Accomack County Public Schools

Questioning (Assessing) Across Bloom's Cognitive Continuum:

Revealing the Depth of Student Understanding

Today's Objectives

- Discuss what makes good questions and questioners
- Examine and discuss research regarding cognitive level of questions
- Identify, discuss, and understand level of Bloom's for sample questions
- Explore use of open-ended questions to uncover depth of student understanding

Personal Response System

Personal Response System

I am rested and ready to go after closing out the 2012-13 school year last week.

A. Strongly disagree
B. Disagree
C. Really? Are you serious?
D. Agree
E. Strongly agree


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Why Do We Question (Assess)?

- To develop interest and motivate students to become actively involved in learning
- To evaluate students' preparation and check on homework or work completion
- To develop critical thinking skills and a disposition of inquiry
- To review and summarize previous learning
- To nurture insights by exposing new relationships
- To assess achievement of instructional goals and objectives
- To stimulate students to pursue knowledge on their own

What Makes a Question Good?

A good question is …

- Clear and coherent
- Purposeful
- Brief
- Natural
- Thought provoking

How Do Good Questioners Question?

Good questioners…

- Mediate and/or redirect incorrect responses
- Use wait time (5 seconds) for think time
- Widely distribute questions and monitor who responds
- Direct to whole group/then individual
- Use feedback purposefully depending upon the intent of the question
- Avoid yes/no, tugging, guessing, rhetorical, and leading questions

Survival Values in Learning Over 12 Months

- Attitudes about subjects, studies, self (100%)
- Thinking skills processes (80%)
- Motor skills (70%)
- Conceptual Schemes (50%)
- Factual material (35%)
- Nonsense syllables (10%)

Research regarding the cognitive level of questions finds:

- On the average, during classroom recitations, approximately 60 percent of the questions asked are lower cognitive questions, 20 percent are higher cognitive questions, and 20 percent are procedural.
- Higher cognitive questions are not categorically better than lower cognitive questions in eliciting higher level responses or in promoting learning gains.
- Lower cognitive questions are more effective than higher level questions with young (primary level) children, particularly the disadvantaged.
- Lower cognitive questions are more effective when the teacher's purpose is to impart factual knowledge and assist students in committing this knowledge to memory.
- In settings where a high incidence of lower level questions is appropriate, greater frequency of questions is positively related to student achievement.
- When predominantly lower level questions are used, their level of difficulty should be such that most will elicit correct responses.
- In most classes above the primary grades, a combination of higher and lower cognitive questions is superior to exclusive use of one or the other.
- Students whom teachers perceive as slow or poor learners are asked fewer higher cognitive questions than students perceived as more capable learners.
- Increasing the use of higher cognitive questions (to considerably above the 20 percent incidence noted in most classes) produces superior learning gains for students above the primary grades and particularly for secondary students.
- Simply asking higher cognitive questions does not necessarily lead students to produce higher cognitive responses.
- Teaching students to draw inferences and giving them practice in doing so result in higher cognitive responses and greater learning gains.
- Increases in the use of higher cognitive questions in recitations does not reduce student performance on lower cognitive questions on tests.
- For older students, increases in the use of higher cognitive questions (to 50 percent or more) are positively related to increases in: on-task behavior, length of student responses, the number of relevant contributions volunteered by students, number of student-to-student interaction, student use of complete sentences, speculative thinking on the part of students, relevant questions posed by students.
- For older students, increases in the use of higher cognitive questions (to 50 percent or more) are positively related to increased teacher expectations about children's abilities - particularly the abilities of those students whom teachers have habitually regarded as slow or poor learners.

Source: Northwest Regional Education Laboratory, 2001

Table Talk

- What surprises you about the findings?
- What questions are raised by the findings?
- What are the implications for our work with students?

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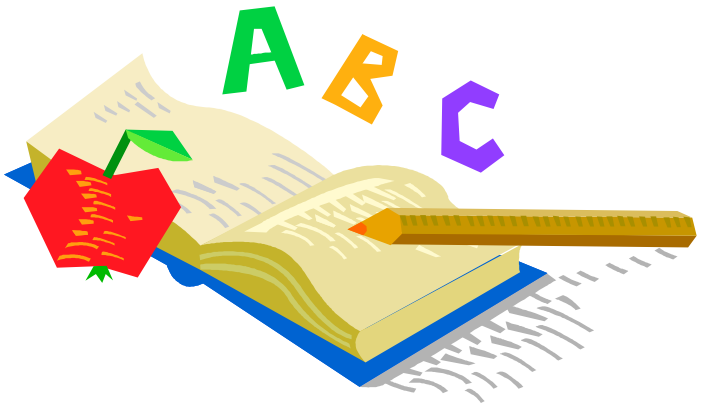


Assessing (Questioning) Across Bloom's Continuum in Language Arts

Levels of Bloom's in Virginia SOL

Reading 2.8 The student will read and demonstrate comprehension of fictional texts.

a) Make and confirm predictions.

b) Relate previous experiences to the main idea.

c) Ask and answer questions about what is read.

d) Locate information to answer questions.

e) Describe characters, setting, and important events in fiction and poetry.

f) Identify the problem and solution.

g) Identify the main idea.

h) Summarize stories and events with beginning, middle, and end in the correct sequence.

i) Draw conclusions based on the text.

j) Read and reread familiar stories, poems, and passages with fluency, accuracy, and meaningful expression.

Levels of Bloom's in Virginia SOL

Reading 11.4 The student will read, comprehend, and analyze relationships among American literature, history, and culture.

a) Describe contributions of different cultures to the development of American literature.

b) Compare and contrast the development of American literature in its historical context.

c) Discuss American literature as it reflects traditional and contemporary themes, motifs, universal characters, and genres.

d) Analyze the social or cultural function of American literature.

e) Analyze how context and language structures convey an author's intent and viewpoint.

f) Explain how the sound of a poem (rhyme, rhythm, onomatopoeia, repetition, alliteration, assonance, and parallelism) supports the subject, mood, and theme.

g) Explain how imagery and figures of speech appeal to the reader's senses and experience.

h) Explain how an author's specific word choices, syntax, tone, and voice support the author's purpose.

i) Read and analyze a variety of American dramatic selections.

j) Analyze the use of literary elements and dramatic conventions including verbal, situational and dramatic irony used in American literature.

k) Generate and respond logically to literal, inferential, evaluative, synthesizing,

Jack and Jill

Jack and Jill went up the hill

To fetch a pail of water.

Jack fell down and broke his crown

And Jill came tumbling after.

Level of Bloom's

F – Creating

E – Evaluating

D – Analyzing

C – Applying

B – Understanding

A –Remembering

What did Jack and Jill do?

Level of Bloom's

F – Creating

E – Evaluating

D – Analyzing

C – Applying

B – Understanding

A –Remembering

Would it be reasonable to suggest that Jack and Jill have other motives in going up the hill?

Level of Bloom's

F – Creating

E – Evaluating

D – Analyzing

C – Applying

B – Understanding

A –Remembering

Who fell down first?

Level of Bloom's

F – Creating

E – Evaluating

D – Analyzing

C – Applying

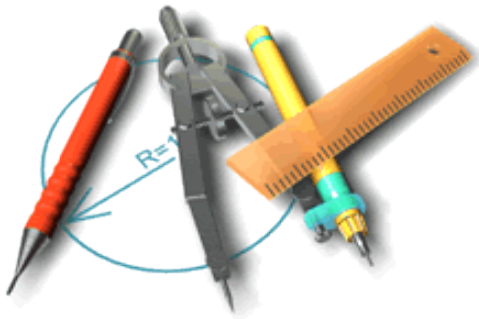
B – Understanding

A –Remembering

Does it make sense to go up hill after water?

Survival Skills for the 21st Century

Critical Thinking and Problem Solving
Collaboration Across Networks and Leading by Influence
Agility and Adaptability
Initiative and Entrepreneurship
Effective Oral and Written Communication
Accessing and Analyzing Information
Curiosity and Imagination



Uncovering Student Understanding in Mathematics: Closed vs. Open-ended Assessments

Types of Questions

- **Narrow** (only one acceptable answer)
  - Cognitive Memory (naming, defining, recalling, observing, recognizing)
  - Convergent (explaining, solving, stating relationships, comparing, contrasting)
- **Broad** (many acceptable answers)
  - Divergent (predicting, hypothesizing, inferring, imagining)
  - Evaluative (judging, valuing, justifying, defending)

15 $7 + 9 =$

A 19

B 16

C 11

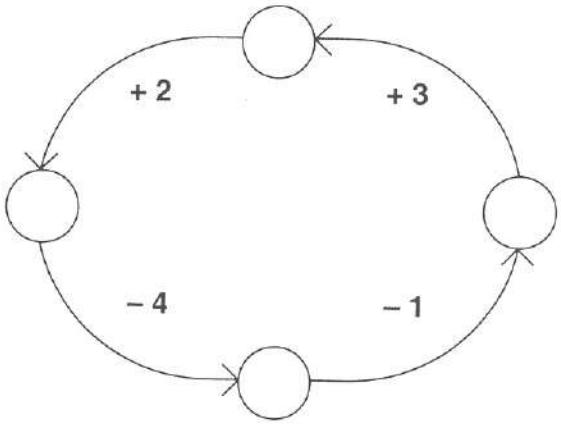
D 18

Addition Rings

This problem gives you the chance to

- *use the number ring to make some computations*
- *describe your results*
- *explain why your results came out the way they did*

This is a special kind of number ring. Any number that goes into the top circle gets changed as it goes around to the other circles.



1. Try this ring: Put a number in the top circle. Now move to the left and add 2. Write the answer in the corresponding circle. Continue around the number ring and fill in the circles. What is the result? _____

_____

_____

Closed vs. Open-ended Questions

Closed-ended Question

The children in the Smith family are aged 3, 8, 9, and 16. What is their average age?

Open-ended Question

There are four children in a family. The youngest child is 3. The oldest child is 16.Their average age is 9. How old might the children be?

Closed vs. Open-ended Questions

Closed-ended Question

337 + 456=

Open-ended Question

On a train trip I was working out some distances. I spilt some soft drink on my paper and some numbers disappeared. My paper looked like

$$\begin{array}{r} 3\,?\,7 \\ +\ ?\,?\,6 \\ \hline 7\,9\,? \end{array}$$

What might the missing numbers be?

Closed vs. Open-ended Questions

Closed-ended Question

Round this number to the hundreds place: 1,238

Open-ended Question

A number has been rounded off to 1,200. What might the number be?

Closed vs. Open-ended Questions

Closed-ended Question

4 x 6 = ?

Open-ended Question

?

Rosa, Glen, Cathy, and Errol each bought snacks from several vending machines. Each person got back 6 coins, but they were different combinations of coins.

Each person received less than $1 in change. The machines returned only nickels, dimes, and quarters. Each person had at least one of each coin.

- Rosa had the fewest dimes but the same number of quarters as Errol.
- Glen had an equal number of nickels, dimes, and quarters.
- Cathy had the same number of quarters as Glen.
- Errol had more dimes than Cathy.

Cathy had more dimes than quarters.

- Rosa had fewer quarters than Cathy.

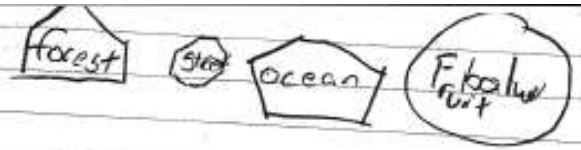
Question: How much money did each person get back from the machines?

Bonus question: How much money did they get back in all?

The artwork at the Isosceles Museum is unusual because the picture frames are not rectangles. On one wall, the paintings have frames in the shapes of a pentagon, a circle, a hexagon, and an octagon.

- The forest watercolor is next to the octagon.
- The ocean scene is not surrounded by a five-sided frame.
- The fruit-bowl painting has a frame shaped like a grapefruit.
- The painting of city streets has a frame in the shape of a stop sign.

Which painting is in each frame?



The forest frame is shaped like a pentagon
The street frame is shaped like an octagon
The ocean frame is shaped like a Hexagon
The Fruit Bowl frame is shaped like a circle

First I looked at the first clue, the forest scene is next to a octagon so I wrote forest then drew a octagon next to it. Then I looked at the second clue, the ocean scene is not surrounded by a pentagon frame, there are 2 other possibilities so I skipped it and went on to the 3rd clue, the fruit bowl painting is shaped like a circle, so I drew a circle with the words "fruit bowl" in it, the fourth clue says that the street scene is shaped like a octagon, so I wrote street in the octagon I drew, the last clue is the 2nd clue which means that the forest scene is shaped like a pentagon. The last shape left is the hexagon which means that the ocean scene is in the hexagon frame.

Forest = Hexagon
Ocean = Pentagon
Fruit = Circle
City = Octagon

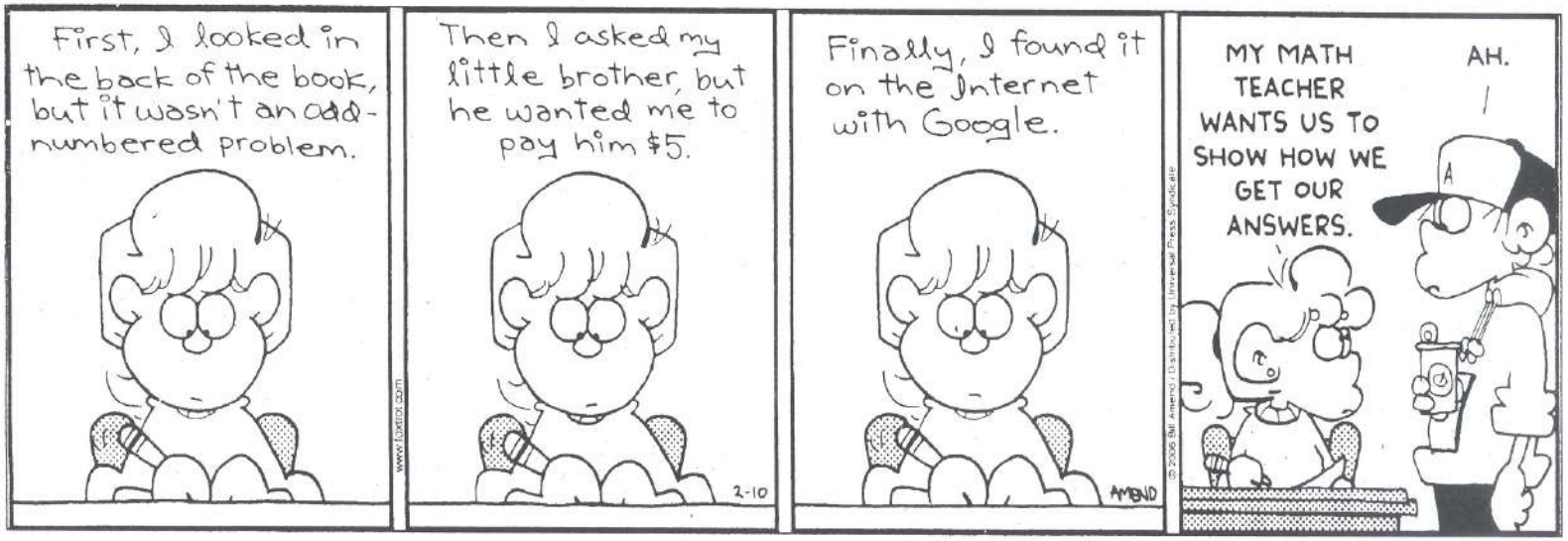
First, I got the answer by looking at the Discribing words like Next, Surrounded, and Shaped. And Matched the name with the Shape. I Know that a Stop sign is shaped like a Octagon, and a grapefruit is a circle. I also Knew that a five sided Shape is a pentagon for Ocean. And the Hexagon is the last one for the Forest

fruit bowl = circle
city = octogon
ocean = pentagon
forest = hexagon

I got this answer by looking at the question. Then I started with the easiest shape which was the circle And I know that a grapefruit is round. Then I went to the last one and I got the octogon for the city. And I knew an octogon has the shape of a stop sign. I went to the second one which was the ocean and I know a pentagon has 5 sides. And I went to the first painting and It was the last shape so it was the hexagon.

https://www.dropbox.com/s/nmgbx5nt0gfmhmc/Video%20Feb%2004%2C%201%2044%2050%20PM.mov

FOXTROT BILL AMEND



Blooms to Structure of Knowledge

- Fact questions
- Higher cognitive fact questions
- Concept questions
- Procedural questions
- Metacognitive questions

Using the Structure of Knowledge to Generate Questions: Human Migration

- Factual questions
- Application + *How did settlement of the East Coast impact what was to become the United States?*
- Concept questions *How might the United States be different if the West Coast had been settled before the East Coast?*
- Procedural questions
- Metacognitive questions

"Questions and questioning may be the most powerful technologies of all. Questions enable us to make changes in life, to invent new and better ways of doing things."

Source: McKenzie, J. (2000) Beyond Technology: Questioning, Research, and the Information Literate School.