

## Purposeful Planning in Mathematics: Begin with the End in Mind

What do we communicate to parents and students through our grading, class work, and homework practices?

### Talking Points:

- What factors should be included in grades?
  - Academic achievement? Behavior? Effort?
  - Is this the same across grade levels? School?
- Should students be graded when they are still learning something?

## Achievement

### Mathematics

Number and Operations  
Patterns and Relations  
Geometry  
Measurement  
Data Analysis and Probability  
Problem Solving

Progress

← Report ⇒

## Work & Social Skills

### Work Skills

Completes work as assigned  
Works independently  
Participates in class discussions  
Listens and follows directions  
Completes quality work

### Social Skills

### Standards Based Subjects

This report is based on grade level standards for each subject area. The ratings indicate your child's progress in relation to each term's standard.

- 4/A: Excellent  
3/B: Very Good  
2/C: Satisfactory  
1/NI: Needs Improvement  
M: Modified Work  
NA: Not taught or assessed

### Work and Social Skills

- E= Excellent  
S=Satisfactory  
NI= Needs Improvement

## Homework & Practice

### Why homework & practice?

To extend the school day and provide students with opportunities to refine and extend their knowledge.

### Specific purposes:

1) Fluency & maintenance: Practice & use what has already been learned (*structured around content in which students have a high degree of familiarity*)

2) Prepare for new content or elaborate on content that has been introduced (*in-depth understanding of content not necessary*)

### Articulation to parents/students:

Purpose, amount of time to spend, acceptable parent involvement, consequences for not completing - *fluency & maintenance compromised - lost opportunities to refine & extend knowledge.*

## Mathematics Classroom

Areas of Focus:

**Content** (*progress report topics*): Engage in problem solving to develop **conceptual understanding** & procedures.

**Problem Solving** (*progress report topic*): Develop and use problem solving **strategies** to reach reasonable solutions to fuzzy/multiple-step and open-ended problems. *What does problem ask? How might problem be solved? Solve/record. Does answer make sense?*

**Fluency & Maintenance** – Practice for fluency and review for maintenance (after conceptual understanding is in place)

Where on the progress report is this reflected?



## CURRICULUM MANAGEMENT: Content Focus (Beyond scope and sequence)

What core curriculum learning will the progress report grade(s) represent?

One way to create and maintain a focus: “Chunk” and “deal” the core curriculum:

<p>1<sup>st</sup> Quarter: Teaching Chunk 1</p> <p><b>Core learning ALL students will be expected to know, understand and do.</b></p>	<p>2<sup>nd</sup> Quarter: Teaching Chunk 2</p> <p><b>Core learning ALL students will be expected to know, understand and do.</b></p>	<p>3<sup>rd</sup> Quarter: Teaching Chunk 3</p> <p><b>Core learning ALL students will be expected to know, understand and do.</b></p>	<p>4<sup>th</sup> Quarter: Teaching Chunk 4</p> <p><b>Core learning ALL students will be expected to know, understand and do.</b></p>
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Sample of one CONTENT “chunk,” “dealt” to a *teaching chunk* folder:

Grade: 2	Standard I: Number & Operations	Fractions
Objective 2: <b>Use unit fractions to identify parts of the whole and parts of a set.</b>		
<p><b>ESSENTIAL QUESTIONS:</b> Find a variety of problem-based tasks (using teacher resources). Ask questions to focus student thinking on targeted learning. Find opportunities to use the target questions for similar problem situations across subjects. <b>These questions are intended to help students make their own sense out of the information we want them to understand, rather than having it imposed upon them.</b></p> <ul style="list-style-type: none"> <li>How might we <b>divide</b> “this” <u>shape</u> into <i>two/three/four</i> equal parts? How will we <b>name</b> the parts?</li> <li>How might we <b>divide</b> “this” whole <u>set of objects</u> into <i>two/three/four</i> parts of equal numbers of objects? How will we <b>name</b> the parts?</li> <li>How might we <b>represent</b> “this” unit fraction (<i>1/2 1/3, 1/4</i>) with <i>objects/pictures/words/symbols</i>?</li> <li>How might we use what we know about fractions to solve “this” problem?</li> </ul>		
<p><b>UNDERSTAND:</b> A fraction is a number that stands for a part of something. Fractional parts are always “fair shares” or “equal-sized portions” of a whole or unit (<i>a unit can be an object or a set of objects</i>).</p> <ul style="list-style-type: none"> <li>We can divide a <u>whole shape or object</u> into equal parts:  = one whole rectangle.  We can describe this picture as: “<i>1 out of 2 equal parts is shaded</i>” or “<i>half of the rectangle is shaded</i>” or “<i>½ of the rectangle is shaded.</i>”</li> <li>We can divide a <u>whole set of objects</u> into parts of equal number of objects:  OO OO OO = One whole set of objects.  We can describe this picture as: “<i>One out of four equal parts is shaded</i>” or “<i>one-fourth is shaded</i>” or “<i>¼ is shaded.</i>”</li> <li>Fractional parts have special names that tell how many parts of that size are needed to make the whole. <i>For example, “thirds” require three parts to make a whole; fourths require four parts to make the whole, and so on.</i></li> <li>The <u>denominator</u> represents the number of equal parts in the whole and the <u>numerator</u> represents the number of equal parts being considered. <b>Don’t expect students to use these formal terms when describing fractions.</b></li> </ul>	<p><b>KNOW &amp; DO (Core Curriculum):</b></p> <ol style="list-style-type: none"> <li>a. <b>Divide</b> geometric shapes into two, three, or four equal parts and <b>identify</b> the parts as halves, thirds, or fourths.</li> <li>b. <b>Divide</b> sets of objects into two, three, or four parts of equal number of objects and <b>identify</b> the parts as halves, thirds, or fourths.</li> <li>c. <b>Represent</b> the unit fractions 1/2, 1/3, and 1/4 with objects, pictures, words (e.g., ___ out of ___ equal parts), and symbols.</li> </ol> <p><b>KNOW and USE:</b> <b>halves, thirds, fourths, 1/2, 1/3, ¼.</b></p>	

# CURRICULUM MANAGEMENT: Problem Solving (Strategy) Focus

## Word Problems

Choose an operation or operations

Translate a story situation into a number sentence or sentences to solve.

One-Step

### Choose an operation

The sales record for second-grade students was 75 boxes. The sales record for first-grade students was 56 boxes. How many more boxes did the second-grade students sell than the first-grade students?

(Operation:  $75 - 56 = 19$ )

Multiple-Step

### Choose the operations

Carrie is allowed to watch 35 hours of television each week. If she watches 20 hours on the weekend, how many hours, on the average, can she watch television each weekday?

(Operations:  $35-20=15$  and  $15\div5=3$ )

## Open-ended Problems

Problems that lend themselves to multiple solution paths

Process Problem

### Select a strategy or strategies

*Guess/check/revise, draw a picture, make a table, look for a pattern, work backward, solve a simpler problem, make organized list, etc.*

Six people entered a tennis tournament. Each player played each other person one time. How many games were played?

A B C D E F  
B C D E F  
C D E F  
D E F  
E F  
F

$5 +4 +3 +2 +1 +0 =15$  games played.

Situational Problem

### Collect data outside of the problem to solve

*Formulate a clear statement of problem and sub problems. Identify assumptions that need to be made and the data needed for finding a solution.*

Your class is going to the zoo. Parents will help with driving. Plan how many cars you will need.

## Universal Problem Solving Strategies

Use problem-solving strategies to reach reasonable solutions to problems.

- **Study**  
What does the problem ask?  
How will the answer look?
- **Explore**  
How might the problem be solved?
- **Record**  
Solve the problem.
- **Check**  
Does the answer make sense?

### Use process skills to gain access to learning:

Reasoning  
Communication  
Connections  
Representation

### **Explain thinking throughout**

Management:

Create a Problem Solving Task Folder full of many, varied, problem task ideas. Tasks may “look like” worksheets in “teacher folder,” but should NEVER look like a worksheet when a problem task is presented to students. *For more information: Sign up to take “Connecting Kids and Content” (Jordan School District/Professional Development Catalog).*

## COMMON ASSESSMENTS (Pre/Post)

How will we know when students have learned? What will we use as evidence?

*Teacher Collaboration:*

*Careful attention is paid to alignment of core curriculum VERBS and assessment VERBS.*



## INSTRUCTIONAL MANAGEMENT

Starting points determined by **pre-assessment** information:

(“Teaching Chunk” folders – *Framework* sheets)



## ON-GOING ASSESSMENT informs actual instruction & practice

See “*Assessment Forms*” – *Teacher/Student* and “*Assessment Samples*”

After listening to student ideas & monitoring participation, the teacher decides when instruction/mini-lesson is appropriate. The teacher decides when it’s time to provide information, clarify an issue, model or lead - when it’s time to attach mathematical notation or language to students’ ideas – when it’s time to intervene with suggestions or hints. **“Should they struggle some more, or should I intervene? Is progress being made? What will I do if students don’t learn? What will I do if students already know it?”**