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Game-Base Learning and Attention Deficit Hyperactivity Disorder

by

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A Project Paper
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Project Abstract

Attention deficit hyperactivity disorder is one of the most commonly diagnosed learning disorders among children. Students with ADHD struggle to pay attention and control their impulses in class. This behavior often provokes frustration in teachers and leads to serious academic problems. Students with ADHD are significantly more likely than their peers to be placed in lower-level classes and drop out of high school. Current research shows that students with ADHD respond well to game-based learning activities. Further research must be conducted to determine which games yield the best academic results. In response to this information, I created a website with instructions for several learning games that teachers can use in their classrooms to motivate their students with ADHD.

Keywords: Attention Deficit Hyperactivity Disorder, ADHD, game-based learning, learning games, engagement, motivation

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Chapter 1: Introduction

Background

Approximately 5.3% of children and adolescents around the world have attention deficit hyperactivity disorder (Polanczyk, de Lima, Horta, Biederman, & Rohde, 2007). Common symptoms of ADHD include "poor sustained attention, impulsiveness, and hyperactivity" (Barkley, 1997, p. 65). The resulting behaviors can often be disruptive in academic settings. When faced with these behaviors, many teachers respond negatively to their students with ADHD. A 2002 survey found that "general education elementary school teachers rated students with ADHD as significantly more stressful to teach than their classmates without ADHD" (Greene, Katzenstein, Park, & Goring, p. 79). While teachers might be quick to dismiss their inattentive students as daydreamers, Hartmann (2003) suggests that students whose attention strays might just be bored with dull classroom activities. If more teachers bothered to consider their students' behavior outside of class, they might be surprised by their ability to maintain focus (under the right circumstances). Zentall (1993) points out that "most students with ADHD would not be considered deficient in attention in response to games" (p. 150).

It is a common story: The same child who cannot stay at his desk for more than fifteen minutes at a time is perfectly happy to spend six hours at home mastering his favorite video game. The real problem might not be an attention deficit, but a lack of engagement. Students with ADHD are perfectly capable of concentrating for long periods of time on content that interests them. The task for teachers is to figure out how to make the process of mastering academic content as interesting as playing games. The solution is surprisingly simple: teachers need to incorporate games into the learning process.

Purpose

Current research does very little to tell teachers how to incorporate learning games into their lessons. The purpose of this project is to develop a website where teachers can go for information about different learning games. The following question will guide my research: Do learning games help to motivate students with ADHD? Ultimately, I want to develop a set of game-based learning activities that middle school teachers can easily incorporate into their lessons.

Literature Preview

If they are lucky, students with ADHD develop coping mechanisms that help them to succeed in traditional academic settings. But, too often, the onus is on the student, when it should be on the teacher. A 2010 study of nine successful college students with ADHD cited effective instructional methods as one of the most important contributing factors to success (Heiney). Several students in the study also indicated that they learned more in classrooms where they were able to interact with their peers. In fact, research shows that peer interaction can improve academic results for both students with and without ADHD. A 1997 study by Tomlinson, Moon, & Callahan found that the use of cooperative learning activities in middle school classrooms increased student understanding, kept students on task for longer periods of time, and helped them retain information in the long-term. The most effective collaborative learning activities are those that are specifically designed for multiple participants. One way to accomplish this is to assign specific roles to different students. But, in order for these roles to effectively engage all participants, they must be of equal importance (Cohen & Lotan, 1995).

Perhaps the most exciting and engaging collaborative activities are those where the roles can emerge naturally, and all students are motivated to participate by interest, rather than force.

The element of competition present in many learning games is one feature that serves to motivate students (Gee, 2003). A 2008 study by Geurts et al. found that students with ADHD who believed they were engaged in a game-based learning activity "were capable of implementing more adequate cognitive control" (p. 853). Despite being aware that there would be no reward for correct answers, students were still motivated by the idea of competition. Teachers can use these types of learning games to increase motivation among their students.

Methodology Preview

The task of developing a set of game-based learning activities that teachers can easily incorporate into their lessons will involve several steps. I will begin this process by reviewing the Common Core Standards. I plan to focus my research on the content standards for grades 6-8. Then, I will review different types of games to identify common game elements. After this, I will review and evaluate various types of learning games. In addition to being educational, it is important that these games also be engaging. In order to ensure that the games I choose for this project are engaging, I will check to make sure they possess some of the common elements of popular recreational games. Finally, I will import this information into a website.

Significance

This project will provide teachers with an easy-to-access database of learning games that they can incorporate into their lessons. These learning games will increase engagement among students with ADHD and reduce behavioral problems. This will lead to improved academic and social experiences for students with ADHD.

Summary

Many students with ADHD struggle to succeed in school. Their teachers, who very often have little training in behavior management, tend to fall back on a rigid system of rules, rewards,

and consequences. The rules for behavior are the same for most classrooms, across grade levels. *Stay in your seat. Raise your hand if you want to be called on to speak. Take turns.* These types of rules are simple enough for typical students, but following them can be painful for students with ADHD. Consequently, students with ADHD are much more likely than their peers to be punished and, as such, have negative perceptions about school. Increasing the use of learning games in classrooms will likely improve the educational experience for all students and reduce behavioral problems for those with ADHD. In creating a website about effective learning games, I hope to provide teachers with a tool that will help them increase engagement in their classrooms—especially among their students with ADHD.

Definitions of Terms

Affective Impact. The student's emotional reactions (Annetta, Minogue, Holmes, & Cheng, 2009).

Attention Deficit Hyperactivity Disorder (ADHD). Symptoms of ADHD include "difficulty concentrating, poor attention to detail, difficulty completing tasks and forgetfulness. Hyperactive/Impulsive symptoms include significant motor agitation, difficulty awaiting turns and excessive talking" (Heiney, 2010, p. 2).

Cognition refers to the "processes of knowing, including attending, remembering, and reasoning; also the content of the processes, such as concepts and memories." (Gerrig & Zimbardo, 2002). Cognitive control refers to the ability of students to control these processes while impact refers to the effect of external factors on these processes.

Game-Based Learning. The practice of using games to achieve educational objectives (Papastergiou, 2009).

Motivation refers to “the process of starting, directing, and maintaining physical and psychological activities; includes mechanisms involved in preferences for one activity over another and the vigor and persistence of responses” (Gerrig & Zimbardo, 2002).

Simulation Games. Games that employ the use of “simulated environments for teaching and learning” (Ruben, 1999, p. 498). Simulation games might also be referred to as “experience-based or experiential” instruction (Ruben, 1999, p. 498).

Chapter 2: Literature Review

The fact that children with ADHD often struggle to succeed in traditional academic settings is widely known. In recent years, more research has been devoted to understanding the disorder and identifying effective classroom interventions for students with ADHD. One of these interventions involves using learning games in the classroom to promote engagement. This literature review will examine the existing literature about ADHD and prove the benefits of game-based learning for students with ADHD.

ADHD and its Effects on Academics

According to the American Academy of Pediatrics (2004), ADHD consists of both Inattentive and Hyperactive/Impulsive symptoms (Heiney, 2010). Inattentive symptoms may include "difficulty concentrating, poor attention to detail, difficulty completing tasks and forgetfulness. Hyperactive/Impulsive symptoms include significant motor agitation, difficulty awaiting turns and excessive talking" (Heiney, 2010, p. 2). While these deficits are identified (and often treated) as behavioral issues, the effects on academics can be devastating. The skills that students with ADHD struggle with the most are the skills most valued in traditional educational settings. In school, students are expected to concentrate for long periods of time, examine their work to eliminate errors, stay quiet while others are talking, and take turns with other students. For students with ADHD, following these rules can be extremely difficult. In addition to the effects on academics, the attributes of ADHD have also been known to negatively affect peer relationships (Johnson & Rosen, 2000).

While some of the symptoms seem to lessen with age, maintaining focus in academic settings remains difficult for teenagers and adults with ADHD. A 2011 study of 326 male students with ADHD and 213 male students without ADHD revealed some disturbing trends

(Kent et al.). High school students with ADHD were more likely than their peers to be placed in lower-level classes, have low grade point averages, and fail their classes (Kent et al., 2011). They were also, “significantly more likely to be absent or tardy during the academic year, and they were over eight times more likely than adolescents without ADHD to drop out of high school" (Kent et al., 2011, p.451). Students with ADHD also struggle with written expression—a task that often requires a great deal of focus (Jacobson & Reid, 2001). Adults with ADHD who are fortunate enough to attend college continue to face challenges. Many enter college lacking fundamental academic skills as a result of their negative experiences in high school. Furthermore, the behavioral traits that made high school so difficult still exist. Despite these problems, some students are able to succeed in college.

In order to identify what characteristics contribute to the success of college students with ADHD, Heiney (2010) interviewed “nine current successful college students with ADHD” and analyzed the data using narrative analysis (p.ii). Heiney found two key characteristics of environments conducive to success: 1) “support within the academic environment and 2) effective teaching methods for students who learn differently” (2010, p.ii). While the students in the study acknowledged that lectures are an inevitable element of the college experience, they expressed appreciation for teachers who tried to incorporate other methods. Heiney (2010) reported that among the most important factors in a supportive environment was the opportunity to interact with other students. He wrote:

> Several participants cited an interactive environment as key to effective learning. Interactive teaching included doing activities in class that applied the concepts taught and using small group work where students taught each other. One major component of an interactive learning environment was class discussion. Participants discussed how this

> helped keep them focused, as they were active participants in the class. In addition to helping with focus, some participants stated that being able to talk actually helped them process the information better. (p. 93)

The students also valued teachers who were understanding of their difficulties and willing to work with them. But the implications of this study are not limited to higher education. Teachers of younger students might also benefit from treating their students with ADHD as partners—a strategy rarely employed in traditional schools. Unfortunately, the element of collaboration is often absent from elementary, middle, and high school classrooms. Students with ADHD are labeled as disruptive and interventions tend to focus more on the student's behavior than the classroom environment.

Teacher Attitudes towards Their Students with ADHD

At any level, and in any academic institution, teachers' attitudes toward their students are likely to influence how they relate to them. In order to glean more information about the attitudes of teachers toward their students with ADHD, Anderson et al. (2012) looked at 127 teachers and 327 education students. Of the teachers-in-training, some had classroom experience and some did not. Both the student teachers with classroom experience and the veteran teachers expressed some degree of frustration with their students with ADHD. The authors found that working teachers were more likely to have negative attitudes about teaching students with ADHD than education students without experience. However, working teachers had more positive attitudes about students with ADHD than did education students with previous classroom experience. The data suggest that teachers tend to look more positively at students with ADHD until they have more direct experience with them. Student teachers seem to enter the educational arena free from negative attitudes about ADHD. However, they are released into

classrooms with limited knowledge about successful strategies for teaching students with ADHD. Not surprisingly, they become frustrated. While the authors stop short of recommending specific instructional strategies, they paint a clear picture of the gaps that exist in instructors' knowledge regarding interventions for students with ADHD.

Research by Green et al. further explains this phenomenon. This 2002 study revealed that elementary school teachers in general education classrooms believed that their students with ADHD were much more stressful to teach than those without the disorder (Green et al.). These findings do not bode well for students with ADHD. After all, it is unlikely that any teacher would look forward to teaching a child who they have identified as being stressful. That ADHD has no physical manifestations might contribute to these attitudes. A 2001 study by Cook found that teachers were more likely to have negative feelings about students with hidden disabilities, than those with noticeable physical abnormalities. While teachers might still be aware of an ADHD diagnosis, the absence of physical abnormalities might make them less tolerant of abnormal or disruptive behavior.

The Benefits of Game-Based Learning

One instructional strategy that has been proven effective in motivating students with ADHD is game-based learning. In 2008, Geurts et al. examined the effects of competition and social motivation on 77 boys—22 with ADHD, 22 with Autism Spectrum Disorder, and 33 who were typically developing. The authors (2008) discovered the following:

> When children with ADHD believed they were playing a game against other children, they were capable of implementing more adequate cognitive control in an interference control task, at least when the accuracy of performance was considered. Although children with ADHD still needed more time to accomplish the task, they achieved the

> same level of accuracy as TD children. To obtain this effect, the children were told only that they were participating in a competition and they were well aware that they could not win anything tangible. (p. 853).

The use of game-based learning could be particularly useful in motivating students with both Inattentive and Hyperactive/Impulsive symptoms (Carlson, Booth, Shin, & Canu, 2002). In keeping with this belief, Volkow (2011) recommended "the use of intrinsically interesting activities" to motivate students with ADHD (p. 1151).

Game-based learning seems to lend itself more to memorization, than critical thinking. In school, students must memorize certain historical facts, mathematical formulas, and vocabulary words in every content area. In 2008, Brasch, Williams, & McLaughlin found success using flashcards to teach multiplication tables to two high school students with ADHD. Teachers sometimes employ Jeopardy-type trivia games to review content covered in previous classes. This type of structure is especially useful in today's large classrooms, where students can be divided into teams. Ideally, familiarity with these terms comes through conceptual knowledge, rather than memorization.

But, while rote memorization will always be an inevitable part of education, the focus—especially in middle and high school—seems to be shifting more toward critical thinking skills. The new common core standards heavily emphasize these skills. While some might argue that critical thinking and games are incompatible, researchers disagree. Ebner & Holzinger (2007) contend that, "games include many characteristics of problem solving, i.e. an unknown outcome, multiple paths to a goal, construction of a problem context, collaboration in the case of multiple players etc., and they add the elements of competition and chance" (p. 875). But, the task of developing games to reinforce critical thinking skills is decidedly more complicated than

preparing questions and answers for a game of Jeopardy. Critical thinking is difficult to teach and, unfortunately, it is not inherent in many school activities. Adding to this problem is the idea that it is easier to test knowledge of facts than skills—at least on a standard scale.

Because it is difficult to find a formula for critical thinking games that fits multiple subjects, these games require much more planning. Killi (2007) found "that authenticity, collaboration and learning by doing were found to be the most important characteristics of effective educational games" (394). Some teachers incorporate these features into simulation games in order to reinforce critical thinking skills. Simulation games, in addition to being entertaining, provide students with a context for learning—an element often missing from traditional lessons. Simulation games challenge students to assume a role in order to learn. While research into the success of simulation games is limited, existing studies have yielded promising results. One study tested the effectiveness of game-based learning in an online simulation game with college students in a Civil Engineering class. The study found that "playing the game leads – at least – to an equal learning result as with the traditional method" (Ebner & Holzinger, 2007, p. 885). The study also found "a positive effect caused by Game Based Learning because the learners enjoyed playing the game during their learning process and achieve at least an equal result" (Ebner & Holzinger, 2007, p. 886). While these results do not imply that game-based learning is academically superior to traditional instructional methods, they do justify the use of games as a legitimate instructional strategy.

The challenge lies in creating games that are both educational and engaging. Students must be motivated to play a game in order to learn from it. In 2009, Howard-Jones & Demetriou found that motivation increases when the element of uncertainty is added to a game. The authors examined the effects of an educational game on "50 pupils (mean age 11 years 3 months 24 days,

27 males 23 females) from a primary school in Cyprus" (Howard-Jones & Demetriou, 2009, p. 521). The directions for the game were as follows:

> Participants were asked to play a purpose-built computer quiz game in which they must answer whether a particular mathematical statement (e.g. 13 9 42 = 564) was true or false. However, before seeing each statement, they were asked to choose whether to receive it from Mr. Certain or Mr. Uncertain. Both would provide the same questions but, if a participant answered correctly, he/she would receive one point from Mr. Certain and either zero points or two points from Mr. Uncertain, depending on the toss of an animated coin. (p. 521).

A majority of students chose to receive their reward from Mr. Uncertain. The authors probed the participants to attain a greater understanding of their motives. When asked if occasionally receiving zero points for providing a correct answer made him want to quit the game, one student insisted, "No…no…It made me want to try my luck with Mr. Uncertain even more." (Howard-Jones & Demetriou, 2009, p. 523).

It is important to emphasize that the element of uncertainty that motivated the students in this study had nothing to do with their knowledge or academic ability. In other words, students were not frustrated by feelings of inadequacy. Frustration was a continuous element throughout the game. However, the students were frustrated by the structure of the game, rather than by their difficulty with the material. The fact that students were given a choice also made the game seem fair. Since students made a decision to gamble with Mr. Uncertain, they could not complain of unfairness if they received no points for the correct answer.

Teachers must also consider the issue of timing. Students process material differently, and at different speeds. Competitive games run the risk of penalizing students who process

information more slowly. If students find that they can seldom produce a correct answer before their peers, they are likely to lose interest in the game. In the previous study, students were told that they were competing against another player. However, they were actually playing against a computer, at their own pace. Consequently, they did not need to rush.

Some teachers have also experimented with using educational video games in their classrooms. In 2009, Annetta, Minogue, Holmes, & Cheng, "evaluated a teacher created video game on genetics in terms of its affective and cognitive impact on student users" (p. 75). The students who learned about genetics through the video game did not demonstrate a greater understanding of the material than did students who learned through traditional methods. They did, however, remain much more engaged. This suggests that there is no solid academic justification for game-based learning. However, better attitudes lead to fewer behavioral problems. Zentall (1993) found that students with ADHD show improved behavior while engaged in games. Students who are engaged in the learning process are much more likely to hold a positive attitude about learning and school in general.

Parent Attitudes about Game-Based Learning

Despite mounting evidence supporting the effectiveness of game-based learning, many parents remain skeptical. In 2011, Bourgonjon, Valcke, Soetaert, de Wever, & Schellens found, "that parents express rather negative beliefs about video games and are reluctant when it comes to using video gaming in educational settings" (p. 1440). Often, these negative perceptions are not based on solid examples of game-based learning, but on a general feeling about the negative effects of video games. Indeed, some of the most popular videogames among young people are characterized by their violent nature. Despite this negative view, parents remain open to the idea of game-based learning (Bourgonjon et al, 2011). The authors emphasize the potential benefits

of educating parents about the effectiveness of game-based learning and even suggest inviting parents to play some of these games.

Summary

The existing literature is rich with examples of how game-based can increase classroom engagement. However, further research is needed to explain the types of games that will yield the best academic results. In order to convince parents, and others, of the value of game-based learning, a stronger connection must be made between games and learning. Current studies into the effectiveness of game-based learning show no particular educational advantage over traditional methods. However, students seem much more engaged when participating in game-based learning. Further research should determine what types of games best can facilitate learning and what elements of games serve to motivate students the most.

Chapter 3: Methodology

Numerous studies have proven the effectiveness of game-based learning for students with ADHD. Two elements of learning games that motivate students are competition and uncertainty. Further research is needed to identify other elements that motivate students to learn and how those features can be incorporated into different learning games.

Design

The purpose of this project was to develop a website where teachers could access directions to games that they could use to teach content standards. I also wanted teachers to be able to import the directions for the games into a lesson plan template. Before beginning this process, I reviewed the applicable Common Core Standards and identified some common elements of good games. I then researched and evaluated various types of learning games. After this, I cross-referenced the games with several standards to verify that they would be appropriate.

Procedures

I began this process by reviewing the Common Core Standards. I planned to focus my research on the content standards for math and English language arts for grades 6-8. Through this research, I hoped to develop a comprehensive database of effective learning games that could be accessed by all middle school teachers. After looking over the standards for my grade levels, I examined the features of different types of games to identify common game elements. This was an essential step in ensuring that the learning activities I included were truly games. In addition to being educational, it was important that they also be engaging. After reviewing some popular games, I identified the following key elements:

- Competition
- Risk

- Strategy
- Random outcomes (e.g. dice, chance cards, etc.)
- Multiple choices with multiple outcomes
- Token rewards
- Prescribed moves and structure

While it was not necessary for the games that I included to contain all of these elements, I wanted at least one to be present in every game.

After familiarizing myself with these game elements, I reviewed and evaluated several types of learning games. I located most of these games in teacher message boards and other informational websites. I also included games that I have either used or seen other teachers use. In order to ensure clarity and ease of use, I rewrote all of the game descriptions, and broke the instructions down into easy steps. I also modified some of the actual games in order to ensure that they conformed to my standards for effective game elements. After reviewing and rewriting the games, I identified specific skills from the standards that these games would reinforce.

My ultimate goal was to create a website that could be easily accessible. I wanted teachers to be able to import directions for the games directly into a lesson template. I knew that my ability to do this would depend largely on the types of web services available to people with limited computer knowledge. I was also looking for a service that would be relatively inexpensive—ideally free—to develop and maintain. Fortunately, I was able to develop a free website through Google Sites. In addition to being free, it offered all of the necessary features to make a site that was both clear and practical.

Summary

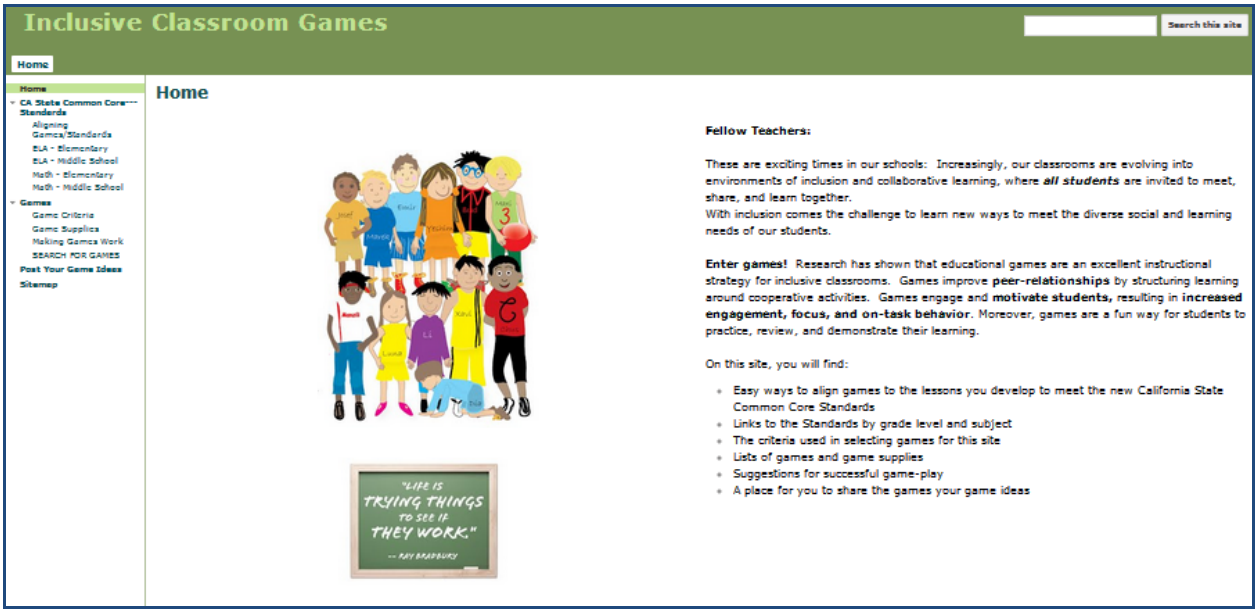
Through my research, I hoped to determine whether educational games could be used to improve engagement among students with ADHD. After confirming this, I wanted to identify some fundamental characteristics of engaging games and compile a list of learning games that conformed to these criteria. Once I had a list of effective learning games, I cross-referenced these games with the Common Core Standards for middle school to ensure that they would be useful. Finally, I imported this information into my website.

Chapter 4: Website Contents

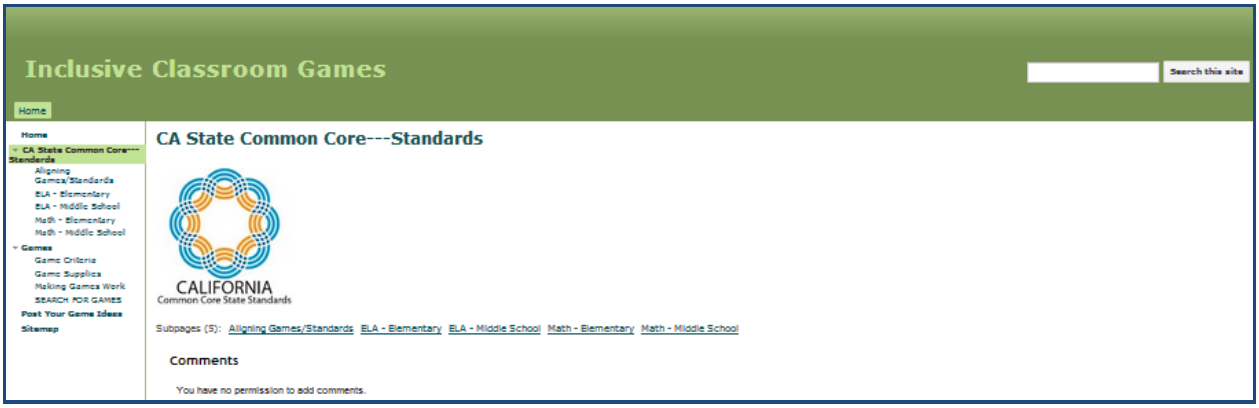
Attention deficit hyperactivity disorder is one of the most common disorders among children. Current research shows that students with ADHD can be motivated to learn by game-based learning activities (Geurts et al, 2008). My website contains information about several games that teachers can use to teach and review the Common Core Standards. In providing teachers with an easily-accessible resource for classroom games, I hope to encourage the use of game-based learning and improve academic experiences for students with ADHD.

Website Address: https://sites.google.com/site/inclusiveclassroomgames/

Home: This page provides teachers with an introduction to the site. It encourages the use of learning games and lets viewers know what they can expect to find in the site.

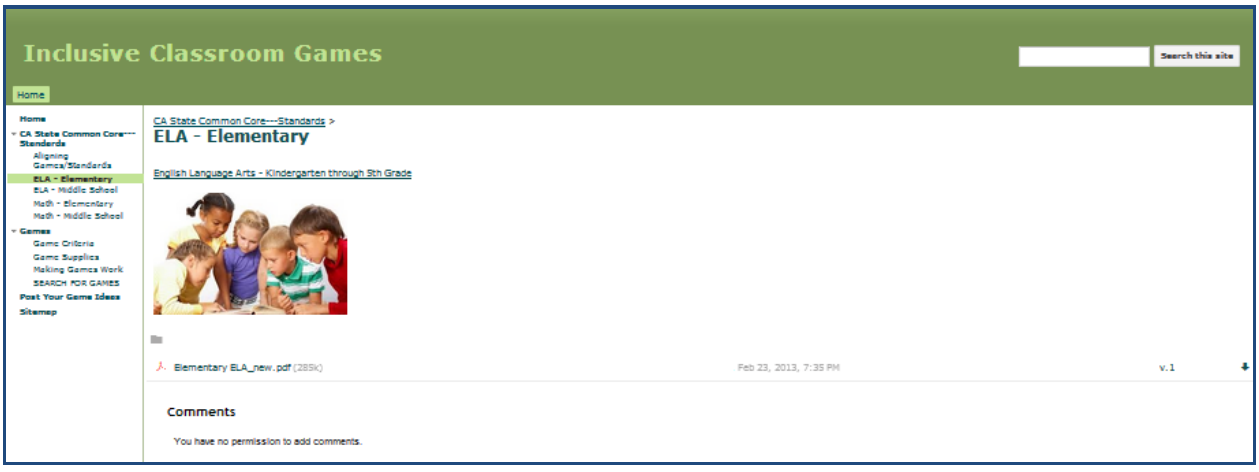


CA State Common Core Standards: This page contains links to the content standards for middle and elementary school. It also contains a link to instructions on aligning games with standards.

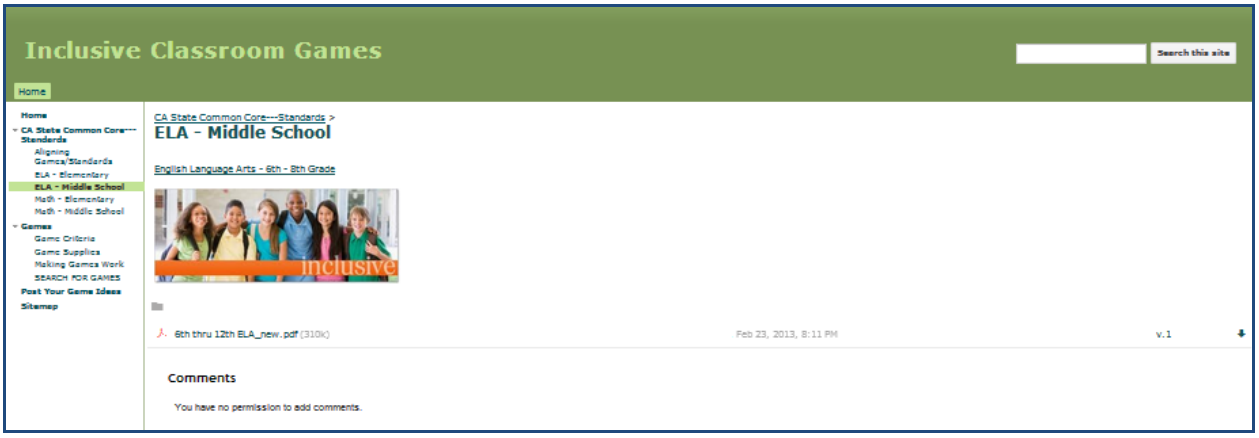


Aligning Games/Standards: This page contains information about aligning games with standards. Teachers should use the documents on this page to guide their planning.

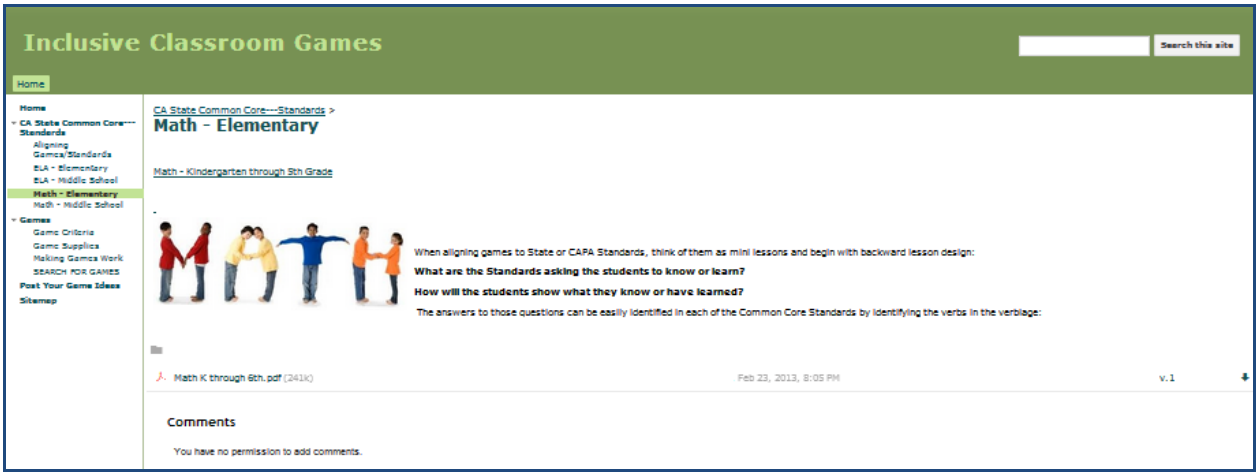
ELA—Elementary: This page contains a link to the English language arts content standards for elementary school. From this page, teachers can view and print a PDF version of these standards.



ELA—Middle School: This page contains a link to the English language arts content standards for middle school. From this page, teachers can view and print a PDF version of these standards.



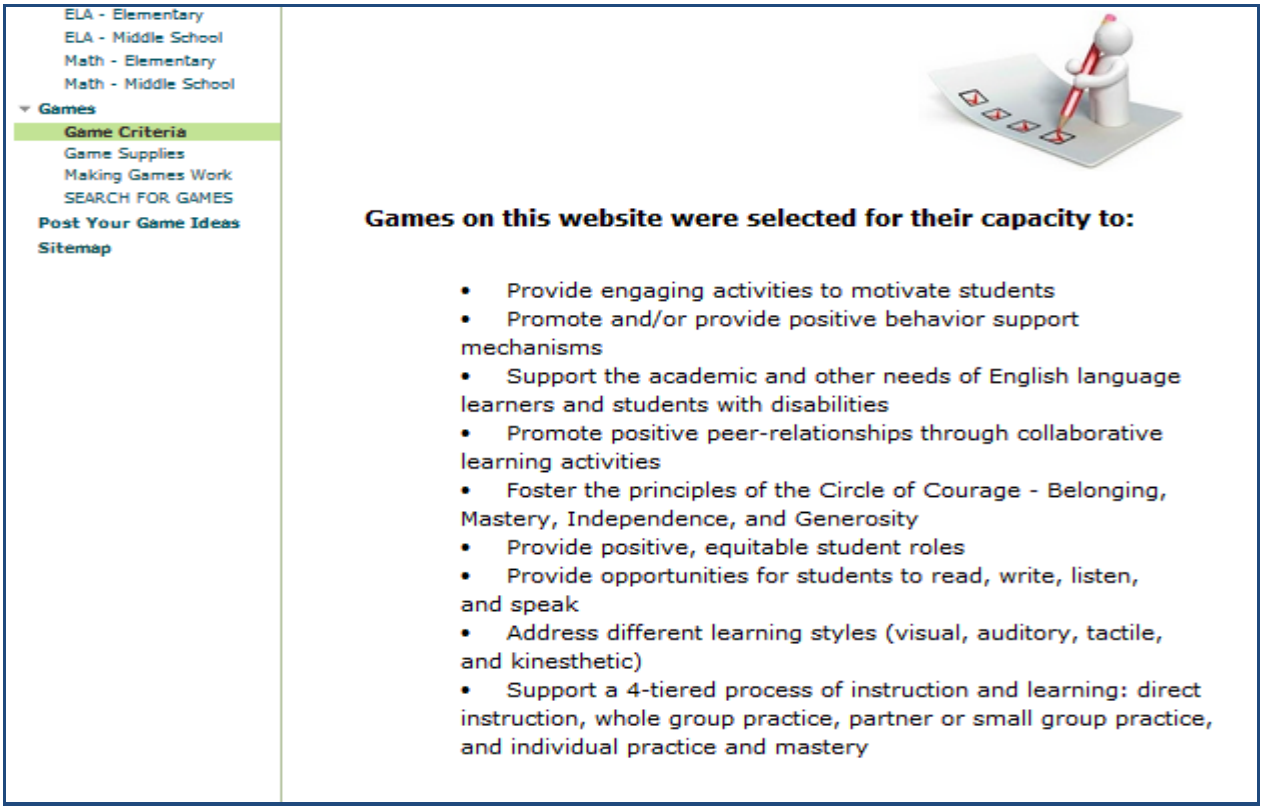
Math—Elementary: This page contains a link to the math content standards for elementary school. From this page, teachers can view and print a PDF version of these standards.



Math—Middle School: This page contains a link to the math content standards for middle school. From this page, teachers can view and print a PDF version of these standards.

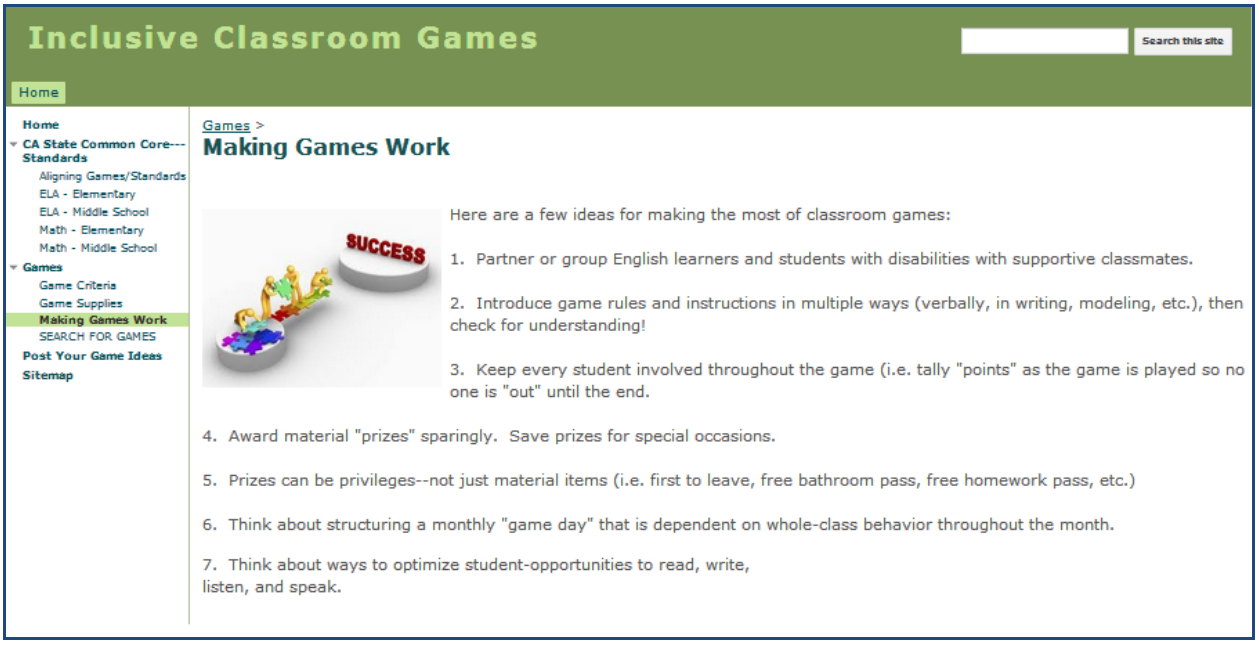
Games: This page contains links to the following four sections of the website: Game Criteria, Game Supplies, Making Games Work, and SEARCH FOR GAMES.

Game Criteria: This page contains information about the criteria that were used to select learning games for this site.



Game Supplies: This page contains links to several game supplies that teachers may want to use.

Making Games Work: This page provides teachers with tips for using games effectively in their classrooms.



SEARCH FOR GAMES: This page contains a list of all of the games that have been uploaded. Below the screenshot, I have pasted all of the middle school games that are in this part of the website.

Middle School Games: These are learning games that can be used in middle school classrooms.

Game	Subject(s)	Grade(s)	Configuration(s)	Purpose	Summary
Academic Baseball	Any	6th-8th	Whole Class	Practice, Review, Assessment	Trivia game with a baseball theme.
Chalkboard	Math	6th-8th	Whole Class	Practice, Review, Assessment	Problem-solving game played in teams.
Detective	Any	6th-8th	Whole Class	New Learning	Good game for introducing new material.
Flashcards	Any	6th-8th	Small Groups	Practice, Review, Assessment	Good game that empowers students to generate their own questions.
Get Out of Here	Any	6th-8th	Whole Class	Practice, Review, Assessment	Students answer questions as a "ticket out the door."
Graffiti Review	Any	6th-8th	Whole class	Review, Assessment	Brainstorming game that forces students to get up and move around the classroom.
In-n-Out	Any	6th-8th	Whole Class	New Learning, Review	Good discussion activity for activating prior knowledge and reviewing material.

Jeopardy	Any	6th-8th	Whole Class	Practice, Review, Assessment	Fact recall game based on the classic trivia show.
King or Queen of (fill in the blank)	Any	6th-8th	Whole Class	Review	Simple review game that gets students out of their seats.
Multiplication Bingo	Math	6th-8th	Whole Class	New Learning, Practice, Review, Assessment	Students practice multiplication facts through a game of bingo.
1 vs. 30 (or whatever the class size is)	Any	6th-8th	Whole Class	Practice, Review, Assessment	Multiple choice-based game where one student tries to beat the whole class.
Persuasion	Any	6th-8th	Whole Class	New Learning, Practice, Review, Assessment	Students debate and discuss controversial issues.
Place Your Bets	Any	6th-8th	Whole Class	Practice, Review	Versatile review game that incorporates gambling.
Power-Write	Writing	6th-8th	Whole Class	New Learning, Activating Prior Knowledge	Good game for activating prior knowledge before introducing a new topic.
Say and Switch	Any	6th-8th	Whole Class	Review	Excellent group review game for auditory learners.
Scavenger Hunt	Any	6th-8th	Partners, Small Groups	New Learning,	Fact finding game using

				Review	multiple resources.
Silent Speed Ball	Any	6th-8th	Whole Class	Practice, Review, Assessment	Ball throwing fact recall game.
Snowball Fight	Any	6th-8th	Whole class	Review	Crumpled up pieces of paper are the weapons of choice in this review game.
Speed Read	Any	6th-8th	Partners	Review, Assessment	Students compete to pronounce vocabulary words
Story Twice	English	6th-8th	Small Groups	New learning, Review	Good game for practicing writing skills, or writing about a new topic.
Times Table Football	Math	6th-8th	Whole Class	New Learning, Practice, Review, Assessment	Multiplication game with a football theme.
Toss a Question	Any	6th-8th	Whole Class	Practice, Review	Good kinesthetic review game.
Toss the Ball	Any	6th-8th	Whole Class	New Learning, Practice, Review, Assessment	Ball throwing fact recall game.
Two Truths and a Lie	Any	6th-8th	Whole Class	Practice, Review, Assessment	Students must differentiate between fact and fiction.
War	Math	6th-8th	Partners	New Learning, Practice, Review	Competitive multiplication card game.

Lesson Plan Templates 1-25: These templates contain instructions for each of the twenty-five games.

……..

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: 1 vs. 30 (or whatever the class size is)

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Several Multiple-Choice Questions

Instructions:

1. Teacher selects player 1.
2. Teacher poses a multiple choice question. Player 1 can answer at his/her own pace, while the rest of the class has 6 seconds to select an answer.
3. If player 1 answers correctly, he/she stays in the game. If not, player must leave with nothing.
4. If any of the class members get a question wrong they are eliminated. Player 1 receives points for each eliminated classmate. However, to claim points, player must eliminate all opponents.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Academic Baseball

Configuration: Whole Class

Purpose: Practice, Review, Assessment

Materials: Fake Baseball Diamond, Projector, Questions

Instructions:

1. Teacher divides students into two groups and selects pitcher and batter.
2. Pitcher asks batter to select the level of difficulty for their question (single, double, triple, or homerun).
3. Batter selects level of difficulty and pitcher asks a question from that level.
4. If batter answers correctly, he/she can make the corresponding move on the baseball diamond.
5. If batter answers incorrectly, teacher calls a flyball, and question goes to a player in "the field".
6. If outfielder answers question correctly, flyball is caught and batter is out. For each out, teacher subtracts one run from batting team's score.
7. If outfielder answers incorrectly, flyball is dropped and batter may proceed to the first base on the board.
8. Questions alternate between teams after each hit or out.

Game Instructions

Subject: Math **Grade Level:** 6th-8th

Topic: Addition, Subtraction, Multiplication, Division

Game Name: Chalkboard

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Board

Instructions:

1. Teacher divides students into two teams.
2. Teacher calls on one person from each team to go up to the board.
3. Teacher provides math problem for students to solve.
4. The first student to write the correct answer and put their marker on the tray with the cap on gets a point for their team.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Detective

Configuration: Whole Class

Purpose: New Learning

Materials: Picture

Instructions:

1. Teacher presents picture related to an upcoming lesson and students look at it for about 5 minutes.
2. After 5 minutes, teacher directs students to write down everything they can remember about the picture (e.g. setting, people, objects, activities, relationships, etc.).
3. After a period of time, teacher calls on students to share their lists. Teacher then discusses photo and how it relates to content

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Flashcards

Configuration: Small Groups

Purpose: Practice, Review, Assessment

Materials: Notecards

Instructions:

1. Teacher divides students into groups of 3-4.
2. Teacher assigns each group a topic and directs them to create several flashcards related to that topic.
3. Teacher collects and shuffles flashcards.
4. Teacher calls on students to answer questions. Students may consult with their group.
5. Note: Teacher should organize groups to support various ability levels.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Get Out of Here

Configuration: Whole Class

Purpose: Practice, Review, Assessment

Materials: Flashcards

Instructions:

1. Teacher stands in the doorway with a set of questions or flashcards.
2. Students must answer 3 questions correctly in order to exit the classroom.
3. If a student misses a question, he/she goes to the back of the line to try again.
4. Note: Choose flash cards according to the individual student's ability.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Graffiti Review

Configuration: Small Groups, Whole Class

Purpose: Review, Assessment

Materials: Markers, Poster Paper, Timer

Instructions:

1. Teacher selects several words or topics from a unit of study (e.g. galaxy, sun, star, astronomer, satellite).
2. Teacher writes one word in the middle of each piece of poster paper and posts around the room.
3. Teacher divides students into groups and gives each group different colored markers. Each group stands at one piece of paper.
4. Teacher says “go!” and students race to write about the word on their paper for a set period of time (use a timer).
5. When the timer goes off, teacher says “switch!” and the groups rotate.
6. This process continues until all groups have written on every piece of paper.
7. As a class, teacher and students review what has been written. Teacher corrects inaccurate information and adds information that students might have missed.
8. Note: Teacher should organize groups to support various ability levels.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: In-n-Out

Configuration: Whole Class

Purpose: New Learning, Review

Materials: None

Instructions:

1. Teacher divides class into two groups and asks the first group to stand in a circle facing out. The second group forms another circle around the first, so that each student is facing another student.
2. Teacher assigns discussion topic.
3. Students talk about topic for set time (e.g. 2 minutes).
4. When teacher says “rotate!” students in the outer circle rotate clockwise and a new sharing session begins.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Jeopardy

Configuration: Whole Class

Purpose: Practice, Review, Assessment

Materials: Paper, Sticky Notes, Projector

Instructions:

1. Teacher divides students into 2-4 teams.
2. Teacher displays Jeopardy board on docu-cam or overhead projector.
3. Teacher may create the board or direct students to create it.
4. Teacher covers answers with sticky notes.
5. Teacher takes turns calling on different groups.
6. Group members may collaborate but only have a set period of time (e.g. 15 seconds) to produce answer.
7. Example:

Characters	Plot	Vocabulary
$100	$100	$100
$200	$200	$200
$300	$300	$300

Note: If subject categories are not conducive to a particular lesson, teacher may decide to use dollar amounts as categories.

Example:

$100	$200	$300
?	?	?
?	?	?
?	?	?

Game Instructions

Subject: Any **Grade Level: 6th-8th**

Topic: Any

Game Name: King or Queen of (Fill in the Blank)

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Paper

Instructions:

1. Teacher assigns 10 problems.
2. Students solve problems silently on sheet of paper.
3. After every student finishes, teacher directs students to stand up.
4. Teacher announces answers. If student gets one wrong he/she sits down.
5. The last student standing is the King/Queen of (fill in the blank).
6. Note: Sometimes you have more than one student standing.

Game Instructions

Subject: Math **Grade Level:** 6th-8th

Topic: Multiplication

Game Name: Multiplication Bingo

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Bingo Cards, Large Flashcards

Instructions:

1. Teacher prints out bingo card template and makes a copy for each student.
2. Teacher randomly draws a flash card, and reads the problem aloud.
3. Each student with the answer on their card marks the square.
4. Game continues until someone gets a bingo.
5. Note: To keep your costs down and save time, print out blank bingo cards in advance and direct students to randomly fill in answers from a number bank.

Game Instructions

Subject: English, History, Science **Grade Level:** 6th-8th

Topic: Any

Game Name: Persuasion

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Paper, Prepared Questions

Instructions:

1. Teacher labels the four sides of the classroom: Strongly Agree, Agree, Disagree, and Strongly Disagree.
2. Teacher poses a potentially controversial question (e.g. Were the bombings of Hiroshima and Nagasaki justified?).
3. Students stand on the side of the room that matches their opinion.
4. Students debate the issue, moving to a different side if they change their minds.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Place Your Bets

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Flash Cards, Chips (or Other Tokens)

Instructions:

1. Teacher divides students into two teams. Each team receives an equal number of chips. Chips are placed on two desks at the front of the class.
2. Players from each team take turns coming up to play. Students wager a certain number of chips before each question is asked.
3. Teacher takes turns asking questions from flashcards. If student answers correctly, team wins whatever chips were wagered. Teacher then asks opposing team a new question.
4. If student answers incorrectly, question then gets passed to opposing team. If player from opposing team answers correctly, that team wins the other team's chips as well as their own wager.
5. Note: Teacher should call on students with similar ability levels to compete.

Game Instructions

Subject: English, History **Grade Level:** 6th-8th

Topic: Writing

Game Name: Power-Write

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Timer, Paper

Instructions:

1. Teacher provides students a topic to write about (e.g. WWI).
2. Teacher sets timer for 1-5 minutes (depending on grade and topic).

Students write everything they know about the topic until the timer goes off. If they run out of things to write, they may generate questions about the topic

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Say and Switch

Configuration: Whole Class

Purpose: Review

Materials: None

Instructions:

1. Teacher calls on one student to answer a question or relate important information.
2. Teacher stops student at the end of a sentence (or mid-sentence) and directs another student to pick up where the previous student left off.
3. This process continues until everyone has had at least one chance to contribute.
4. Note: Teacher should judge when it is appropriate to call on certain students (e.g. Students with special needs, English language learners, etc.). This activity should be challenging for every student, while still providing each with a reasonable chance to contribute.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Scavenger Hunt

Configuration: Partners, Small Groups

Purpose: New Learning, Review

Materials: Worksheets, Textbooks, Encyclopedias, Computers

Instructions:

1. Teacher creates graphic organizers with questions (straight-forward, fill-in-the-blank, matching, etc.).
2. Teacher divides students into pairs or small groups and distributes graphic organizers.
3. Students work in groups to answer questions using textbooks, encyclopedias, computers, smart phones, and other classroom resources.
4. Note: Teacher should organize groups to support various ability levels.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Silent Speed Ball

Configuration: Whole Class

Purpose: Practice, Review, Assessment

Materials: Ball

Instructions:

1. Teacher directs students to stand in a circle.
2. Students take turns throwing ball to each other. If student drops the ball, he/she stays in the game.
3. Students continue throwing ball until teacher yells “stop!”
4. Teacher asks student holding the ball a review question. If student answers correctly, he/she stays in game. If student answers incorrectly, he/she returns to desk.
5. The last student standing wins the game.
6. Note: Teacher should ask questions that are appropriate for each child’s ability level.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Snowball Fight

Configuration: Whole Class

Purpose: Review

Materials: Scratch Paper

Instructions:

1. Teacher directs students to write test questions on pieces of recycled paper.
2. Students write their questions then crumple the pieces of paper into “snowballs”.
3. Teacher divides students into two teams and directs them to stand on opposite sides of the room.
4. Students throw the snowballs at each other.
5. When the teacher calls “stop!” each student picks up a snowball and answers the question.

Game Instructions

Subject: English **Grade Level:** 6th-8th

Topic: Reading/Pronunciation

Game Name: Speed Read

Configuration: Partners

Purpose: Review, Assessment

Materials: Word Lists, Pronunciation Guide, Timer

Instructions:

1. Teacher directs students to work in groups of three.
2. Student 1 sets timer for one minute and shouts “Go!”
3. Student 2 reads as many words as possible while student 3 checks for accuracy.
4. This can be done in several rounds. The student who pronounces the most words correctly (or with the highest rate of accuracy) wins. Note: Teacher should organize pairs to support various ability levels

Game Instructions

Subject: English **Grade Level:** 6th-8th

Topic: Writing

Game Name: Story Twice

Configuration: Small Groups

Purpose: New Learning, Review

Materials: Paper

Instructions:

1. Teacher directs students to work in groups of 3-4.
2. Each student in group contributes two sentences to a story. Teacher may decide to assign topic or let students choose their own.
3. After every student has contributed, each must retell the story omitting a letter (e.g. the letter N).
4. Note: Teacher should organize groups to support various ability levels.

Game Instructions

Subject: Math **Grade Level:** 6th-8th

Topic: Any

Game Name: Times Table Football

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Board, Projector, 4 Sets of Flash Cards

Instructions:

1. Teacher creates a field of play using the overhead projector or board and selects about 100 flash cards.
2. On the side of the flash card with the answer, teacher writes the results of a football play (e.g. 25 yard pass to wide out, 3 yard run by fullback, incomplete pass, lose 5 yards due to a fumble, etc.). Most of the results should be good, but some plays can be errors.
3. Teacher divides students into two teams. Each "player" takes a turn solving a problem. If player answers correctly, the play on the card occurs.
4. If player misses an answer, the opposing team is given a chance to answer. If the other team answers the fact correctly, the team recovers the fumble and starts with a first down.
5. Additional Rules and Guidelines:
    - Start on the 20 yard line at the beginning of the game, the beginning of the second half, and after touchdowns.
    - On the 4th down, the team may choose to try for a 1st down, punt (40 yards), or attempt a field goal (must be at least on the 40 yard line).
    - Teacher can be creative with penalties (e.g. penalties can be assessed for not paying attention when it is not your turn, excessive talking, or helping someone else).

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Toss a Question

Configuration: Whole Class

Purpose: Practice, Review

Materials: Paper

Instructions:

1. Teacher directs all students to write a question on a piece of paper.
2. Students crumple their paper into a ball and toss it to another student, who then must answer the question before returning it. This process can continue for several minutes.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Toss the Ball

Configuration: Whole Class

Purpose: New Learning, Practice, Review, Assessment

Materials: Ball

Instructions:

1. Teacher tosses ball to first student and asks a question.
2. If student answers correctly, he/she tosses it to a classmate and asks that person a question. Teacher may also ask the questions, depending on the purpose of the game or maturity level of students.
3. If any wrong answer is given, teacher takes the ball back and tosses it to another student.

Game Instructions

Subject: Any **Grade Level:** 6th-8th

Topic: Any

Game Name: Two Truths and a Lie

Configuration: Whole Class

Purpose: Practice, Review, Assessment

Materials: Paper

Instructions:

1. Teacher directs students to generate three statements about a given topic: two statements that are true and one that is false.
2. Teacher moves around the room, giving everyone a chance to make their statements and identify lies.
3. Note: Teacher may want to generate additional questions to ensure that everything is covered. Both right and wrong answers can be used as a basis for discussion.

Game Instructions

Subject: Math **Grade Level:** 6th-8th

Topic: Multiplication

Game Name: War

Configuration: Partners

Purpose: New Learning, Practice, Review

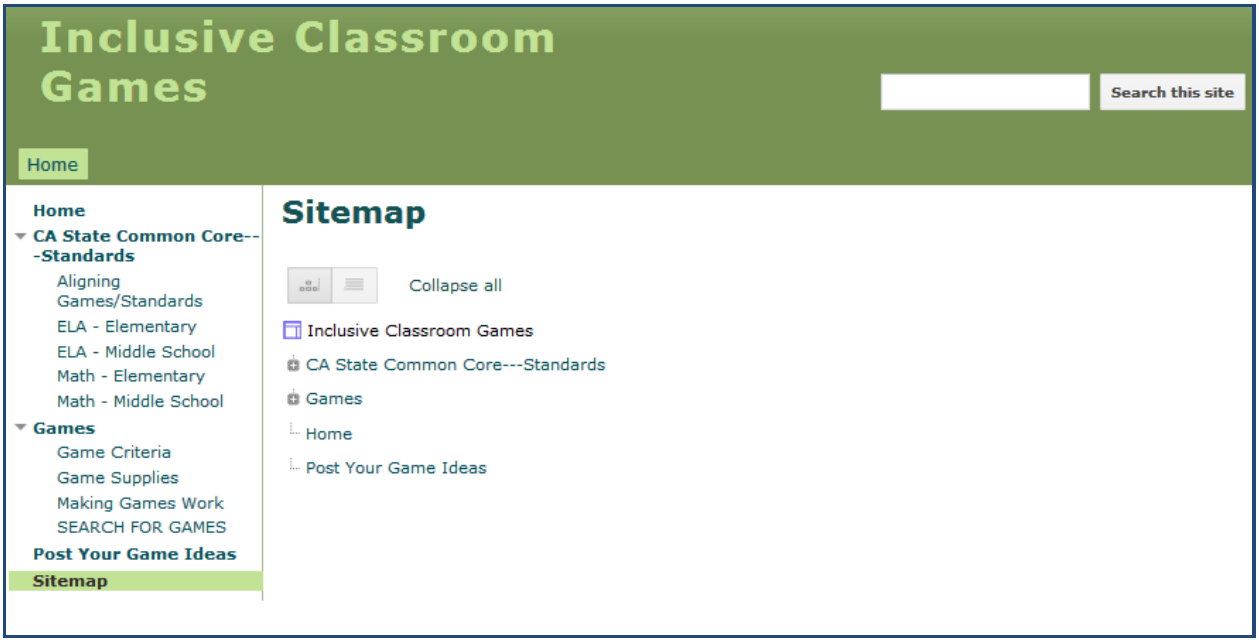
Materials: Several Decks of Playing Cards

Instructions:

1. Teacher writes the following key on the board: Ace = 1, J = 0, Q = 11, K = 12.
2. Teacher divides students into pairs and gives each pair a deck of cards.
3. Students divide cards equally.
4. Both students turn over their top cards at the same time. As quickly as possible, they must multiply the 2 cards together, and shout the answer.
5. The student who says the correct answer first places the cards in his/her winning pile. If a tie occurs, students should continue to play until someone wins the pile.
6. When the entire original stack has been played, the players count their winnings. The player with the highest number of cards wins.

Post Your Game Ideas: This page will eventually serve as a forum where teachers can post their own ideas for learning games.

Sitemap: This page contains a map of the website.



Chapter Five: Project Recommendations

Teachers often struggle to find effective instructional methods to teach their students with ADHD. When provided with a stimulating learning environment, these students can excel academically. However, many students with ADHD have trouble in traditional classrooms. In response to this problem, I created a website with instructions for learning games that teachers can use to engage their students. In the following pages, I will share what I have learned, highlight the educational implications of my work, outline my future plans for implementation, identify the limitations of my project, and provide suggestions for expansion.

Lessons Learned

In creating this project, I learned about the importance of clarity and simplicity in designing games for others to implement. I came across hundreds of resources related to game-based learning. However, very often, the authors of these sites provided unclear instructions and—in some cases—too much extraneous information about their games. Most teachers do not have time to comb through all of these resources to find appropriate learning games for their classrooms. Consequently, the temptation to fall back on familiar instructional methods is great. In designing and refining these games, I paid special attention to the clarity of the directions.

I also came to recognize that games can fit very well into inclusive environments. Since most games are, by nature, interactive, they can provide a context for the inclusion of students with disabilities in otherwise non-inclusive classrooms. Moreover, all of the games presented on my website could be easily adapted to include students of varying ability levels. For example, several games call for review questions. On the website, I encourage teachers to select review questions based on individual students' ability levels. This ensures that all students could participate in these games.

Educational Implications

While these games are designed to be accessible, teachers must remember that the act of playing a game is a skill in itself. As with any learning activity, teachers should take time to introduce procedures and revisit rules as needed. Once students have mastered the skill of playing the game, it will be much easier for them to master the educational content.

Project Implementation Plans

I would like to incorporate these games into my own classroom to the greatest extent possible. I plan to observe my students' reactions to the games and ask for their input. In gathering student input, I hope to improve the games to make them even more engaging and effective. I will also invite my colleagues to explore the site and experiment with different games. Over time, I plan to add more games to the website and revise the existing ones based on feedback.

Limitations of Project

While this project provides support for the motivational benefits of game-based learning, it does little to assess the academic benefits. If I had more time, I would like to test these games with a group of students in order to assess the education benefits. Ideally, this would involve studying two similar middle school classrooms—one that uses games in a unit of study and another that does not.

Suggestions for Expansion

In addition to adding more games to the website, I would like to upload resources to help teachers implement the games—for example, templates. I think it would also be useful to include some game content that is directly related to the common core standards. This would reduce the amount of time teachers would have to spend planning these games. One way to

accomplish this would be to create a page where teachers could upload game questions based on content standards. Since clarity of content is essential, I would want teachers to be able to upload content into a prescribed format (e.g. a two column table with specific standards on one side and specific questions on the other).

Summary

I created this website to provide teachers with strategies to engage their students. Engagement is an important element of learning, but it is especially crucial for students with ADHD, who constitute a significant minority. More than 5% of school-aged children around the world are diagnosed with attention deficit hyperactivity disorder (Polanczyk et al, 2007). The symptoms of ADHD—namely impulsivity and hyperactivity—can be disruptive in settings that call for more controlled behavior (Barkley, 1997). As a result, students with ADHD are more likely than their peers to perform poorly in school (Kent et al., 2011). While frustrated teachers might be inclined to respond to these students with disciplinary action, experts suggest a more positive approach. Rather than trying to change the child to fit the demands of the environment, teachers should change the environment to fit the needs of the child. This can be accomplished by implementing game-based learning activities. Research suggests that students with ADHD are more able to maintain focus when engaged in games (Geurts et al, 2008). Game-based learning has the potential to transform classrooms, improving experiences for all students.

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