ANNALS OF MEDICINE

EVERY DISEASE ON EARTH

Elmhurst Hospital's medical melting pot.

BY RIVKA GALCHEN

New Yorker (23 May 2013)

FID Series No. 10
APR 2014

Can you rephrase that?
A systematic approach to inquiry based teaching

Karen Spear Ellinwood, PhD, JD
Richard Amini, MD

Session Objectives

We intend for you to be able to do the following by the time we end our session:

1) Identify the **principles** of effective questioning.

2) Identify and describe **factors** involved in creating an inquiry-friendly environment.

3) Describe **key considerations** in formulating effective questions.

4) Describe how you can **formulate effective questions** for inquiry-based teaching in preclinical or clinical teaching.

- Science is about inquiry.
- Good scientists are inquisitive.
- Medicine is about inquiry.
- Good doctors are inquisitive.
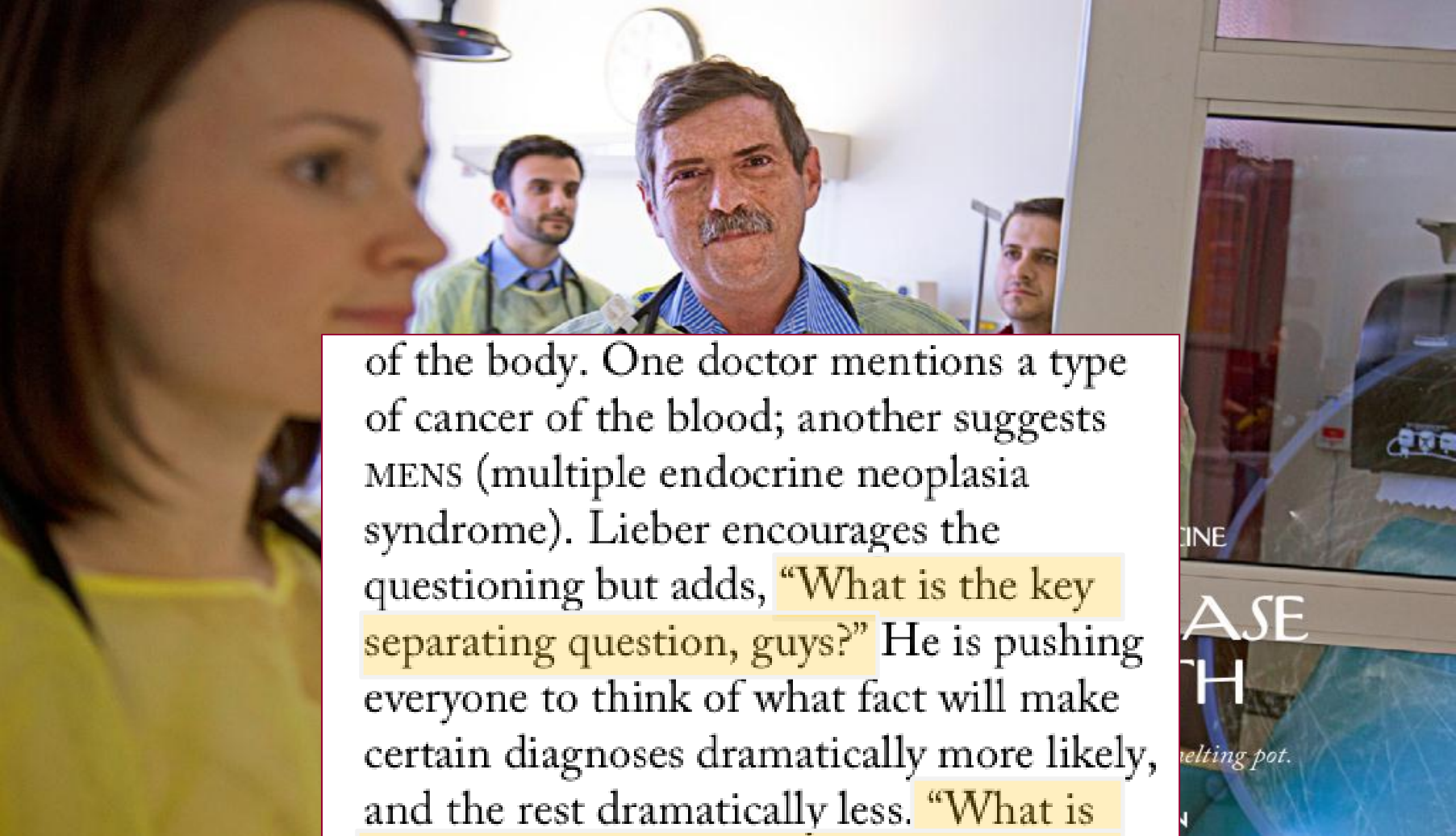
of the body. One doctor mentions a type of cancer of the blood; another suggests MENS (multiple endocrine neoplasia syndrome). Lieber encourages the questioning but adds, "What is the key separating question, guys?" He is pushing everyone to think of what fact will make certain diagnoses dramatically more likely, and the rest dramatically less. "What is going to split the path of the differential diagnosis?"
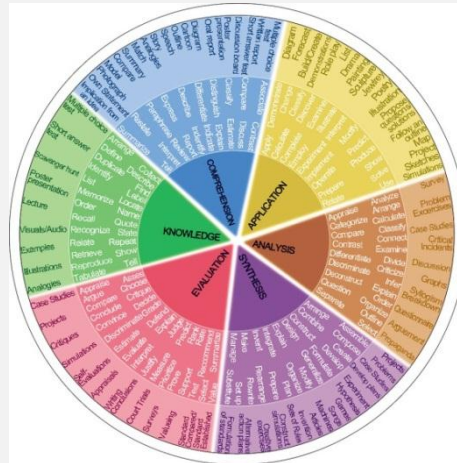
Source: The New Yorker, 13 May 2013
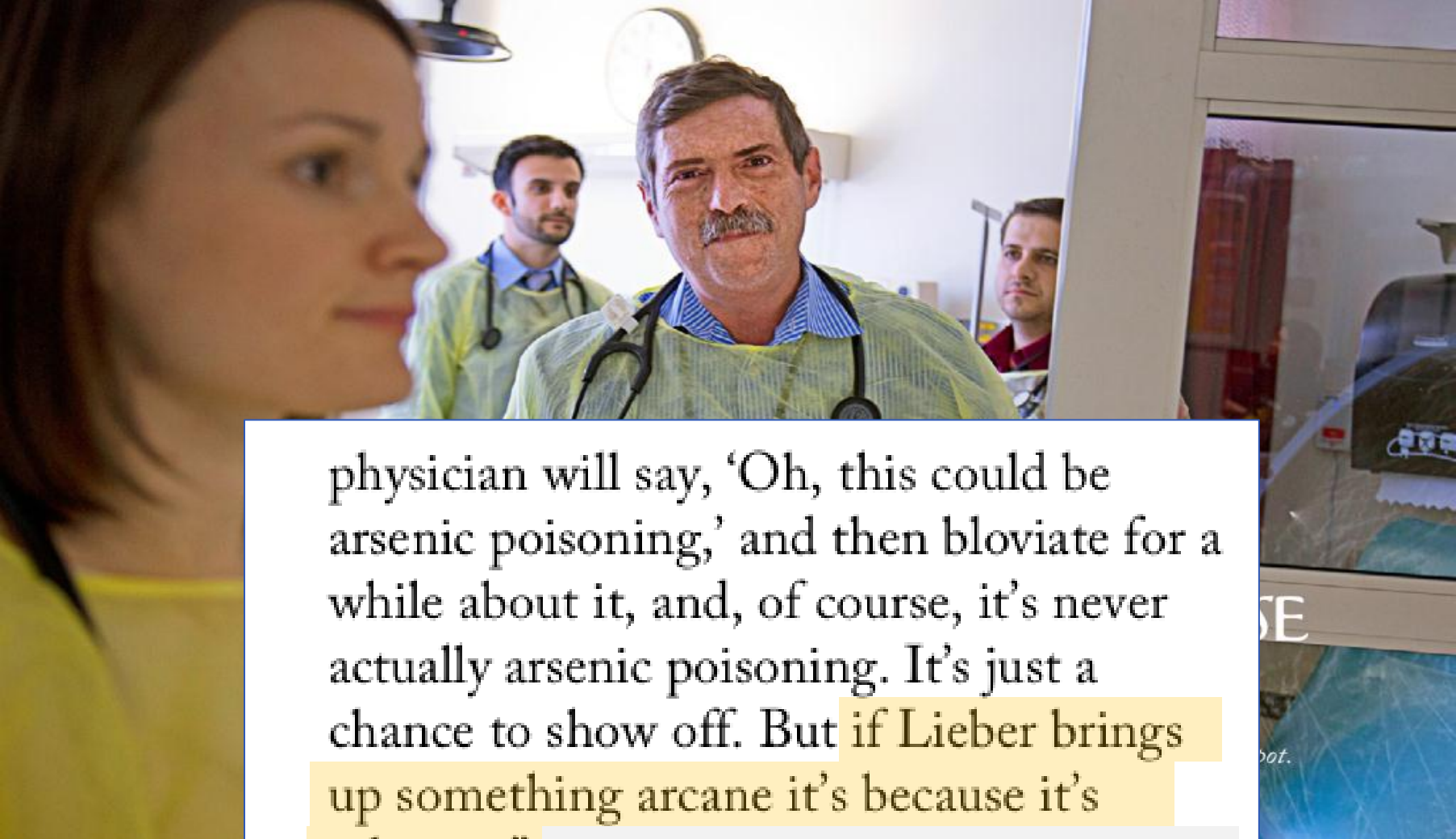
physician will say, 'Oh, this could be arsenic poisoning,' and then bloviate for a while about it, and, of course, it's never actually arsenic poisoning. It's just a chance to show off. But if Lieber brings up something arcane it's because it's relevant."
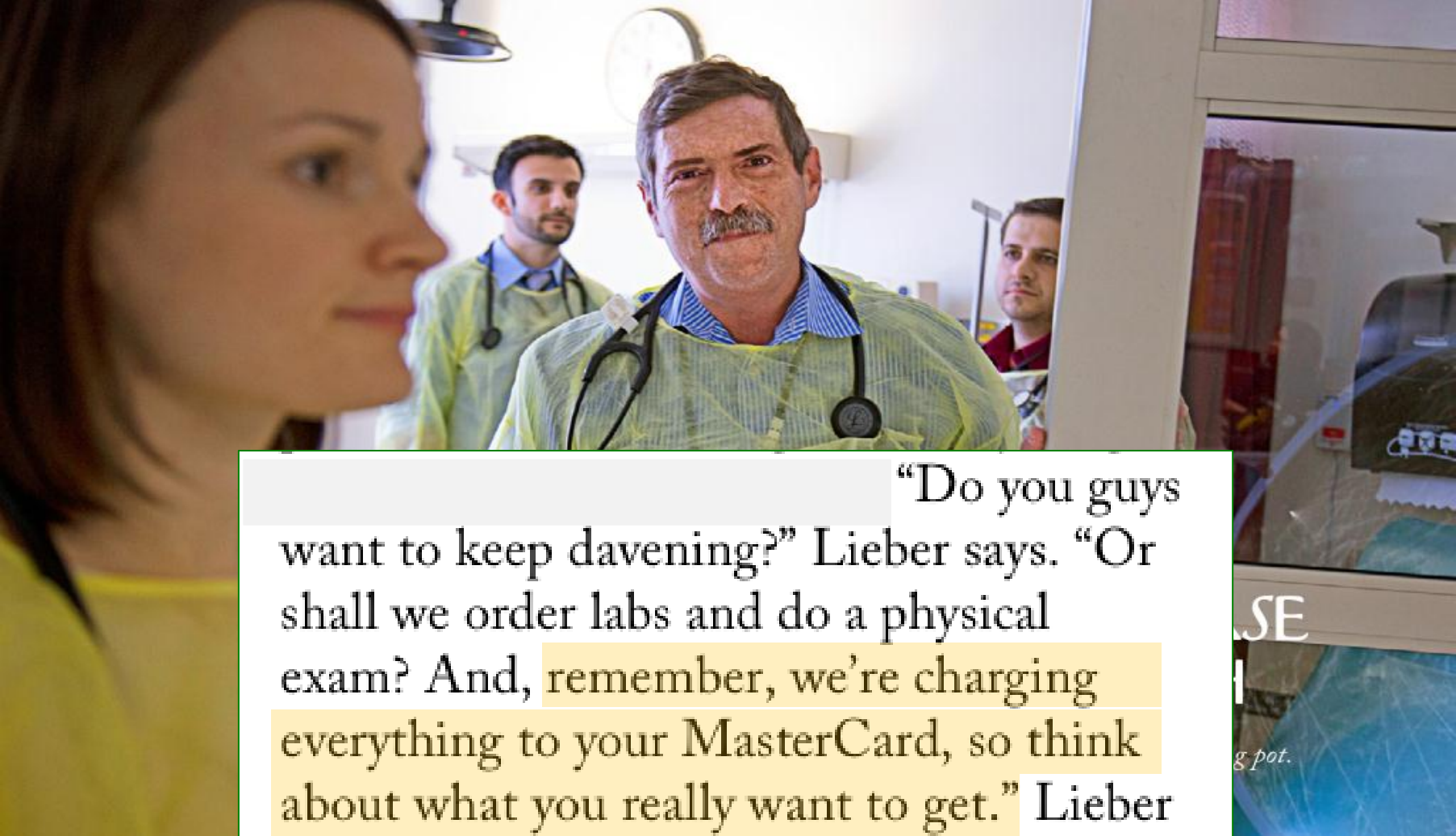
"Do you guys want to keep davening?" Lieber says. "Or shall we order labs and do a physical exam? And, remember, we're charging everything to your MasterCard, so think about what you really want to get." Lieber

Will the real Socratic method please stand up?

We should (encourage students to)

Ask Strategic Questions

But what does inquiry-based teaching look like?

And what makes a question effective?

The challenge is strategically frame and phrase questions.

Effective or Ineffective?

- Why did you even bother to swab her?

- Are you really going to wait for the culture results?

Objection
CAN YOU REPHRASE THE QUESTION?

Objection

CAN YOU REPHRASE THE QUESTION?

The challenge is strategically frame and phrase questions.

What did you think of these questions?

- How do you decide who to do a throat swab on?

- So how do you determine if your suspicion is low?

- Did you know there are at least 4 signs or predictors for strep?

[LO1-LO2] Principles of effective inquiry-based teaching

1) Create a comfortable climate.

2) Aim questions at the learner's "proximal developmental level" – not at their "actual" level.

3) Get the student to tell the story, describe the process or perform the procedure.

4) Wait for a response.

5) Plan follow-up questions and, when time & setting allow, ask learners to pose follow-up questions.

YOU CAN CALL ON STUDENTS DIRECTLY

BUT DON'T LEAVE THEM FEELING STRANDED OR DEFENSELESS

Principle No. 1
Create a Comfortable Climate

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Create a Comfortable Climate

Every question is attended by psycho-social conditions of the climate we (help) create.

- **Psychological Safety**
- **Social equity**
- **Motivate participation**

- Build trust and confidence = Convey it's "safe" to risk not knowing
- Respect
- Allow reasonable wait time
- Allow life lines

Principle No. 1
Create a Comfortable Climate

Every question is attended by psycho-social conditions of the climate we (help) create.

- **Psychological Safety**
- **Social equity**
- **Motivate participation**

- Help students get beyond "peripheral participation" (Lave & Wenger, 1997 – learning communities)
- Set boundaries for students who dominate

Principle No. 1
Create a Comfortable Climate

Every question is attended by psycho-social conditions of the climate we (help) create.

- **Psychological Safety**

- **Social equity**

- **Motivate participation**

- Respond to what's been said
- Work it in to where you're going next to build on prior knowledge
- Demonstrate interest
- Respond to questions
- Make the question interesting (challenging)
- Reward - Offer praise
- Return to issues that were unresolved

Principle No. 2
Aim questions at the learner's "proximal developmental level"

- Learner
  - Medical student
  - Intern
  - Resident

- Context
  - Preclinical
  - Clinical

Q: How do we determine the learner's actual developmental level? Proximal developmental level?

A: **Lay Foundation**

Q: In Bloom's Taxonomy for which cognitive dimensions would we aim?

A: **Aim for cognitive dimensions, Knowledge & Comprehension**

Principle No. 2

Aim questions at the learner's "proximal developmental level"

- Learner
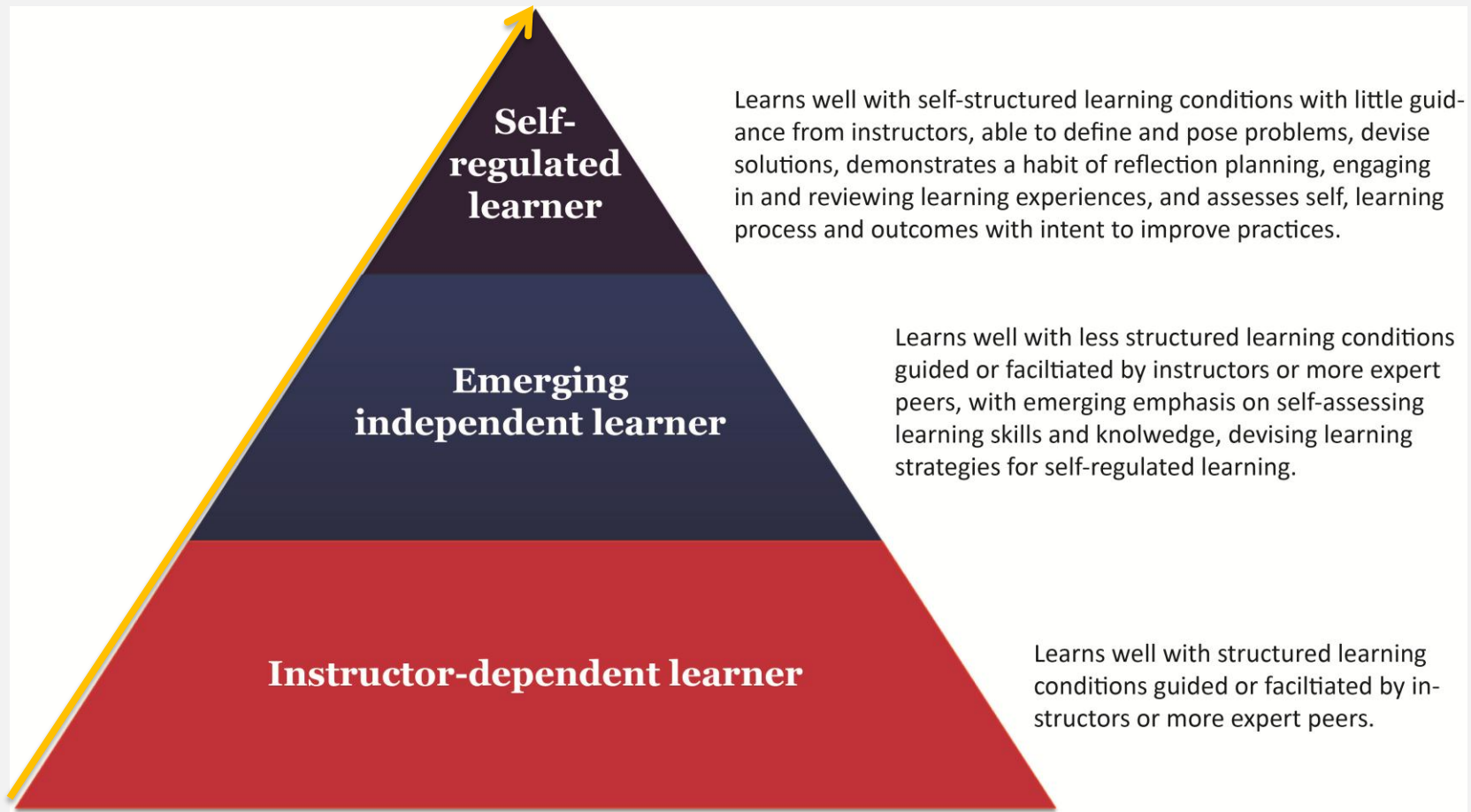 - Medical student
  - Intern

Q: How do we determine the learner's actual developmental level? Proximal developmental level?

A: **Lay Foundation**

Q: In Bloom's Taxonomy for which cognitive dimensions would we aim?

A: **Aim for cognitive dimensions, Knowledge & Comprehension**

Developmental curriculum is based on the concept of the actual and proximal developmental levels

Self-regulated learner

Learns well with self-structured learning conditions with little guidance from instructors, able to define and pose problems, devise solutions, demonstrates a habit of reflection planning, engaging in and reviewing learning experiences, and assesses self, learning process and outcomes with intent to improve practices.

Emerging independent learner

Learns well with less structured learning conditions guided or faciltiated by instructors or more expert peers, with emerging emphasis on self-assessing learning skills and knolwedge, devising learning strategies for self-regulated learning.

Instructor-dependent learner

Learns well with structured learning conditions guided or faciltiated by instructors or more expert peers.

How do you provide strategic guidance to students to help them move from the ACTUAL developmental level to the PROXIMAL developmental level?
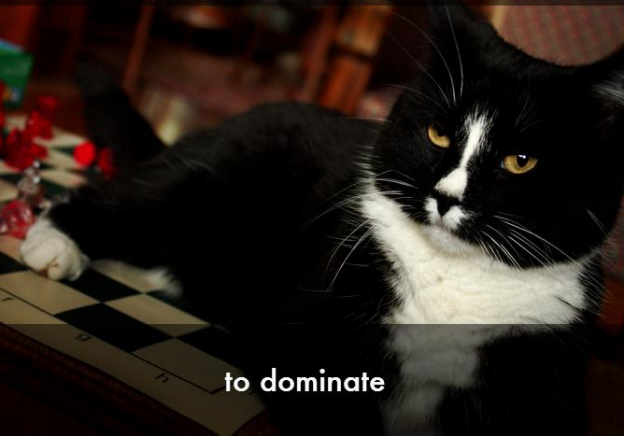
(something they can do, but only with assistance)

(what they can do right now without assistance)

STRATEGIC WAIT TIME

PLEASE WAIT HERE UNTIL YOU ARE USEFUL

getting comfortable with silence

THANK YOU

THINK-PAIR-SHARE

It takes just a few minutes

SEQUENCING

responsive teaching - build on what's been said

DON'T ALLOW ANY ONE STUDENT

to dominate

MIX IT UP!

ask different types of questions
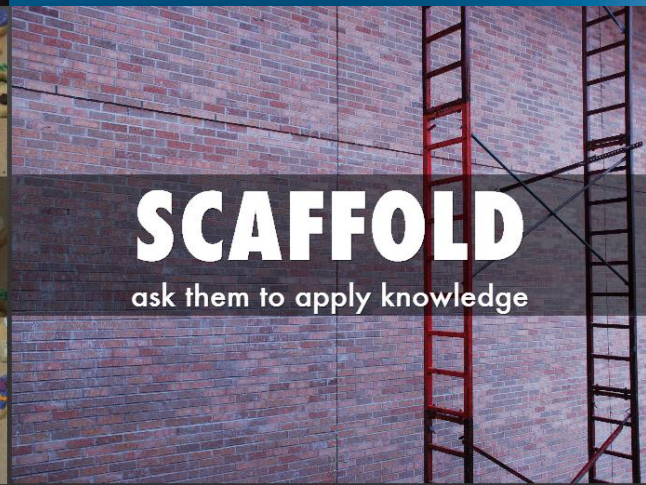
SCAFFOLD

ask them to apply knowledge
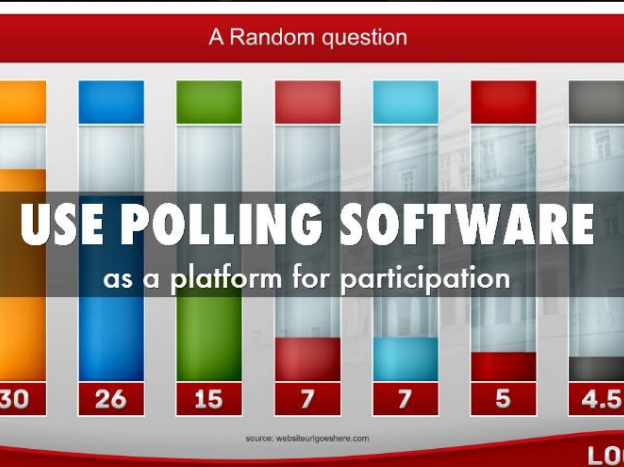
A Random question

USE POLLING SOFTWARE

as a platform for participation

30 26 15 7 7 5 4.5

source: websiteurlgoeshere.com

LO

THROW THEM A LIFELINE

Let them ask a colleague for help

RAPID REWARD

STRATEGIC WAIT TIME

PLEASE WAIT HERE UNTIL YOU ARE USEFUL

getting comfortable with silence

THANK YOU

THINK-PAIR-SHARE

It takes just a few minutes

SEQUENCING

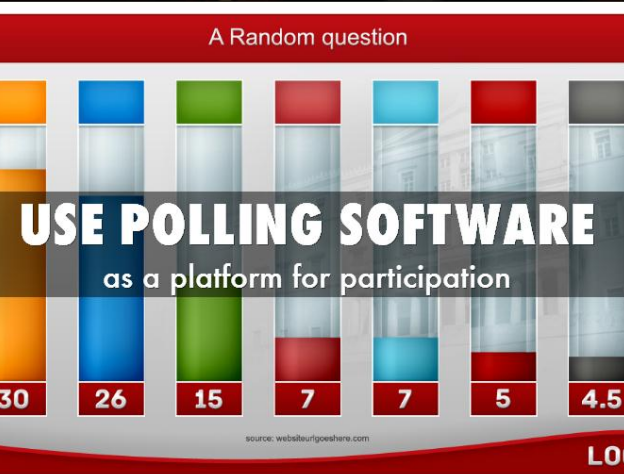responsive teaching - build on what's been said

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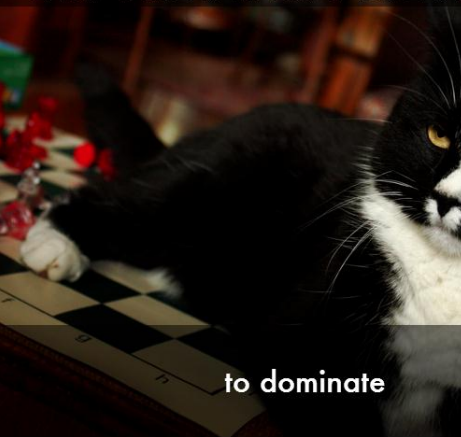
to dominate

✓ Determine knowledge base.
✓ Ask Effective Questions that ask students to dive deeper.
✓ Provide strategic guidance.

FOLD

ply knowledge

A Random question

USE POLLING SOFTWARE
as a platform for participation

30   26   15   7   7   5   4.5

source: websiteurlgoeshere.com
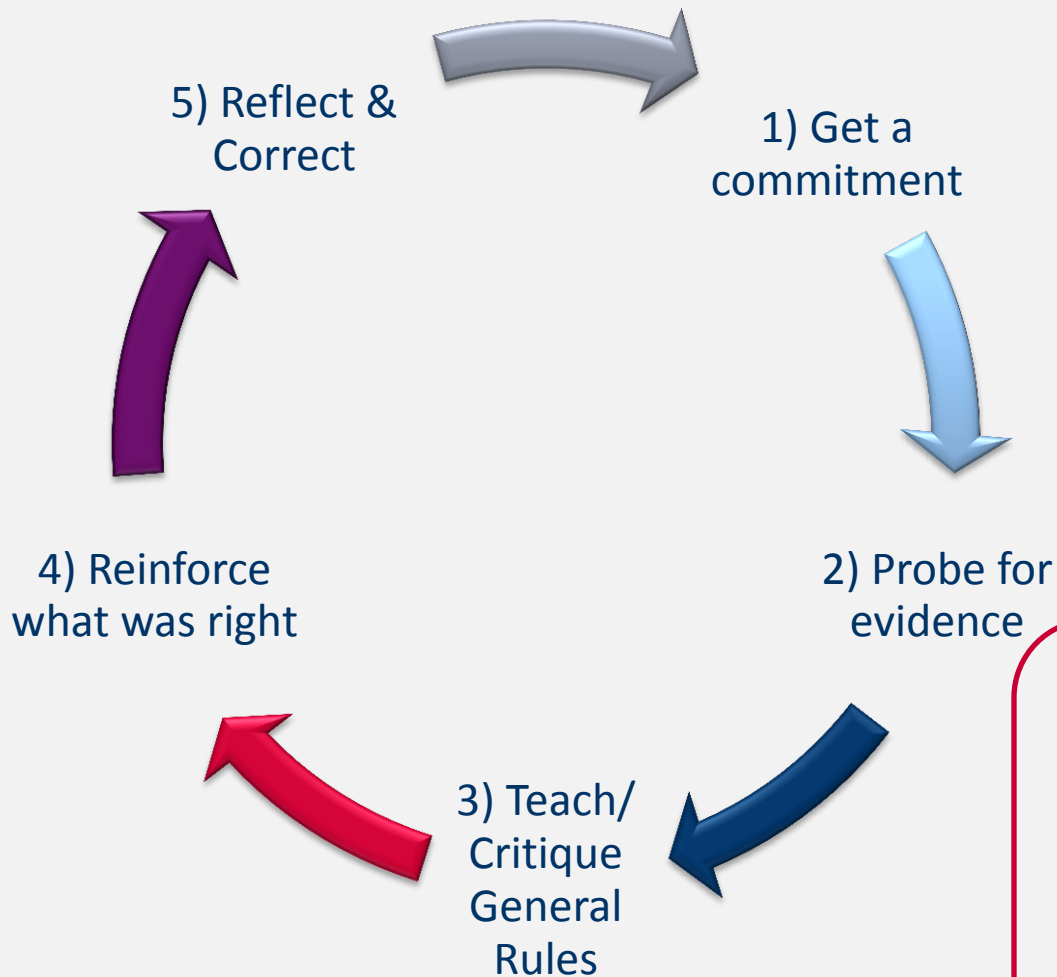
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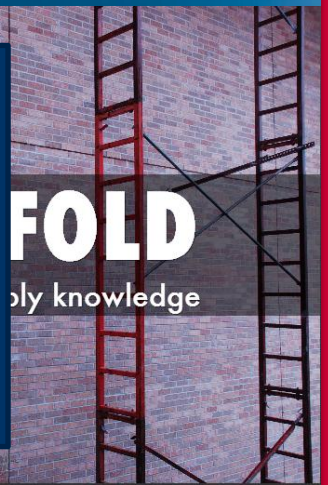
THROW THEM A LIFELINE
Let them ask a colleague for help

RAPID REWARD

Principle No. 3
## Get the student to tell the story

Microskills is an approach used to teach medical students in clinical settings.

How do we encourage the student in preclinical or clinical settings to "tell the story"?

Cycle diagram:

- 1) Get a commitment
- 2) Probe for evidence
- 3) Teach/ Critique General Rules
- 4) Reinforce what was right
- 5) Reflect & Correct

✓ Determine knowledge base.
✓ Ask Effective Questions that ask students to dive deeper.

[LO3] Key Considerations in Formulating Questions
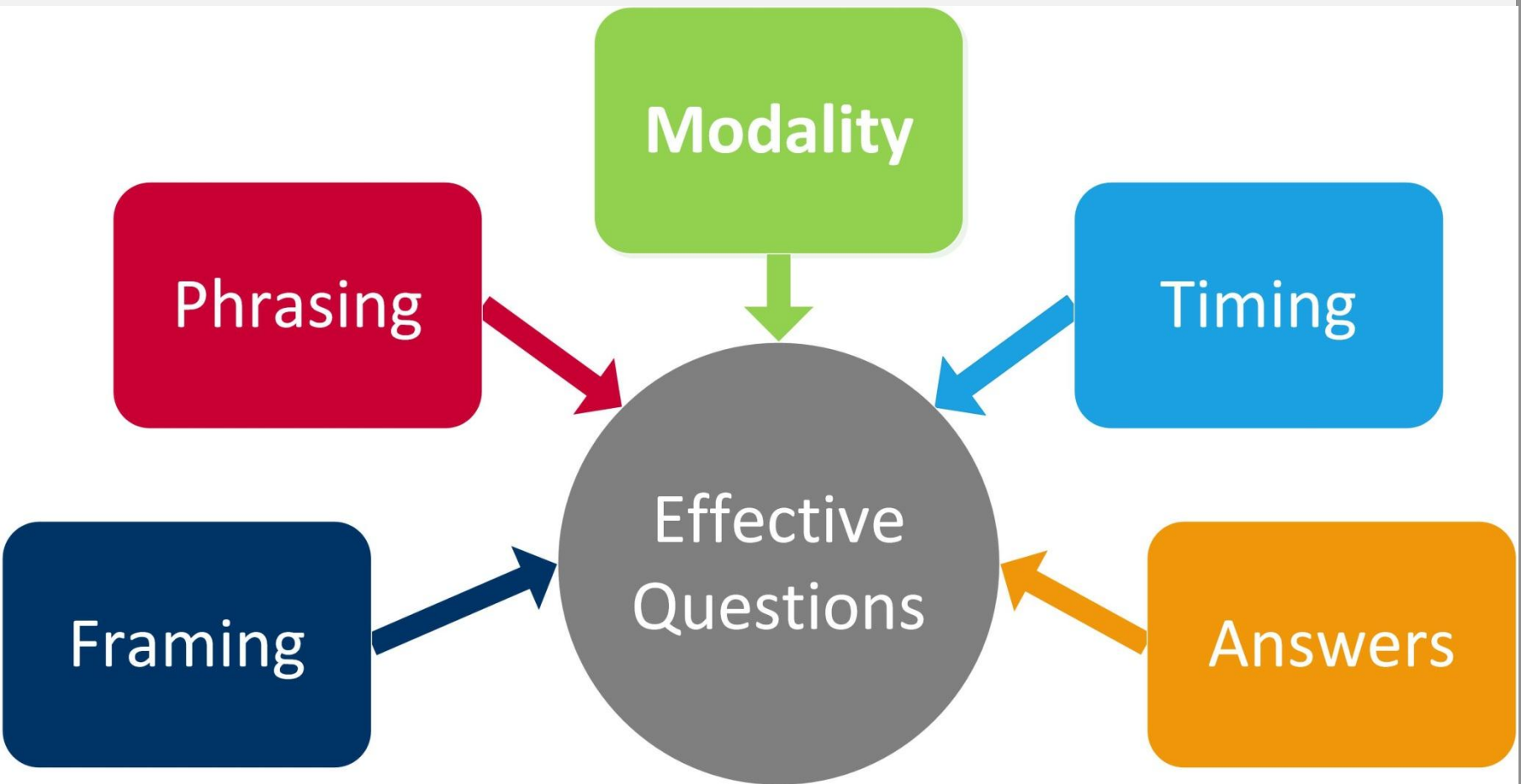
[LO3] Key Considerations in Formulating Questions

Modality

Timing

Provides or suggests perspective
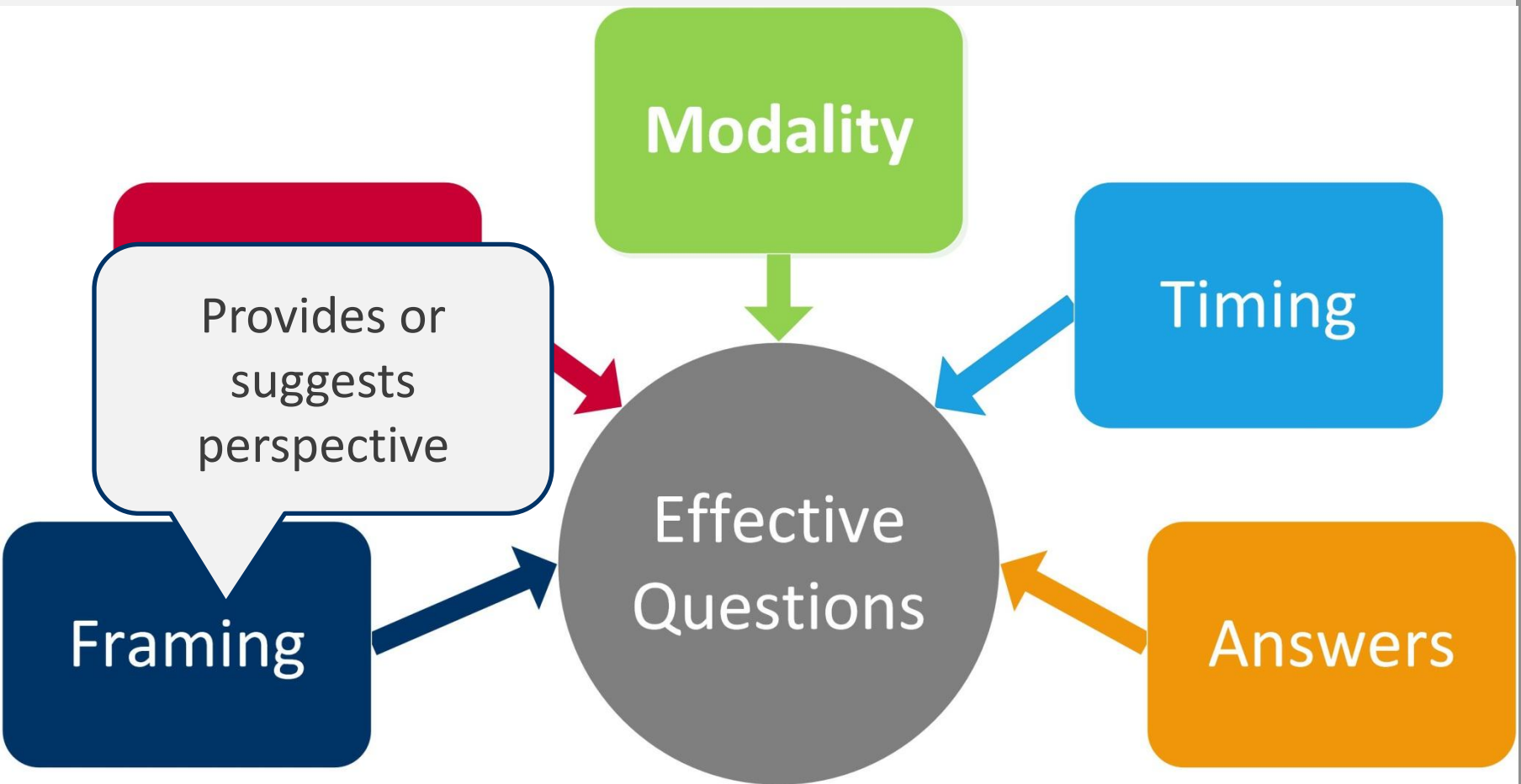
Framing
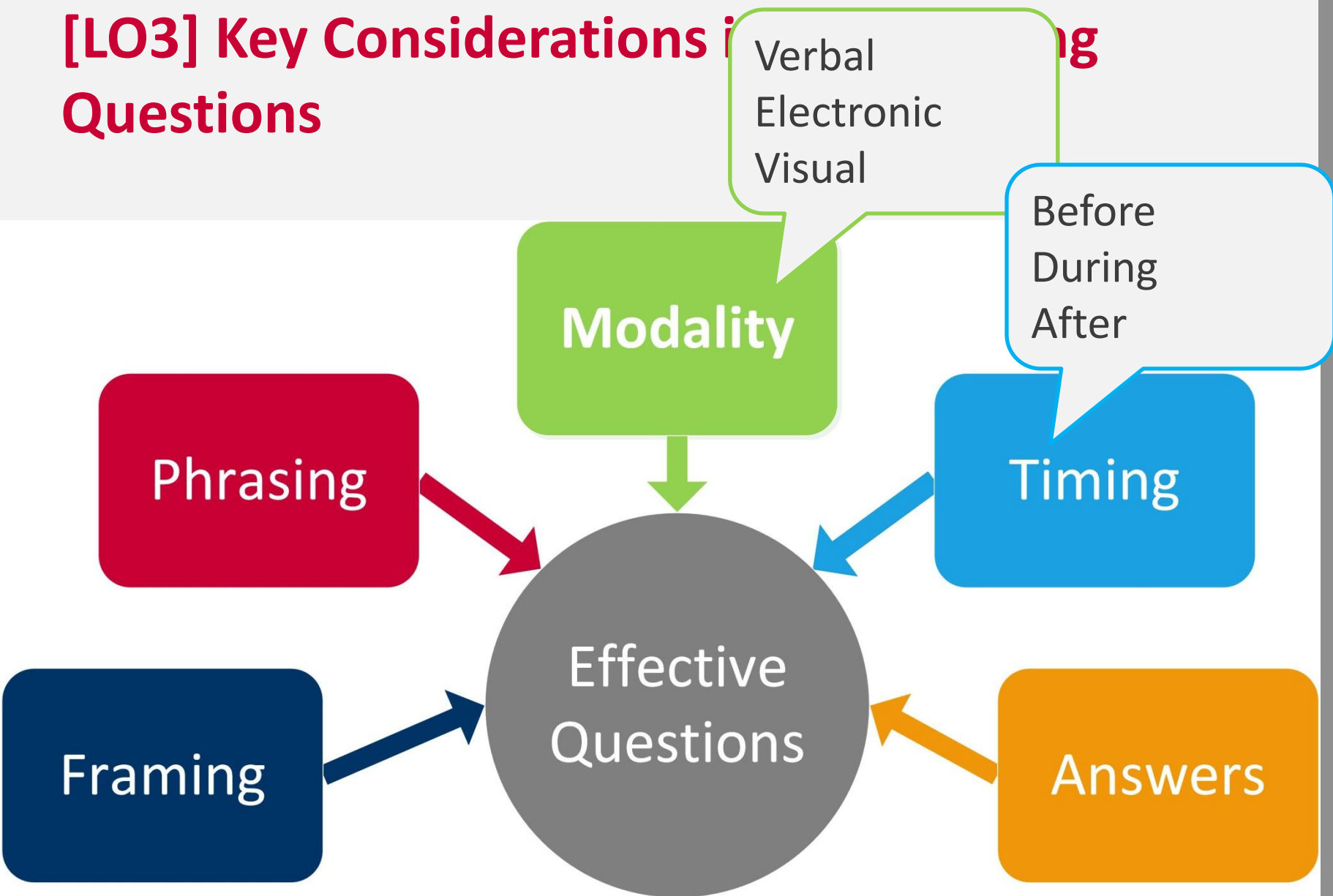
Effective Questions

Answers

[LO3] Key Considerations in Formulating Questions
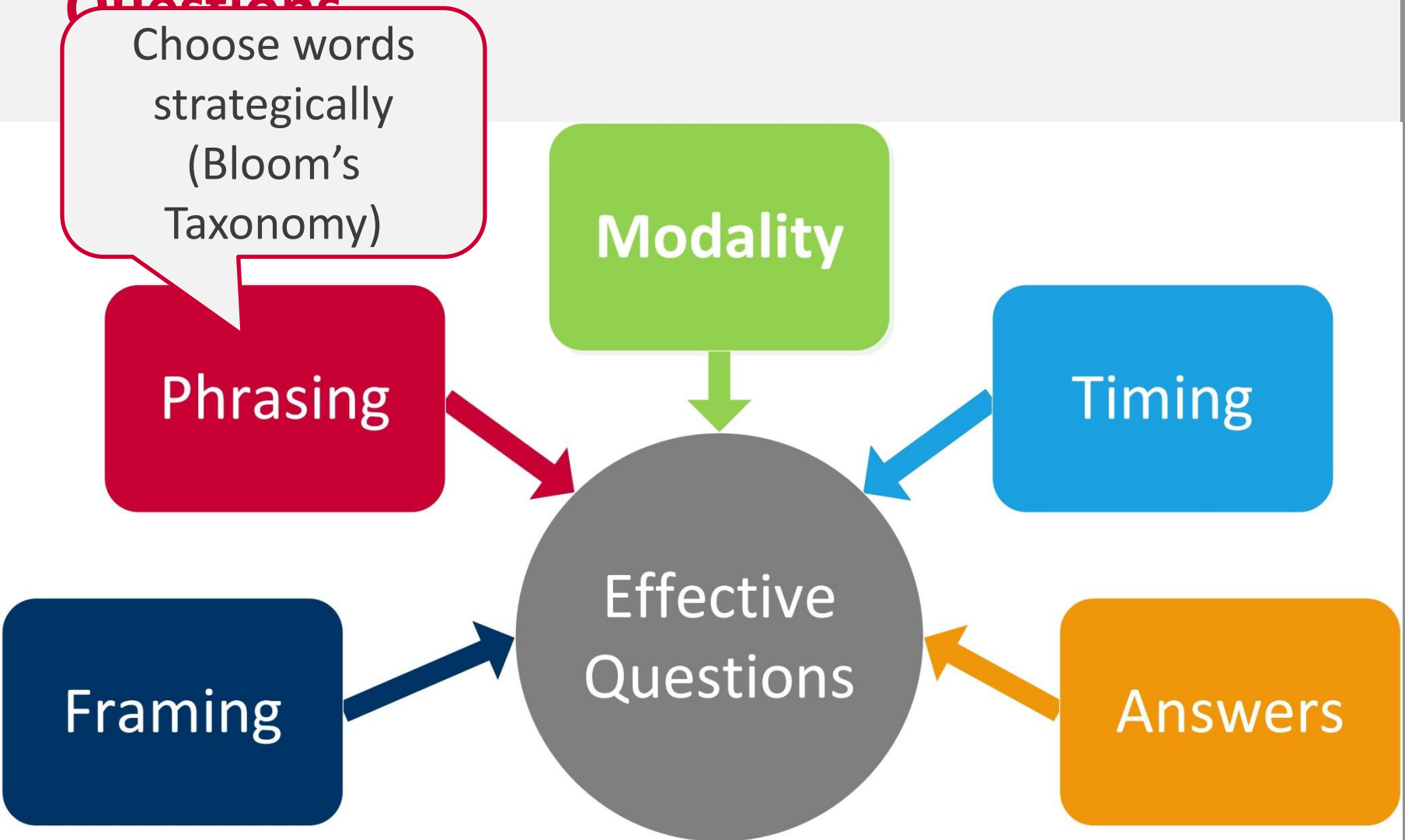
[LO3] Key Considerations in [...]ng Questions

[LO3] Key Considerations in Formulating Questions
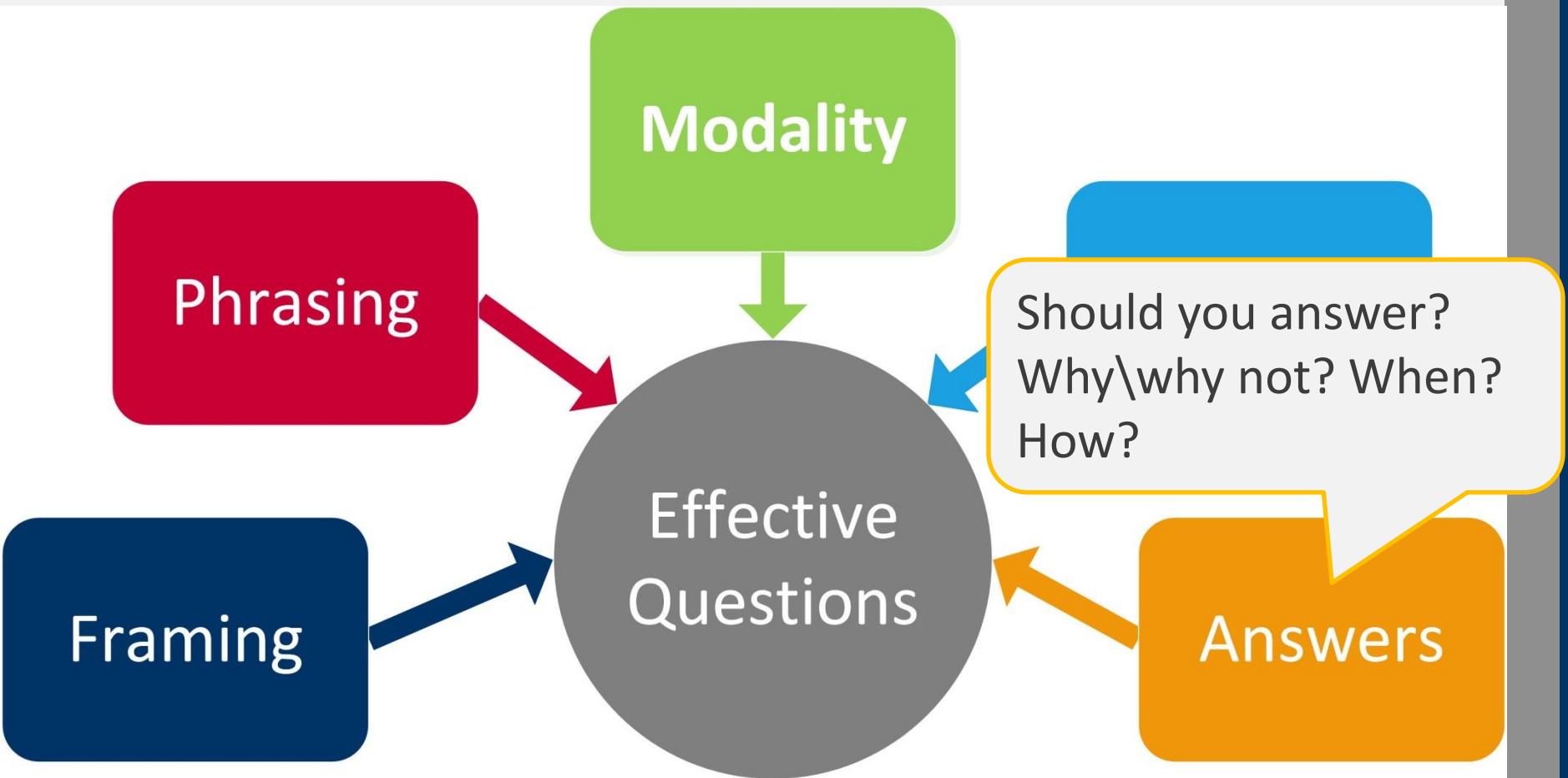
Frame your questions according to your purpose
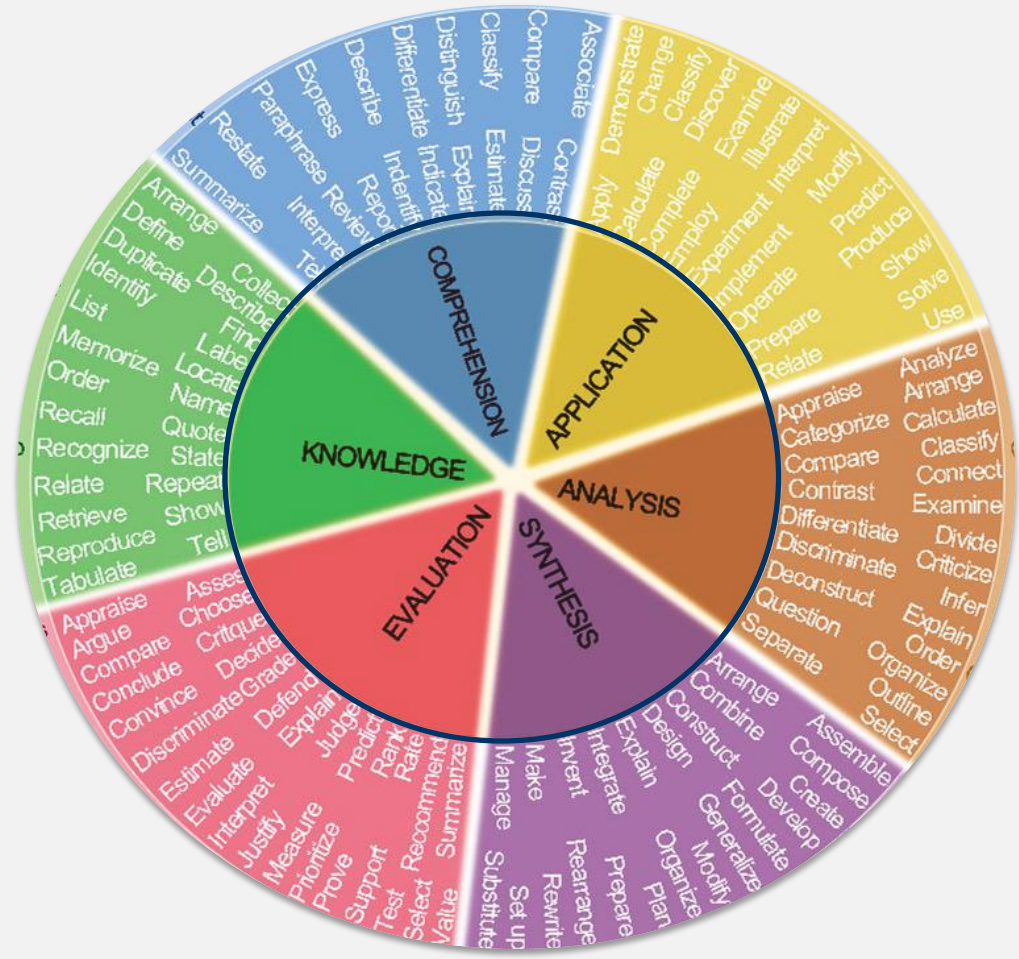
Frame *verb* \ˈfrām\

- to put (something) inside an open structure that holds it
- to put (something) in a frame

Related: framework = context

Source: Merriam-Webster online dictionary

Wheel: Steven Crawford. Aligning Assessments with Learning Objectives. Teach Online; ND.
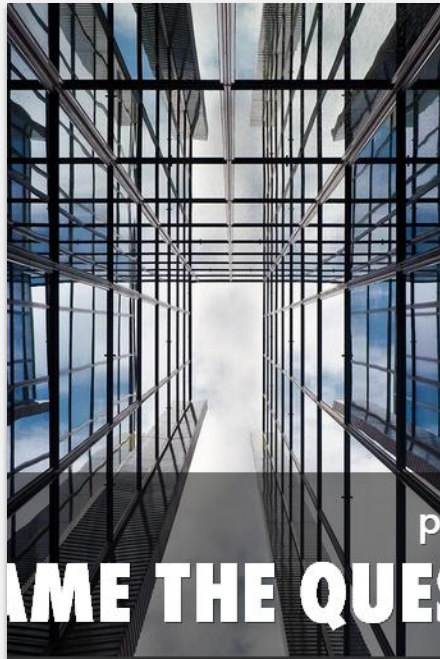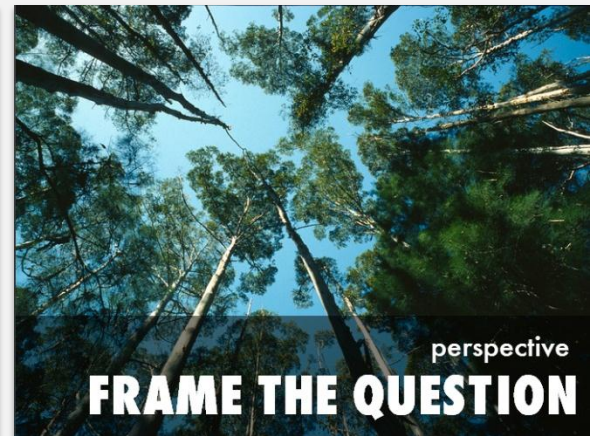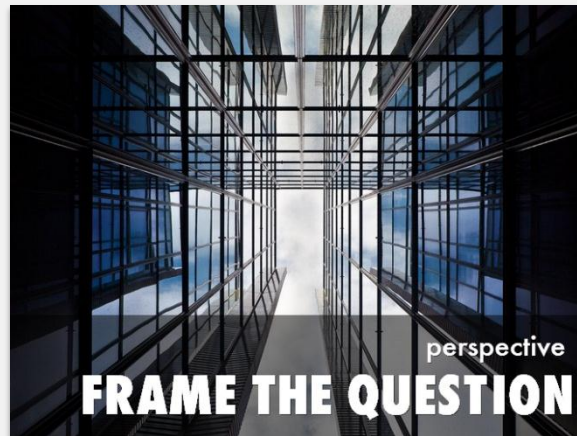
Phrase your questions to specify the kind of thinking in which you want the learner to engage

Wheel: Steven Crawford. Aligning Assessments with Learning Objectives. Teach Online; ND.
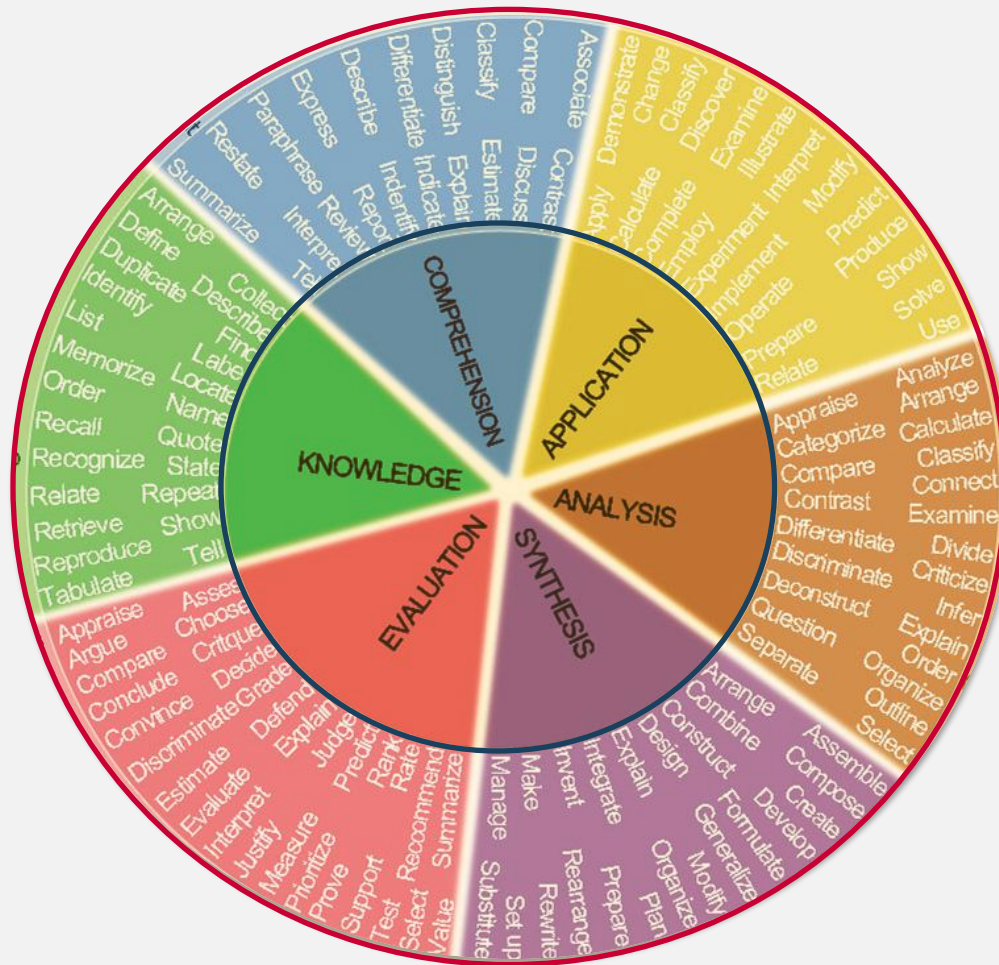
Phrase (tr. verb)

- to say (something) in a particular way

- to express in… appropriate…terms

Source: Merriam Webster Online Dictionary

Phrase

WORDING THE QUESTION
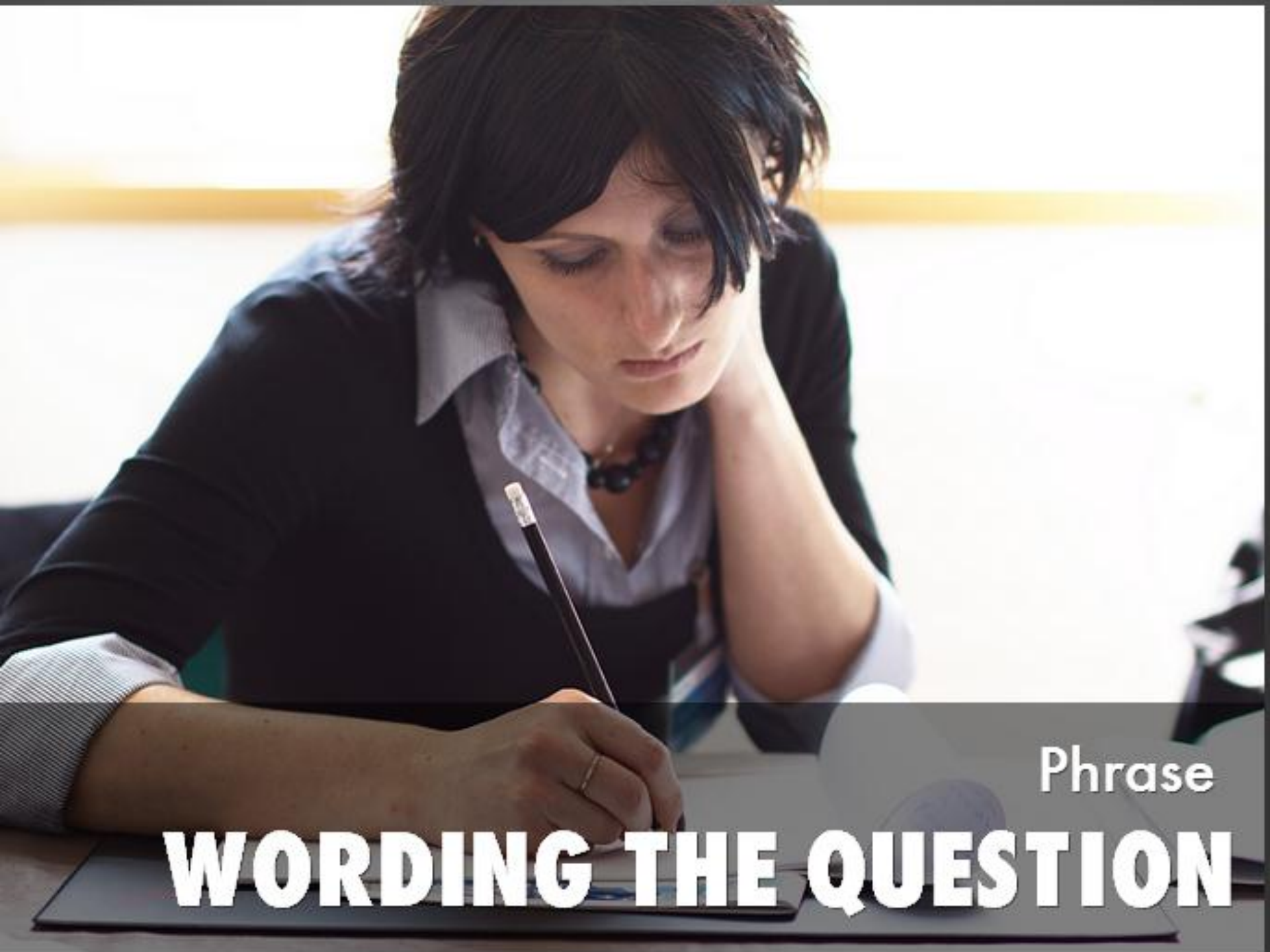
Phrase

WORDING THE QUESTION

Phrase

(RE)WORDING THE QUESTION

Framing + Phrasing = Effective Question

Phrase

(RE)WORDING THE QUESTION

Map for Formulating Effective Questions
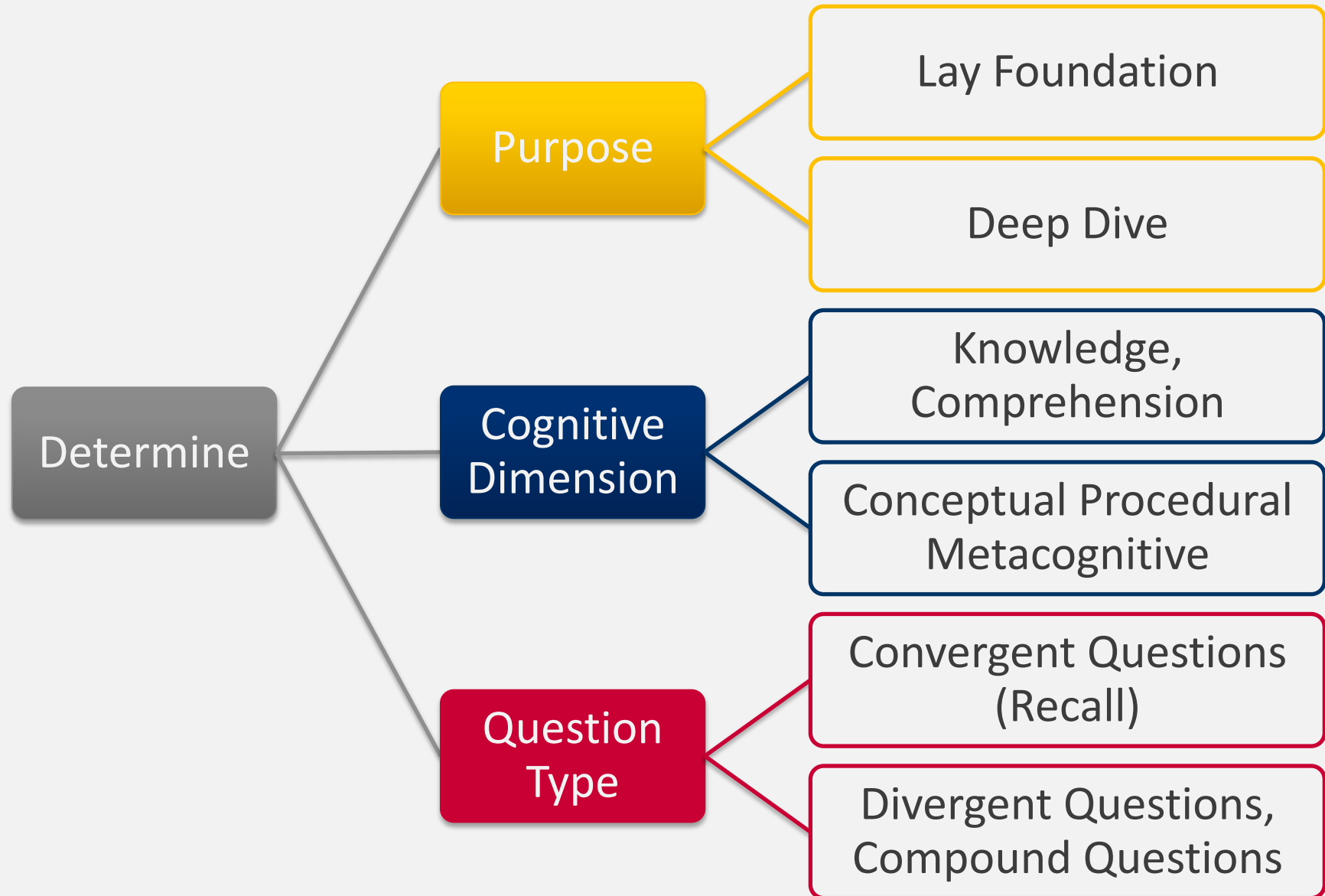
Sample Pathway for Drafting Questions

PURPOSE	COGNITIVE DOMAIN	QUESTION TYPE

Determine

Lay Foundation — Knowledge, Comprehension — Convergent Questions (Recall)

Deep Dive — Conceptual Procedural Metacognitive — Divergent Questions, Compound Questions
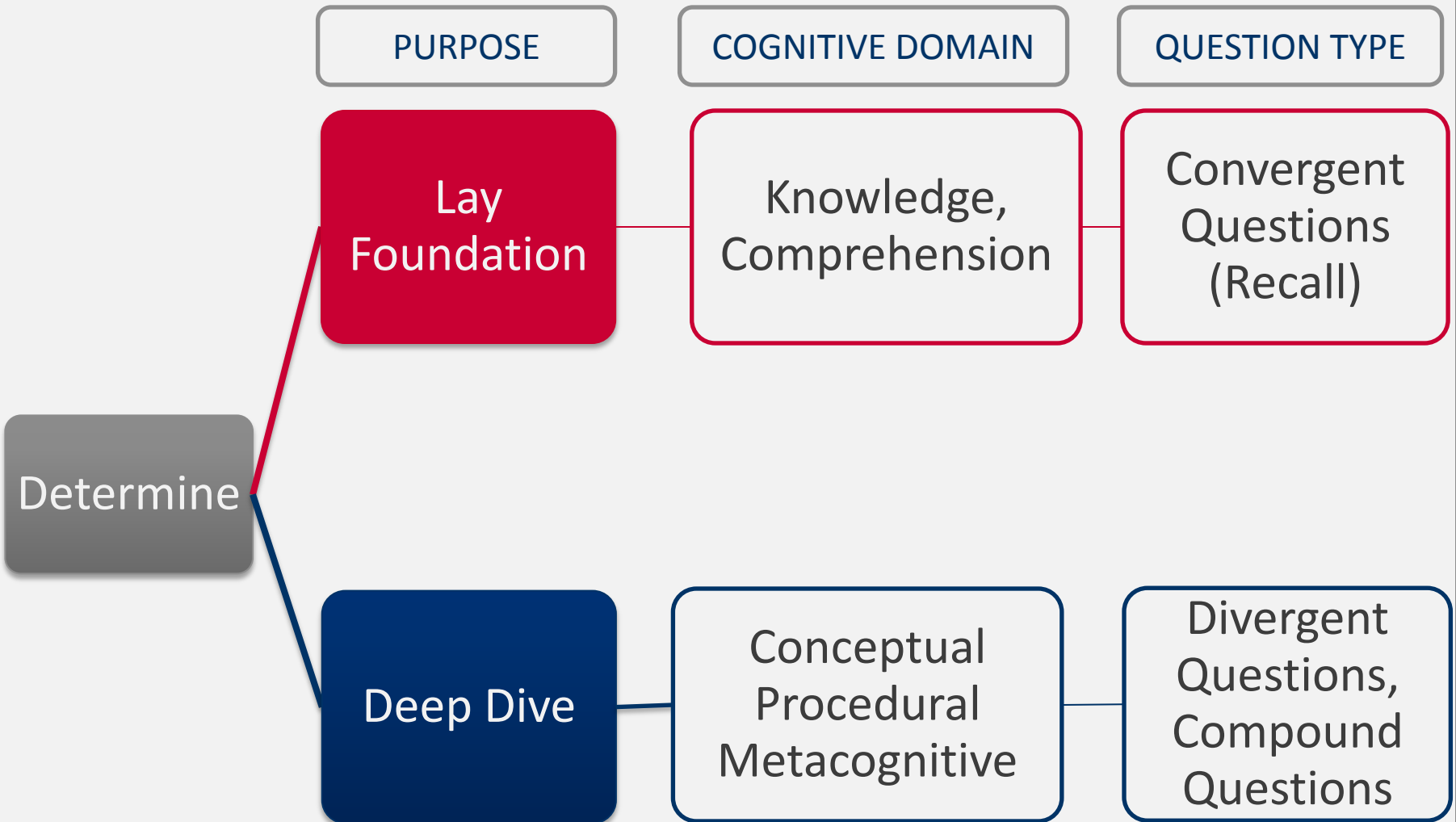
Inquiry Purpose

- Questions that
  - Lay foundation
  - Invite a deep dive (investigation, reflection)
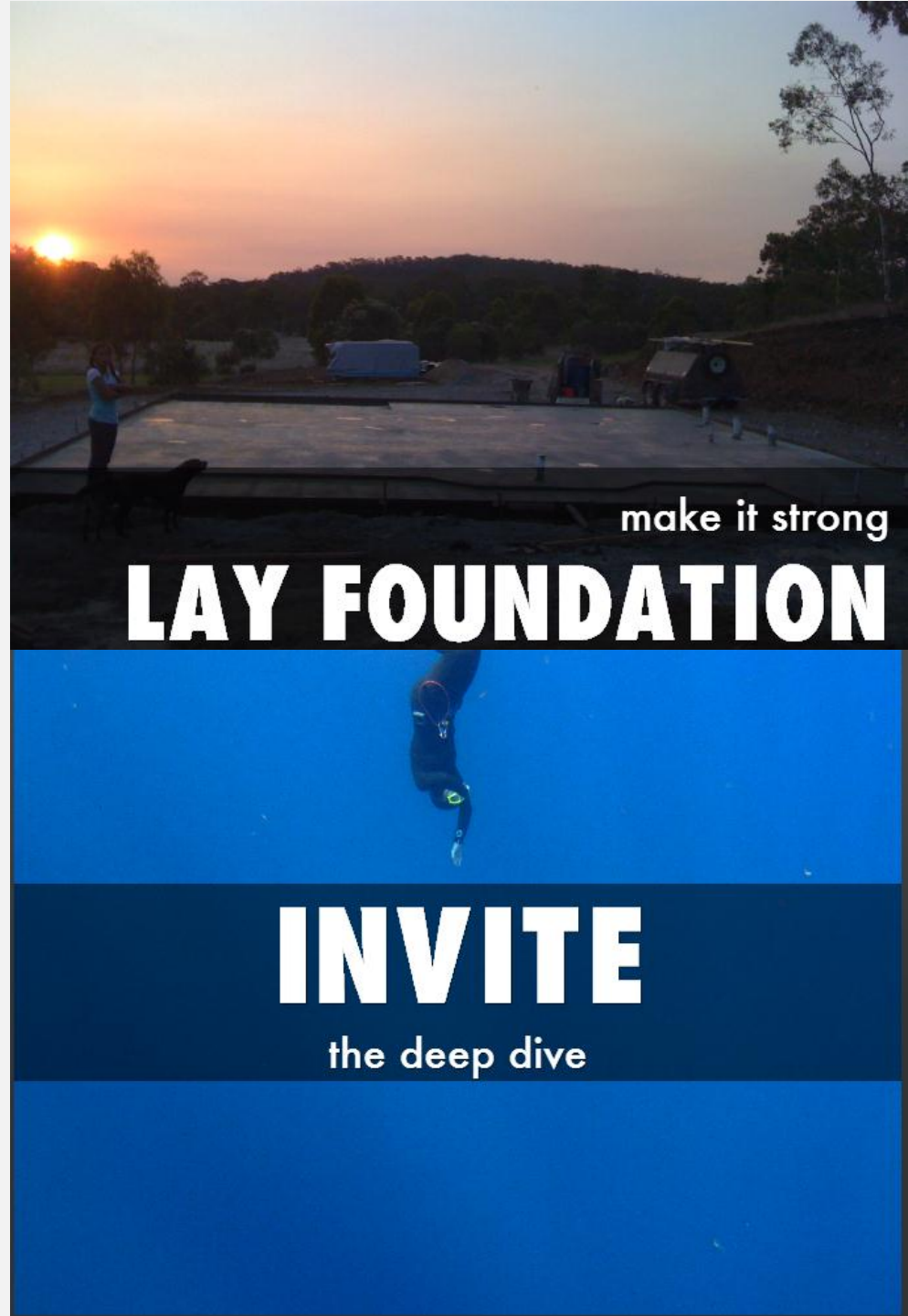
Formulation Process

- Start by asking yourself: Why am I asking the question?
- If the answer is: "To Lay foundation"
  - *Cognitive Dimension*: Knowledge, Comprehension
  - *Question Types*: Yes/no questions, Multiple choice or other "recall" questions
- If the answer is: "To invite students to take a Deep Dive"
  - *Cognitive Dimension*: Analysis, Evaluation, Synthesis, Generative Thinking
  - *Question Types*:
    - Divergent, Procedural, Conceptual, or Compound questions
    - Ask learner to pose questions

Activity #1 [Handout]

1. Describe a setting in which you teach (clinical – morning report, rounds, ICU; preclinical – lecture, CBI)

2. Describe something you are charged with teaching (process or content-oriented)

3. Determine the kind of thinking you want the student to do

Question Types

- To increase the challenge for students, you can ask them to formulate questions based on a case scenario presented

- Questions should be a mix of various types:

  – **Conceptual**

  – **Procedural**

  – **Metacognitive**

Conceptual: Why do we care about dehydration in a patient with sepsis? Why might you conduct an ultrasound exam on a patient with suspected sepsis?

Procedural – How do you differentiate Septic Shock from cardio shock?

Metacognitive: How would you approach an attending or resident if you thought they were missing a probably diagnosis of Sepsis?

Question Types

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Conceptual: Why do we care about dehydration in a patient with sepsis? Why might you conduct an ultrasound exam on a patient with suspected sepsis?

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Procedural – How do you differentiate Septic Shock from cardio shock?

Question Types

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  - **Metacognitive**

Metacognitive: How would you approach an attending or resident if you thought they were missing a probably diagnosis of Sepsis?

Question Types

Convergent Questions

- Closed questions that look for specific answers from a finite list of possible answers (yes/no; symptom list)

- Tend not to encourage thinking or reflection.

- Convergent questions require an answer.

Divergent Questions

- Open-ended questions

- Require deeper thinking or problem-solving

- May require dialogue

- There may not be one answer, or at least there is not a pat answer.

- Tend to encourage divergent thinking – looking at the topic from multiple perspectives.

- Tend to lead to Discussion. Patrick & Urhievwejire (2012).

Purpose: Deep Dive

Procedural Question

Describe other ways we could diagnose a STEMI?

Conceptual Question

Why would we want to use a treadmill stress test with a female patient?

Compound Question

(Question Circles)

In what situation would a treadmill stress test not be the ideal study for risk stratifying a patient?

To Lay foundation

Type: Convergent question
Knowledge Dimension

- Do you know what the symptoms are of a heart attack?

- What are the symptoms of heart attack?

- How does heart attack present?

To Invite a Deep Dive

Type: Divergent questions
Application, Analysis (presumes Knowledge)

- How is the presentation of a heart attack different for women versus men?

- How can heart attack be confused with other conditions? In men? In women? Of a certain age?

Activity 2 [Handout]

- Work with a colleague
- Share with one another the setting, topic and type of thinking in which you want the students to engage (from Activity #1)
- Determine the types of questions that might suit your purpose.
- Draft a sample question
- Share with us the questions created.
- Explain why you think they would be effective.

Map for Formulating Effective Questions
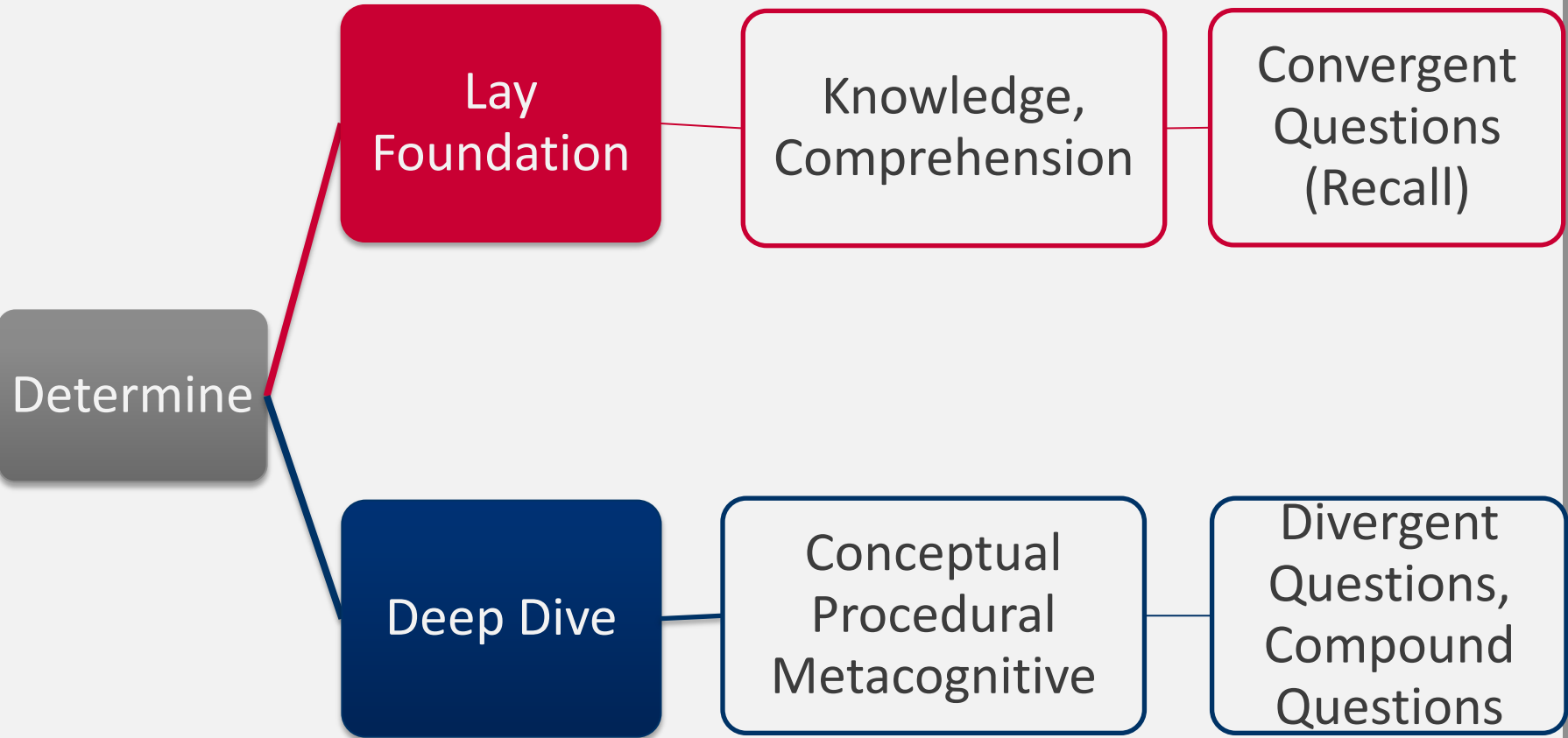
EBM food for thought

- When is the learner ready?

  - Ask questions that lay foundation to determine readiness.

- Questions offer a path to help students develop pattern recognition & understand the bases for risk-stratification protocols

  - How can we help students to identify and use these to begin to recognize patterns of illness or non-illness?

  - How can we encourage students to formulate:

    - Questions about using these protocols in practice?

    - Inquiries to dive deeper into the subject matter?

"Don't just teach your children to read... Teach them to question what they read. Teach them to question everything."

~George Carlin
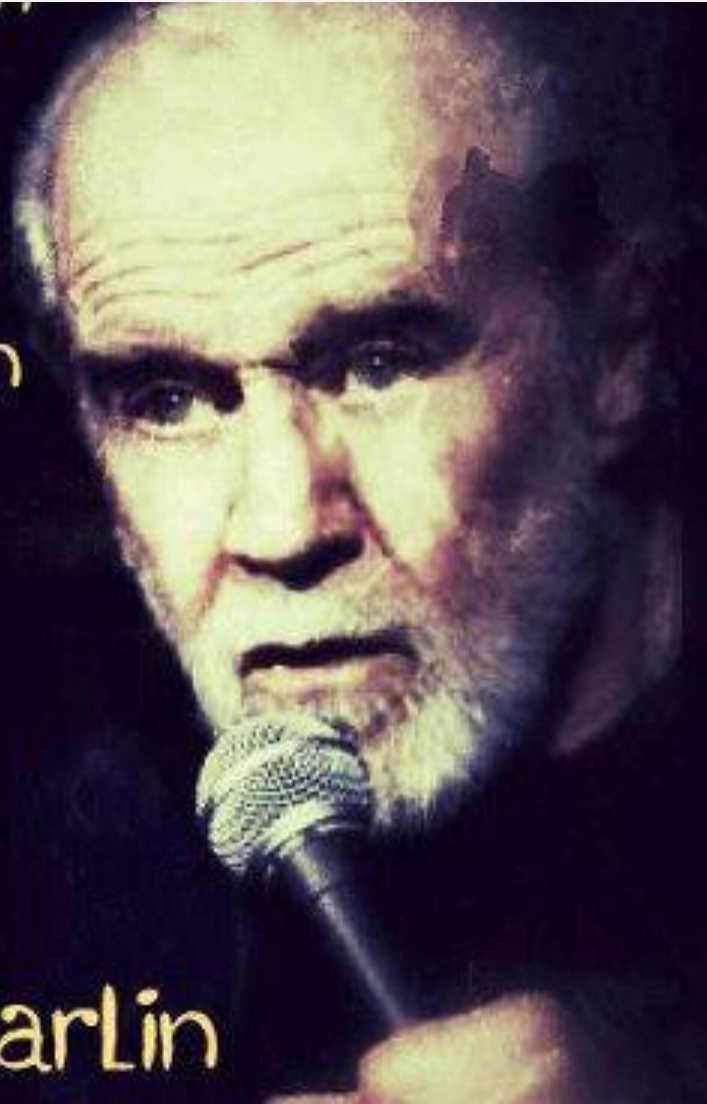
Essential principles of inquiry-based teaching strategies

In Summation

[LO1-LO2] Essential Principles of Effective Questioning

Friendly
ENVIRONMENT

- Create Comfort with Questioning

- Motivate participation

- Respond (Engage in Responsive Sequencing)

- Respect

[LO3] Key Considerations

[LO3] Key Considerations

perspective
FRAME THE QUESTION

Phrase
(RE)WORDING THE QUESTION
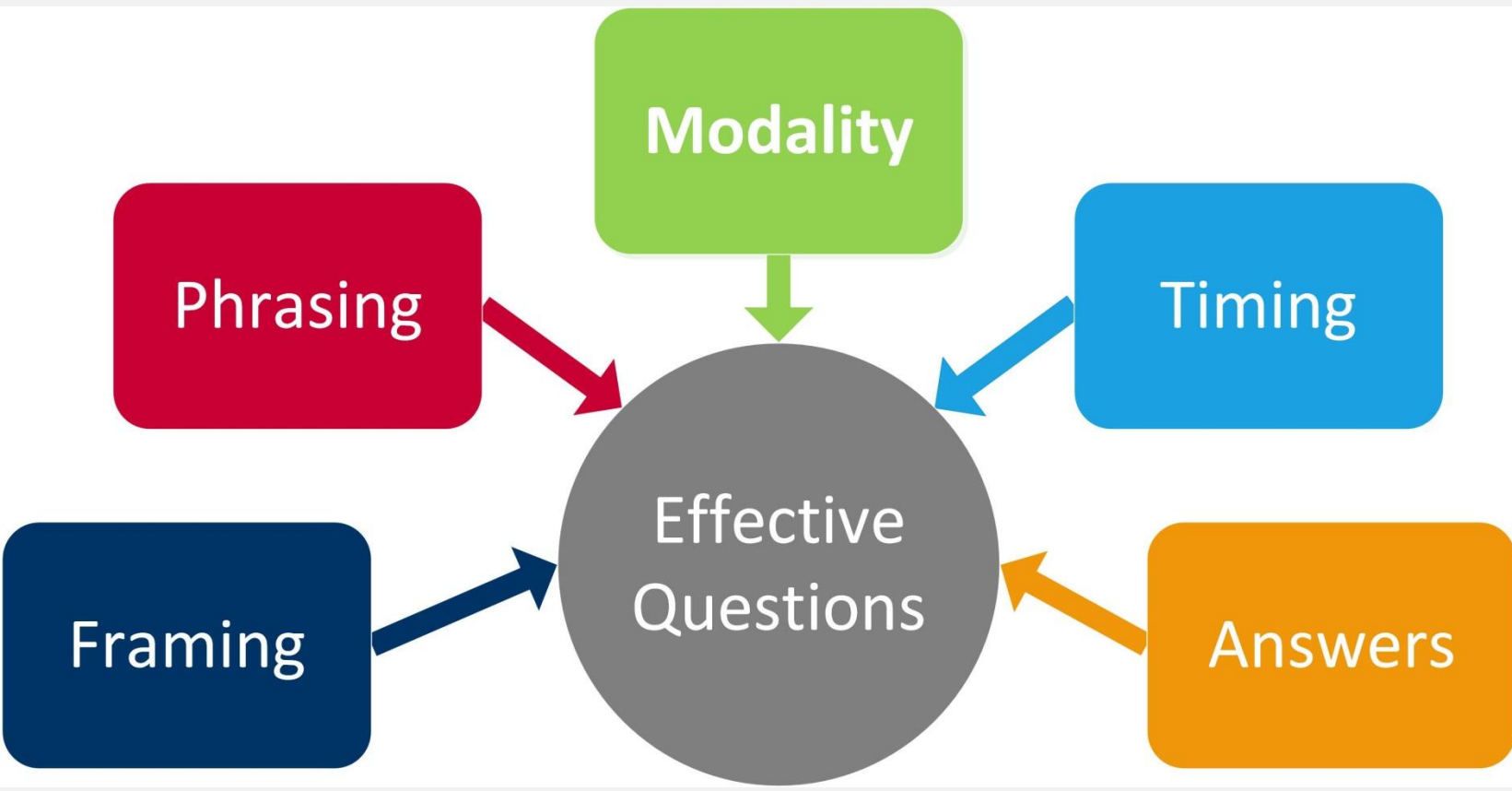
Consider:

- Learner Perspective
- Educator Perspective

Consider:

- Bloom's Taxonomy
- Question Taxonomies (Tofade, Elsner & Haines, 2013)

Table 1. Types of Nonhierarchical Questions Used as Teaching Tools[1,2,12]

Question Type	Description	Sample Question (Content Area: Analgesics and Pain Management)
Convergent	Closed, not offering many options; converges on a single or narrow list of "best" answers; encourages focused, succinct response	What percentage of the population is a poor metabolizers, and therefore, unlikely to have an adequate analgesic response to codeine?
Divergent	Open, having many responses; permits the exploration of diverse perspectives; encourages dialog	Codeine isn't used as much today for analgesia as it once was. Why?
Focal	Student must choose or justify a position.	Would you recommend the use of a fentanyl patch in a patient with a history of substance abuse? If so, why? If not, why not?
Brainstorm	Questions that generate a list of ideas or viewpoints.	If you could create the ideal analgesic product, one that could be widely used in any population for various causes of pain, what features would it have?
Shotgun	Questions containing several content areas with no particular link.	What are the potential risks of using NSAIDs? When was aspirin first synthesized? Methadone is available in what dosage forms? What patient-specific data should be obtained prior to initiating tramadol therapy? What the best way to manage opioid-induced constipation?
Funnel	Multiple questions starting broadly and gradually leading to more focused inquiry.	What federal laws and regulations apply to the sale of narcotic analgesics? What are the record keeping requirements for a pharmacy that stocks and dispenses narcotic analgesics? What are the potential benefits and

Tofade T, Elsner J & **Haines** ST (2013)

"For the purposes of teaching, these taxonomies can be used by educators to formulate questions intended to elicit specific cognitive processes."

American Journal of Pharmaceutical Education 2013; 77 (7) Article 155

Consider Cognitive Dimensions & Question Types

Question Circles
COMPOUND QUESTIONS

Cognitive Scale

- Lower order, Higher order (Think Bloom's Taxonomy)

Cognitive Dimensions

- Factual, Procedural, Conceptual

- Metacognitive

Convergent

- Close-ended questions, limited response options

Divergent

- Open-ended questions

Compound Questions (Question Circles) –

- Combines subject matter, perspective and external reality (conditions)

answers? discussion points?

QUESTIONS?

Contact

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Richard Amini, MD

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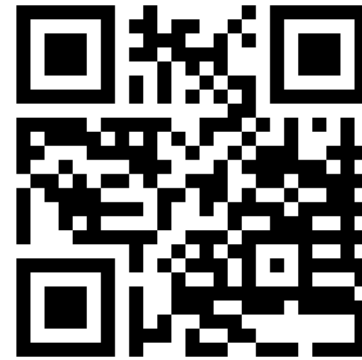
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