

QUESTIONS TO ENCOURAGE STUDENTS TO USE INTUITION THROUGHOUT PROBLEM SOLVING

Questions to focus on sense making at the beginning of the problem:

- What's going on here?
- What are you noticing?
- What do you wonder?
- Tell me something about this problem.
- Forget about the question for a second. What's going on in this situation?
- What do you estimate the answer might be?
- What do you predict the solution might look like?

Questions to redirect students to the problem while solving:

- Can you read the problem aloud again?
- Let's go back to the question for a second. Is everything still making sense?
- Let's refresh our memories about what each of these numbers represents. What's the _____ mean?
- Let's put numbers aside for a second and think about the units. Do they check out?
- Wait a minute. I'm trying to visualize what's going on in this problem. Does that seem possible?
- Did you have a picture in your mind when you read the problem? Can you share it with us so we can see what you saw?

Questions to teach students to expose and analyze their decision-making throughout:

- Stop there for a second. We're in the details, but can you remind us why you were figuring that out in the first place?
- Before you calculate that, can you tell us why you'd want to?
- What are you planning to do with that information, once you find it out?
- What's that going to do for you?
- Why do you need to know that?
- Tell us why that matters.
- What made that an appealing way to start?
- How did you decide what to do next? What was your rationale?
- What were you hoping for when you made that decision?
- Did you have a plan, or were you trying things out?
- Were you going on a gut feeling here, or did you have a plan?
- Were you working off a hunch? Did it work? Why or why not?
- Where'd you get the idea to do it that way?
- Slow down. We want to follow your thinking. Can you tell us your reasons for approaching it that way?

Questions to encourage relational thinking to make sense:

- Oh, so you were remembering another problem? Can you tell us about that?
- Oh, so you thought about (a connected concept)? Can you tell us how that relates?
- How did thinking about your experience with _____ help you here?

Questions to teach students to check in with their intuitions during problem solving to develop a feel for mistakes and inconsistencies:

- What was going through your head when you noticed that?
- Was everything fitting together at that point?

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- Did you feel satisfied, like everything made sense?
- What tipped you off that something wasn't right?
- Did anything jump out at you?
- Oh, so that raised some red flags for you?
- What caught your eye and made you think something might have been off?
- How did you know you were wrong?
- Does anything strike you as unreasonable here, or does it hold together?
- Is anything about this work troubling anyone?
- Does her approach seem reasonable or unreasonable to you? Why?
- When did the bells start going off, like maybe this approach had a problem?

Questions to teach students to apply intuition to their solutions:

- How do you feel about that answer?
- How confident are you?
- Does that sit right with you?
- Do you believe that?
- Do you believe yourself?
- What's making you doubt?
- What would convince you?
- You seem unsettled. Talk to us about why.
- When your estimate and your answer didn't match, what did you think?
- Does that seem reasonable?
- Did that match what you expected?
- That was a surprising result! Do you think it's true?
- Was it about what you thought it would be or not?
- Does it make sense that _____ is bigger/smaller than _____?
- Does that pass the commonsense test?
- Is anything nagging at you, or are you completely satisfied?
- How close was your estimate?
- It feels counterintuitive, doesn't it? Say more about that.

Questions to encourage students to refine their intuitions going forward:

- Did anything surprise you here, or did it work out like you expected?
- So you think the math is right, but the result doesn't make sense? Interesting! Let's talk about that.
- How did you reconcile those two thoughts/answers/ideas?
- What are you thinking now?
- Where do things stand?
- What are you reasoning through now?
- Did you end up reexamining anything you'd thought you knew?
- What would help you settle your remaining questions?
- What's next? Where will you go from here?
- Did anyone change your mind today? How?
- What new questions are you asking now?
- What new understandings did you come to?
- What do you think you'll remember for next time?