

# How Instructors Probe for Understanding After Students Complete Mastery Learning™ Online

Mastery Learning™ ensures students arrive prepared, but it is still the instructor's responsibility to verify that students:

- Understand the material, not just recall it
- Can apply concepts in real diving situations
- Can explain their decisions with valid reasoning
- Have no hidden misconceptions

Probing is the bridge between “online knowledge” and “real-world application.”

## 1. Why Probe for Understanding?

“Probing is essential to go beyond surface-level answers... identify misconceptions, gaps, and ability to apply concepts.”

Probing helps you determine whether a student has real comprehension and can apply the information to a variety of scenarios or has only memorized content.

Think of probing as:

- Testing reasoning
- Testing transfer of knowledge
- Testing decision-making
- Testing situational awareness

## 2. Use GUE EDGE as Your Primary Probing Framework

We recommend probing using GUE EDGE because it naturally leads students into explaining planning, reasoning, and risk management. Ask the students to plan all dives starting from dive 1. The instructor will need to tell the students what skills are covered, but the students should be able to plan the rest of the dive. To verify they understand what they are doing the instructor should ask:

## A. Justification Questions

Ask them to justify their choices. For example you can ask:

- “What is the “D” in GUE EDGE? What factors need to be considered?”
- “How did you choose that minimum gas? What would change it?”
- “Why is this dive time appropriate for the plan?”

Purpose:

To reveal whether the student understands the reasoning behind the plan, not just the definitions.

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## B. Application Questions

Push them beyond what they may have prepared and ask them to apply their knowledge to a new scenario. Example questions include:

“What would change if we planned this dive at 20m instead of 6m?”

“If visibility dropped to 1m, how would the plan change?”

“If your teammate used a different size cylinder, what adjustments would you make?”

“If the current picks up, how would this impact the team's position?”

Purpose:

To test whether the student can transfer knowledge into realistic dive changes.

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## 3. Effective Techniques for Probing

When asking questions it is important to push the students to see how deep their knowledge goes but also to give them time to develop their answer. Some practical strategies you should use:

1. Do not rush the students.

- Give the student a time to think.
- This produces deeper answers and reduces anxiety.

## 2. Follow-Up Questions

Never stop at the first answer.

Example:

\* Student: "We use 32% because it's safe for the depth."

\* Instructor: "What makes it safe? What factors limit it?"

## 3. Encourage Dialogue, Not Interrogation

Make probing conversational and supportive with input from the team.

Example:

\* "Walk me through your thinking..."

\* "What factors mattered most to you?"

## 4. Use Nonverbal Cues

Nods, silence, or a raised eyebrow signal that more detail is expected.

## 5. Adapt the Depth of Probing

Match question difficulty to:

\* Course level (Performance diver vs Fundamentals)

\* Student experience

Your goal is to build their confidence in their ability to apply their theoretical knowledge and develop a safe space where team members can discuss their ideas and work together to plan dives. You should also be able to fill in the gaps when you identify missing knowledge and correct any misconceptions.

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## 4. Common Pitfalls to Avoid

The questions asked are very important to understanding what your students understand.

### Leading Questions

Avoid steering them:

- \* Bad: "So the reason is because it's safer, right?"
- \* Better: "Explain why that depth is appropriate."

### Yes/No Questions

These reveal nothing and the student has a 50% chance of guessing the right answer..

Avoid: "Do you know what GUE EDGE is?"

Avoid: "Is the Minimum Gas at 6m 40 bar?"

### Teaching Instead of Probing

Do not start teaching the GUE EDGE sequence, ask them to recall and explain it. It may take a little longer, but the students will learn as they try and remember each point.

### Overloading

Do not ask stacked, multi-part questions.

- "What gas would you choose for this dive, why would you choose it, and how would the plan change if we went deeper?"
  - This contains three separate questions:
    - Gas choice
    - Justification
    - Depth change impact
  - A student won't know which part to answer first.
- "Why did you choose that turn pressure, how did you calculate it, and what would you do differently if your SAC rate doubled?"
  - This forces a student to:
    - Identify the reason

- Describe calculation steps
- Apply a new scenario
- Each should be asked separately.

Break the questions down and ask each point separately.

## Judgmental Tone

Students must feel safe to reveal what they don't understand.

## 5. Practical Probing Examples (Ready for Use in Class)

Examples of questions you can ask during classes.

### Buoyancy

- Describe what happens to your buoyancy as you descend.
- How do you make yourself neutrally buoyant?
- If you want to descend from 3m to 6m how do you initiate the descent?
- If you are ascending from 6m to 3m how do you stop at 3m?

### Gas Management

- What is the MG for the dive?
- How long can you dive for?
- If someone's SCR is 25 how will this affect the dive time?
- What would change if we did the skills at 9m instead of 6m?

### Team Communication

- What is the sign for 6?
- Where is the easiest position to communicate to your teammates?

### Ascent Strategy

- What is the ascent strategy from 9m?
- Why is there a variable ascent rate?
- How do you gauge your ascent rate?

## Narcosis/stress

- What signs would tell you or a teammate is becoming task-loaded?

These questions reveal depth of knowledge, risk awareness, and ability to apply concepts under stress. There are many more questions that can be asked, this will depend on the students. The concept is to ask questions instead of giving a lecture, allow the students gain confidence that they know the answers

## 6. Instructor Goal After Mastery Learning™

What are you looking for as an instructor? Students should be able to demonstrate:

- Understanding, not memorization
- Transfer, not repetition
- Reasoning, not guessing
- Confidence, not dependency
- Decision-making, not passivity

Probing is the mechanism that makes flipped learning work in scuba diving.

This maximises the time in the water during the class to work on the practical skills - not theory review.