

Eyes-Closed Exercises for Feedback, Practicing Recall, and Model Based Reasoning

1. **Eyes-closed exercises (ECE)** are any in-class activity that students can do with eyes-closed, and either no movements at all or using their hands.

- ECE are done with ALL students having their eyes closed
 - Quick feedback
 - No need for advance planning
 - Can engage EVERY student
 - Removes fear of how peers will view an individual's response
 - Removes distractors (removes all visuals, including peers)

- **ECE are my alternative to class response systems:** free, easy, low maintenance, faster, with pedagogical benefits, and greater flexibility
 - Warning: I can find no research or other description of these, despite considerable searching. They seem so simple that I keep thinking there must be something out there, but as far as I can find, this is all there is.
 - *In other words, this isn't evidence-based.*

2. **ECE can begin building memory for concepts, structures, or events.**

- One can ask students to use their hands to sketch in the air for a structural model, flow chart, or other image
- Sometimes I leave an image up on the screen, and have students close their eyes to think through it from memory
 - I tell students to open their eyes to peek for anything they can't remember, closing their eyes again to run through it.
- Or I have them close their eyes to go through a model for a system that they have sketched for a homework assignment, reinforcing their memory with ECE.
 - I tell students:
"Sketch, picture, or frame with your hands this structure, pathway, or series of events."

3. **Self-designed and instructor-designed thought questions in ECE:** Both instructor and students can invent questions for ECE. Two formats I find easiest, in order, are:

1. *Change-one-thing, What-would-be-different? [Fastest for students to learn – it does require that I walk them through some examples.]*
2. *Choose-an-outcome, Can-you-make-it-happen (or explain why not)? [This one takes more time to learn, and more worked examples.]*

4. Simplest use of Eyes-closed Exercises: **Feedback** that engages all students, safely for them.

- Some Questions can be uncomfortable for students (or teachers) to answer publicly.
 1. *"Could you explain the concept we just covered?"*
 2. or *"Raise your hand if you need more time on the concept we just covered."*
 3. *"Most teachers are familiar with the Executive Function Creative Teaching model (EFCTv). But if you're not, please raise your hand and I'll explain."*
 4. *"How many of you did all of the reading for today?"*
 5. *"Raise your hand if you spent more than 1 hour on the homework?"*

- **Students are hyper-aware of their peers.** They are usually far more afraid of looking ‘dumb’ or foolish to their peers than to their teachers. (At least, that’s my experience – my students are often quite willing to admit, when everyone’s eyes are closed, aspects of preparation or understanding.
- **When students are confident all other students’ eyes are closed, giving them safety from peers, they often give more reliable responses.**

5. Quick Instructions you can give to students”

“- I’m going to ask a question when everyone’s eyes are closed.

- I’m going to make sure everyone’s eyes are closed before I ask you to raise your hand.

- I’ll tell you to lower your hands before I allow you to open your eyes, so keep your eyes closed until I tell you!

- Close your eyes ... Close your eyes ... No peeking ... Close your eyes ...
 - Someone’s eyes are still open!
 - Eyes closed please.
 -

Here’s the question: Raise your hand if you are confused or have questions about the topic we just covered.

Everyone keep your eyes closed while I estimate ... OK, Hands down.

- NOW you can open your eyes.”

Two Critical Rules:

- I. Students must trust you to enforce the eyes closed rule.
- II. NEVER reveal how an individual student responded. You must not break that trust.
 - But what if, without thinking, you reveal a student’s response? I’ve done that. Admit the mistake instantly, apologize quickly, and promise you’ll work very hard never to do it again. For a while those students are more cautious and less open, but I gradually regain most of their trust.

6. Follow-up and more complex Eyes-closed questions:

- *Nearly all of you said you recall concept X – could you sketch it?*
 - *Raise your hands*
 - *OK – nearly all of you feel you probably could. See if you can keep your eyes closed and sketch it in the air with a finger.*
- **OR:** *OK – it looks like many of you couldn’t sketch it.*
 - *Open your eyes, and let’s have you try to explain it to your neighbor (or ask them), and then I’ll take questions.*
- **OR:** *None of you felt you need a review. Here’s a quick test (you can open your eyes). What would happen if you added X to the system? Think about it for a moment – you’ve added X to the system ... (PAUSE) ...*
 - *Might we expect more of Y, less of Y, or the same amount of Y?*
 - *Close your eyes*

- *Raise your hand if you think there would be more of Y?*
- *Hands down What about Less of Y?*
- *Hands down ... the Same amount of Y?*
- *OK – hands down. You may open your eyes.*

7. Model-Based Reasoning with eyes closed: Pose a problem on a concept or system you've just finished, or that was covered in a previous class.

- *“What if we injected water under pressure into a system with active fault stresses?*
- *What might be different? ... OK, you've had some time to think.*
- *You'll choose one – more, the same, or fewer earthquakes. Close your eyes*
- *Everyone, close your eyes ... (as you look around the room for open eyes):*
 - a. *More earthquakes? Hands up for more earthquakes. OK – hands down.*
 - b. *Same number of earthquakes? Hands? OK – hands down.*
 - c. *Fewer earthquakes. OK – hands down. You may open your eyes.*

Most of you said more earthquakes. Eyes closed again, please.

- *Would you predict stronger earthquakes or weaker earthquakes?*
 - a. *Eyes still closed: Hands up for bigger (stronger) earthquakes? -- OK, hands down,*
 - b. *Hands up for smaller (weaker) earthquakes.*
- *Most said stronger earthquakes, but I am not sure I agree.*
- *Open your eyes – see what you can explain with your neighbor.*

8. Pedagogy: *What makes Eyes-closed Exercises effective?*

1. Removal of distractors
 - A. Students pay more attention to peers than to answers.
 - If their eyes are closed, you can remove peers as a distractor.
 - B. Humans focus better by shutting down vision. We are easily and constantly visually distracted. There is even some research evidence that when a human closes their eyes, some visual processing areas are recruited for other elements of thinking. If so, then we may gain more attention and information processing.
 - C. Students can't look at a phone or scan websites with their eyes closed.
2. Lower-stakes assessments.
 - When peers cannot see a student answers, the stakes are lower.
 - The teacher alone is a setting with lower stakes than students + teacher.
3. Retrieval Practice of Memories and Self-Assessment.
 - A. The *Yes-I-remember-that-I-used-to-know-that* problem.
 - If I ask students, do you remember X? Often, nearly all students will raise their hand. I've learned that their response is usually not for the question I asked. The question they are answering is, *Do you remember than you once knew X?* They decide, *“Yes, I remember that I used to know X.”* And up go the hands.
 - It is different if I ask the question with eyes closed.

- *“You once studied X. Close your eyes and try to picture it, or explain it in your mind with words and any images you have for it. I’ll give you 20 seconds or so. ... Keep your eyes closed.*
- *Now, raise your hand if you feel you recall it and could explain it. ... wait while I get a rough count ... OK, hands down.”*

- When I ask the question this way, with eyes closed students are self-assessing their recall and understanding.
 - Their answers better reflect what they still know.

4. Active learning and Reasoning

- With eyes closed, students must attend to the problem and genuinely* think through it.

9. Eyes closed by the Teacher – when you want information, but when the teacher shouldn’t know how individuals responded.

- In this case, the teacher doesn’t watch and stands facing a wall – all eyes closed, except one trusted individual student to count.
 - I have the trusted individual promise publicly they will not reveal any information to me no matter how desperately I beg and plead.
- Use these if you would like information that students would not want YOU (the teacher) to know.

Additional Thoughts, FAQ’s, and Issues

Email me if you have questions (pdheid@wm.edu)

(1) How accurate/honest are students?

Two answers: first, I don’t know, and second, it depends a lot on the kind of question asked. If the questions disclose information about which students might be sensitive, one shouldn’t predict complete honesty: honesty would be expecting a lot.

An example. I teach a one-week summer transition course to about 20 students in most years. We do quite a few eyes-closed exercises. A few years ago, when the class was talking about some of the neuroscience and cognitive science data on focus and attention, students began talking about how distracted they could be when expecting something important on social media through their phones. One student, in particular, had been noticed by everyone in the class as often on his phone during breaks, and sometimes during class. I was curious about the whole class’s estimates on their phone use, so we did an eyes-closed exercise with hands raised for various intervals: 0-1 hr, 1-2 hrs, 2-3 hours, etc. (Students immediately asked: Do you mean on school days or weekends/summer days? We settled on weekdays during school.). The highest reported use was 3-4 hours by the phone-addicted student. I reported the results, and told them that the great majority had reported either 1-2 hrs or 2-3 hrs. Then I took questions. The phone-addicted student looked up, raised his hand, looked around the class, and with perfect timing said, “I lied” — getting a good laugh from all. That question was just too sensitive for him. Students won’t, and I expect can’t, always be honest.

(2) It’s OK to OPT OUT of answering!

I try to be careful with what questions I ask. I avoid questions I think will make people uncomfortable. For many questions, however, it's hard for me to know. Some questions might make one or few students uncomfortable if they answer, but not any others. To address this, I encourage students to use an OPT OUT whenever they wish. I tell students to not give an answer if: (a) they can't choose an answer because they've forgotten something, (b) they aren't sure of any one answer, or (c) if they aren't comfortable with answering. I give all three potential reasons because it allows them to opt out without revealing their discomfort – could be that they just aren't sure. The language is something like this: *“If a question feels uncomfortable, just don't respond — keep your hand down in the same way you all would when you can't decide on an answer. If just can't decide on a single answer, if you are unsure or don't remember, keep your hand down — that's OK, too. Give me a raised hand answer only when you're OK with sharing & feel that you have an answer — in those cases when some hands stay down, it's not dishonesty, it's just privacy. It's sensible to not answer when you truly don't know, or to keep things private when you wish!”*

Later in a course, if I'm asking a question that I think might be sensitive, I give a reminder, such as, *“Remember that you don't have to raise your hand — if you're either unsure or uncomfortable answering, or if your arm is sore from a sport or workout, just keep your hand down.”* I include the range of possibilities *‘unsure or uncomfortable or sore ...’* because I want them to realize that I won't assume a negative from a non-response.

(3) Answering MORE THAN ONCE.

Occasionally I also tell students they may raise their hand more than once; for other questions, I tell them they may choose only one answer or opt out. And sometimes I tell them, *“You MUST answer, and only once. I want you to commit, even if you are unsure.”* The latter, “must answer” is ONLY on questions that are about content and problem-solving. Here's an example: *“If we increase the number of K⁺ channels in a cell membrane, will K⁺ concentration in the cell become higher, lower, or the same? Please everyone answer, and answer just once — I want you to commit to a single answer, even if you aren't very sure. To repeat, “If we increase the number of K⁺ channels in a cell membrane, will K⁺ concentration in the cell become higher, lower, or the same? OK — Eyes-closed to choose”*

(4) SIGNALLING UNCERTAINTY with a hand twisting or wiggling back and forth.

I find that eyes-closed hand-raising has nuances. When students are quite sure or enthusiastic about an answer, their hands are more likely to go up high. When they have an answer, but are unsure, their hands are more likely to stay low, around shoulder high or head high. Or when they're unsure, their hands often go up but twist back and forth. Usually, after reporting an early exercise, I tell students that, *“Some of the responses had hands twisting back and forth, which suggests they weren't very sure. I'm guessing that many or most of you might be unsure, so let's have you get more information or reminders by asking some questions”* Students tend to do the hand twisting quite naturally. I have never had to tell them to wobble their hand a bit when unsure. My comment to the class informs everyone in the class that they may do the same thing.

(5) NOT EXPOSING STUDENT RESPONSES: It is important to keep responses private. That includes NOT suggesting by gaze or hand movements which students gave which. There

are multiple ways a teacher might indicate who gave a specific answer: naming students, pointing, or by looking at one student as they talk about one answer. For that reason, when talking about specific answers, never point, never give names (I've screwed that one up), and keep your gaze moving, certainly never fixing on any one student and not even lingering in any one part of the room.

(6) Making sure students understand the question.

As needed, repeat your question and the choices. Encourage your students to ask you to repeat or clarify their choices when necessary.