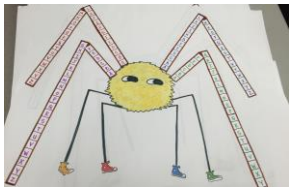
3rd Grade Math Lesson

Lesson Title: Spider Leg Game
Grade: 3 "Students will articulate the solution to a division problem."

Content Standard: Content Standard: Operations and Algebraic Thinking 3.OA.A.2
Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.

Materials: Game board, linking cubes, dividend letter cards, dice to determine the divisors, data & score sheets (see attached), white boards and/or paper, 1-6 dice for each group



Shared Experience and procedure details:
Number of Players: Two to four players
Object: To be the first player or team to remove equal-sized groups that will get the player closest to the winning space on each game board.
Set-up: Each team will need a game board that included rows of squares that have 26 spaces that would fit the size of a single linking cube. Each player will need a set of linking cubes. A capital letter of the alphabet will be labeled on each space on the game board. Each team will be given a set of letter cards. Each group will play four (4) rounds per game.
Play:
Each player completes a fun challenge task (eg. Trying to get a jumping toy frog into a bucket, or a race). Practice shooting frogs into bucket. To set player order (1st player to get frog in the bucket is player 1, 2nd person to get frog in the bucket is player 2, etc.) Optional: may have student flip frogs every time to set order of drawing the card.
*Demonstrate how to play the game with the class.
The winner of the challenge task draws a letter card. The letter cards in the stack will the following letters: F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.
Each player looks at the letter on the card and finds the corresponding letter on the game board. The players fill in the row of squares on the game board covering all the letters before the letter on the card including the letter on the card. The total cubes represents the amount to be divided. The players examine the cubes on the path and decides the number of equal groups of cubes that they can remove to get closest to the winning space. The players may land exactly on the winning space or close to the winning space with some cubes leftover. The player rolls a dice and then the player repeatedly removes that number until they can't take any more equal-sized groups. The player who is closest to the winning space earns a point. In the case of a tie, both players earn a point. The game continues until the instruction period for the game ends. The player with the most number of points wins.
Questions: What do you think about the game board? Why is it important to know how many game cubes you have? What does that mean? How do you know what is the best roll? What are the other important parts of the game? Tell me more about that? Talk to the people in your group. Is there another way to think about this? Can you predict who will win? What would be a good number to roll?

3rd Grade Math Lesson

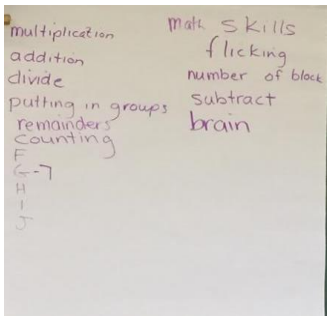
Note: The student is demonstrating the grouping model of division by dividing by the number of items in each group to find the total number of equal groups. The instructor can decide to switch the division situation by providing the direction that the secret number represents the number of equal groups to demonstrate the sharing model of division by having the student place the cubes in the groups. In each situation, the answer to the division problem is the quotient.

Differentiated instruction: Students who know their multiplication facts 2 to 9 should to be able to divide mentally when working with division problems with remainders. Students who struggle with multiplication concepts may need to work with numbers that divide evenly and be provided a number chart to use as a tool for understanding patterns or counting.

Possible Picture:
Students draw a picture to show their thinking or what they did.
Have students share picture & writing with their group.

Possible People Talk:
Students may use non-math and math terms to describe the game, explain the process, or the strategy used to play the game.

Feature Talk: (ingredients, important ideas)
You could ask: "What was easy with this lesson?"
"What was hard with this lesson?"
"What kind of math did you do?"



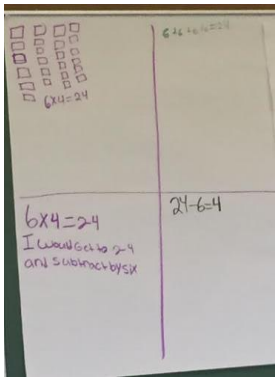
total/amount/dividend
even/odd
sharing, equal groups/grouping/equal sets
divide/division
add/subtract/repeatedly subtract
multiply/multiple/multiplication/skip counting
leftover/extra/remaining/remainder/sum/difference
equal/equality

- Students discover that they need to know the total amount to be divided before doing any grouping or sharing.
- Students learn that when you share equally, you are actually dividing into equal groups and then count number of items in each group.
- Students learn that when you group you divide the number of items in each group to find the number of equal groups.
- Students may recall or show that multiplication and division are inverse operations.
- Students may use words or express that there is an equation or a number sentence that describes the solution they tried in each round of the game.
- Students understand that the product and the dividend will always be greater than the divisor.
- Students may understand that there can be remainders when dividing to make equal groups or when dividing to share equally.

3rd Grade Math Lesson

Possible Symbolic Representation:

You could pose the question: If you pull an "x card" and roll 6 using the dice, what would happen? Have students agree that x=24.



- Students will show how addition, subtraction, multiplication, and division relate to the situation.
- Students may illustrate the relationship between multiplication and division.
- Students illustrate the difference of sharing by dividing equally and dividing by grouping.
- Students may illustrate the situations when dividing and using either sharing and groupings may include a remainder.
- Students will answer the division situation.

Extensions/Reteaching/Next steps:

Change the dice, get rid of the 1, how would this change the game
Change the dice to a deca dice

Increase the number of possible number of dividends (add on to the game board AA, BB, CC, … ZZ). To assist students in making sense of the letter and corresponding number, students could be given a chart to record the meaning of the letters (ex: BB=28) *chart attached

Teacher Reflections/Feedback:

This game lends itself to the discussion of odd and even numbers and the divisibility rule of dividing by 2.
During the shared experience, as misunderstandings occur students can learn to carry on agree/disagree conversations.

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Updated 7/23/15 by Brad Strong & Carol Houseworth

3rd Grade Math Lesson

DATA & SCORE SHEET

Name _____ Date _____

Letter	Corresponding Number	Number rolled	Number of Group/Sets	Number Left over	Points Earned	Why was Point earned?