

Growing Our Intentionality with Disciplinary Literacy

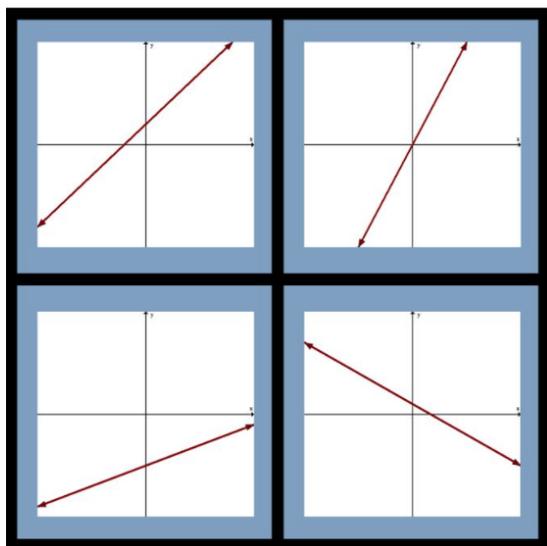
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In this series in April, I stated, “whether we intend to or not, we use disciplinary literacy every moment while we are teaching”. This month, we begin thinking about how we might grow our practice and our intentionality in recognizing and using disciplinary literacy (DL) in mathematics teaching and learning. As promised, I’ll share a practical example of how one might begin growing more intentional practice in DL.

In the MAISA GELN document, [“Essential Instructional Practices for Disciplinary Literacy in the Secondary Classroom”](#), Disciplinary Literacy Essential (DLE) #1 points us to engaging students in “problem-based instruction”. That’s a great fit with recommended mathematics teaching and learning practices. Reading all of DLE #1, we are encouraged to engage students in inquiry into problems large and small, abstract and applied, theoretical and relevant to their lives and communities. Included in these inquiry problems are many “cognitively-demanding mathematical tasks” – problems which prompt deeper mathematical thinking and connection-making than provoking just an algorithmic or rote response. Some inquiry tasks can take students days (weeks? months?) to explore, understand, model, and present findings. Others take just a few minutes. Since we have just a few column-inches today, I’ll select a short task and use an inquiry approach.

Looking at the bulleted recommendations for developing disciplinary literacy through problem-based instruction, I think I’ll start with the first two bullets listed: “engaging students in asking mathematical questions, both practical and theoretical”, and “engages students in abstract and quantitative mathematical thinking and reasoning.” One way I might do this is through a math talk using a task such as “Graph 5” from “Which One Doesn’t Belong?” (<http://wodb.ca/graphs.html>) You can [find a big version to view here](#).



GRAPH 5

from Mary Bourassa

My students have already engaged in some of these WODB tasks. I already ask “how do you know” whenever a student says to “vote off the island” *Survivor*-style one of the four choices. Now, I decide instead that I will focus on broadening and highlighting the questions students ask themselves when faced with a graph or set of graphs like this. In other words, **how they inquire into this text and make sense of it**. As a bonus, in doing so they’re engaging in “abstract and quantitative mathematical thinking and reasoning”. Currently, many of my students have focused in on one or two “favorite” attributes to look for and so are in danger of not seeing - and learning - all they could see about graphs like these.

Since I’m now focusing on questioning and reasoning, before I present this task to my students, I’m going to **try it out for myself** and **make a running list of all the questions I myself can think of to ask**. I encourage you to **pause** at this point and try this out for yourself...just say them out loud or jot them down.

Looking at my list, I’m going to ask myself some questions, and I encourage you to ask yourself these, too:

- How did I even know to ask that question?
- How did I learn to read this text (graphs like these) and make sense of them?
- What experiences did I have that helped me to list many questions that help me to answer the big one, “Which one doesn’t belong?”

- How did (or didn't) those strategies and experiences provide solid understanding for me at the time? Knowing what I know now, should I repeat those strategies and experiences with my own students?
- And the main question for me - How am I going to teach the students I now have to ask these questions and make similar analyses so they can develop a deeper understanding of not just mathematics, but how we think and communicate mathematically?

To save some space and also to give you a chance to hear someone else's reasoning, [I've recorded my questions and my thinking around them](#). Nothing fancy, just a "record yourself at your computer" video like students would do if they got to respond by video, too. I apologize here for forgetting to point-while-explaining for the first few questions.



So how am I going to teach the students I now have to develop this understanding to ask these questions and make similar analyses?

As you heard in the video:

- It mattered to me to see lots of graphs identical in some regard but different in another. I'll make a point to do this in lessons, warm-ups, closures, and homework.
- Using technology helps, especially now with full color and animation. I'll be sure to leverage technology tools and help students to use color and animation with tools, too.
- There are videos I could direct students to watch (maybe with a bit of EdPuzzle added by me). I'll select one or two that are the most helpful.
- And eventually we'll learn [the Math Dance](#). (Enough said.)

And...

- Seeing practical applications of linear models with various slopes and y-intercepts, and how those get interpreted in a real-world setting, would help.
 - This would increase relevance and give a WHY to these abstract concepts.
 - I'll be sure to include real-world scenarios, especially those relevant to students' lives now and their career and other interests.
- My assessments and assignments will also include more questions that involve characteristics/attributes rather than finding exact values all the time.
- I will be more intentional in teaching and assigning concepts like slope and intercepts by avoiding relying on rote learning and memorization (how I was taught), instead being sure that students can also interpret, apply, and connect.

Also key to the "how" - What's good for the goose (me) is good for the gander (students), too. If recording and reflecting on my thinking can help me by making my own thinking visible to me, I should give students an opportunity to record a video of their thinking and reflect on it as well. They could also write out their thinking. Both forms could be shared with peers for feedback. I might also require one or the other (video or writing) depending on what I want to formatively assess but giving them a choice gives students a voice in my class, too.

And for a couple weeks, we'll put graphs of functions into heavy rotation into our opening task/warmup or closure activities, giving students many opportunities to generate questions and hear their classmates generate questions, too. And, I'll also work to highlight questioning at least part of the time in other tasks we address, so they don't associate this type of questioning - and thinking - with just this narrow type of text.

Let's connect this all back to growing practice and intentionality with Disciplinary Literacy:

That one little cognitively demanding mathematical task (problem-based instruction) leads to a lot of mathematical conversation, questioning, vocabulary usage, and quantitative reasoning. It springboards us into examining why slope, y-intercept, and caring about quadrants matter, especially as we work with real-world data and scenarios. And the students are reading graphical text, writing out their questions or speaking them to the class or the camera, listening to the questions and reasoning of others, and viewing a few videos of their classmates to provide feedback (Notice-and-Wonder, anyone??).

Now that you've seen and heard and read (and wrote or spoke...Sorry! It's DL, you know?) the thinking start-to-finish about how one might begin to purposely incorporate disciplinary literacy into mathematics teaching and learning, I'm hopeful that you're game to try this for yourself and your students. Start with what you're already doing regarding math content, be thoughtful about how you (the expert) think and know and do and make a plan for how to let your apprentice (novice) students in on these ways of thinking, too.

I'd love to hear your thoughts and questions, cheerlead for you as you venture into DL, and support you however you might need. My contact information is below:

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