Arcade Games

Efficient Way to Earn Tickets

Mathematical Goals

The student will investigate different rates involving games, tickets, time and money to determine the most cost-effective strategy to gain the most tickets for a prize.

The student will:

- Read a scenario and use rates to solve multi-step problems.
- Understand there are two unit rates associated with each ratio.
- Transition into the use of algebra to answer a question.
- Evaluate an algebraic expression for different values of the variable.
- Solve an algebraic equation
- Work with rates in a meaningful context familiar to students.

Before the lesson, practice mental mathematics (5-10 minutes).

Number Talk Possibilities: Select two or three depending on student abilities.

If it costs $0.50 to play one arcade game, how much does it cost to play 8 games?

If it costs $0.75 to play one arcade game, how much does it cost to play 8 games?

If it costs $0.95 to play one arcade game, how much does it cost to play 8 games?

If you win 4 tickets per $0.50 spent, how much would money would it take to win 20 tickets?

If you win 4 tickets per $0.50 spent, how many tickets would you win with $2.50?

Arcade Games

Skee-Ball

Marianne Navratilova and Steph, her annoying younger brother, rode their bikes to the Never Lose Arcade in their city. It has many old-fashioned arcade games in addition to the latest video games.

“Wow!” Marianne exclaimed. “Look at the neat prizes you can get in exchange for tickets! Are those sparkly bracelets cool, or what? I’m going to earn enough tickets for three of them, one in every color. They’re only 180 tickets apiece. I can earn that many tickets playing Skee-ball with one hand tied behind my back.

“Last time I played Skee-Ball I got 240 tickets for 8 games. Too bad it’s not an Olympic sport, because I’d bring home the gold for sure.

“Now…how much is this going to cost me?” she wondered.

Skee-Ball games cost $0.50 to play each time. The last time Marianne was at the arcade she played 8 games and won 240 tickets. It took her 20 minutes to complete the 8 games. She divided 240 tickets by 8 games to learn that she won at a rate of 30 tickets per game.

240 tickets/8 games = 30 tickets/1 game, or 30 tickets/game

She also decided to determine the rate of the tickets she won per dollar spent. Since each game cost $0.50 to play, the total cost was $0.50×8 = $4.00.

240 tickets/$4.00 = 60 tickets/$1.00, or 60 tickets/dollar

“Hey,” Steph said, “we’re learning about rates in math class. I’m going to try to figure out how many games you’ll have to play to actually earn enough tickets for a bracelet.” He thought about this for a while. Then he said, “Marianne, I could use a little help here.”

"Sure thing. Let's put together an algebraic expression to represent the number of tickets I won with each game I played. I think you'll find out that I earned 30 tickets per game."

"How did you do that?" her brother asked.

"Easy!

You just let x = the number of games played

Then $30x$ = the total number of tickets won in all those games."

Steph started Table 1 and began filling in the values for playing 1, 2 or 3 games.

x =Number of games	Number of tickets = 30 x
1	30(1) = 30
2	30(2) = 60
3	30(3) = 90
4	
5	
6	
7	
8	

Table 1: Skee-Ball games and tickets won

1. Help Steph by completing Table 1.

2. Look at the table to figure out the number of games Marianne would need to play to win enough tickets for a bracelet.

3. How much money would Marianne spend to win enough tickets to buy a bracelet?

“I don’t know, Marianne,” Steph said to his sister. “It feels good to figure out the answer but, to tell you the truth, this method seems like a lot of work. And not very interesting work at that. Do you think you can figure out an easier way to do this?”

“You know, for a little kid you ask an awful lot of questions,” his sister replied. She thought for a moment. “All right…What you can do is set up an algebraic equation and then solve it. No tables needed! This is the equation you would use to find the answer directly.”

$30x = 180$

4. What does the *x* in this equation represent?

To solve this equation, divide both sides of the equation by 30.

$$\frac{30}{30} = \frac{180}{30}$$

$x = 6$

To pay for the three bracelets, Marianne would need 540 tickets

3 bracelets × 180 tickets/bracelet = 540 tickets

5. Set up and solve an equation to determine the number of games Marianne would need to play to win 540 tickets.

“Cool,” Steph said. “I like that much better. But I have another question. Mom and Dad said that we can only stay 45 minutes. Do you think you’ll have enough time to earn 540 tickets?”

“Hmmm…I didn’t think about that.”

“I know! You can figure out the rate at which you play each game. It took you 20 minutes to play those 8 games, right?” Steph suggested.

“I guess you’re not *that* high maintenance,” Marianne retorted.

6. Calculate Marianne’s rate of games per minute.

7. Calculate Marianne’s rate of games per hour.

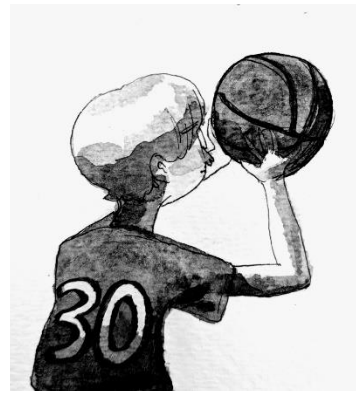
8. Which of these rates do you find the easiest to use to determine the amount of time needed to play 18 games? Explain your answer.

9. Which of these rates do you find the easiest to use to determine the number of games she can play in forty-five minutes? Explain your answer.

Basketball

“I gotta tell you,” Steph said to his sister. “I don’t know what you see in Skee-Ball. If you ask me, the best game in this whole arcade is basketball.”

“No one asked you. And anyway, what’s the big deal about basketball? You play basketball every day after school. Why would you want to pay money to play a game that you can play for free?”



“I didn’t expect you to understand. Some days when I play in the schoolyard, I hardly get the ball at all. How can I improve if I can’t practice?

“Here at the arcade, each game lasts 2 minutes. The goal is to score as many baskets as possible before time runs out.”

“That is a lot of playing time for one person, I suppose,” Marianne conceded. “How many baskets do you usually make?”

“Well, that depends,” Steph said thoughtfully. “You see, I play at different speeds. When I rush I can take 10 shots in 30 seconds.”

“That sounds pretty good…”

“Well,” Steph answered, “it’s good but it’s also not so good. When I rush, only 40% of my shots go into the basket. But if I play at a slower pace, I take 10 shots in *40* seconds. However, my success rate increases to 60%. Hmm, I wonder which is better.”

10. For each pace, what was the shot taking rate per minute?

11. For each pace, how many shots were successful per minute?

12. Which pace is better? How many more baskets would Steph make in a two-minute game with the better strategy?

Each basket scored wins 3 tickets.

13. If Steph uses the better strategy, how many tickets does he win per game? Is Steph's rate of winning tickets per game better or worse than Marianne's per game of Skee-Ball?

Steph saw a ball that glowed in the dark. The cost was 250 tickets.

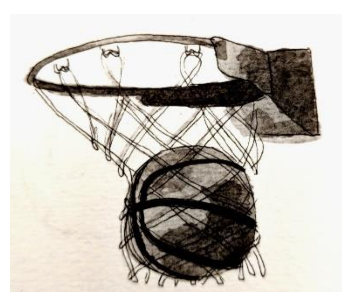
14. Write and solve an equation to determine the number of games Steph would need to play to buy a glow-in-the-dark ball.

15. What problem arose in using the solution to plan the number of games? How did you address this problem?

The basketball games were more expensive than Skee-ball. Each game cost $0.75.

16. How much would Steph spend to win enough tickets to buy the glow-in-the-dark ball?

"You know what I think?" Steph said.



"No I don't," Marianne replied, "but I'm sure that you're going to tell me."

"I think that not only is basketball more fun than Skee Ball, it's also a better deal when it comes to earning tickets."

"Is not," she protested.

"Hey, you're the genius. You do the math!"

17. Determine the rate at which Steph wins tickets per dollar spent on basketball.

“Tell you what,” Steph proposed. “How about if I play a game of basketball and give you my tickets so that you’ll have enough for your bracelets?”

“You would do that for me?!?” Marianne asked, touched by her brother’s generosity.

“Sure, as long as you pay for my game…”

“Well that’s only fair.”

“***And***, you pay me a dollar for playing,” Steph added.

Marianne sighed. “Why am I not surprised?"

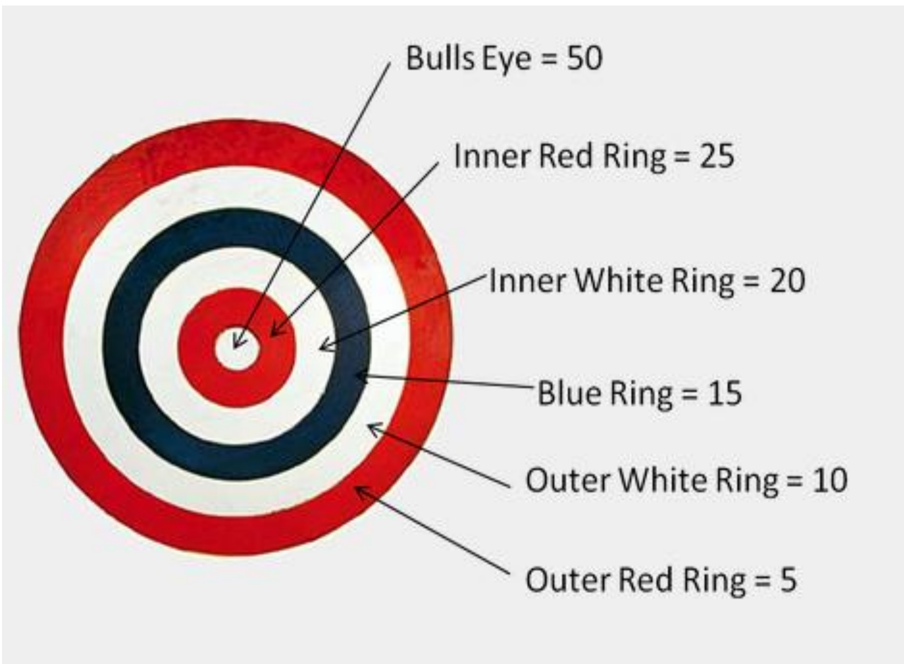
18. Should Marianne accept his offer? Justify your answer.

Project Idea: Visit the website of NBA leaders at http://insider.espn.com/nba/hollinger/statistics. Explore carefully what each of the column headings represent using the legend below the table. Working in groups of four, use the worksheets provided to collect data from at least three games involving your local basketball team (boys or girls). Worksheets are located in the teacher guide. Use the data to calculate various rates per game such as points per game or assists per game. Also determine various percentages that are important. Compile and analyze the team stats to determine what conclusions can be drawn from the data?

Practice Problems

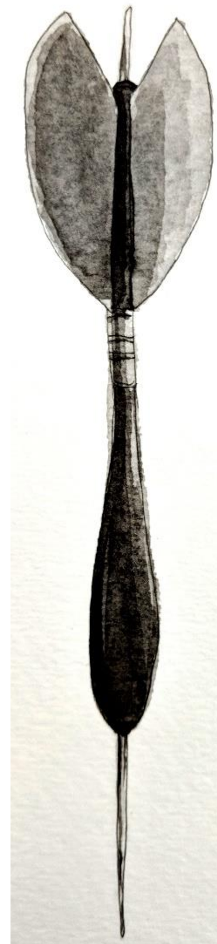
According to dartspiks.com website, Vogelpiks or piks is a darts game that began in Belgium that is played around the world. It is gaining popularity in certain regions of the United States. The target board for piks is much simpler than the American darts board. It is simply a series of concentric circles.

In a standard game each player throws 4 piks per round and there are a total of 5 total rounds. Piks are scored based on the ring values below and the piks are removed from the board before the next player goes. It is customary to wait until your opponent reviews the score before they are pulled. The highest total score after 5 rounds wins the game. If there is a tie, the score on one more round serves as a tiebreaker.



1. How many piks per player are thrown in a complete game?

2. What is the highest number of points in a round a player could score?



3. Ken has participated in piks tournaments before. In his previous six games, Ken has scored as few as 400 and as many as as many as 550 points in a game. Ken was curious as to how many points on average he scored per round. What is Ken's lowest average number of points per round? What is Ken's highest average number of points per round?

4. Tom also participates in piks tournaments. In the previous fifteen rounds, Tom has scored as few as 80 and as many as 150 points per round. Tom was interested in finding the range of his average number of points per pik. What is Tom's lowest and highest average number of points per pik?

5. Based on Ken's and Tom's previous performance at piks tournaments, if Tom and Ken were to compete today, who would be the winner? Support your decision with work.

6. In the current competition, after 3 rounds Tom has an average of 100 points per round and Ken has an average of 25 points per pick. Based on this new information, what do you think the final score will be? Explain your reasoning.

7. Tom goes first and averaged 100 points per round over five rounds. Ken has completed the first four rounds and averaged only 90 points per round. How many points must Ken earn in the fifth round to beat Tom?

8. Ken's first throw in round 5 landed in the 5 point ring. Provide an example of points earned on each of the next four throws that beats Tom's total score for the game.

9. Ken's second throw in round 5 landed in the 15 point ring. Provide an example of points earned on each of the next three throws that beats Tom's total score for the game.

10. Ken's third throw in round 5 landed in the 25 point ring. Can Ken still defeat Tom? What do you think of his chances of winning the game?

11. Bob wants to practice before the next tournament. In preparation for the tournament Bob has two options. He notices that he can throw 50 piks for $12 or participate in practice games at $5 per game. What is the better deal?

Thinking Through a Lesson Protocol

UNIT: Rates
Suggested Time: Two to three class periods
Materials needed: Worksheets for Project Idea

Standards
6.RP.A.2: Understand the concept of a unit rate a/b associated with a ratio a:b with b not equal to 0 and use rate language in the context of a ratio relationship.

6.RP.A.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

6.RP.A.3B: Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?

Mathematical Practices:

MP1: Make sense of problems and persevere in solving them.

MP2: Reason abstractly and quantitatively.

MP6: Attend to precision.

MP7: Look for and make use of structure.

Setting up the Problem - Launch	
Selecting tasks/goal setting	(5-10 minutes) Ask students if they know what an arcade game is. If they do, let them talk about their favorites. If they do not know, have them explore on the internet. Arcade games were popular in the 1970's and 1980's.

Monitoring student work - Explore		
Part I – All Students		
Strategies and misconceptions - Anticipating	**Who - Selecting and sequencing**	**Questions and Statements - Monitoring**
(10 minutes) Have students read page 2 in text and then review as whole class the expressions and equations explained in text.		Are there other rates that we could find other than tickets per game and tickets per dollar? Are these unit rates? How do you know? Is there another way that you could write a different unit rate?
(15 minutes) Answer questions #1-3 with a partner. Have the whole group share out their answers for #1-3.		What does the "x" represent? State the words for the equation.
(15 minutes) Continue reading and with a partner answer questions #4 and #5. Share whole group.		State the words for the equation. What does the "x" represent? What is the first step in solving this equation? How do you know?
(20 minutes) Continue reading text and answer questions #6-10 with a partner. Share solutions with whole group.		Is there a unit rate? What might it be? What makes it a unit rate?
(40-50 minutes) With a partner read the Basketball section and answer questions #11-19. Share results in small groups, followed by a whole group discussion of #19.		Go slowly through this section and check group progress along the way. It is important that students have correct answers as well as their work correctly labeled.

Monitoring individual student work - Explore		
Part II – Specific Groups of Student		
Strategies and misconceptions - Anticipating	**Who - Selecting and sequencing**	**Questions and Statements - Monitoring**
For off-task students or for students that seem to be self-conscious about you listening to them share.		I am just listening or looking to find out how you are working on the problem. This helps me think about what we will do later.
For students that appear to be stuck. Also for when you are having a difficult time understanding their strategies.		Can you tell me a little about your reading? How would you describe the problem in your own words? What facts do you have? Could you try it with simpler numbers?
For students that want to ask you questions, these are ways to uncover their thinking and judge to what extent you want to respond.		Tell me what you've thought about so far. What do you know? Why are you interested in more information about that? Let me say a little about that part.

Managing the discussion – Summarize	
Parts of discussion - Connecting	**Questions and statements - Connecting**
Launching the discussion: Select the problems in questions #18-19 that students are struggling with or you wish to share out.	Will team 1 start us off by sharing one way of working on this problem? Please raise your hand when you are ready to share your solution. What did you do first when you were working on this problem? Let's start by clearing up a few things about the problem. Let's list some key parts in this problem. What was unclear in the problem?
Eliciting and uncovering student strategies	Joe would you be willing to start us off? What have you found so far? Can you repeat that? Can you explain how you got that answer? How do you know? Walk us through your steps. Where did you begin? Can you show us?
Focusing on Mathematical Ideas	Can you explain why this is true? Does this method always work? How is Bob's method similar to Kelly's method? What do all the solutions have in common? What would happen if I changed the numbers to _____?
Encouraging Interactions	Do you agree or disagree with Kahlil's idea? What do others think? Would someone be willing to repeat what Tom just said? Would anyone be willing to add on to what Sue just said?
Concluding the Discussion	Can anyone tell me some of the big ideas that we learned today? How would you explain what we learned today to a 5^{th} grader? Some of the key points from our discussion today are . . . Tomorrow we will continue our exploration of ______ beginning with the idea from today that ___________.
Post Lesson Notes	You may wish to assign the practice problems that you feel would benefit the students.

Solutions to Text Questions

x =Number of games	Number of tickets = 30 x
1	30(1) = 30
2	30(2) = 60
3	30(3) = 90
4	*30(4) = 120*
5	*30(5) = 150*
6	*30(6) = 180*
7	*30(7) = 210*
8	*30(8) = 240*

Table 1: Skee-Ball games and tickets won

1. Help Steph by completing the table.

   See complete table above.

2. Look at the table to figure out the number of games Marianne would need to play to win enough tickets for a bracelet.

   Marianne would need to play 6 games to win 180 tickets, the cost of a bracelet.

3. How much money would Marianne spend to win enough tickets to buy a bracelet?

   *Six games at $0.50 per game would cost Marianne $3.00. (6 * $0.50)*

4. What does the *x* in this equation represent?

   The "x" represents the number of games needed to win 180 tickets.

5. Set up and solve an equation to determine the number of games Marianne would need to play to win 540 tickets.

   30x = 540

   x = 18

6. Calculate Marianne's rate of minutes per game.

   It takes 20 minutes for 8 games. To get the time it would take for 1 game, divide by 8 to get 2.5 minutes for 1 game.

   OR using a ratio table.

Minutes	*20*	*10*	*5*	*2.5*
Games	*8*	*4*	*2*	*1*

7. Calculate Marianne's rate of games per minute.

   It takes 20 minutes for 8 games. To get the number of games played in 1 minute, divide by 20 to get 0.4 games per 1 minute.

   OR using a ratio table.

Minutes	*20*	*10*	*5*	*1*
Games	*8*	*4*	*2*	*⅖ or 0.4*

8. Calculate Marianne's rate of games per hour.

   *It takes 1 minutes for 0.4 games. To get the number of games played in 1 hour, multiply by 60 to get 60 minutes per 24 games or **24 games per 1 hour**..*

9. Which of these rates do you find the easiest to use to determine the amount of time needed to play 18 games? Explain your answer.

   The number of minutes per game is simple to use. Since it takes 2.5 minutes to play 1 game, simply multiple 2.5 times 18 to get the number of minutes it will take to play 18 games.

   OR using a ratio table.

Minutes	*20*	*10*	*5*	*20 + 20 +5 =**45***
Games	*8*	*4*	*2*	*8 + 8 + 2 =**18***

10. Which of these rates do you find the easiest to use to determine the number of games she can play in forty-five minutes? Explain your answer.

    The number of games per minute is simple to use. Since she can play 0.4 games in 1 minute, simply multiply 45 times 0.4 to get the number of games she can play in 45 minutes.

    OR using a ratio table.

Minutes	*20*	*10*	*5*	*20 + 20 +5 =**45***
Games	*8*	*4*	*2*	*8 + 8 + 2 =**18***

11. For each pace, what was the shot taking rate per minute?

    For the 10 shots in 30 seconds, multiply by 2 to get 20 shots per 60 seconds or ***20 shots per minute.***

    For the 10 shots in 40 seconds, you can divide by 2 to get 5 shots in 20 seconds and then multiple by 3 to get 15 shots in 60 seconds or ***15 shots per minute.***

12. For each pace, how many shots were successful per minute?

    *At the faster pace, 20 shots per minute, 40% of the shots were successful. 0.40 * 20 =* ***8 shots per minute were successful.***

    *At the slower pace, 15 shots per minute, 60% of the shorts were successful. 0.60 * 15 =* ***9 shots per minute were successful.***

13. Which pace is better? How many more baskets would Steph make in a game with the better strategy?

    He is better to go slow and make 9 baskets per minute instead of 8. In a two minute game he would score 18 baskets per game instead of 16. He would score 2 more baskets per game with this strategy.

14. If Steph uses the better strategy, how many tickets does he win per game? Is Steph's rate of winning tickets per game better or worse than Marianne's?

    Steph scores 18 baskets per game. He gets 3 tickets per basket scored. He would get 18 times 3 or ***54 tickets per game****. Marianne's rate is 30 tickets per game. Steph's rate is better than Marianne's.*

15. Write and solve an equation to determine the number of games Steph would need to play to buy a glow-in-the-dark ball.

    $54x = 250$

    $x = 4.629$

    Since you can't play a partial game, Steph would need to play 5 games to get enough tickets.

16. What problem arose in using the solution to plan the number of games? How did you address this problem?

    Since there is a remainder, Steph would need to play 5 games to get enough tickets. Four games would be 216 tickets (not enough) and five games is 270 tickets, more than enough. So I rounded up.

17. How much would Steph spend to win enough tickets to buy the glow-in-the-dark ball?

    *Five games at $0.75 per game would cost 5 times $0.75 or **$3.75**.*

18. Determine the rate at which Steph wins tickets per dollar spent on basketball.

    *One game costs $0.75 and Steph can win 54 tickets per game. This is a rate of 54 tickets per $0.75. If we multiply by 4, we get a rate of 216 tickets per $3.00. If we now divide by 3 we get a rate of **72 tickets per $1.00**.*

    OR

    *54 tickets per game divided by $0.75 per game is **72 tickets per $1.00**.*

19. Should Marianne accept his offer? Justify your answer.

    Marianne wins tickets at the rate of 30 tickets per game which costs $0.50 per game. This is a rate of 30 tickets per $0.50 or 60 tickets per $1.00. Steph can win 72 tickets per $1.00.

    *To get the 540 tickets needed for the bracelets Marianne would need to play 540/30 or 18 games at a cost of $0.50 per game for a cost of **$9.00**.*

    *For Steph to win 540 tickets he would need to play 10 games (he wins 54 tickets per game) at a cost of $0.75 per game. The cost would be $7.50 for the games and $1.00 for his service or a total of **$8.50**. This is still cheaper than it would have cost Marianne. **I would recommend Marianne take him up on his offer.***

Solutions to Practice Problems

1. How many piks per player are thrown in a game?

   *Four piks are thrown per round by each player and there are 5 rounds to a game that does not end in a tie. 4 * 5 =* ***20 piks per player per game****.*

2. What is the highest number of points per round that you could score?

   *Since there are 4 piks thrown per round and the highest score for one pik is 50 points, 4 piks * 50 points per pik =* ***200 points possible per round****.*

3. Ken has participated in piks tournaments before. In his previous six games, Ken has scored as few as 400 and as many as as many as 550 points in a game. Ken was curious as to how many points on average he scored per round. What is Ken's lowest average number of points per round? What is Ken's highest average number of points per round?

   There are 5 rounds per game, Ken's lowest average number of points per round would be 400 points divided by 5 rounds OR ***80 points per round****. Ken's highest average number of points per round would be 550 points divided by 5 rounds OR* ***110 points per round.***

4. Tom also participates in piks tournaments. In the previous fifteen rounds, Tom has scored as few as 80 and as many as 150 points per round. Tom was interested in finding the range of his average number of points per pik. What is Tom's lowest and highest average number of points per pik?

   Four piks are thrown per round, Tom's lowest average number of points per pik would be 80 points divided by 4 piks OR ***20 points per pik*** *and his highest average number of points per pik would be 150 points divided by 4 piks OR* ***37.5 points per pik****.*

5. Based on Ken's and Tom's previous performance at piks tournaments, if Tom and Ken were to compete today, who would be the winner? Support your decision with work.

   Answers may vary. Based on previous performances and comparing points per game, Ken scores between 400 and 550 points per game while Tom scores between 400 and 750 points per game. I predict Tom will be the winner.

   Based on previous performances and comparing points per round, Ken scores between 80 and 110 points per game while Tom scores between 80 and 150 points per round. I predict Tom will be the winner.

Based on previous performances and comparing points per pik, Ken scores between 20 and 27.5 points per pik while Tom scores between 20 and 37.5 points per pik. I predict Tom will be the winner.

6. In the current competition, after 3 rounds Tom has an average of 100 points per round and Ken has an average of 25 points per pik. Based on this new information, what do you think the final score will be? Explain your reasoning.

   Tom is averaging 100 points per round. A game consists of 5 rounds so his final score would be 500 points.

   Ken is averaging 25 points per pik. A game consists of 20 piks so his final score would be 500 points.

   Based on this information the game would be tied at 500 points after 5 rounds.

7. Tom goes first and averaged 100 points per round over five rounds. Ken has completed the first four rounds and averaged only 90 points per round. How many points must Ken earn in the fifth round to beat Tom?

   100 points per round times 5 rounds = 500 points for Tom.

   90 points per round times 4 rounds is 360 points so far for Ken.

   Ken will need 500-360 = 140 points to tie Ken. To win Ken will need at least 145 points in the fifth round.

8. Ken's first throw in round 5 landed in the 5 point ring. Provide an example of points earned on each of the next four throws that beats Tom's total score for the game.

   Answers will vary. If Ken scores all 50 pointers on the next 4 throws he would have a total of 205 points.

   Another example would be 50 + 50 + 20 + 20 for a total of 145 points.

9. Ken's second throw in round 5 landed in the 15 point ring. Provide an example of points earned on each of the next three throws that beats Tom's total score for the game.

   Ken could score all three 50 pointers to beat Tom's score. 5+15+50+50+50 = 170 points. If Ken misses one 50 pointer, he could score 5+15+50+50+25 = 145 points. Anything less than 145 points and he would lose.

10. Ken's third throw in round 5 landed in the 25 point ring. Can Ken still defeat Tom? What do you think of his chances of winning the game?

5+15+25+50+50=145 points. Ken could still defeat Tom, however, since none of his last three throws were 50 pointers and his average for the first 4 rounds was only 90 points per round, it isn't looking good.

11. Bob wants to practice before the next tournament. In preparation for the tournament Bob has two options. He notices that he can throw 50 piks for $12 or participate in practice games at $5 per game. What is the better deal?

*If Bob throws 50 piks for the $12.00, dividing by 50, the cost would be **$0.24 per pik.***

*If Bob participates in a game, he would throw 20 piks for a cost of $5.00. Dividing by 20 this would be a cost of **$0.25 per pik.***

Throwing 50 piks for $12 is the better deal.

Project Idea Worksheet #1 - Basketball Stat Sheet

Home Team

Names	#	2 FGA	2 FGM	3 FGA	3 FGM	FTA	FTM	FLS	AST	REB

2 FGA - 2 point field goal attempts

2 FGM -2 point field goals made

3 FGA - 3 point field goal attempts

3 FGM - 3 point field goals made

FTA - free throw attempts

FTM - free throws made

FLS - fouls

AST - assists

Visiting Team

Names	#	2FGA	2FGM	3FGA	3FGM	FTA	FTM	FLS	AST

2FGA - 2 point field goal attempts

2FGM -2 point field goals made

3FGA - 3 point field goal attempts

3FGM - 3 point field goals made

FTA - free throw attempts

FTM - free throws made

FLS - fouls

AST - assists