Asking Questions to Foster Learning

CFP Education Workshop
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Thank you to

HMS Academy

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Introductions

- Name and role
- Why are you here today?

Learning Objectives

- Describe the teaching and learning goals of asking questions during class
- Explain the process of aligning questions with learning objectives
- Identify and evaluate approaches for
  - writing questions
  - posing questions to students
  - responding to student answers and questions

Learning Community Norms

1. Respect each other's ideas, views and opinions
   - ➔ One voice at a time
   - ➔ Say what you think
   - ➔ Say why you think it
2. Listen and reflect on what others say
3. Build on what others say
4. Support and include each other
5. Confidentially share partial ideas
6. Ask when you don't understand
7. Try to reach an agreement
8. Seek clarity from each other
9. Speak calmly - be noise aware

Based on Teaching Speaking and Listening - Secondary *National Strategy*

http://www.nsead.org/downloads/Effective_Questioning&Talk.pdf

What are your teaching and learning goals when asking questions?

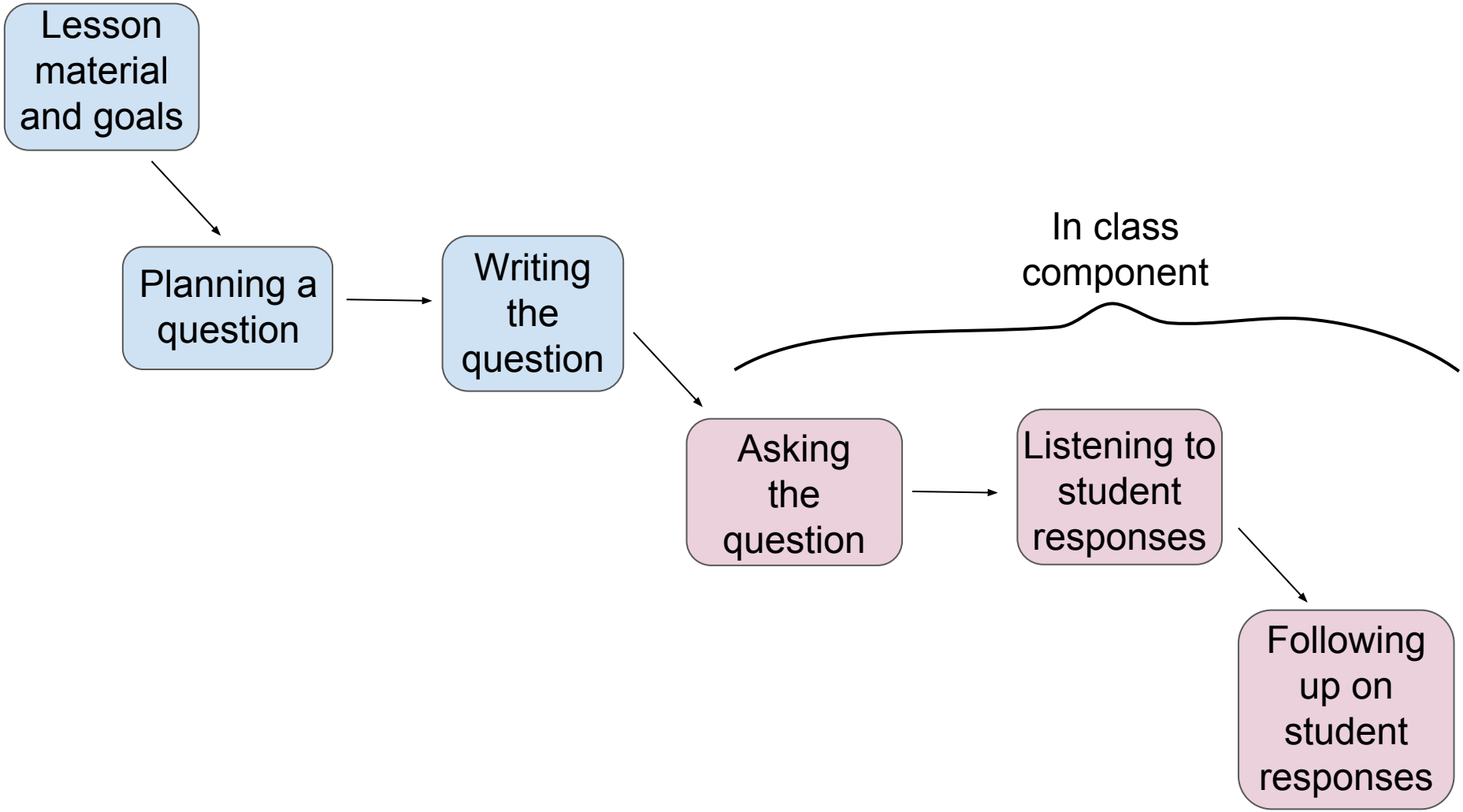
*Think about this **silently** for 1 minute. Then we will discuss as a group.*

Questions can be asked to

- Assess/identify
  - Needs of your learners
  - Students' baseline knowledge
  - Misconceptions or points of confusion
  - Achievement of learning objectives
- Strengthen learning and recall (retrieval practice)
- Elaborate, connect, and apply concepts
- Help students assess their own knowledge
- Relate content to students' lives
- Prompt curiosity and engagement/attention
- Model ambiguity and uncertainty
- Create a sense of shared learning and promote collaborative thinking
- Give students agency
- Build teamwork and appreciation of peer perspectives
- Build students' attitude of questioning and lifelong learning

Across all of these goals, also think about how to

- Ensure that ALL learners are included
  - Maintain trust between learners and instructors
  - All students have an opportunity to engage with the question and share
  - (Instructor has opportunity to assess learning of all students)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Writing the question
In class component
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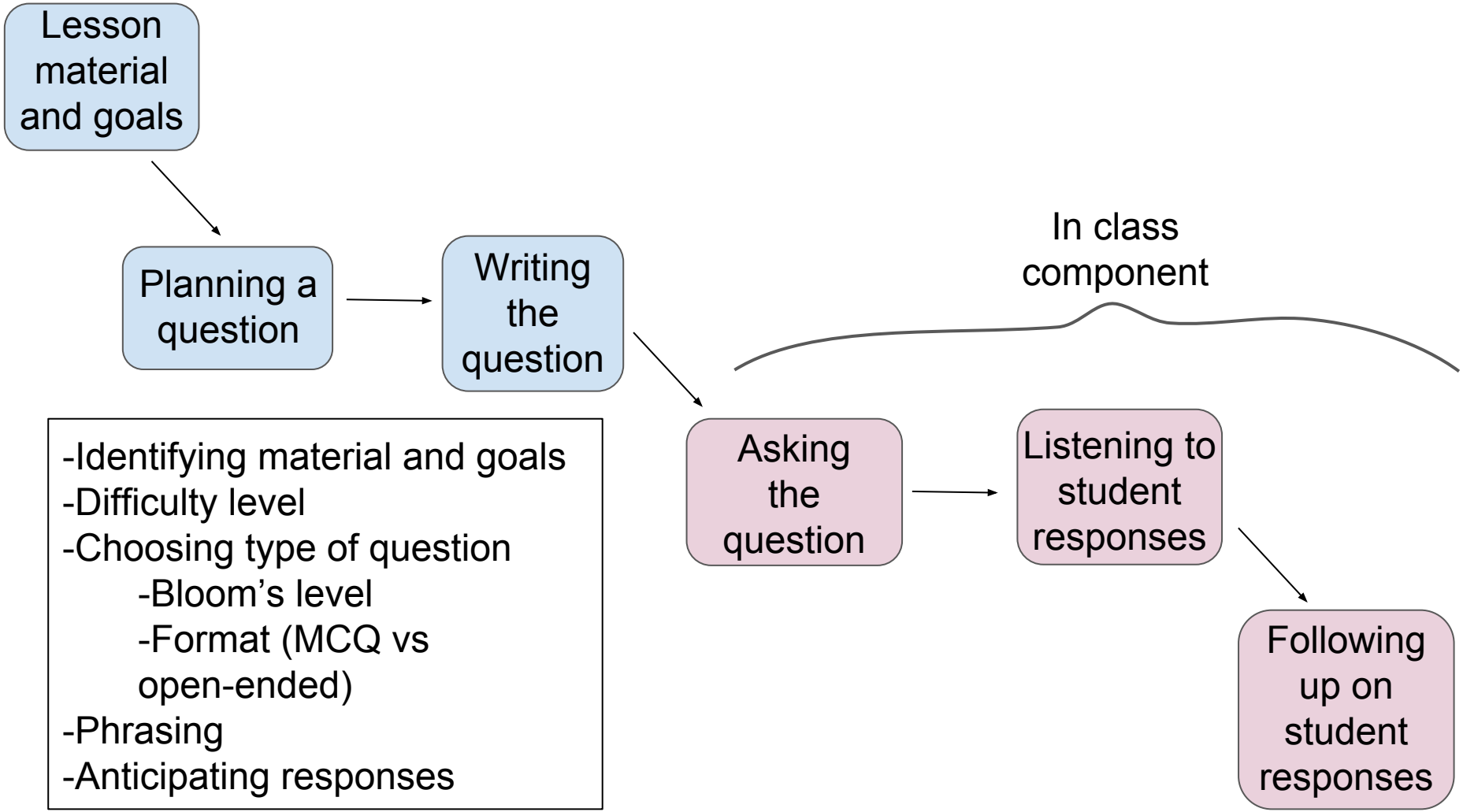
Listening to student responses
Following up on student responses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-Format (MCQ vs open-ended)
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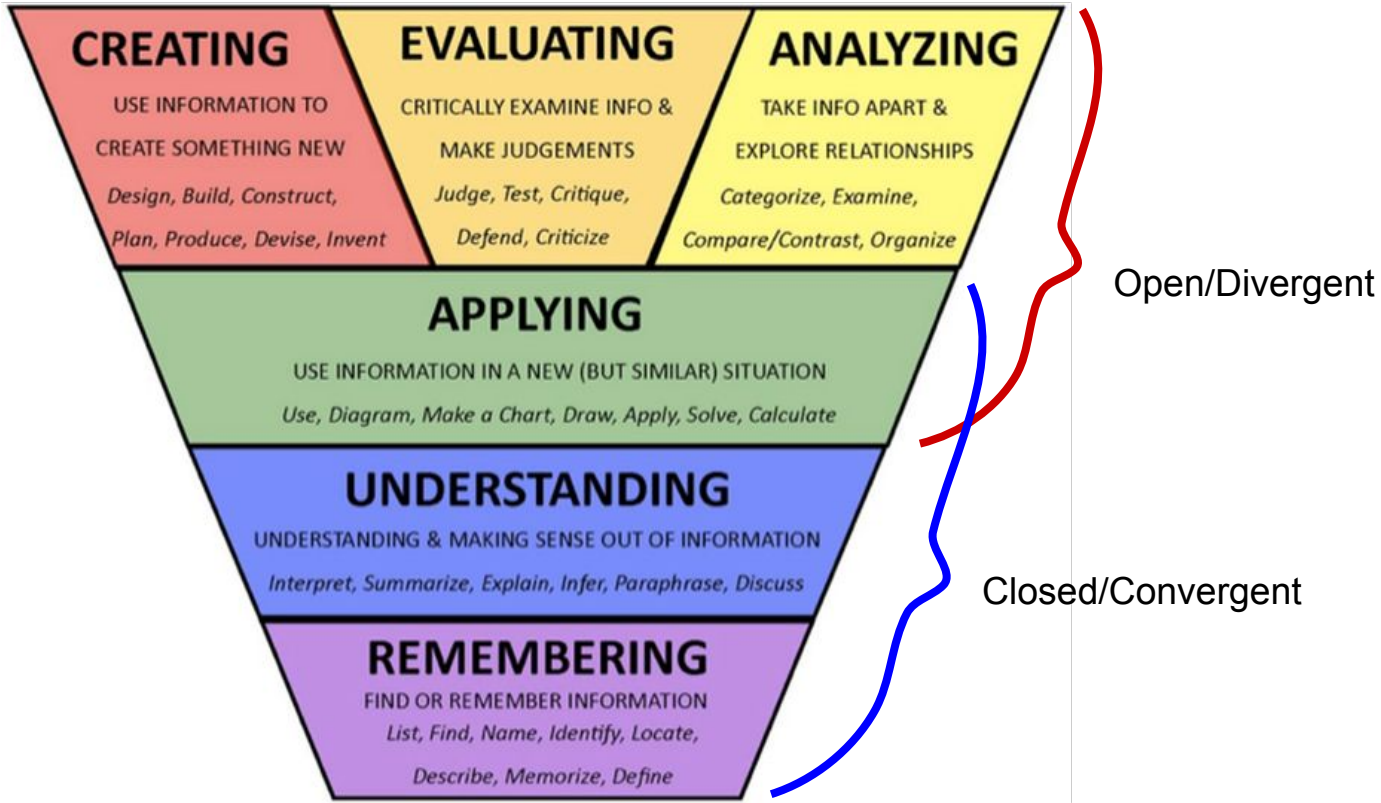
Bloom's level



https://www.scholarlyteacher.com/blog/using-questions-for-student-learning

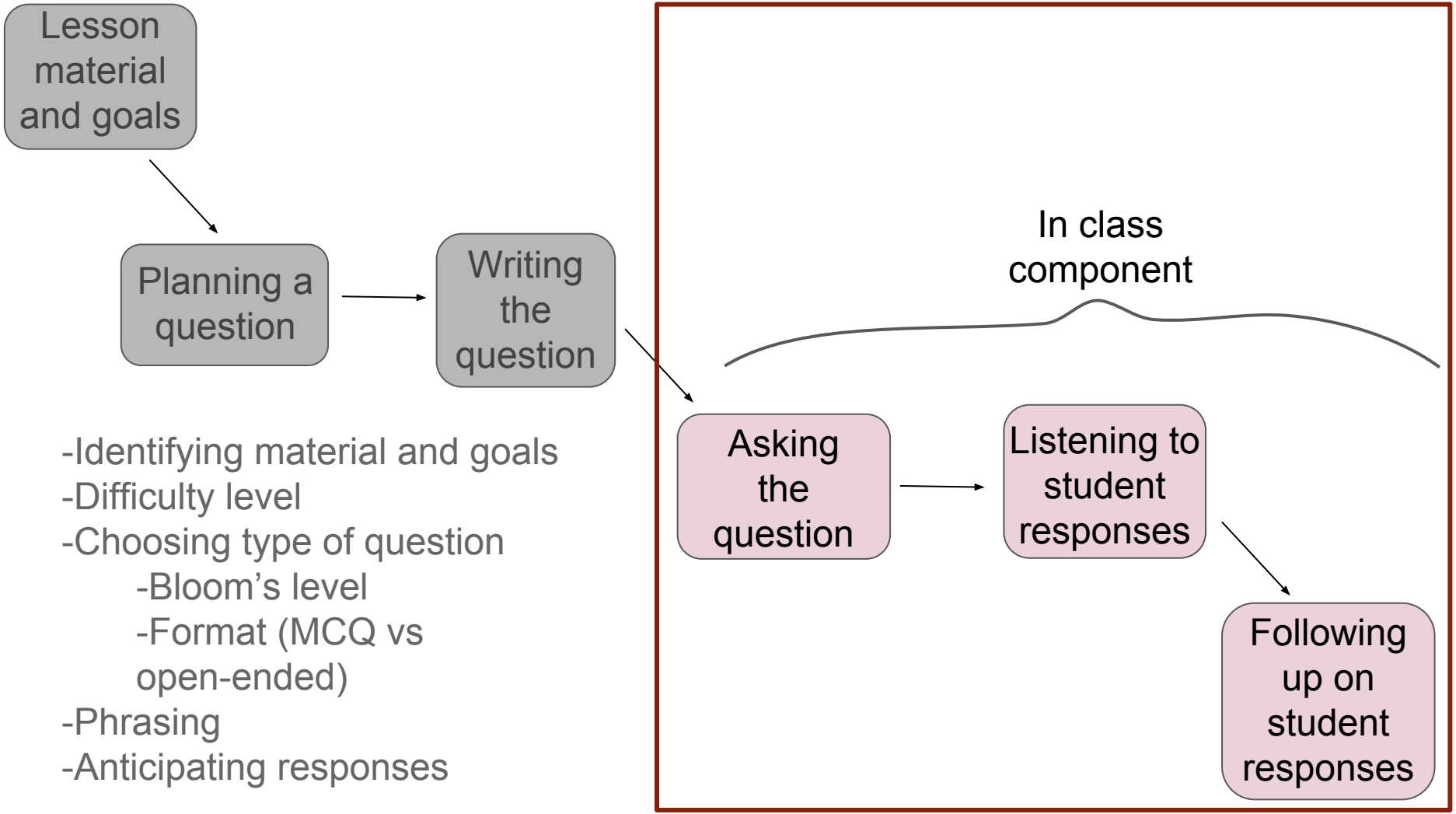
Some examples

2 **Comprehension** **Organization and selection of facts and ideas**	convert describe explain	interpret paraphrase put in order	restate retell in your own words rewrite	summarize trace translate
	Re-tell _____ in your own words. What is the main idea of _____?		What differences exist between _____? Can you write a brief outline?	
5 **Synthesis** **Combining ideas to form a new whole**	change combine compose construct create design	find an unusual way formulate generate invent originate plan	predict pretend produce rearrange reconstruct reorganize	revise suggest suppose visualize write
	What would you predict/infer from _____? What ideas can you add to _____? How would you create/design a new _____?		What solutions would you suggest for ____? What might happen if you combined _____ with _____?	

http://www.nsead.org/downloads/Effective_Questioning&Talk.pdf

Well-written questions are:

1. Purposeful
2. Clear and accessible
3. Brief
4. Thought-provoking
5. Limited in scope
6. Adapted to the level of the class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With the goal of including all learners...

How do you encourage all students to engage and share answers?

-Learning environment

-How you ask the question

-Delivery, Structure

*Think about this **silently** for 1 minute. You will then have 5 minutes to discuss this in pairs before sharing with the group.*

How do you encourage all students to engage and share answers?

- Learning environment
  - Class norms/contract
    - Encourage creativity/curiosity
    - Transparency
      - Explain goal of questions
      - Set expectations for participation, grading, etc
  - Model listening
    - Repeating/rephrasing/building
    - Writing
    - Non-verbal cues
  - Model uncertainty
    - Questions should be bi-directional
    - Cultivate a culture of curiosity
    - Leave questions open (wait overnight)
    - Say, “I don’t know”
  - Classroom setup
- Delivery
  - Tone - respond neutrally - positively)
  - Wording - clear, open-ended
  - Non-verbal cues
  - Write questions on slides
- Structure
  - Wait-time
    - “No-hands rule”
    - Timing
  - Opportunity for small-group discussion
    - “Think-Pair-Share”
    - Written responses - “Minute papers”
  - Opportunity for all students to share
    - Rotate through room
    - Assign reports for groups
    - Polling technology

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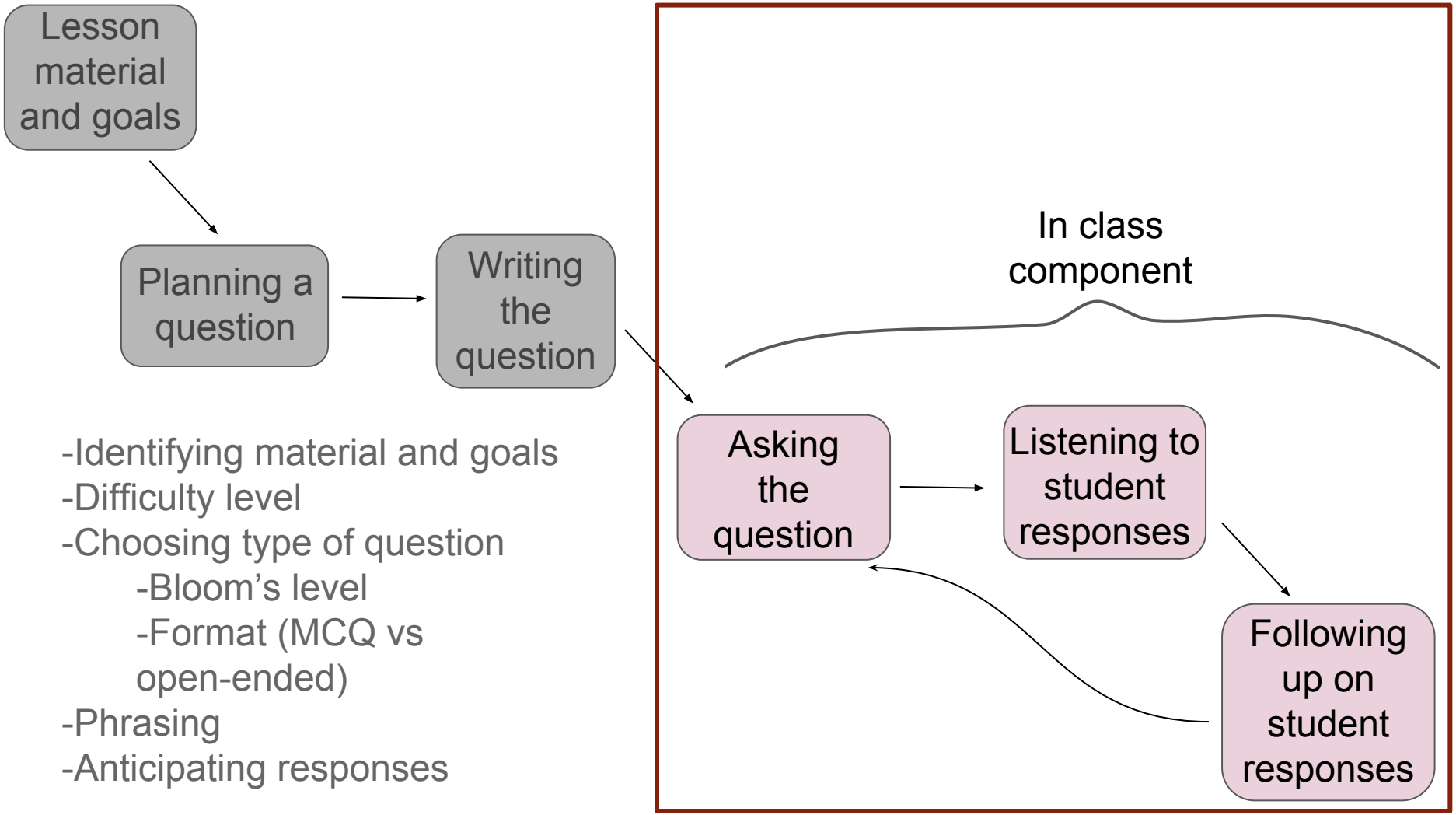
  - Opportunity for all students to share
    - Rotate through room
      - (mark down, change order)
    - Polling technology

What norms would you like to establish in your class?

In groups, take 5 minutes to write at least 4 on individual stickies. Post it to the board when you are ready.

Norms (your suggestions)

- “Arrive on time and prepared for class to start”
- Create a respectful environment
  - “Show personal respect for your peers - it’s okay to be different”
  - “Show intellectual respect for your peers - it’s okay to disagree”
  - Engage thoughtfully/intentionally
  - Tell students you goal is to create an inclusive environment. Tell them you want input and feedback.
- Establish rules for engagement
  - Encourage and teach healthy interaction practices
  - Teach and model good listening
  - Say: “There are no dumb questions.” “Give it your best shot!” “Try to answer, even if you are not sure.” “We want you to learn from questions, not evaluate you.” “There are no right/wrong answers.” (or at least that no penalties/criticisms)
  - Expect participation from everyone. Say: “Every answer has to come from a new person.”
  - Give time for reflection
  - Give students feedback on their progress
  - Avoid cold-calling. Or, use cold-calling, but make expectations clear and environment supportive.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How to respond to student answers when:

-a student gives an incorrect answer
-a student gives a partial answer
-a student gives a correct answer

(keeping in mind the goal of maintaining trust and fostering learning…)

Let's practice!

You are teaching a large, freshman biology lecture class. You asked your students the following question:

> *"What does the information in genes provide instructions for?"*

The first student who responds says:

> *"The information in genes provides instructions for rearranging DNA into traits."*

What might you say in response?

Think for 1 minute, and then submit answer on polleverywhere.

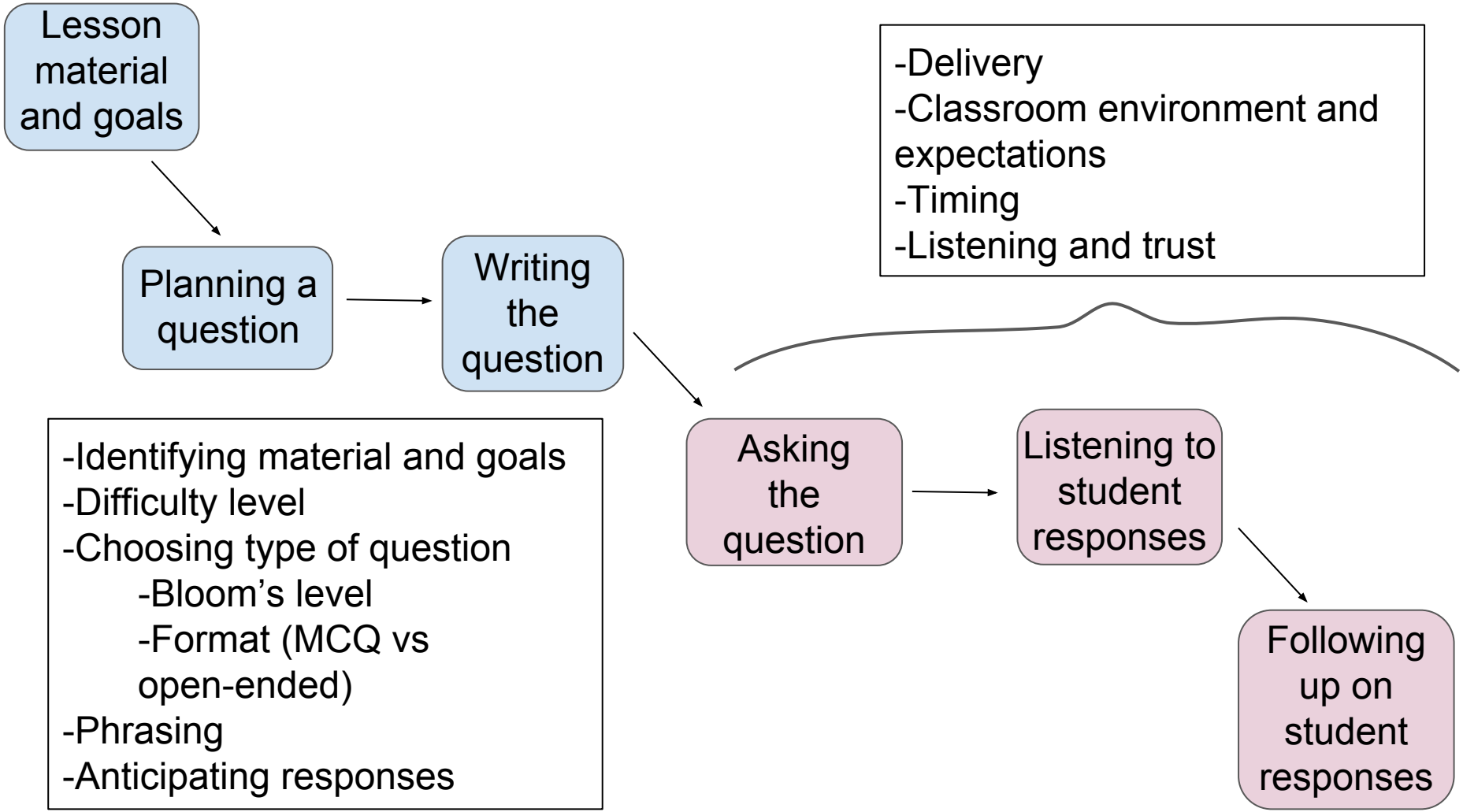
http://assessment.aaas.org/misconceptions/1/RHM065/303

Polleverywhere responses:

- “Okay, thanks for trying, let me rephrase the question, what is the function of gene?”
- “Thank you for your response but that's not quite the answer that I was looking for.”
- The overall idea of genetic information eventually resulting in phenotypic effects is correct. We can be more specific though. DNA is not rearranged into traits. Instead, it is transcribed into RNA, that is then translated into proteins. Those proteins will have many diverse functions in the organism, and together contribute, in part, to the person's traits.”
- “What molecular component/machine is responsible for physical traits?”
- “Thank you for answering - let's hear some more answers - what is the class thinking about that ?”
- “OK. There are two ideas here. That DNA is related to traits, and that DNA is encoding the rearrangement of itself. Are there more thoughts about these ideas?”
- “First say that genes absolutely contribute to traits. But then ask that student: whats is the relationship between DNA and traits?”
- “Let's look at what you said. Yes, it's correct that the genes provide instructions for the various traits of cells and organisms. But it's not actually through rearranging DNA. Would anybody be able to assist (name)?”
- “How would DNA be re-arranged? And how is it related to the theory of central dogma?”
- “"Why do you think that is?" "Tell me more."
- “So you nicely made the link between genes and traits - can you explain a bit more about what you mean by "rearranging DNA"?
- “Does anyone have other thoughts on this?”
- “"This student made an association between genes, DNA, and traits. Can another volunteer tell us more about the relationship between genes, DNA, and traits?"

Themes - Responding to student answers

- Correct
  - Repeat/write
  - Ask for additional answers or responses
  - Summarize/Reinforce correct answer
  - Don’t judge
- Incorrect, partial/superficial, or no response
  - Repeat/write
  - Redirect - Ask for additional answers or responses
  - Probe further
  - Ask students to discuss with each other
  - Rephrase
  - Scaffold
  - Don’t judge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Resources

https://citl.illinois.edu/citl-101/teaching-learning/resources/teaching-strategies/questioning-strategies (tips for planning questions and handling student responses)

http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=5EE852D154353B753DFF657B340A829B?doi=10.1.1.173.4022&rep=rep1&type=pdf (Page 109: Questions and Questioning Techniques, also contains a lot of information on other teaching topics)

http://www.nsead.org/downloads/Effective_Questioning&Talk.pdf (This is geared more for K-12 but has a lot of information applicable to many student populations, pgs 21-22 for example question formats at different Bloom's levels)

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3776909/ (Types of questions, practical considerations, more graduate/professional focused)

https://pdst.ie/sites/default/files/Draft_Questioning_Handout_FaSMEd.pdf (example questions, ways to follow up on student responses, tips for planning)