Mystery Dinner

Summary

These activities help to develop a student's abilities in understanding the type of division of sharing objects equally as compared to dividing objects into groups of a known size. By completing the sharing activity, students can then relate the information into the standard symbolic representations.

Group Size

Pairs

Materials

Carryout food boxes
Dice
Miscellaneous items
Small paper plates
Large paper plates
- *Dinner is Served*
- Division tile sets
Spinners with numbers1-9
Additional Resources
Books
About Teaching Mathematics, A K-8 Resource, by Marilyn Burns; ISBN 978-0-941355-76-6

Background for Teachers

These activities help to develop a student's abilities in understanding the type of division of sharing objects equally as compared to dividing objects into groups of a known size. By completing the sharing activity, students can then relate the information into the standard symbolic representations. Before beginning the activity, materials must be gathered so that each group has a set of courses. Classes can be arranged into groups of 12. Within the group, students will work in pairs so one group has 6 pairs. This way, each pair will be working one course and a bell can serve as a signal to switch to a new course. Student's only knowledge should be an understanding of what it means to share equally. They must also understand the term remainder or leftovers for this activity. As students complete the activity, teachers must be aware of clean up and keep students aware also to prevent the loss of items, thus changing the results from pair to pair.

The two division games are ways to encourage students to use mental math, practice math facts and develop number sense in terms of relating division to other operations. Several variations may be used for each game after the students have become familiar with the structure of the game. These activities also serve as good center activities and can be utilized in that manner once the games have been taught within the whole class. Division tiles are self-checking and thus eliminate the need for the teacher to verify student work. No Remainder reinforces the rules of divisibility also.

Intended Learning Outcomes

1. Develop a positive learning attitude toward mathematics.
3. Reason logically, using inductive and deductive strategies and justify conclusions.
4. Communicate mathematical ideas and arguments coherently to peers, teachers, and others using the precise language and notation of mathematics.

Instructional Procedures

Invitation to Learn

On separate laminated cards, have written division problems and a matching card with the answer. Spread the cards in the center of the room. Each person picks up a card and searches for the matching card. When a match is found, students perform 5 jumping jacks (or other physical activity as designated) while saying the problem and answer. Cards are placed in a stack and the activity continues until all cards are matched. This activity promotes getting students out of their chairs and active while learning.

Instructional Procedures

Mystery Dinner

Prior to class, fill boxes with miscellaneous items, making a matching set for each group. Mark each set with a course number of 1-6.

Divide the class into groups of 12 and further split them into 6 pairs.

Each pair will work together to complete the tasks on the *Dinner is Served* worksheet. Remind pairs that they will switch courses when they hear the dinner bell.

Distribute to each group boxes, 6 die, plates and worksheets.

Demonstrate to the class the process of setting up their serving platter, and fair sharing them onto the plates. Explain to groups how to record their information on the worksheet. Members of the group alternate the responsibility of the maitre d' to check the recording of the course and approve it.

Each course has a number and has a plate representing the number of items in the box. Next to the plate is a place to record the number of servings that were filled. The space above the plate indicates the number of objects on each plate and the number of leftovers.

Ring the bell and dinner is served!

Pairs will take their first course, dump it onto the serving plate, roll the die to determine the number of servings required. Inform students if they roll a 1, it automatically becomes a 7. Pairs will then set out that number of small plates and begin to share the "food" equally. Any leftovers will remain on the serving plate.

Student pairs will take their first course box and begin completing worksheet.

Within their group, pairs will exchange boxes until all courses have been completed.

Division Tiles

Instruct students to deal out the tiles, face up in 10 stacks. Since there are 54 tiles, piles will end up with some stacks of 5 and some stacks of 4.

Remove tiles in pairs. In each pair, disregard the remainder and make sure each quotient matches.

As each pair is removed, cross them out to easily identify the removed pairs. Continue to match quotients and remove pairs.

If a pile runs out, split any other pile at any point and place in the open space.

As in solitaire, if at any time no pairs are showing, the player has lost to the deck and will need to begin again.

If the last 2-8 tiles do not pair out, a mistake has been made in a previous pairing.

Examine each of the removed sets of tiles and check for an error. When the error is found those tiles are placed on the table and the game continues.

A student "wins" when all tiles have been placed into pairs.

No Remainder

Spin 4 times and record the number each time.

Have the students use the four numbers to try to make a division problem with no remainder.

See how many different problems can be made with the four numbers.

Have students share their findings in their journals. If you are sure a problem cannot be made with no remainder, explain your reasoning.

Extensions

Curriculum Extensions/Adaptations/ Integration

    To make Division Tiles more challenging, use less than 10 piles.
    To increase the chances of winning, increase the number of piles for less skilled players.
    Division Tiles variation- the game can be played matching the remainders and ignoring the quotient.
    Easier tiles can be made with no remainders for students needing extra practice.
    Have students play the game War with the tiles.
    Play No Remainder with playing cards or dice to determine the numbers in the problem.
    Extend this lesson to vocabulary terms of quotient, divisor, dividend and remainder. Students are then ready to begin the development of long division skills.

Family Connections

    Have students fill a dinner course box with an item from home and share it with a group.
    Students can take home a set of division tiles and teach the game to a parent.
    Have students teach No Remainder to a parent and race to see who can find a problem with no remainder first.
    Remember to list any handouts, worksheets, etc. that are to be sent home with the student.

Assessment Plan

    A walk around during the dinner activity will give an informal assessment of understanding of fair sharing through division.
    Journal writing explaining real world problems similar to the dinner activity. Students should present their solutions in writing and explain their reasoning.
    Assign division problems and ask students to show 2-3 different ways to figure the answer and explain their reasoning.
    Provide numbers and students will determine which are divisible by 2, 3, 5, 6, 9, and 10.
    Alter the game *No Remainder* by spinning five times.

Bibliography

Research Basis

Gregg, J. & Underwood Gregg, D. (2007). Interpreting the Standard Division Algorithm in a "Candy Factory" Context. *Teaching Children Mathematics*. 14(1) 25-31.

Using a candy factory context for a problem solving activity, students were better able to develop a deeper understanding of the mathematical concepts behind the algorithm of division. The problem-solving design allows students to develop their own strategies to understand the concept of division.

Weiss, D.F. (2006) Keeping It Real: The Rational for Using Manipulatives in the Middle Grades. *Mathematics Teaching in the Middle Schools*. 11(5)238-242.

Reviews of research show that manipulatives are effective as a learning tool. It is not the manipulative itself leading to understanding but the activity in which the students are engaged and using the tools to aid learning. Students should be comfortable using manipulatives so as to not add an additional layer of frustration to the activity.

Authors

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