

# Mathematics: The Language of STEM

## Family Adventure Day Part I

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### Content and task decisions

Grade Level(s): 2

Description of the Task:

Students will be asked to plan a Family Adventure Day for a family of four using an adventure fund of random coins collected throughout a year of saving.

- First, students will be presented with the challenge of counting the coins within the fund using a student-selected method (included in the lesson plan for part one of this activity).
- Second, students will be asked to plan out a Family Adventure Day using the money within the jar and flyers that indicate event/activity pricing (included in this lesson plan).
- Throughout, students will then present their findings to their peers and evaluate the work of other students.

Indiana Mathematics Content Standards:

- 2.M.7: Find the value of a collection of pennies, nickels, dimes, quarters and dollars.
- 2.DA.1: Draw a picture graph (with single unit scale) and a bar graph (with single unit scale) to represent a data set with up to four choices (What is your favorite color? red, blue, yellow, green). Solve simple put together, take- apart, and compare problems using information presented in the graphs.

Indiana Mathematics Process Standards:

- PS.1: Make sense of problems and persevere in solving them.
- PS.3: Construct viable arguments and critique the reasoning of others.
- PS.6: Attend to precision

Mathematics Content Goals:

- Students will be able to count and represent money combinations of pennies, nickels, dimes, quarters, and dollars within one hundred dollars.
- Students will be able to use multiple ways/strategies to solve mathematical conjectures and communicate their thinking/process through writing, technical means, or discussion.

Materials: (Used throughout all lessons)

- Plastic or Glass Jars (Enough for each group of four students)
- Paper of various sizes (for student work)

- Various Plastic Coins (Varying denominations excluding half dollars)
- Various Paper Bills (Varying denominations excluding bills over \$20)
- Sets of Flyers Attached (Enough for each group of four students)
- Assignment/Task Explanation Sheets (Time Table, Money Task Explanation Sheet, Recording Sheets, and Reflection Questions, Time Task Explanation Sheets Explanation Sheet, Recording Sheets, and Reflection Questions)

## Procedure Family Adventure Day (Part One)

Before: (Prepare coin jars with same amount of money using same coin combination within each jar. Adjust amount to meet the needs of your students. If needed, do this activity twice to scaffold learning by increasing money values during the second round. I recommend doing a value under \$35 the first time coining, then increasing the difficulty to over \$120 the second time counting)

- Review Coin Values and Recognition Strategies (Example of Recognition Strategy- Presidents on Front of Coins, Buildings/Objects on the Back of Coins, Value/Name written on the Coin)
- Review making a dollar using multiples of one type of coin (Example- four quarters, ten dimes, twenty nickels, one hundred pennies)
- Present students with problem with a narrative from personal experience (big jar of coins)- coming up with a strategy to count coins easily and to check your answer within small math squads
- Review expectations for small math squads (take risks, respectful treatment of others and opinions, persevere through challenge, mistakes are learning, take care of math tools)
- Distribute materials (jars full of coin values, various paper, pencils) to small groups of students; students will also receive a student friendly task sheet (included within materials)

During: Prepare Class Data Chart using document camera or large chart paper

- Monitor student progress throughout this time period. If a group is struggling, prompt students to try various methods that were explored by other groups. You may also have a student leader visit another squad to observe how the other group is tackling the problem.
- Students will manipulate the coins into piles/groups to come up with a method to count coins with efficiency
- Students will record their thinking and conjectures on paper (size is chosen by groups of students) or using technology (student presentation app such as poplet)
- Students will record their final answer within class data chart (If students finish early, they may discuss how to present their thinking to others, or check their answer using another strategy)

After:

- Review class data together using Class Data Chart to discuss trends (Example- Highest amount counted, lowest amount counted, range of data, and whether multiple groups came to similar answers)
- Have different groups present their thinking using student presentation app or recording sheets (Discuss how thinking is different or the same from previous methods or have students discuss within their squads)
  - How is this group's process similar or different than yours?
  - Is it more similar or more different?
  - Can you use any part of their strategy to help count more efficiently next time?
  - How close did your group come to the solution of the presenting group?
  - Do you notice any celebrations or errors in their strategies?
- Students will then return to their groups to complete second try at counting their money faster using new learning
  - Optional: Students can create video interview- what did you do differently? What did you do that was the same? What is the amount you counted the first time and the second? What is the difference between the amounts?
- Students will then complete an independent reflection sheet about their thinking and process (attached within plans)- This sums up personal experience, not group experience.
- Students will then be able to view the correct answer after everyone has completed their reflection piece (Idea: You can give students a link through a QR code to watch a video explaining two ways to solve the problem)

#### Assessment:

- Students will be assessed on participation within math group and both group and individual reflections.
- Students will be asked to communicate their thinking/process through both an application and a written reflection. Students will answer the following questions using both means:
  - What strategy or process did you use to solve the problem?
  - What part of your strategy made this work easier?
  - What part of your strategy proved to be difficult?
  - What did you learn about working with groups?
  - What did you do differently and the same next time?
  - What answer did you get both times? What is the difference between these totals?
  - How well did your group work together?

# Our Family Adventure Day

My family collects change in a jar all year long. Once a year, we use all of the change that we have collected to have a family adventure day. This year, I get to pick what our family does during our family adventure day. My mom told me that I could pick from these activities:

- going bowling
- going to the zoo
- going walking on a trail
- going for ice cream
- going to the mall
- going to the movies
- going for dinner/lunch
- going fishing
- going mini-golfing
- going to a trampoline park
- going to a park for a picnic
- going to an arcade
- going go-cart racing



My mom told me that before I am allowed to plan our day that I need to count the money in our jar.

My mom also told me that that I needed to:

- Write down my thinking and strategies on a recording sheet
- Be able to explain how I reached my total coin amount
- Check my answer using some help from my math squad

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Our Family Adventure Day Reflection

Answer the following questions using your learning from part one of our family adventure day activity. Make sure to use complete sentences and your best spelling.

1. What strategy or process did you use to solve the problem?

2. What part of your strategy made this work easier?

3. What part of your strategy proved to be difficult?

4. What did you learn about working with groups?

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Our Family Adventure Day Reflection

Answer the following questions using your learning from part one of our family adventure day activity. Make sure to use complete sentences and your best spelling.

5. What did you do differently and the same next time?

6. What answer did you get both times? What is the difference between these totals?

7. How well did your group work together?