

Asking Questions in Class: Influencing Learning and the Learning Environment

Learning Objectives:

- 1) *Recognize the positive impact of asking higher-order classroom questions.*
- 2) *Develop question structures and delivery that promotes learner engagement.*
- 3) *Develop a strategic approach to question delivery that facilitates deep learning and metacognition.*

Andrew P. Binks

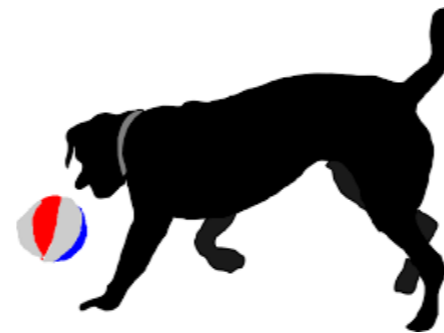
Virginia Tech Carilion School of Medicine
Department of Basic Science Education

Why do we ask questions?

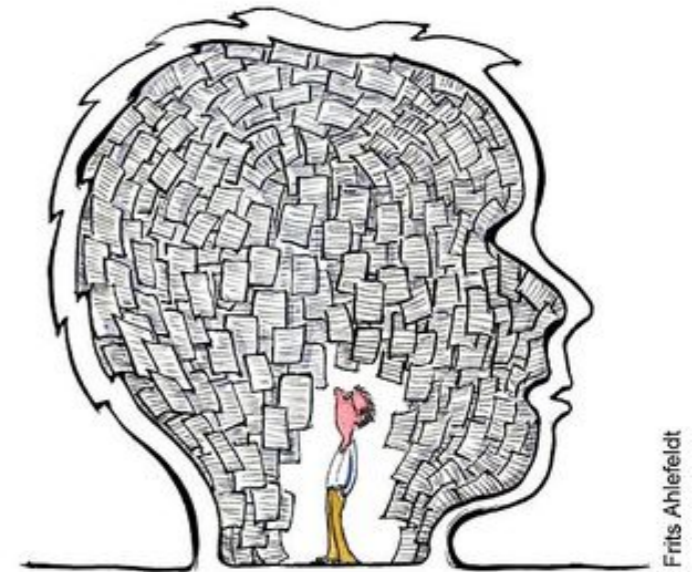
Elaborate Knowledge: working with information to enhance retention



Retrieval: solidifying neural connections



Assess for Understanding: identifying learning illusion



By Frits Ahlefeldt

Stimulate curiosity

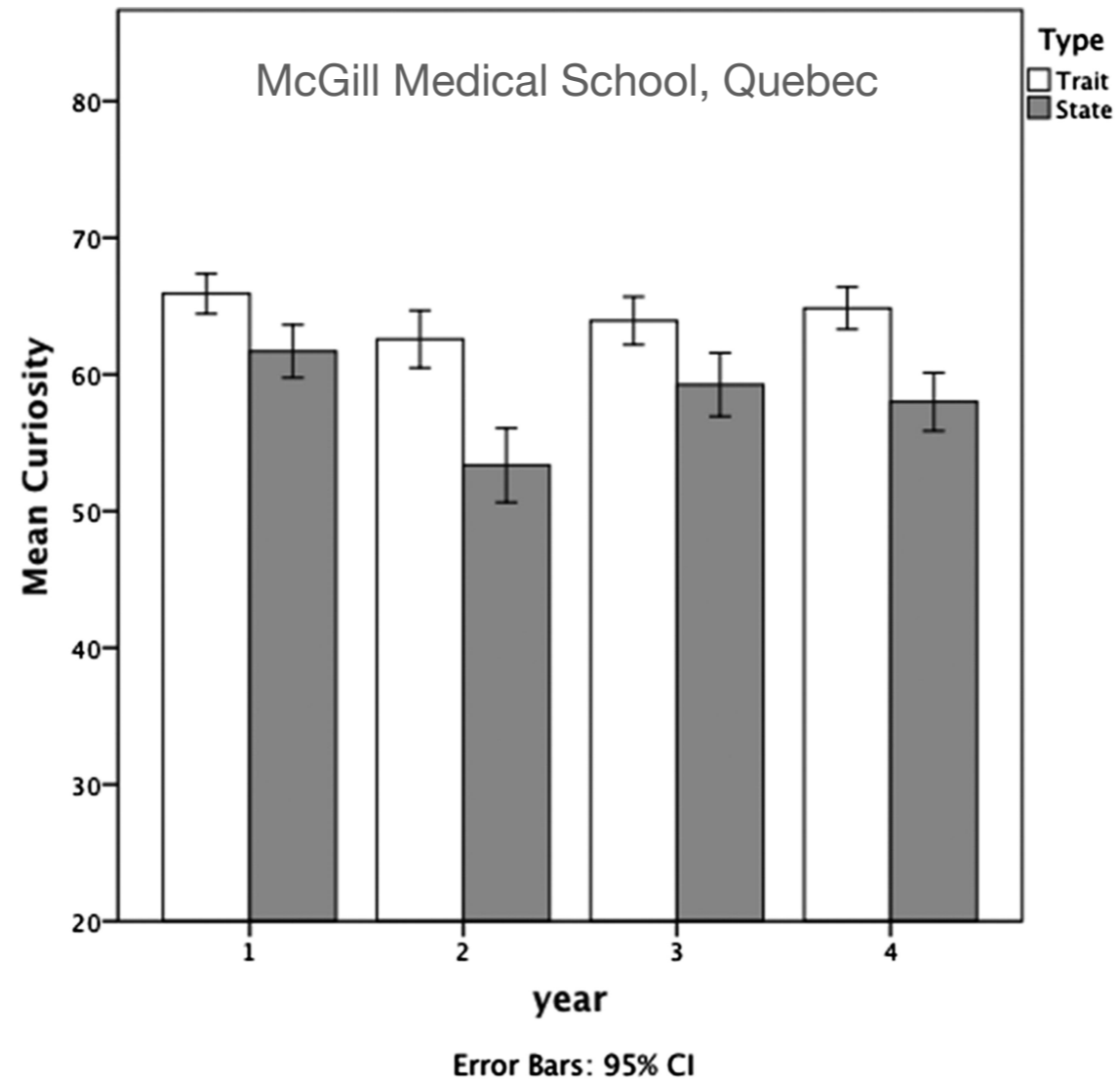


Dealing with uncertainty: getting accustomed to not knowing





Promoting Curiosity in Medical Education?



Medical Teacher, 39 (4), 2017

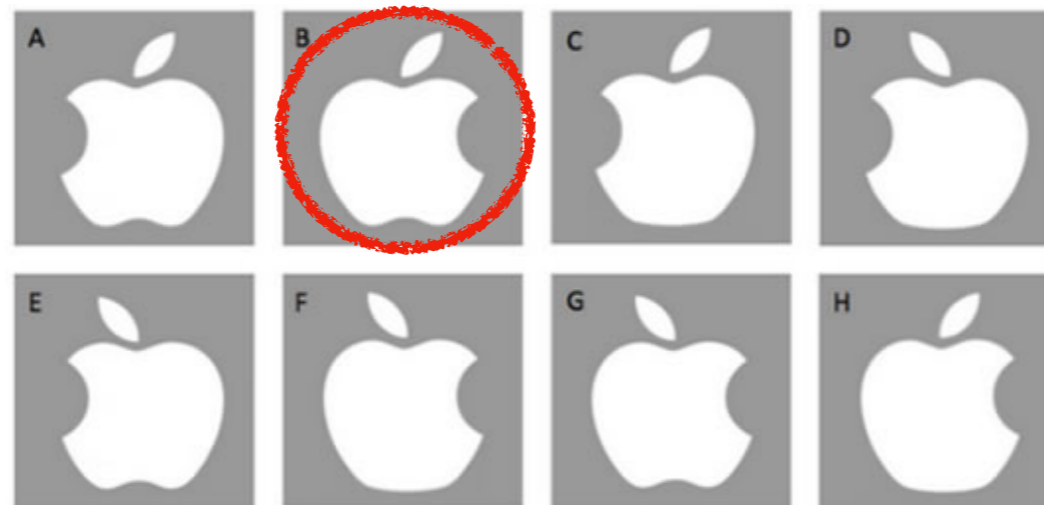
Learning Illusion

By Fritz Ahlfeldt

Read it = know it
Read it again = really know it
Read it yet again = totally nailed it

Pennies for Your Thought

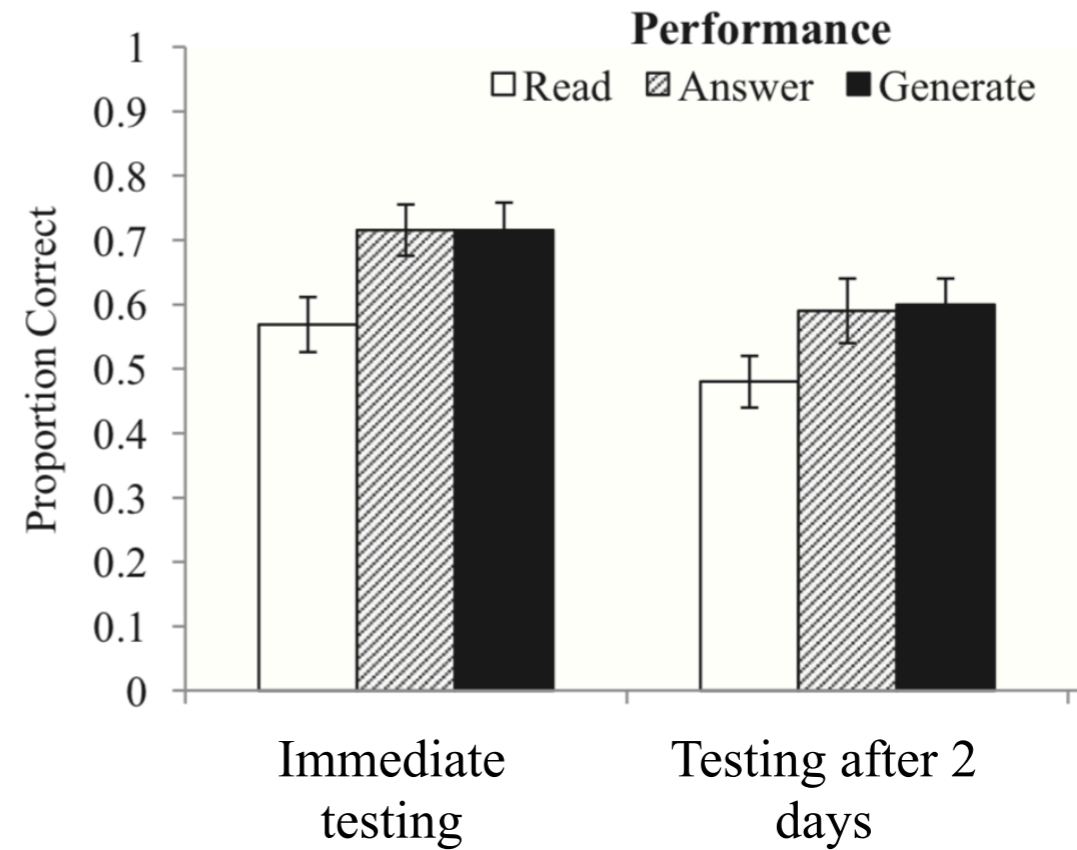
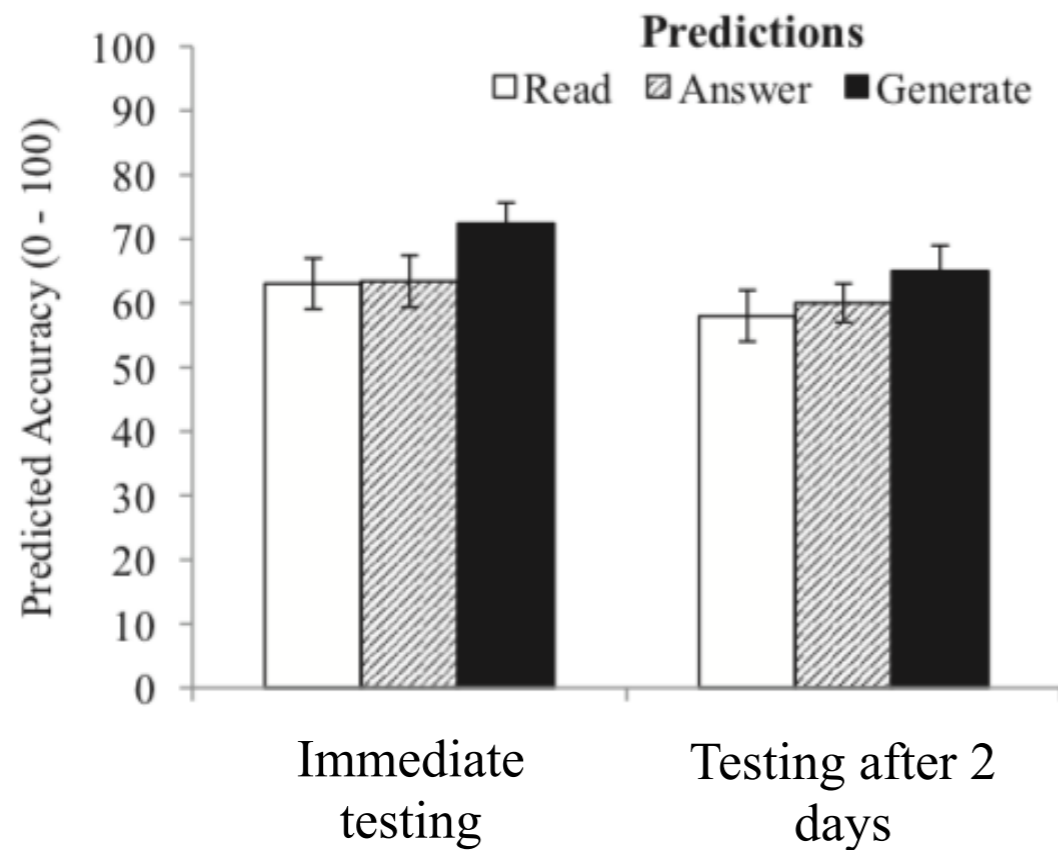
Participants in a 1979 experiment were shown these 15 drawings and asked to identify the correct penny design. Just over 40 percent chose correctly (answer below).



Blake, A. B., Nazarian, M., & Castel, A. D. (2015). Quarterly Journal of Experimental Psychology, 68(5), 858–865.



A Comparison of Study Strategies for Passages: Rereading, Answering Questions, and Generating Questions



Case - Generate questions to assess and engage the student?

A 55-year old woman presents with 24-hours of shortness of breath. SaO₂ is 88% and she is experiencing chest pain that is sharp in nature. She feels lightheaded with change in position. She is now in the ED and a student consults you regarding further workup and management.

What is the most common cause of chest pain in a middle-aged woman?

What is your differential diagnosis?

What do you not want to miss here?

What do you think her arterial CO₂ is, high or low?

What is the first test you should order?

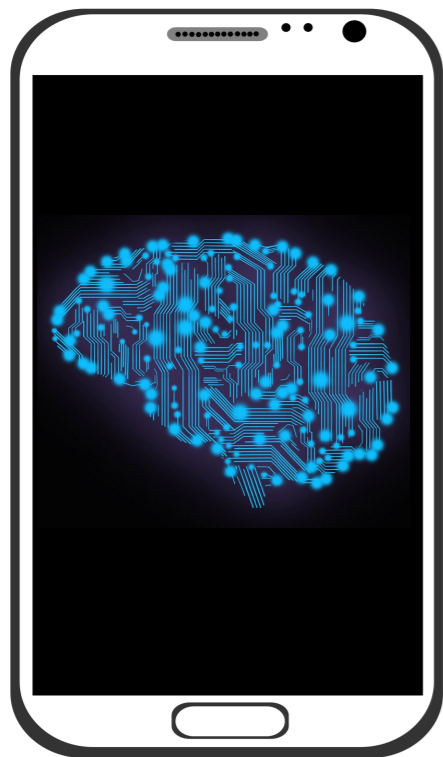
Basic fact answers

1-3 word answers

Challenging

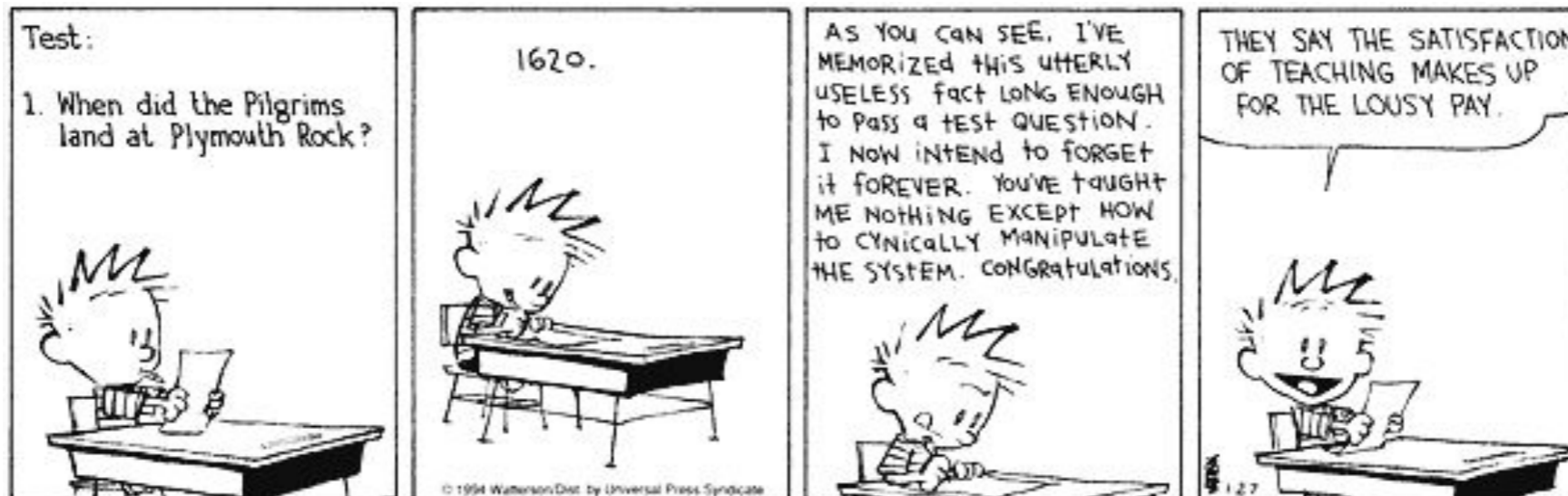
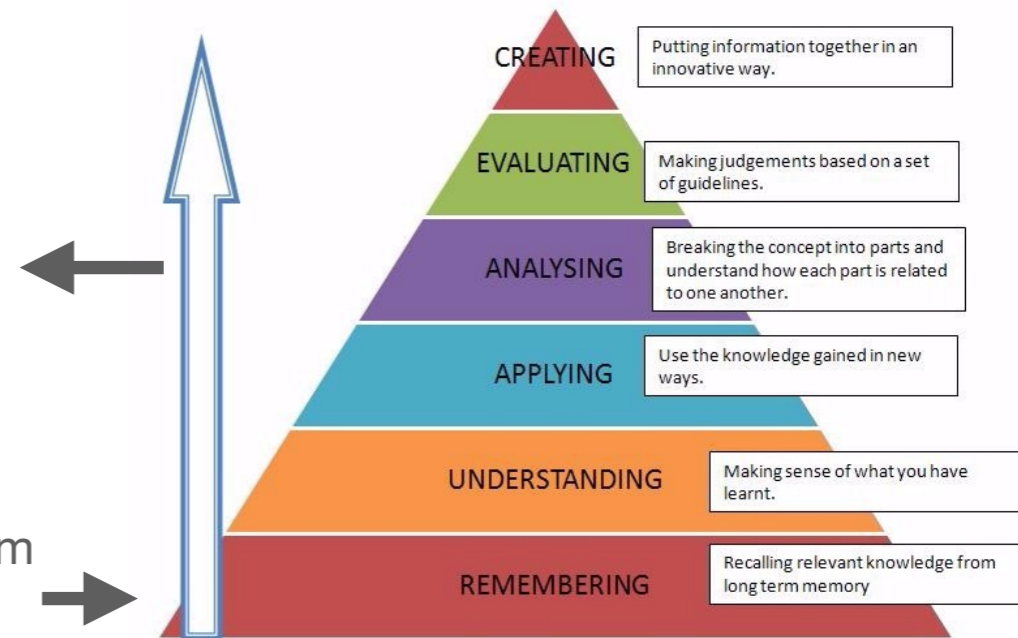
Right or Wrong answers

Changing role of the Educator



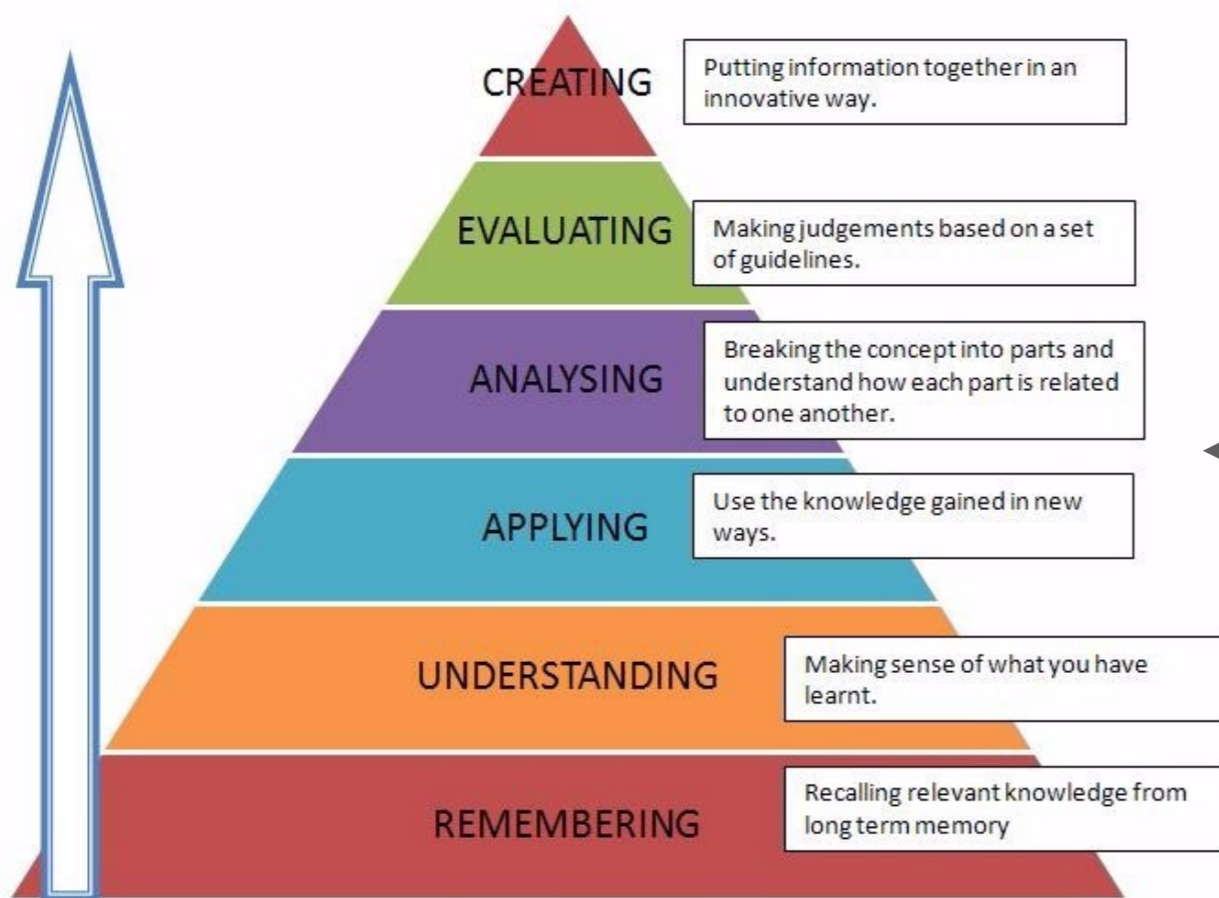
12-27% gain in performance

~80% Classroom questions



Changing role of the Educator

Promote thinking & life long learning



(1) On-task behavior

(2) Length of student responses

(3) The number of relevant contributions volunteered by students

(4) The number of student-to-student interactions

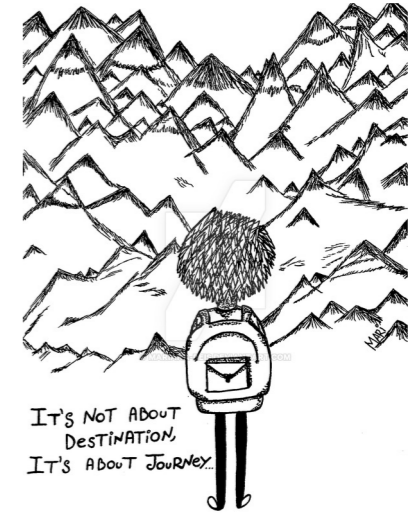
(5) Student use of complete sentences

(6) Speculative thinking on the part of students

(7) Relevant questions posed by students

Thinking about their thinking

How does the student approach the problem?



Reveal cognitive bias

Be a role model in thinking for the student



Case - What questions can you generate to assess and engage the student?

A 55-year old woman presents with 24-hours of shortness of breath. SaO₂ is 88% and she is experiencing chest pain that is sharp in nature. She feels lightheaded with change in position. She is now in the ED and a student consults you regarding further workup and management.

Why is a O₂ saturation of 88% a concern?

Why would a change in position produce lightheadedness?

How might her chest pain be related to her oxygen saturation?

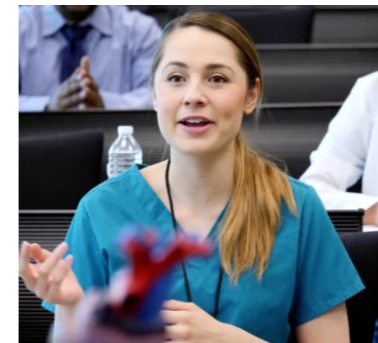
How would knowing she had a high arterial PCO₂ influence your Ddx?

How? Why? Predict. Explain.

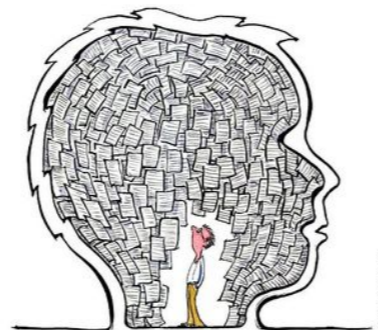
- Allows Learner to move



- Allows Learner to get something right



- Reveals Thinking
- Stops guessing

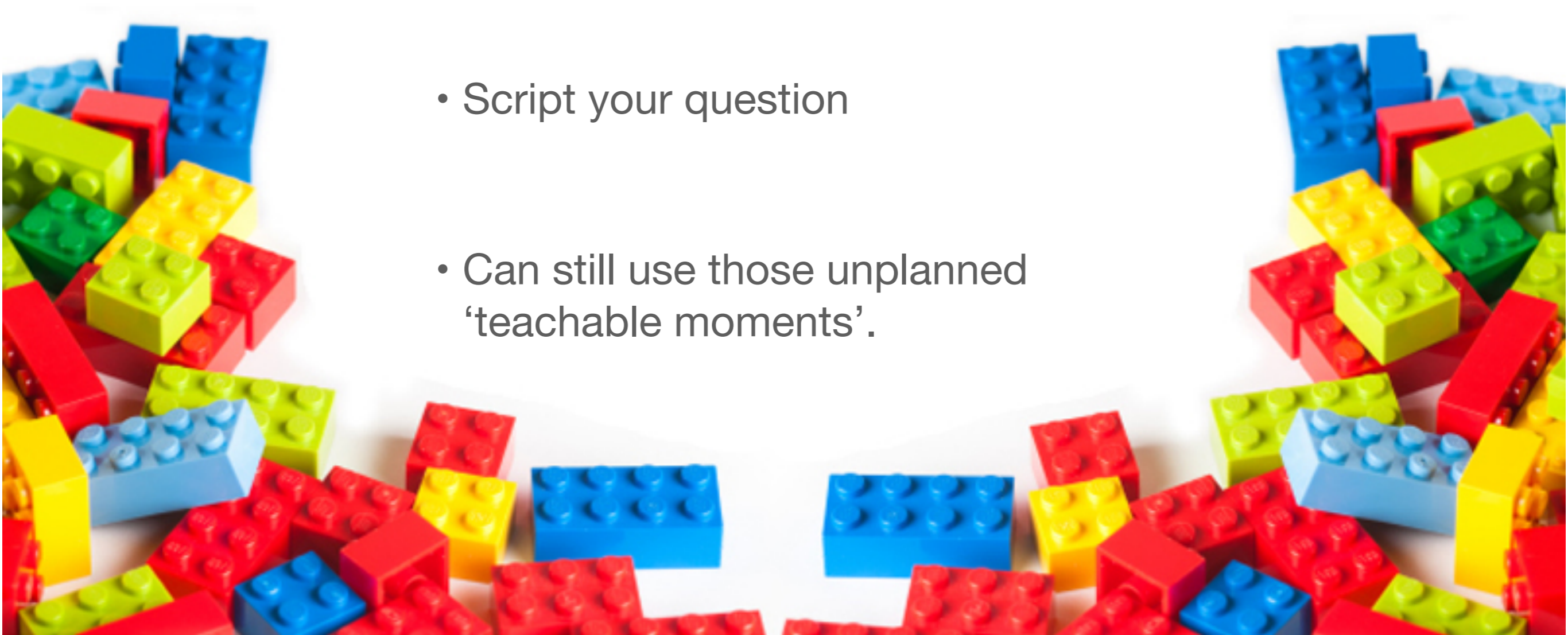


- Allows you to build on their answer (probe, hint)



Preparation - building questions

- ‘Productive’ how/why questions are hard to generate on the fly.
- Plan your destination - develop and sequence questions with strategic purpose.
- Script your question
- Can still use those unplanned ‘teachable moments’.



Creating a Safe Learning Environment

Admits your own limits - *“Good question, I don’t know”*



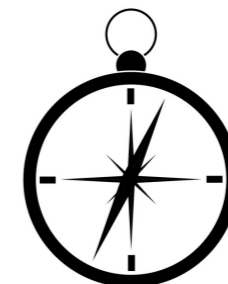
Yielding to student ideas - don’t be too rigid in your lesson plan, go with their curiosity.



Be excited about getting a good question or answer

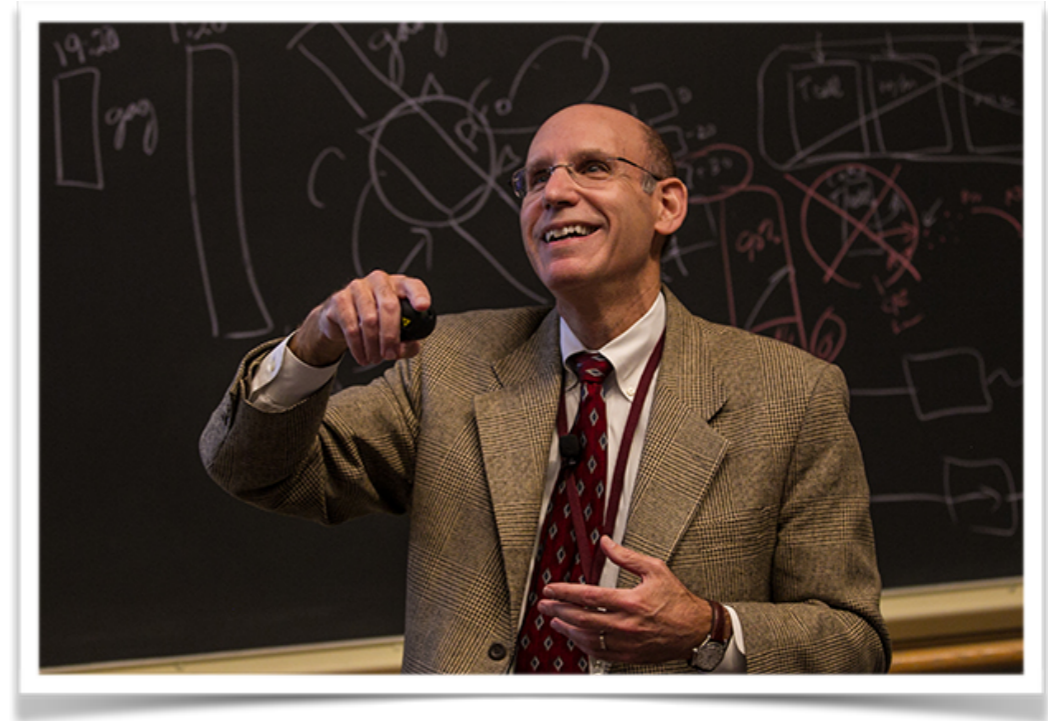


Tell the students why you’re asking questions



Delivery: Create your Learning Environment

- Introduce your topic with a question.
- Wait time #1 (7-10 seconds)
- Schwartzstein Rule - *'never leave a student not having said something correct'* - rephrase, provide a hint or lead them.
- Ask the rest of the class if they agree or have something else to offer - denotes your expectation of involvement.
- Don't settle for a superficial response.
- Wait time #2: Let the student finish.
- Reinforcement is important - individualize, but don't overdo it.



Learning Environment: Dealing with Smarty Pants

- Can deter/frustrate others by:
 - Answering all the time
 - Giving overly complex answers
 - Asking off-topic or overly complex questions



- Simply tell them its someone else's turn
- Ask to discuss a complex issue later with them
- Defer the question to a later time or class (don't forget)

Summary

DO: Pose 'Why', 'How' high-level questions

DO: Provide time for learner to digest the answer

DO: Ask for elaboration on even the correct answers

DO: Promote Peer-Peer interaction

DON'T: Handwave...

DON'T: Allow distractions posed by complex questions - stay at level of learner, not the smarty pants.

DON'T: Ask "Does everyone understand?"

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