws a new location card. The game is over when players run out of shapes. At the end players determine the winner by scoring victory points earned by biggest polygons in each area. It can be used to introduce the subject before teaching geometric shapes or for review after teaching it.

Chemistry: Lab Cabinet
„Lab Cabinet“ is a chemistry game, that deepens understanding of the names, formulas and appearance of common chemicals. Players become familiar with 6 main classifications of chemicals – metals, non-metals, acids, oxides, salts and bases as well as with hazard symbols of lab safety.

Chemistry: Mendeleyev’s Dream
“Mendeleyev’s Dream” is a chemistry game that helps players to increase familiarity of names, symbols and atomic numbers of common elements. It also helps to increase familiarity of the concepts of groups and periods on the Periodic table.

Chemistry: Chemical Compounds
„Chemical Compounds“ is a chemistry game that helps players to increase familiarity with ionic compounds – acids, bases and salts, reinforces the need to have charges balanced in an ionic compound and increases familiarity with ionic formulae.

Chemistry: Acids and their Salts
„Acids and their Salts“ is a chemistry game that helps students to increase familiarity of Acids and their derivative Salts. Players will learn the names of the main acids, formulae, acid residues, derivative salts and their names.

Biology: Bon Appetit
„Bon Appetit“ is a biology game, that deepens the understanding of plant and animal diversity as well as food chains in forest.

Biology: Bunny and a Pea
“Bunny and a Pea” is a biology game that helps students to understand the heredity processes of crossing over and genetic recombination as well as the meaning and interaction of dominant and recessive alleles.

Biology: Mammals vs Others
The object of this biology game is to get acquainted with and deepen understanding of Animal classification.

Biology: Organization of a Human Body
This is a biology game that teaches students to understand levels of organization in the human body.

Social Skills: School Life
“School Life” is a career choice game that shows why subjects studied at school are needed for future profession and adult life. Participants play two parallel lives at once - their present life at school and also an adult life 10-15 years from now. In order to choose a career path, you have to have attended several classes at school. In order to advance in your career you have to take more classes at school. The key outcome is an increase in motivation to study school subjects. This game also teaches tactical planning and strategic planning skills. It can be applied at any subject class or at carrier guidance events.

Social Skills: Hello My Friend
“Hello My Friend“ is a classroom teambuilding game where teambuilding effect is reached through
deeper knowledge and understanding of each other. All participants depart to their journeys on the board. On each move they get question cards they have to answer. There are 5 question groups – questions about players past experiences, present beliefs or preferences and future dreams as well as questions about their perceptions of other people and fun quiz challenges. By hearing answers to those questions players discover others from a different and sometimes surprisingly pleasant angle thus adding a new perspective to their relationship and providing teambuilding effect.

The key outcome is relationships with classmates. This game also teaches listening skills. It can be applied at any subject class or at school or class events.

Social Skills: TimeMentor Teens
„TimeMentor Teens“ teaches key principles of work/study life balance, personal efficiency and time management. Every player runs a virtual game life, they have to make choices in goals they set and tasks they do in order to increase their personal efficiency and achieve a well-balance life.

Social Skills: Start Your Business
„Start Your Business“ is a challenging strategic thinking board game where each participant starts up a retail chain company and competes with others. In real life that might be retail stores, restaurants, home business, service businesses etc. Players must develop and implement strategy, while managing limited resources and making prompt decisions.


Outcomes:

Increased students motivation
Increased interactivity and dynamics in the classroom

Evaluation:

We have implemented these tools in ALL (800+) schools in Latvia - printed games, delivered, trained teachers. Very good reaction.

Notes for further use:

I would like to deliver a WORKING WITH TOOLS workshop.
I am going to present this tool, not run it
60 minutes is ok. can be 90 as well.
these games have already been used before - in 800+ schools in Latvia - see above

Rating:

No votes yet

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