Formative Assessment a Practical Approach

Using Good Questions and Tasks to Assess Student Understanding

NCTM Annual Meeting April 2010



#### **Summative Assessment**

## ... assessment of learning



#### **Formative Assessment**

## ... assessment *for* learning



## **Formative Assessment**

- Provides teachers and students with information about what students understand.
- Reveals students' misconceptions.
- Occurs as a part of daily instruction.
- Guides instruction to improve student learning.



## **Strategies for Formative Assessment**

- Presenting students with open questions and tasks
- Observing students
- Listening to students
- Examining student work



## **Open Questions and Tasks**



- In what ways does the task allow students to develop their mathematical skills and understanding?
- What will I know about my students as a result of their working on the task?



World Series Math For All: Differentiating Math Instruction By Dacey and Gartland

Among the students in our math class, 15 stayed up late to watch the baseball game and 5 did not.



## Assessing for ...

- Accuracy
- Flexibility
- Engagement



#### "It means most of us watched the game and so most of us are tired!"

"The majority of us watched the game."

## "The minority did not watch the game."



## "Seventy-five percent of us watched the game."

## "Oh, that means that twenty-five percent of us didn't watch the game."



"One-quarter of us didn't watch the game."

"That means three-quarters of us watched the game."

"The majority of the kids that watched the game probably follow the team or one of the teams."

#### "That's me. I'm a real fan."



"The ratio of students who watched the game to those who did not was three to one."

"Seventy-five percent is the probability of us staying up late again."



## "Any fool can know. The point is to understand."

#### -Albert Einstein



## **NCTM Process Standards**

- Problem Solving
- Reasoning
- Making Connections
- Communicating
- Representing





## Observing and Listening to Students



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How would you convince someone that these fractions are in order from least to greatest?



## Where does 2/5 fit? Explain your reasoning.



## Examining Student Written Work



When these cubes are connected to make a train, do you think it will be shorter, longer, or about the same length as the line below? (Mark an "x" above the appropriate choice.)



## **Snap Cube Train Problem**

There are 30 cubes in the train.

Each cube is 3/4 inches long.

How long is the train when all 30 cubes are snapped together?

Solve the problem in two ways. Share your thinking with someone sitting nearby.



Examining Student Written Work

# What does the collection of work suggest about next instructional steps?



because he know 22'h cube equals that сn en 3/4 inches. We rounded inch.Then เพก 62 ulo m ഷ 60 and som Q 50 us whic ea. 70 we inc **/q** ncn. nch 25 Group 6 cn 92 h



## 1.00= 4/4 00 3/4=.75 so we multipled ,75x 30 = 22.5 which is 221/2 inches our answer is 22 you inches. another way we figered it out $was 30 \times 3 \div 4 = 22.5$



## table 5

2. 
$$\frac{3}{4} + \frac{3}{4} = 1\frac{1}{2}$$
 or 1.5  
(.5 (2 cubes))  
15.0 (15 cubes because 30 in half)  
22.5 (totle)



## **Strategies for Formative Assessment**

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"Formative assessment ... has the goal of providing feedback that educators can use throughout the year, ultimately leading to students who are more prepared to take a standardized test later in the year.



"It's important to understand and value this type of assessment ... since it can serve the purpose of helping us improve instruction on a day-to-day basis, all year long."

This Is Only A Test: Teaching for Mathematical Understanding in an Age of Standardized Testing Nancy Litton and Maryann Wickett, 2009



#### References

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- •Dacey, Linda and Karen Gartland. Math for All: Differentiating Instruction Grades 6-8.Sausalito, CA: Math Solutions, 2009.
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