Primary Mathematics: Accommodations and Assessments for Able Learners

Kathy Paul
Johnston Community Schools
Johnston, IA & Drake University
kpaul@johnston.k12.ia.us
2013
To view this presentation:

♦ [http://www.johnston.k12.ia.us/schools/elp/resources.html](http://www.johnston.k12.ia.us/schools/elp/resources.html)

♦ Or search “Friends of Johnston ELP”
First, assess
Determine Needs

- Standardized, District, or Subject assessments
- Checklists
- Performance tasks
Variety of Assessments

- Standardized Tests: Cognitive Abilities, Iowa Assessments, Wide Range Achievement Test, Sequential Tests of Educational Progress, Stanford Achievement, Metropolitan Achievement Tests, Key Math, Otis-Lennon Arithmetic Reasoning

- District Tests designed to demonstrate standards

- Year-End Tests: math series

- Parent/Teacher Checklists: often ask about strategies, graphs, organization of time, solving multi-step problems

- Open-Ended Mathematics Assessment
Performance Tasks

♦ Relate to district or state standards and benchmarks, including content and mathematical practice

♦ Match learning assessment to district expectations or common core standards

♦ Small group or individual

♦ Need to record answers/student explanation

♦ Establish a baseline, build rapport

♦ Can move to more formal testing as needed
Performance Tasks: Using manipulatives to determine ability in practice standards as well as content performance standards

- Number operations, reasoning, patterns, makes sense of numbers and perseverance in solving them: Create story problems using manipulatives to see how children solve addition, subtraction, basic computation. (I have 4 cubes and I found 5 more in my bag. How many do I have now?) After doing several, ask them to create a problem for you to solve.
Performance Task: Pencil and Paper

- Number sense, operations, reasoning, patterns: “What is the biggest number that you know how to write? What is the most difficult math problem you can solve? Show me some hard problems.” Listen and watch for the process used. May have trouble with vocabulary (subtraction, multiply, negative numbers) or placement (add horizontally but not vertically).
What is the biggest number you know?

Kyle
1,000,000
one million
dash is for 3 zeros

Kaitlyn
20,050
Two thousand and fifty

Cole
1,000,000
1 million
put a dash down lower

Tyler
1,000,000,000
1 billion has nine zeros
What is the biggest number you know?

Adam

A google - it has 100 zeros
What is biggest number you know?

Alex

4 million, quadrillion
It has 21 zeroes
I got it from a book "Adventures with Molecules"
This is how many molecules in 2 drops of water
Performance Task: Using Money

- Money, addition, multiplication, patterns, strategies, reasoning, graphing:
- Chart showing how many ways to make 25 cents
  - 2 dimes and 5 pennies
  - 1 quarter
  - 5 nickels
  - 25 pennies
  - 2 dimes and 1 nickel
  - 1 dime, 1 nickel, and 10 pennies
  - 1 dime, 2 nickels, and 5 pennies
  - 1 nickel and 20 pennies
Different responses

How many ways can you make a Quarter?

<table>
<thead>
<tr>
<th></th>
<th>1¢</th>
<th>5¢</th>
<th>10¢</th>
<th>25¢</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of coins</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>number of coins</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>number of coins</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>number of coins</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>number of coins</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>number of coins</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>number of coins</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Kaitlyn Tredick
How many ways can you make a Quarter?

<table>
<thead>
<tr>
<th>number of coins</th>
<th>1¢</th>
<th>5¢</th>
<th>10¢</th>
<th>25¢</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Tasks Using Time

- Time & addition: Individual clocks and series of statements. (It takes 10 minutes to clean the hamster cage. It takes 30 minutes to walk the dog. It takes 5 minutes to set the table. How many minutes have I used?) Check for ability to measure time in 5 minute increments. Knowledge of minute and hour hands, relationship between the two. May be able to add minutes in head without using the clock. Students can make their own time cards for extensions.
Logical thinking vs. Rote
Tasks with Ordinary Objects

Logical reasoning, spatial thinking, number sense: Create puzzles using 3-5 paper clips or small objects of various colors. (Book for ideas: Clue Clip Puzzles)

Example: (2 green clips, 1 blue clip, 1 red clip) The green clips do not touch. The red clip is between 2 clips of the same color. The blue clip is first. Students may or may not need to manipulate the clips. After several examples, see if students can create a problem for you to solve. Is it the same as one of your examples or original?
The two blues do not touch. The white touches both blues. The red does not touch the white.
More Tasks- 2nd - 3rd grade

- Number sense, operations, strategies, reasoning: Using a chart, show how to graph the number of units it takes to complete different sizes of squares
Students create chart or can scaffold to start.

<table>
<thead>
<tr>
<th>How many units?</th>
<th>How many blocks?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 block square</td>
<td>4 block square</td>
</tr>
<tr>
<td>1 x 1</td>
<td>X</td>
</tr>
<tr>
<td>2 x 2</td>
<td></td>
</tr>
<tr>
<td>3 x 3</td>
<td></td>
</tr>
</tbody>
</table>

How many different ways can you place blocks/units in the squares?
Accommodations

- Independent learning
- Large groups in regular classroom
- Small flexible groups
Independent Learning

- Manipulatives (K-3)
- Packets (1-3)
- Task cards (K-3) TOPS (Topics of Problem Solving) or similar types of individual cards given to or selected by students.
- Computer programs, such as IXL, web-based.
- Online Games: CoolMath-Games.com, ABCya.com, Figure This (NCTM), and MIND Research Institute (ST Math)
Technology: IXL

Here is a list of all of the skills students learn in second grade. The skills are organized by categories, and you can move your mouse over any skill name to see a sample problem. Just click on any link. IXL will track your score, and the questions will vary in difficulty as you improve!
Specific math topics by grade level

This input/output table shows subtraction. Find the rule and type in the blank.

<table>
<thead>
<tr>
<th>In</th>
<th>Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>51</td>
<td>45</td>
</tr>
<tr>
<td>83</td>
<td>77</td>
</tr>
</tbody>
</table>

Rule: -
Large groups in regular classroom

- Alternate Work (K-3) Eliminate basic skill repetitions, find another way to show mastery, provide a higher level of challenge

- Extend basic lesson (K-3)

- “9” – ways to equal 9 as opposed to writing numeral or beyond 4 +5. (39-30=9) (36/4=9)

- Create book of shapes

- ABC book for mathematics: A is for Abacus, B is for Big Numbers (or binary)
A trapezoid is half of an octagon.
A triangle is a very pointy shape.
A rectangle has 2 long sides and 2 short sides.
Large Groups (con’t)

- Centers (K-3) Use materials already in the room to promote mathematical thinking.
Large Groups

♦ Literature and math: Integrate with language and literature materials.

♦ Create story problems, graphing, grids with any book.

♦ Use quality books with math theme. See resource list.

♦ Keep track of progress through computerized records or notebooks.
Record Keeping

Miss Moderow’s

Kindergarten Data Binder
## Classifying

<table>
<thead>
<tr>
<th>Date:</th>
<th>Could recognized objects were sorted and added objects sorted by...</th>
<th>Still learning about classifying by attributes...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorted &amp; classified objects by attribute...</td>
<td>Could recognized objects were sorted and added objects sorted by...</td>
<td>Still learning about classifying by attributes...</td>
</tr>
<tr>
<td>Sorted &amp; classified objects by attribute...</td>
<td>Could recognized objects were sorted and added objects sorted by...</td>
<td>Still learning about classifying by attributes...</td>
</tr>
<tr>
<td>Sorted &amp; classified objects by attribute...</td>
<td>Could recognized objects were sorted and added objects sorted by...</td>
<td>Still learning about classifying by attributes...</td>
</tr>
<tr>
<td>Sorted &amp; classified objects by attribute...</td>
<td>Could recognized objects were sorted and added objects sorted by...</td>
<td>Still learning about classifying by attributes...</td>
</tr>
<tr>
<td>Sorted &amp; classified objects by attribute...</td>
<td>Could recognized objects were sorted and added objects sorted by...</td>
<td>Still learning about classifying by attributes...</td>
</tr>
</tbody>
</table>
Large Group: Calendar Time

- Differentiation using questions: What day is it in 3 days? What day is 3 weeks from Tuesday? Why can’t there be 6 Sundays in a month?

- Individual calendar to color in patterns, make personal calendar. How many ways can you make 24? Use money to make the date.
Small Flexible Groups - Advanced Concepts

- Statistics
- Fractions
- Egyptian numerals
- Probability
- Coordinates

-Enrichment Units in Math, Dandy Lion Publications, 1995 or Grid and Graph It, Fearon Teacher Aids.
Materials

- Set limits, explain expectations for use
- Allow time to explore before using as a teaching tool by first placing them in a learning center
- Some materials come with math kits from other grades and may not be in use
- Don’t overlook “donated” materials. Notify parents what you need!
Pattern Blocks

- Geometric designs
- Tessellations
- Fractions
- Adding & subtracting
- Logical thinking
Enlarge the shapes!
Attribute Blocks

- Logical thinking
- Sorting

Dominoes

- Sort by number of dots (pips)
- Games
- Create a template for an addition problem, etc.
- Count, add, or subtract
Open-Ended Domino Task
Cubes

- Show different ways to make a number using variety of colors

- Great Graphing by Scholastic & The Pattern Factory by Ideal School

Supply are potential sources.
Small counting objects

- Great for story or logic problems, probability
- Can often find these at party supply places
Greeting cards or coupons

♦ “play Store” – sort cards or coupons

♦ Create venn diagrams

♦ Price items, add them up. Subtract cents off from “regular” price
Tangram Puzzles

- Puzzles are great for logical thinking
- Students can create their own template
Problem solving

+ Make the squares 3 different ways using a variety of pieces in each square.

+ Use the 7 pieces to create an object. Trace around the shape. Use the shape to create a picture. Have a friend try to fit the puzzle pieces over the shape you created.
Book order forms

- Cut out picture of book to pretend to order. Use graph paper to get numbers and decimals lined up. May give each a certain “amount” to spend, or a certain number of books to purchase.
Geoboards

- User friendly
- Give rules for placing rubber bands with both hands BEFORE you start. Lots of problem solving situations.
Critical Thinking with Geoboards

Can create own problems and solutions using paper template or board.

How many squares can you find?

How can you keep track of the squares you find? (There are 50 in a 5x5 square).

How about rectangles?

Make letters of the alphabet on the board to study lines of symmetry.

How many triangles can you make with exactly one peg inside? What strategy did you use?

How many shapes with a perimeter of 12 “units” can you make?
“Pizza Wheels” or Die-Cut Circles

- Circles can be covered with clear laminate. Divide into sections (6-12) first. Students can write problems that can be solved by clipping on pre-numbered clothes pins. Can create problems for others to solve.
Literature and Math
Connections: Using Picture Books
Checklist for Selecting Quality Picture Books

- Content is mathematically sound and age appropriate
- Quality writing from a literature perspective
- Builds appreciation for math and literature
- Provides opportunities to reinforce or introduce mathematical concepts
- Supports students in thinking & reasoning
Source book from Marilyn Burns

- As Easy as Pi - Picture Books are Perfect for Teaching Math by Marilyn Burns, 2010.
- Ideas for how to use specific books with different grade levels
- Suggestions for selecting books
Literature: Addition and Subtraction


Literature: Classifying


Literature: Estimation

Literature: Problem Solving


MIND'S EYE

In a Picasso you might see,
both front and side concurrently!

He changed the way we think of art,
his Cubist style was just the start.
Literature: Fractions


Literature: Geometry & Patterns

♦ Flournoy, Valerie. The Patchwork Quilt. Dial, 1985


Literature: Measurement


Measuring Penny

Penny's Breakfast Dash

Penny's Times

- Her bed to her dish: 6 seconds
- Across the backyard: 4 seconds
- Around the block: 5 minutes
- To the park: 7 minutes
- To my bus stop: 15 seconds
Literature: Multiplication and Division

Literature: Money

Literature: Number Sense

Literature: Time


Thank you!

🔗 https://www.johnston.k12.ia.us/schools/elp/resources.html