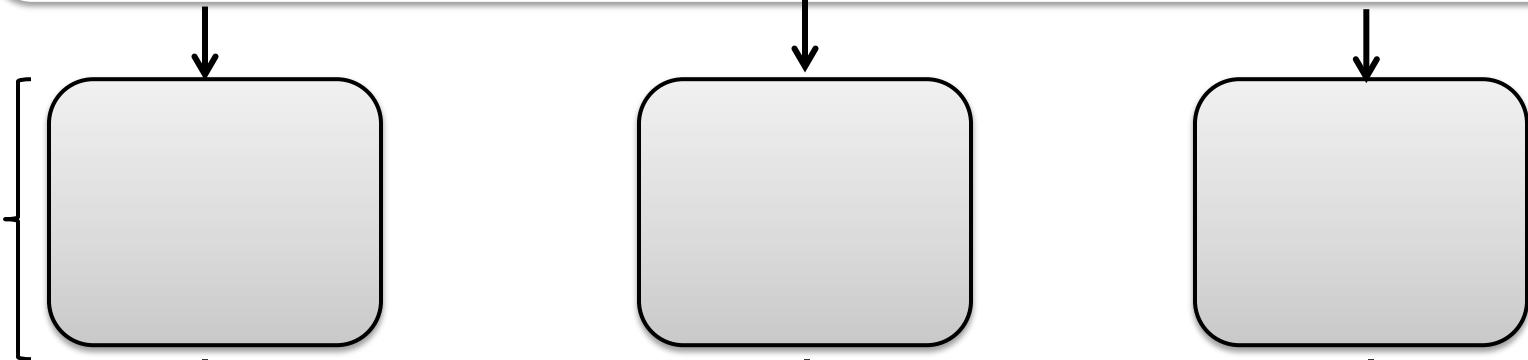


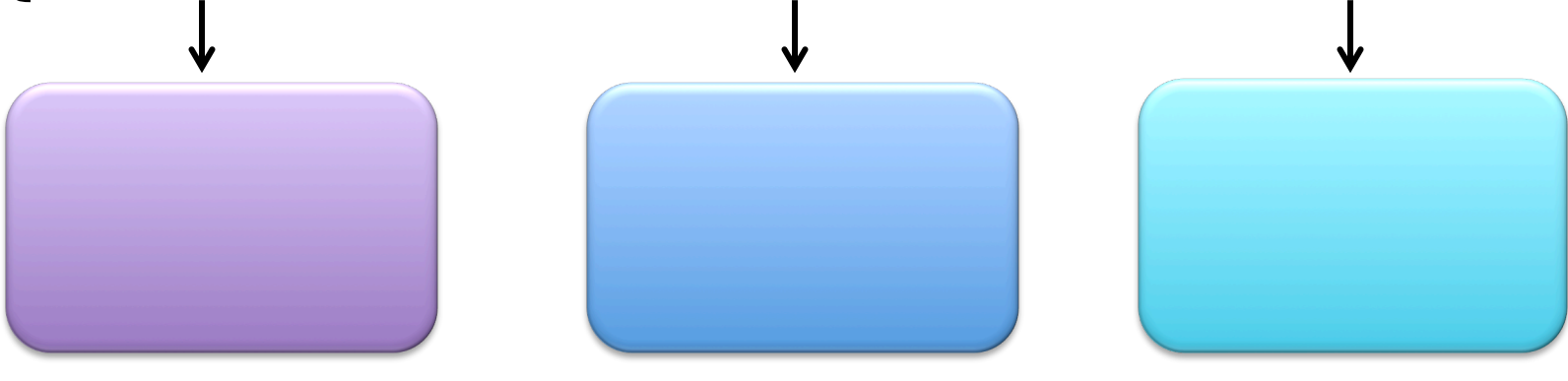
# GROUPING AND PARTITIONING PROBLEMS

Clarence has 6 bags of marbles. There are 5 marbles in each bag. All together he has 30 marbles.

WHAT IS UNKNOWN?



TYPE OF PROBLEM



EXAMPLE PROBLEM

Clarence has 6 bags of marbles. There are 5 marbles in each bag. How many marbles does Clarence have all together?

Clarence has 30 marbles. He puts 5 marbles in each bag. How many bags can he fill?

Clarence has 30 marbles. He put the marbles into 6 bags with the same number of marbles in each bag. How many marbles are in each bag?

Related problems: similar structure to the grouping/partitioning problems → can be constructed as multiplication, measurement division, or partitive division and can be modeled with counters.

## Rate

Problems involve a rate rather than a number of countable objects

Example: A baby elephant gains 4 pounds each day. How many pounds will the baby elephant gain in 8 days (multiplication)

## Price

A special type of rate problem in which the rate is the price per item

Example: Bubble gum costs 4 cents per piece. How many pieces of bubble gum can you buy with 20 cents? (measurement division)

## Multiplicative Compare

Problems have a comparison of two quantities in which one is described as a multiple of the other

Example: A giraffe is 18 feet tall. She is 3 times as tall as the kangaroo. How tall is the kangaroo? (partitive division)

The main focus for these problems should be the class of the problem type: multiplication, measurement division, or partitive division.

*Note: There are other types of multiplication and division problems that are not discussed in this session. We focused on problems that can be classified as multiplication, measurement division, or partitive division. Other problem types include symmetric problems: area, array, and \*combination problems. (\*not as foundational and more difficult; used sparingly in the primary grades)*

# ACTIVITY NOTES

## Plates and "Pieces"

Plates represent the sets/groups

Pieces represent the items

## Number Lines

Works best with multiplication and measurement division

-can use with partitive division but it's more difficult

\*Closed and Open Number Lines

## Base 10 Blocks

Great for transitioning students to working with larger numbers!

Easy to model multiplication and division!

Can model with remainders also  
-remember to give a context so remainders are meaningful

## **Arrays**

**Provides a way to transition students from concrete to semi-concrete representations with larger numbers**

## **Alternative Algorithms**

**Break apart the numbers to make things easier! (similar to array models)**  
**-Distributive Property in action**

**Partial Products and Partial Quotients**

## **Procedural Fluency**

**Using the Multiplication Chart in Meaningful Ways**

**Circles and Stars-Multiplication**

**Spinner Division**

**War Card Game**

## **Other Information**

**Introduce Traditional Algorithms as late as possible!**

**Make Homework Meaningful**

# MATHEMATICS RESOURCES

## RESOURCES

- Illuminations: <http://illuminations.nctm.org/>
- National Library of Virtual Manipulatives: <http://nlvm.usu.edu/>
- Annenberg Learner:  
<http://www.learner.org/resources/browse.html?discipline=5>
- McKinley Online Math Manipulatives:  
<http://mckinleytiger.com/math/manipulatives>
- Word problems:
  - [http://www.math-aids.com/Word\\_Problems/](http://www.math-aids.com/Word_Problems/)
  - <http://www.dadsworksheets.com/v1/Worksheets/Word%20Problems.html>
- Printable Number Lines:  
[http://www.helpingwithmath.com/resources/oth\\_number\\_lines.htm](http://www.helpingwithmath.com/resources/oth_number_lines.htm)
- Printable Materials:  
[http://lrt.ednet.ns.ca/PD/BLM/table\\_of\\_contents.htm](http://lrt.ednet.ns.ca/PD/BLM/table_of_contents.htm)
- Printable Base 10 Blocks (in color)  
<http://childdrivenlearning.files.wordpress.com/2013/02/place-value-strips-and-base-10-blocks-printable.pdf>
  
- John Van de Walle activity books
- Carpenter, T. P., Fennema, E., Franke, M. L., Levi, L., & Empson, S. B. (1999). *Children's Mathematics: Cognitively Guided Instruction*. Portsmouth, NH: Heinemann.
- Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2012). *Elementary and middle school mathematics: Teaching developmentally*. Upper Saddle River, New Jersey: Pearson

**Please feel free to contact us with any questions!**

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