

**Be Explicit
about Stance and
Pedagogical
Rationale**

**Make
Expectations
Explicit**

**Get to Know
Students**

**Share Your Own
Experiences**

Regarding the class: At the beginning of the semester, ideally the first or second class meeting, distribute index cards to students and ask them to take a few minutes and write down why they are taking the class and what they hope to get out of it. Tell them you will collect these. Have a conversation with students after they have written on their cards. Also, take the cards away and read them and, if it seems appropriate, share the student statements in generic form (i.e., not with names or any other identifying information) so that everyone knows the range of reasons why people are in the class.

Regarding Disciplinary Approaches: Find occasions (in class) and forums (e.g., syllabus, in framing assignments) to make explicit (a) general expectations regarding discipline-specific ways of thinking and writing and (b) your own particular expectations regarding these in a particular course. Ask students for their experiences of and feedback on these.

Regarding Assignments: With any forum for participation in the class, graded or ungraded but particularly graded, be explicit up front (in syllabus, in introducing the class or an assignment) about what your goals and expectations are for the assignment and check in with students regularly about how they are experiencing the assignment, what they are getting out of it, and what their frustrations with it are. This kind of ongoing dialogue takes time, but it is worth it so that students feel clear about and engaged in the assignments.

Professors' Expectations: When asking students to write down why they are taking the class and what they hope to get out of it, answer those questions yourself and share them with the class. Clarify and articulate for yourself (a) general expectations regarding discipline-specific ways of thinking and writing and (b) your own particular expectations regarding these in a particular course and find occasions (in class) and forums (e.g., syllabus, in framing assignments) to make those explicit. With any forum for participation in the class, be explicit up front (in syllabus, in introducing the class or an assignment) about what your goals and expectations for the assignment are and check in with students regularly about how they are experiencing the assignment, what they are getting out of it, and choices about how to clarify or modify your expectations.

Consider your own 'social location' in your thinking about what and how to share aspects of your life. Think ahead of time—before you begin teaching a particular class—about the kinds of things you feel are comfortable and appropriate to share with students within the context of exploring the subject matter of any given course, and be aware as you move through the course of opportunities to share your own personal angles on or experiences of the subject.

State explicitly and repeatedly the reason why you are doing something or asking students to do something.

Be clear about but not impositional with your own biases and commitments. They inform your practice regardless of whether you name them or not, so naming them makes for a more genuine dialogue.

Find ways early in the semester to get to know your students, such a questionnaire or an interest or experience survey.

Sources for ideas:

What Kids Can Do. (2003). "First Ask, Then Listen."
MacBeath et al. (2003). *Consulting Pupils: A Toolkit for Teachers*

**Provide Various
Forums for
Participation**

**Use Multiple,
Inclusive
Examples and
Illustrations**

**Consider the
Role of Silence**

**Be Allies and
Advocates**

Analyze the examples you use to illustrate concepts or points and consider whether you are making assumptions about background knowledge and experiences.
Building on what you learn from getting to know students and what you are comfortable sharing from your own experiences, generate a range of examples that illustrate different concepts or points, and include more than one example or illustration in your discussions.

Make conscious with whom you align yourself and why and try to find ways to be clear about how you position yourself in relation to students and speak with students whose voices are often marginalized or silenced but without silencing other voices.
Find ways to bring various students' voices into dialogue.
Consider ways you can make yourself vulnerable and take risks comparable to—not necessarily the same as—the ones you ask students to take.

Think about the nature of participation you want from students—listening and taking notes, engaging in discussion, etc.—and think about what different learning styles, cultural and otherwise, students bring to your classroom, then configure the room in various ways at different times so that it is most conducive to each of those modes and styles.
For active student participation, create smaller, structured forums—talking briefly with one other student; writing for a minute, then sharing with a partner, then sharing with the larger group; etc.—within which students can clarify and deepen their own ideas, gain confidence, and prepare to contribute to larger class discussion.

During the course of a class, be conscious of allowing for student silence—and remaining silent yourself—while students have the chance to think and formulate their thoughts.
Create regular opportunities—short writing times, memos, Black-board forums, etc.—for students to have silent times during and outside of class to process what they are learning.
Consider ways to bring a variety of student voices into dialogue within the class without making students too vulnerable, such as reading aloud anonymous journal excerpts and framing/facilitating discussion around them.

**Be More
Conscious and
Deliberate**

**Giving students
opportunities to
think and talk
about the course
subject**

**Encouraging,
demanding, and
actively managing
the participation
of *all* students**

**Building an
inclusive and fair
classroom
community
for *all* students**

Wait time: Increasing wait time to promote student engagement and participation,

Allow students time to write: Another way to scaffold wait time is to explicitly require students to write out one idea that capture their initial thoughts on how to answer the question posed. This act of may lead students to discover points of confusion or key insights. Think–pair–share: This activity generally involves giving all students to think (or usually write) about their ideas on a question. Then, students are charged to turn and talk with a neighboring student, compare ideas, and identify points of agreement and misalignment. These pair discussions may or may not be followed by a whole-group conversation in which individual students are asked to share the results of their pair discussion aloud with the whole class.

Do not try to do too much
One strategy for prioritizing how to spend precious class time is to decide on which biological ideas in a course are most difficult to learn, are rooted in common misconceptions, and/or represent fundamental biological principles.

Learn or have access to students' names: Having students submit index cards with their names and personal information is an easy first step to learning names. Integrate culturally diverse and relevant example: Attention to integrating culturally diverse and personally relevant connections to the course subject can demonstrate for students that diverse perspectives are valued in your classroom (Ladson-Billings, 1995).

Work in stations or small groups: Instructors can structure opportunities to practice thinking and talking about the course subject by regularly engaging students in tasks that require students to work together in small groups. Care must be taken to be explicit with students about the goal of the group work and, whenever possible, to assign roles so that no student in a small group is left out (Johnson *et al.*, 1991, 1993, 1998; Tanner *et al.*, 2003). Use varied active-learning strategies: The “best” way to teach equitably may be to consistently provide multiple entry points into the conceptual material for students. Lack of variation could result in the alienation and exclusion from learning of a subpopulation of students.

Be explicit about promoting access and equity for *all* students: Explicit statements by the instructor about the importance of diverse perspectives in science can make issues of fairness and equity explicit. Instructors can share with students why they use the teaching strategies they do, for example, sharing the reasoning behind having students write to allow thinking and processing time for everyone.

Identify the choices we make for particular pedagogical reasons and then analyze them for how they might also address other pedagogical issues, particularly, how they might be responsive to diverse students; Take a step back from the choices we make regarding how we construct and facilitate a course and ask ourselves if there are other choices we could make that would be more responsive to diverse students. Step back and try to look at the content of our courses with the eye of someone unfamiliar with it and think about what might need to be flagged or highlighted; and Find and develop a relationship with a long-term consultant, ideally someone in a cognitive place that is very different than your own.

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from some members of our community who I haven't heard from yet today.”

Monitoring
(your own & students')
behavior to cultivate
divergent critical
thinking

Teaching *all* of
the students in
your classroom

Teach them from the moment they arrive: Instructors are best served by considering what students are learning, not just about the subject matter, but also about culture of the classroom from the moment they enter the room. If the course is about learning biology, then instructors can implicitly and explicitly teach this by engaging students in exciting, intellectually challenging, and rewarding experiences about biology on the first day of a course.

Collect assessment evidence from every student, every class: Frequent collection of assessment evidence is essential for instructors to know the learners they are trying to teach. While the nature of the assessment evidence may vary from class session to class session, the evidence collected from each and every student in a course can aid instructors in continuously re-evaluating student ideas and iteratively changing the arc of the course to best support the learning of that course's student population.

Ask open-ended questions: Open-ended questions are by definition those which have multiple possible responses, such that inviting answers from a large group can yield more than an expected set of responses (Bloom *et al.*, 1956; Allen and Tanner, 2002; Crowe *et al.*, 2008).

Do not judge responses: To create a safe environment that encourages students to share all of their ideas, instructors may be best served in acknowledging student responses as neutrally as possible. This does not require inadvertent support of a scientifically inaccurate idea. Clearly stating "I'd like to hear from a number of us about our thinking on this, and then we can sort out what we are sure of and what we are confused about," sets the stage that all the responses may not be correct.

Use praise with caution: Instructors may inadvertently convey to the rest of the students who are not participating that the response given was so wonderful that it is impossible to build on or exceed. Using praise with caution is essential, so other students feel that they still have something to add and can be successful in sharing.

Establish classroom community and norms: Common group norms established by experienced instructors include the following: "Everyone here has something to learn." For many instructors, these classroom norms are simply verbally asserted from the first few days of a class and then regularly reiterated as the term progresses.