Mystery Coins Puzzle

Thank you for downloading the science and mathematics activity packet! Below you will find a list of contents with a brief description of each of the items. This activity packet contains all the information (including any handouts) you will need to run this activity in your own classroom or at a science festival.

Please note: some activities might require the need for a facilitator to be present to oversee the activity. Activities that require a facilitator will be clearly noted.

-Community Resources for Science

Mystery Coins Puzzle

ACTIVITY PACKET CONTENTS

1. Organizer Instructions for the person running the activity
    - Print suggestion: 1 for the facilitator
    - Includes information for setup prior to the event (e.g., materials prep)
2. Participant Instructions (tabletop sign/printout)
    - Print suggestion: 1-2 to put in a plastic sign holder
3. Activity Printout(s) for participants
    - Print suggestion: number of expected participants
    - Printouts needed for participants to do the activity (e.g., cutout templates)

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ORGANIZER INSTRUCTIONS

Grade(s): 3-6

Standard connections:

- **CCSS.Math.Practice.MP1:** Make sense of problems and persevere in solving them
- **CCSS.Math.Practice.MP2:** Reason abstractly and quantitatively
- **CCSS.Math.Practice.MP4:** Model with mathematics

Next Generation Science Standards: Science and Engineering Practices

- **Constructing Explanations and Designing Solutions:** Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem
- **Using Mathematics and Computational Thinking:** Use counting and numbers to identify and describe patterns in the natural and designed world(s)

Objective: Solve word problems with addition, subtraction and deductive reasoning

Activity overview and background: Student-directed, independent activity. The activity focuses on deductive and critical thinking to solve currency word problems. The ability to translate word phrases into algebraic expressions is crucial, not only in algebra but in almost all higher mathematics and science courses. This skill is also indispensable in economics, biology, geology, physics, and engineering.

Materials:

- Real dimes, nickels, pennies, and quarters or play money (about 20 of each coin)
- Pencil and paper for calculations
- Handout with directions and story

Setup:

1. Give each student a handout, pencil, paper and handful of coins (about 20 of each coin)

Directions:

1. Read story about a grandfather who carries coins in his pocket
2. Solve math problems about the number and type of coins he carries using knowledge of number, calculation skills and deductive thinking
3. Try solving more difficult problems for an additional challenge

Grandpa’s Coins

Danielle and her brother Jordan have fun playing games with their grandfather. He has a habit of jiggling the change in his pockets when he walks. Grandpa made up a game. If the children can guess the number of coins he has in his pocket, they can split the money. To help his grandchildren, he offers them some clues.

Work together to help Danielle and Jordan figure out the amount and number of coins in Grandpa’s pockets. If your child gets stuck on one problem, leave it and move on to another one. Go back later to the problem that was difficult. Talk about how you solved each problem and describe the strategies you used.

Easier Version

Each pocket contains at least one of each coin: penny, nickel and dime. There may be more than one combination of coins that will work for each pocket description.

1. This pocket contains:
    a. Half as many nickels as pennies
    b. 4 dimes
    c. 16 coins in all

2. This pocket contains:
    a. Twice as many nickels and dimes
    b. 8 nickels
    c. 85 cents in all

3. This pocket contains:
    a. An equal number of nickels and pennies
    b. The number of dimes is a square number.
        i. A square number is the product of a number multiplied by itself.
    c. $1.08 in all

4. This pocket contains:
    a. Two more pennies than nickels
    b. The value of nickels is four times the value of the pennies.
    c. $1.00 in all

More Challenging Version

Each of the following pockets contains at least one of each coin: penny, nickel, dime, and quarter.

1. This pocket contains:
    a. The same number of dimes as nickels
    b. One-third of the coins are dimes
    c. Five is a factor of the value of each coin group.

2. This pocket contains:
    a. Half as many nickels as quarters
    b. The value of dimes and pennies together is half the value of quarters
    c. 10 coins in all

3. This pocket contains:
    a. A nickel for every two dimes (or a 2 to 1 ratio of dimes to nickels)
    b. The value of quarters is equal to the value of dimes and nickels
    c. 10 coins in all

4. This pocket contains:
    a. Three more nickels than pennies
    b. The value of nickels equals half the value of quarters and dimes together
    c. The total number of quarters and dimes is half the number of nickels

5. This pocket contains:
    a. One more nickel than pennies
    b. Two fewer pennies than quarters
    c. The total number of coins is a prime number