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Green – 2007 Demo

Yellow – 2008 Demo

Red – 2009 Gold

sport Games

## Physics: sports: Futball

*Objects: 2+ players, one ball, two goalposts*

*Objective: touch goalpost with ball more times than opponent or team  
Actions: Limited Kick and Throw*

*Ent/Edu Score: 10/3*

*Description:* A match will last 5 minutes. When a player enters the field, their force and angle settings for kick and throw are frozen. Thus to reset these setting you must leave the field. When there are enough people for teams (3+ players), each player can come in with a specific role and thus preset their kick and throw and not have to leave. Each side of the field has a rectangular goalpost; if a ball touches that, it’s a point to the opponent. You can run and kick the ball as much as you want to touch the goalpost and score points. If you hold the ball, you must immediately come to a stop. This is the only way to throw a ball, from stopping. The clock never stops and gameplay is continuous (scoring a goal doesn’t stop gameplay).

*Pedagogy:* This game uses both the kick and the throw actions in conjunction, something that no other game does. It allows players to conceptualize how games such as Futbol and Football have embedded in them the physics they are trying to learn. Because of its fast pace, this is not a good ground for pedagogical exploration but can be seen as a good ground to see physics in action. The player must leave to change their settings and this gives a small window of physics exposition where the player must think of which physical settings will best let it win. Different field conditions will also lead to discussion on friction. Realistic weather will lead to discussions of drag and wind on an object.

*Game Ideas:* This game should be just plain fun! While it will be hard to envision a way to directly teach during a game, the game itself will be a unifying action for the citizens and players of PAST. This game will be every bit what the world cup or the Olympics are to the world: unity through competition. It will be a generic amalgam of both futbol and football and will play more like ultimate Frisbee than either of the two. The use of magical equipment, spells, potions, and level abilities will spice up the game and should make for a very fun and unique online experience.

## Bowling

*Objects: 1+ players, one ball, ten boxes (pins)*

*Objective: knock over more boxes than opponent or team  
Actions: Full Kick*

*Ent/Edu Score: 7/5*

*Description:* Ten unstable boxes (pins) are lined up in consecutive rows of 4 3 2 and 1 pins. These pins are placed at the end of a long lane. The player kicks a ball towards the 1 pin in front and tries to un-stabilize (knock down) it and all other pins. If the ball touches the sides of the lane at any point before the pins, there is no score for that try. Two tries per frame, 10 frames per game. High score wins!

*Pedagogy:* The simple force setting on the kick allows the player to set their angle personally and focus on straight line trajectories and collision. The tracers and visible vectors will reinforce conceptual knowledge of kinematics (velocity, acceleration) and dynamics (Force and momentum). Because of the nature of a bowling, it naturally allows us to emphasize 1D motion.

*Game Ideas:* 1) Bowling can be done just as the game itself. It might not be bad to populate the world with such entertainment only games. Though pedagogy is never far behind for even physics spells like “attract” and “repel” will have use here as ways to un-physically (but still pedagogically sound) change a balls direction. 2) It can also be introduced into the narrative by making bowling a siege like event. It can be presented as a way to bring down castle walls or clear debris to rescue children from cave-ins. We can disguise the basic “throw object; hit object” premise behind many trappings (many of which come below) and can be put as part of the Quest Story. 3) It can also be introduced as another form of combat. Each guard or monster is a pin, a rectangular object stood up lengthwise. In order to incapacitate them, you have to knock them to the ground (not kill). Hence making them fall asleep (though mind spells) or knocking out their feet (through a kicked ball) would both be ways of resolving the conflict, one slightly more violent than the other.

## Air Bowling

*Objects: 1+ players, one ball, ten boxes (pins)*

*Objective: knock over more boxes than opponent or team  
Actions: Full Throw*

*Ent/Edu Score: 8/6*

*Description:* Same as in regular American style bowling but now pins are suspended up in the air on a platform. Instead of kicking, you must now throw the ball at the pins to knock them down.

*Pedagogy:* Same as in regular bowling but with the added “z” component. By elevating the pins but leaving all other game mechanics the same, we give a good way to use throw and engage in 2D and even 3D thinking.

*Game Ideas:* If done as part of a traditional game, each pin would represent a guard and this is a guard tower game: knock the guards over to get them to stop shooting at you! Say you go bowling against a 2 guard tower. All you have to do is knock them down (each is a stood up rectangular box) and they will stop protecting the box or themselves! Once the guards are out of commission, the same throw can be used to knock out the tower, perhaps Jenga style below. Larger towers could have upwards of ten guards and mount different defense. I’m not sure how well that could work but it would be a neat way of playing the same game but with a fantasy dressing.

## Archery

*Objects: 1+ players, one ball, one goalpost*

*Objective: accurately and precisely hit a target on or off the ground  
Actions: Full Throw*

*Ent/Edu Score: 8/6*

*Description*: Pull back, aim, release. The classic archer will send a volley of destruction yards away. In our world, the archer is replaced by the mages who can launch volleys just like his traditional counterpart. Whether an arrow carved of wood or one conjured from the astral plane, once in our world they (mostly) have true physical behavior.

*Pedagogy*: Classic 2D projectile motion. There are no better mappings between physics and games than this! An arrow’s trajectory can be emphasized using tracers or visible vectors. It can then be viewed from all manner of angles to expose key points like constancy of horizontal velocity and vertical acceleration. It is a natural virtual counterpart to the “projectile cannons” that are part of every physics lab in every school. This activity has always been a lynchpin of our project.

*Game Ideas*: Not too hard to imagine warfare applications. This is to be the classic static ground level target with no strings attached. One idea is to have a blind folded event: the player must be told where the target is (by words or numbers), then set his force and angle, and when he fires, he gets to see the result of his shot. Score is by accuracy, allows a competition style atmosphere and to me seems like a pedagogical event that will not be too disruptive.

## Billiards

*Objects: 1 or 2 players, one cue ball, 9 pool balls, six goalpost*

*Objective: get all pool balls into goalposts faster than opponent  
Actions: Full Kick*

*Ent/Edu Score: 7/9*

*Description*: 9 numbered colored pools balls are placed in a diamond formation and numerically organized on a large 2D flat table. Each corner of the table and two of Its four midsections have goalpost on them (where the pockets would be in real snookers). The player hits/throws/or kicks the cue ball (un-numbered white ball) towards the pool balls in an attempt to get a pool ball to touch a pre-designated goalpost. If it does, that ball is taken out of the game and the player whose turn it is gets a point. Alternating turns, each player can then try to hit the cue ball onto the pool balls onto the goalposts onto points.

*Pedagogy*: Like bowling but now with full 2D freedom. Now that we can move around the table and set any value of force and direction, we can examine more closely what momentum and collisions are all about as well as basic rebounds and bank shots give good trigonometry exposure. The use of pedagogical devices like the visible vectors and tracers will once again make a traditional game a powerful learning instrument (should the student-player want it)

*Game Ideas*: Like several other games, a straight adaptation of this game could prove valuable to the game world. Some schools may want to use the “lab” aspect of the environment exclusively and this game is a perfect candidate. In terms of narrative or story play, this is no different than bowling... it is still throw one object onto another. The only difference is in the direction of throw where in bowling we had no choice and in billiards we have plenty.

# Rope Games

## Tug-O-War Classic

*Objects: 1 players and 1+ players/mobs, rope*

*Objective: Pull on rope until other player crosses the ropes initial midpoint position.  
Actions: Hold, Pull*

*Ent/Edu Score: 8/8*

*Description*: The little sister of all MP games! ToW doesn’t have as much movement as FutBall but it does have the short burst of excitement as you gather your people to pull pull pull!

*Pedagogy*: Each side will be adding an opposite force. When the forces are made unequal, there is a net force and the rope center movers (alternatively: the players move). This is a baseline example of force equilibrium in one dimension. Fnet will determine what the ropes acceleration is and Fnet is determined by the players themselves.

*Game Ideas*: Simple ToW. Perhaps ToW can be made into a “Harry Potter” like linking of magics that push and pull their casters. The strength of the magical fight could be a direct analog to pushing and pulling. Perhaps the physical version will be exactly as the real thing with the magical version allowing to pull and push (an action that would have to be made meaningful in the game).

ADVANCED TOW: Same as above but with multiple endpoints at each end of rope. This will allow for many-on-many pulling in each direction. Good example of additive influence of many people and perhaps of propagation of errors.

## ToW Ring

*Objects: 1+ players and 1+ player/mob and 1+ player/mob, rope, ring*

*Objective: pull ring center closer to you while 2+ others try to do the same.  
Actions: Hold, Pull*

*Ent/Edu Score: 9/9*

*Description*: Imagine a floating ring. It’s facing is such that the sun makes a perfect ring shadow on the ground. Three people come up and attach ropes to it (or three magicians attach ley lines to it). Now all three try to pull it closer to them after a set amount of time. Alliances can be set up so that 2 against 1 occurs at less penalty and more rewards for all. The ring can also be seen holding object from falling off cliffs or as intricate triggers

*Pedagogy*: A direct copy of the physics experiment “Force table”. In that, a round table with angle markings has a rod at the center and several pulleys attached to its perimeter. The pulleys have free hanging weights on one end and are attached to the ring on the other. In the experiment, all three weights’ mass and angle must be calibrated for the ring to be perfectly centered.

*Game Ideas*: Alternatively, in the game it’s not about being perfectly centered but rather some competition where the ring is meant to go somewhere else, preferable to you! The game should be based on one fact: pulleys have no friction and magic doesn’t either. Thus in case of force imbalance, the ring will constantly move in that direction. The game’s outcome could be determined by end conditions (whose closest at end), points (most time of possession), or some other result (least energy spent)

# Misc Games

## Horse Races

*Objects: 1+ players, Horse, Betting Bot*

*Objective: correctly guess which horse will win the race based on given information  
Actions: Trade*

*Ent/Edu Score: 9/8*

*Description:*

*Pedagogy:* The Betting sheet will have several information about the horses. AT the lowest level, it will include which is faster. Very easy. Then it will include not which is faster, but which accelerates more. Also easy. At the next step, the betting sheet will include some with max velocity, others with starting acceleration... now you have to work out who will win. The returns are based on how little information you need from the Betting Bot (and thus presumably how much information you are processing as a player.

*Game Ideas:* The game is easily understood. You see the stats, you bet, and you get returns. The more difficult the guess, the larger the return. You could also use magic to alter a horses performance. Some houses may be magic free but in the ones that aren’t, if several people are betting on horse (say a convenient 4 to 8 horses per race) each will be doing their best to win the race. Ally with big shots and ride their luck and skill! Bet on a loser and cast a fast spell to make them win! Group play is hard to come by but we could envision a “pool” where lot’s of people pool their money for higher rewards. As well, perhaps with four people, each would only need to choose one variable to solve the

## Mass Buttons

*Objects: 1+ players, 10+ Differently Shaped Boxes*

*Objective: put the correct massive object on the correct platform  
Actions: Attract/Reject Spells, Drop*

*Ent/Edu Score: 5/8*

*Description*: Inspired by Indiana Jones and countless other movies, this is a typical pressure sensitive pad used for our purposes. It will be buttons to open doors, triggers on the floors, as well as other puzzle like combination. What they all have in common is that they require you to place (or remove) a force to activate. Hence stepping on one may or may not trigger it due to your weight. Think wisely of the task and the riddles presented before you and these buttons will be a piece of cake!

*Pedagogy*: Each button will ask for either a Mass or a Weight. This will be a simple way to reinforce the W=mg equation. Dynamically, equilibrium concepts can also be examined by requiring specific movement of the button instead of just a on/off setting.

*Game Ideas*: In gameplay principles, these buttons function as doors. They will obstruct progress in some direct (as in a huge button that blocks a door) or indirect (as in three small buttons that need to be pressed in sequence). Triggering them will always involve taking or putting mass on the button/platform. The leapfrog would put a nxn square array of buttons with the task of journeying from one end to the other. Each square has a weight rating which if exceeded, cause that button to be activated and you fall. The Key would be 5 buttons placed in a row next to a door. The key to open the door is to slide each of the buttons a certain way down until they match a map or a riddle. The riddle could be physics related since each button requires a certain mass setting to be correct.

## Elemental PUzzles

*Objects: 1+ players, 10+ Differently Shaped Boxes*

*Objective: put the correct massive object on the correct platform  
Actions: Attract/Reject Spells, Drop*

*Ent/Edu Score: 5/8*