



Troubleshooting Seminar Presentations in Mathematics

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18.704
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Writing,
Rhetoric,
And
Professional
Communication

Questions from Survey



What challenges did you face in
PREPARING for your
presentation that you would like
more instruction on?



*I think it's difficult to **identify** which parts of the proof need **emphasizing**, and is most **important**.*

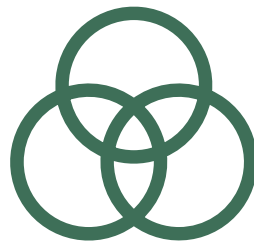


*deciding what's important to
talk about; serre is a *really*
terse book*



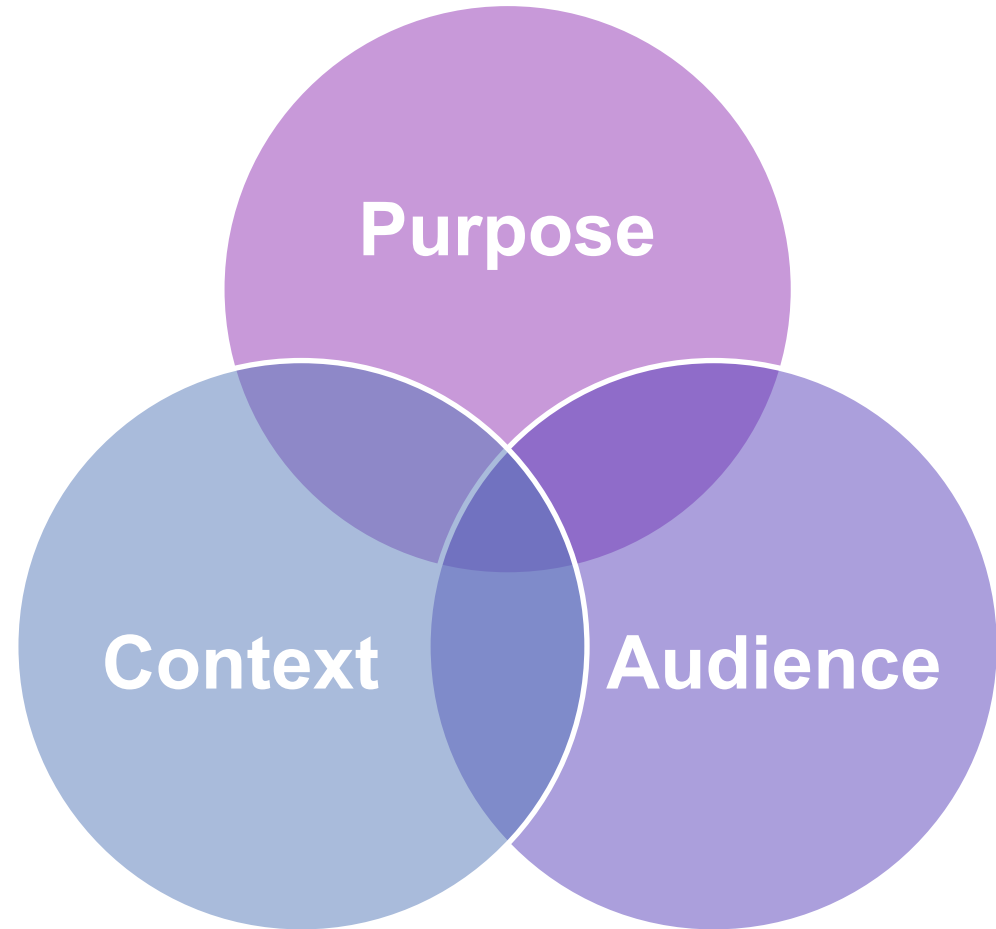
Let's work this **problem** with the **tools** that we have from last workshop.



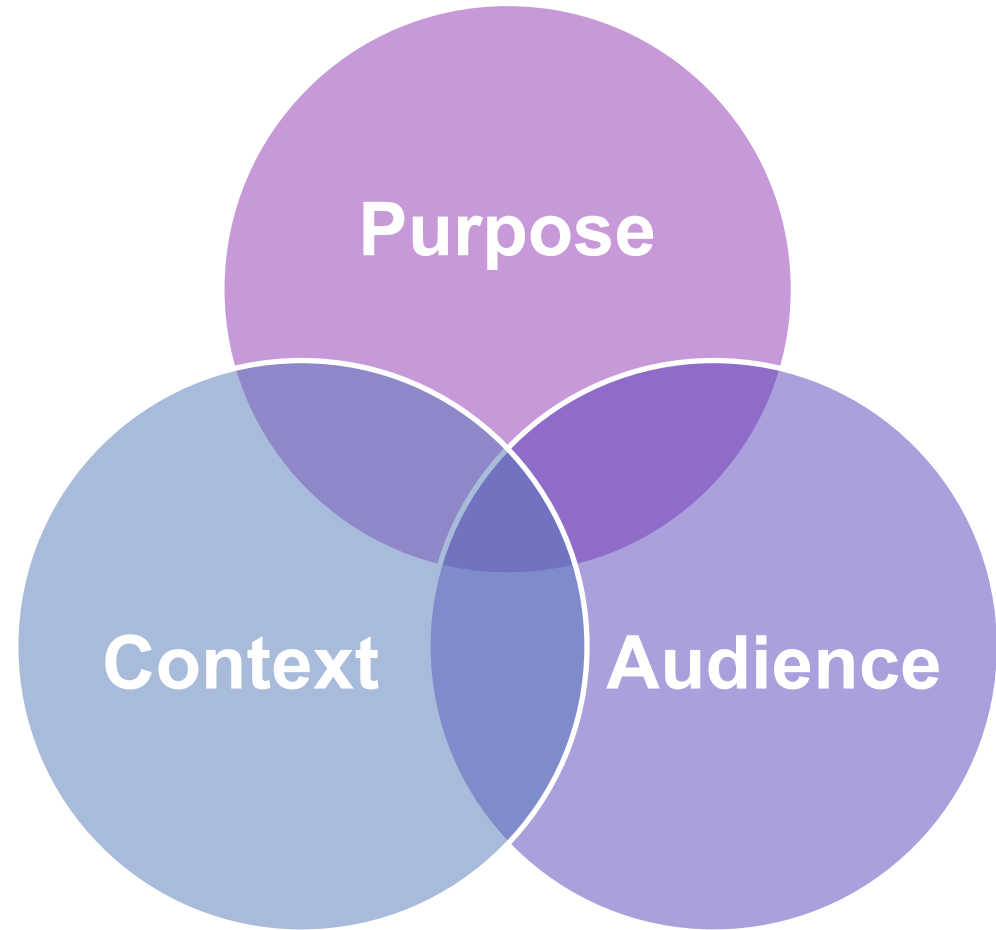


Rhetorical Situation

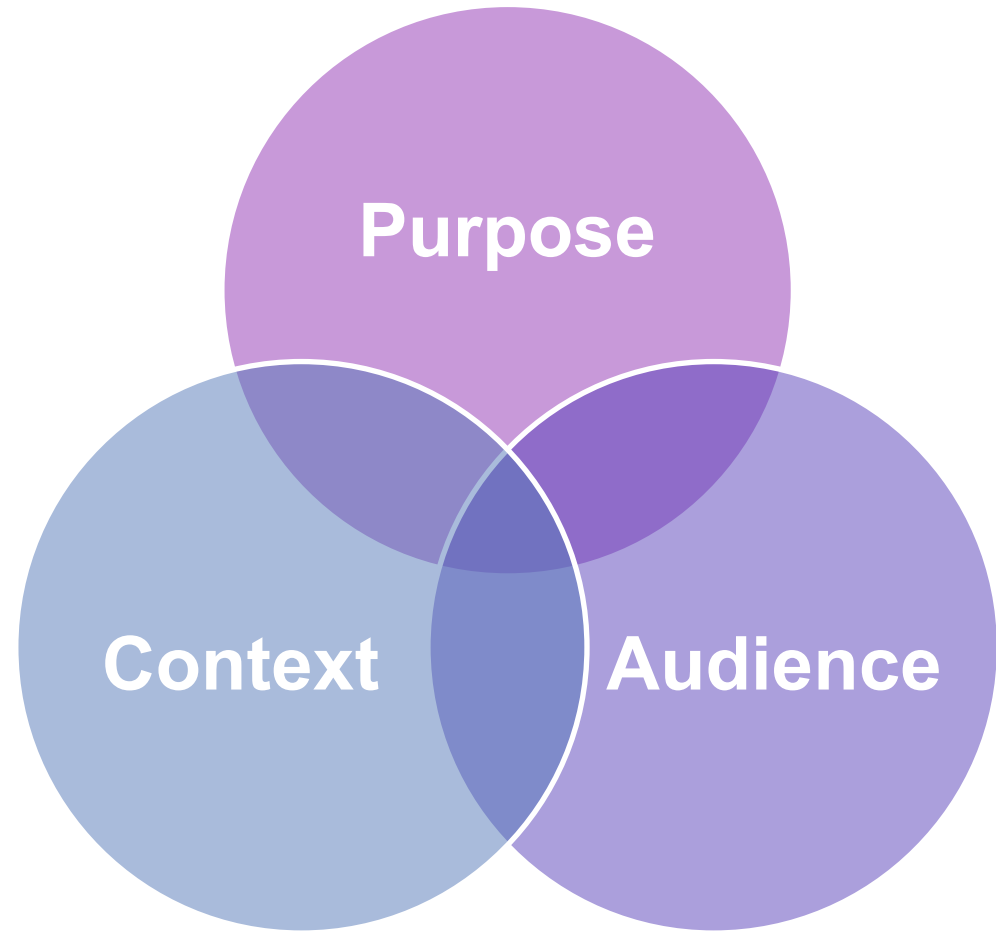
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Each of these **variables** could be useful for helping us **solve this problem.**

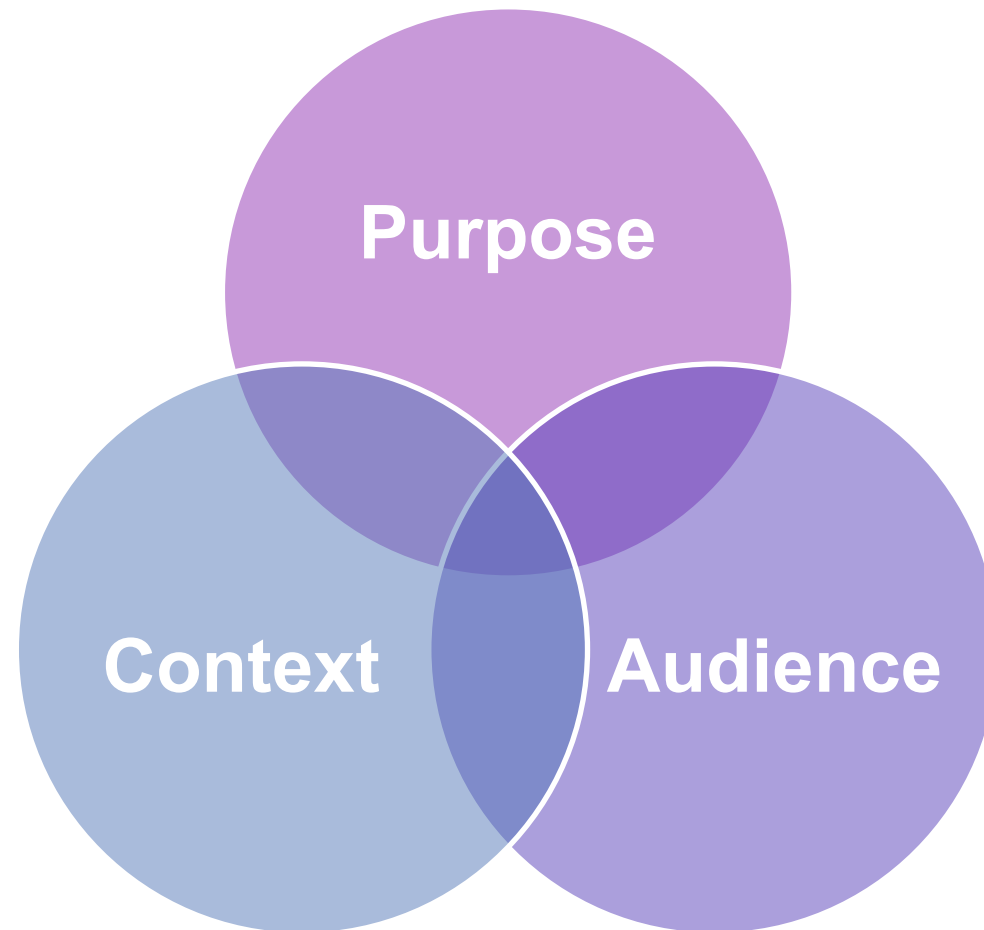


Let's look back
on the
questions and
see which of
these
variables
seems most
likely to be
most useful.



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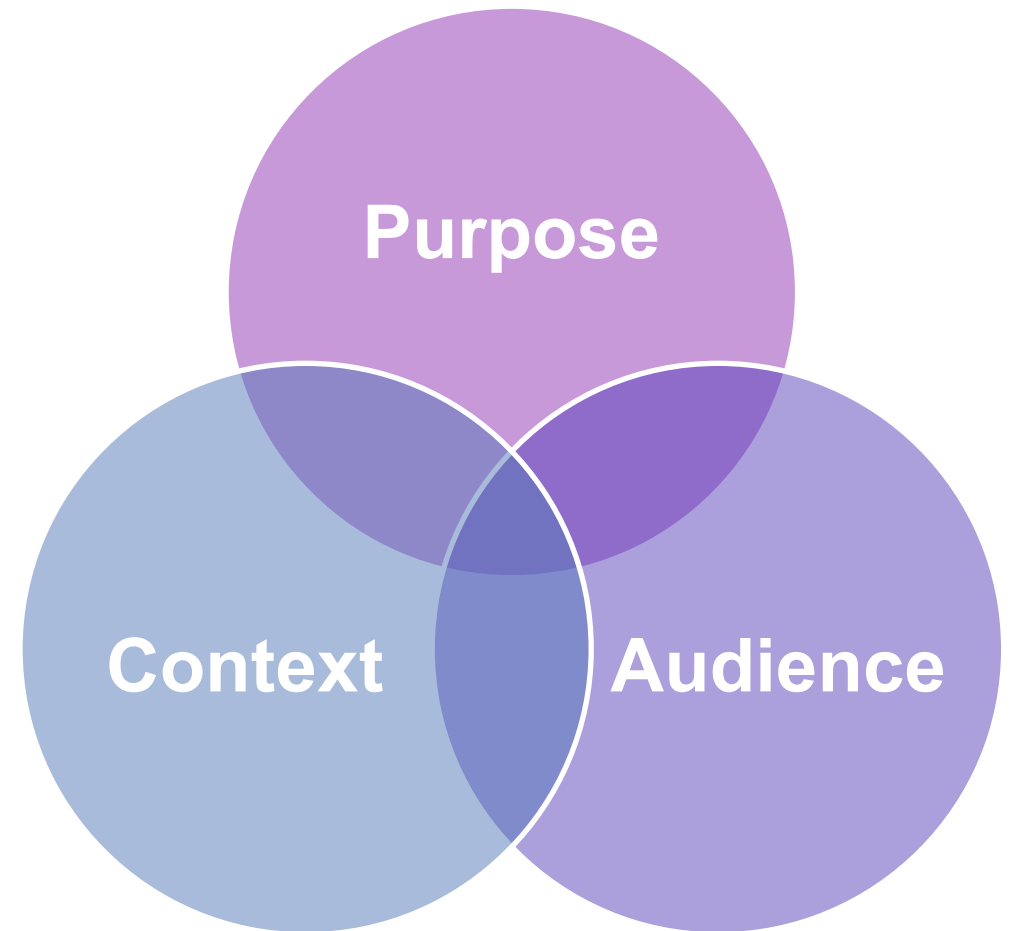
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I think it's difficult to **identify** which parts of the proof need **emphasizing**, and is most **important**.

These questions, to me, seem like they're both looking for a **sorting function**.

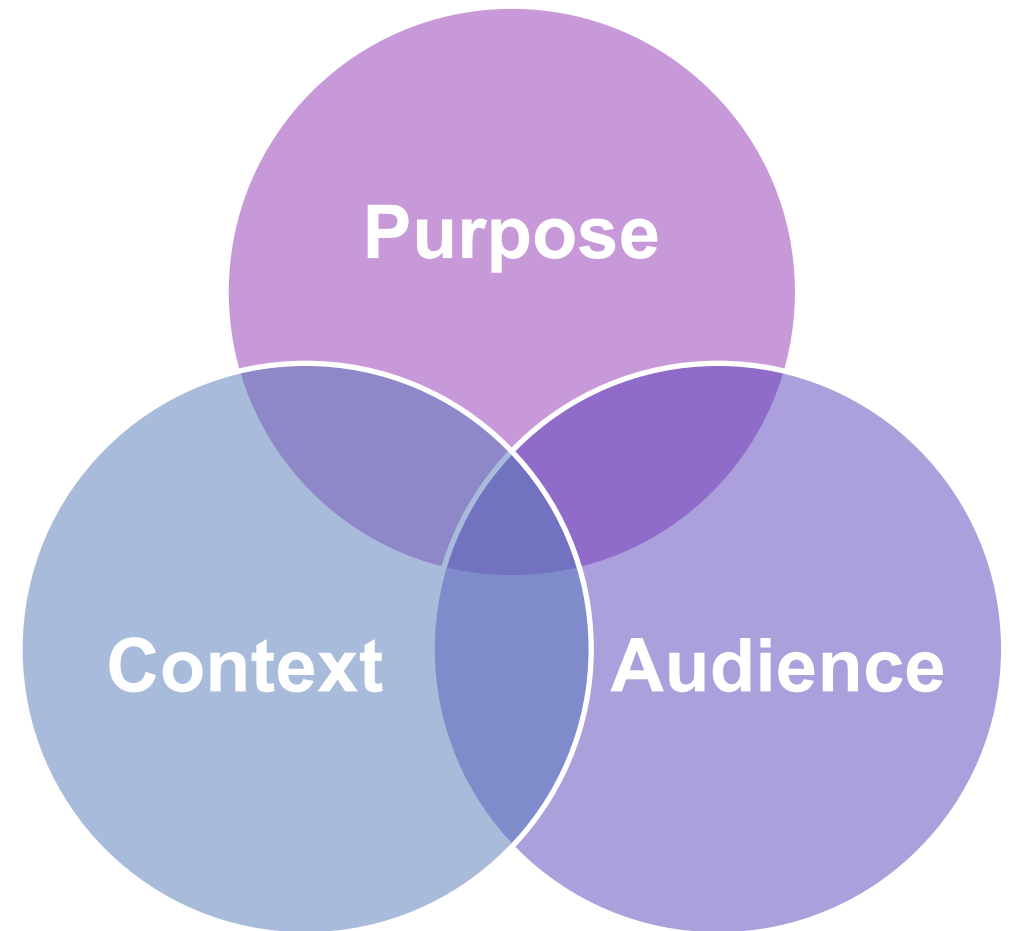
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I think it's difficult to **identify** which parts of the proof need **emphasizing**, and is most **important**.

The students want some **method** for **sorting** what's **important** and should be discussed in the presentation, and what is **less important** and can be glossed or skipped.

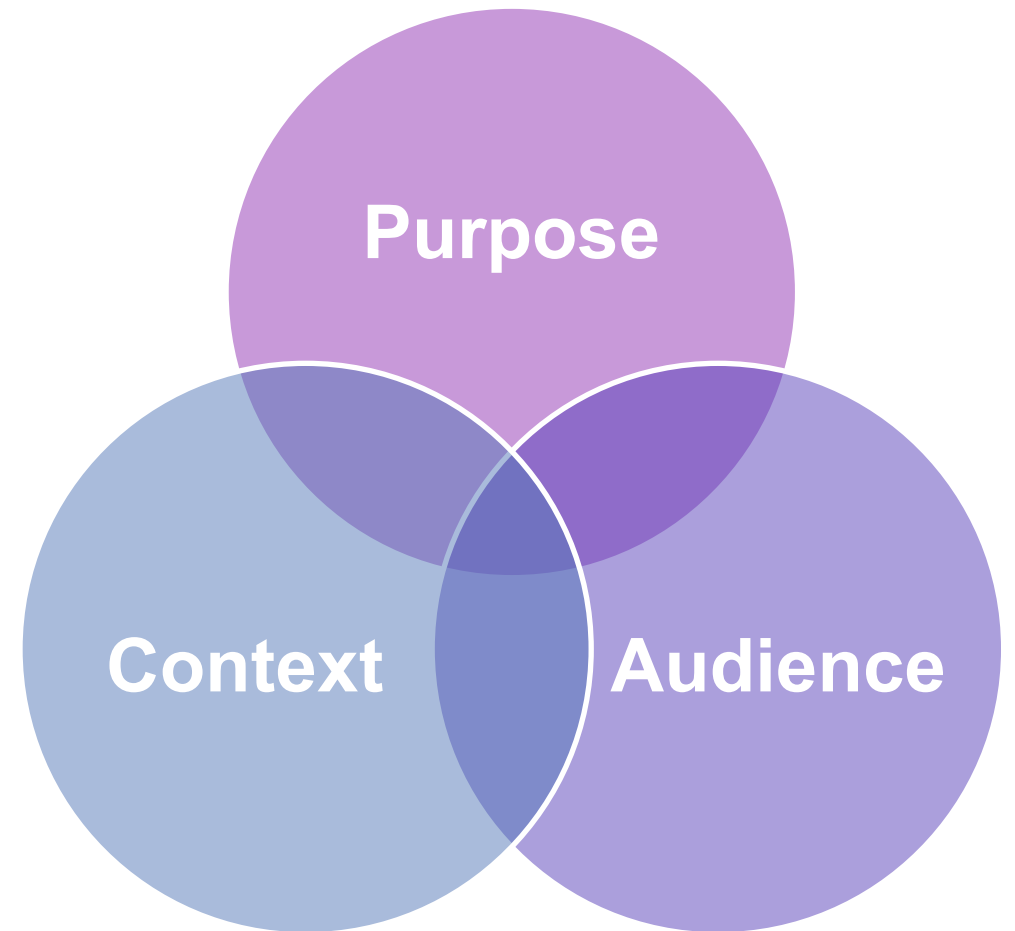
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I think it's difficult to **identify** which parts of the proof need **emphasizing**, and is most **important**.

deciding what's **important** to talk about; serre is a *really* terse book

What are your **initial thoughts** on the questions?
How do you **interpret** them?
Which of the **variables** of the rhetorical situation seems most useful here as a possible **sorting function**?



Purpose

Recall...

- What is hard or subtle about these ideas?

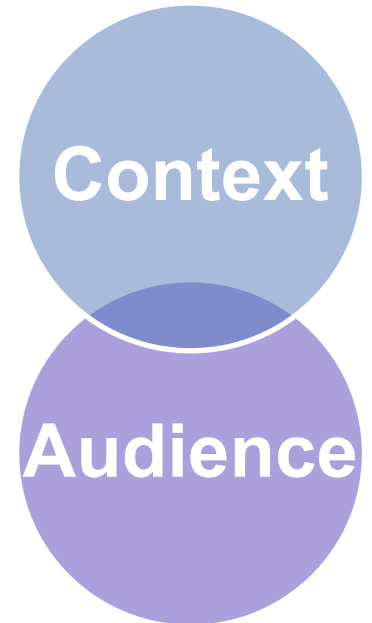
Useful Sorting Questions

- What are your **main takeaways**?
- What is the **role** of the **proof** in the **overall presentation**?
- **Why** do you need to present the **proof**?

If the audience needs to know then...

- What's the **crux** of the proof?
- What is **different** about this proof?
- What makes the theorem **true**?
- What can the **audience** do **themselves**?

Principle: An outline of the proof is more helpful than equations



What other **questions** could be useful for **sorting important** from **less important** information?

Purpose

Recall...

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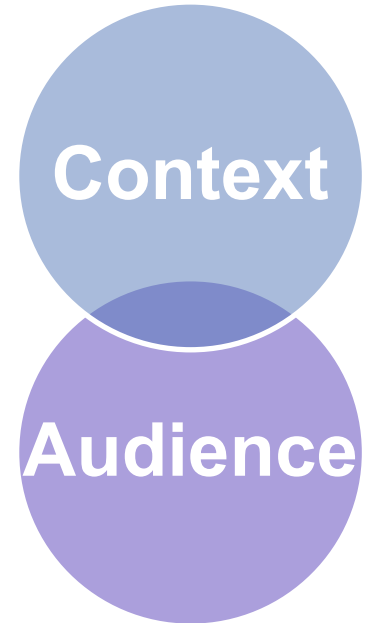
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What challenges did you face in
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*General advice on how to speak
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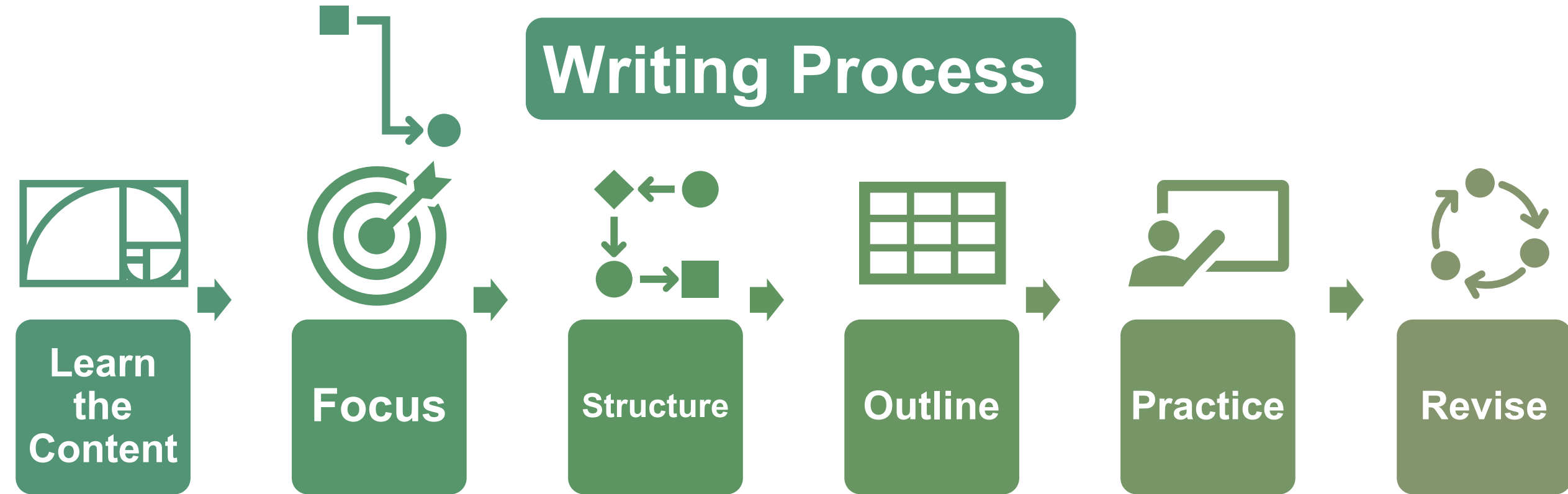
timing



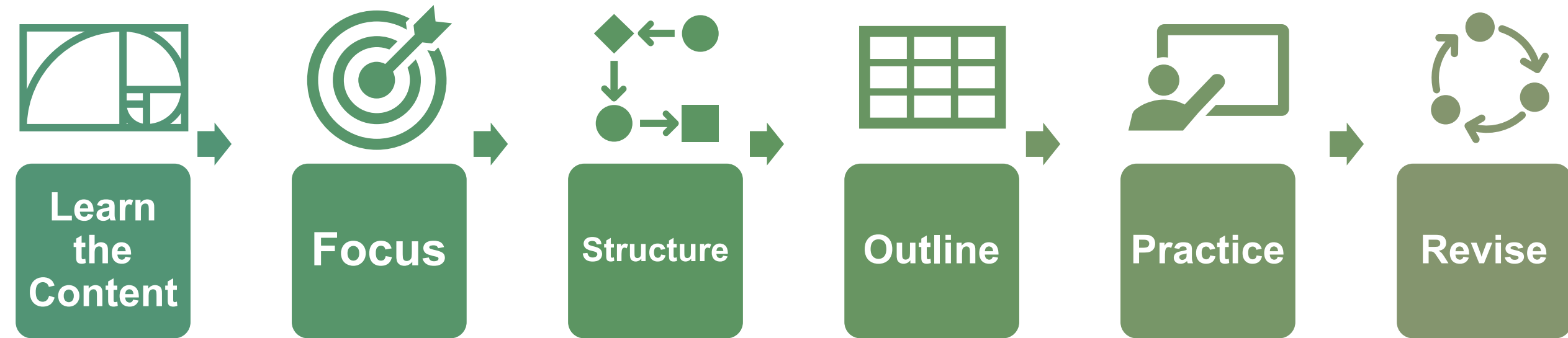
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And let's revisit the questions to see where in the **Writing Process** the solution might be found...



General advice on how to speak more smoothly (i.e. speed, hand gestures, timing)

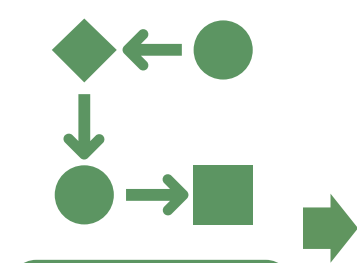
timing



Learn
the
Content



Focus



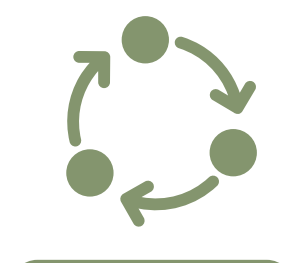
Structure



Outline



Practice



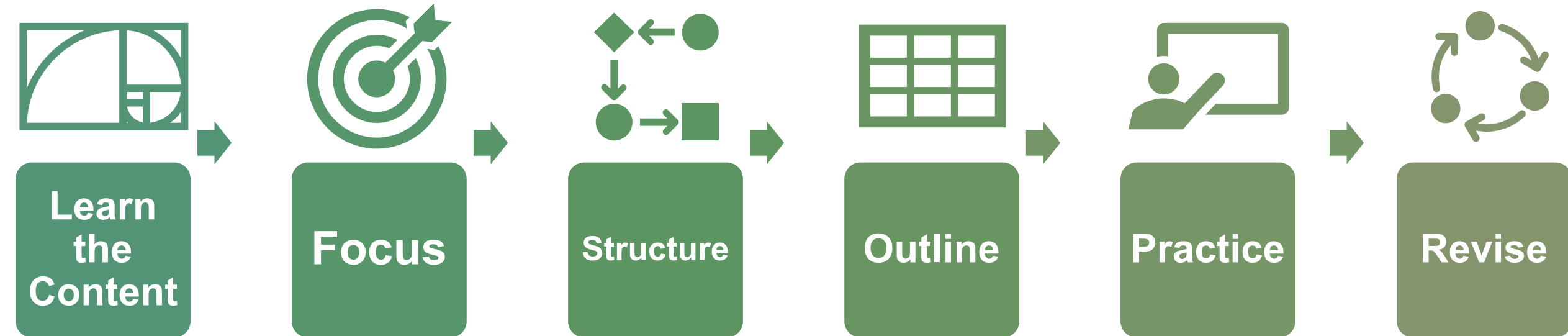
Revise



General advice on how to speak more smoothly (i.e. **speed**, hand gestures, **timing**)

timing

What are your initial thoughts on this question of timing?
What **step** in the **Writing Process** might you explore to figure out the **timing** problem?



General advice on how to speak more smoothly (i.e. **speed**, hand gestures, **timing**)

timing

What are your initial thoughts on this question of timing?
What **step** in the **Writing Process** might you explore to figure out the **timing** problem?



Practice





Practice

General Strategies

- Break your talk into modules and time each section with a stopwatch.
- Plan how you will keep track of time – Classroom clock? Watch?
- Give yourself a buffer. Plan to finish early.
- Pause for questions.
- Drink water.

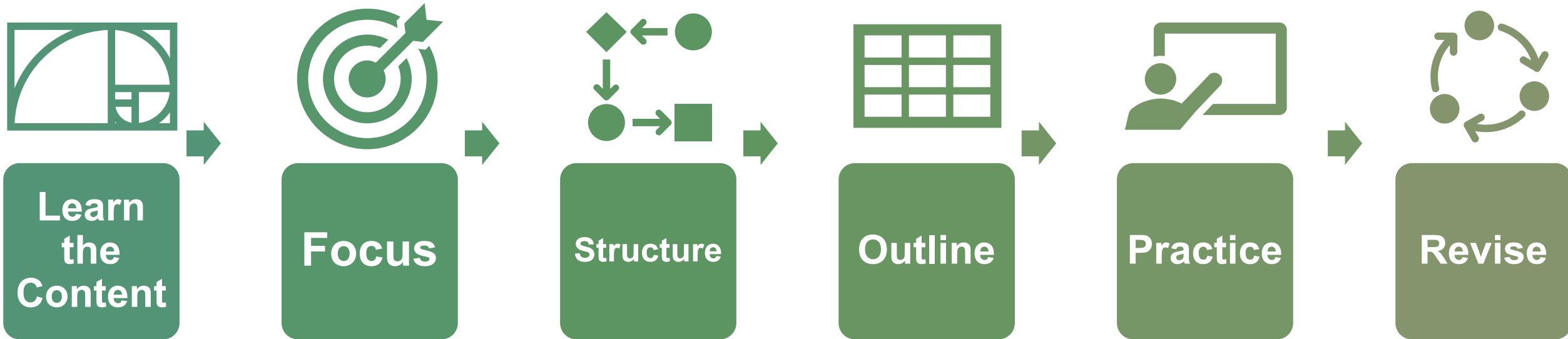
Writing on the Board

- Chill out & don't rush. Slowing down gives people time to think.
- Explain concept. Write on board. Say what you're writing. Elaborate on variables. Comment on what you wrote.

General advice on how to speak more smoothly (i.e. speed, **hand gestures**, timing)

timing

What are your **initial thoughts** on the **gestures** question?
What part of the **Writing Process** could it be addressed?



There's a LOT of research on gesture in teaching math.

Today's notes are from this article, which I recommend if you're interested in learning more about this topic.

Weinberg, A., Fukawa-Connelly, T., & Wiesner, E. (2015). Characterizing instructor gestures in a lecture in a proof-based mathematics class. *Educational Studies in Mathematics*, 90(3), 233–258.

<https://doi.org/10.1007/s10649-015-9623-1>

Characterizing instructor gestures in a lecture in a proof-based mathematics class

Aaron Weinberg¹ · Tim Fukawa-Connelly^{2,3} ·
Emilie Wiesner¹

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Abstract Researchers have increasingly focused on how gestures in mathematics aid in thinking and communication. This paper builds on Arzarello's (2006) idea of a *semiotic bundle* and several frameworks for describing individual gestures and applies these ideas to a case study of an instructor's gestures in an undergraduate abstract algebra class. We describe the role that the semiotic bundle plays in shaping the potential meanings of gestures; the ways gestural sets create complex relationships between gestures; and the role played by polysemy and abstraction. These results highlight the complex ways in which mathematical meanings—both specific and general—are expressed in gesture, and to highlight the integrated nature of elements of the semiotic bundle.

Keywords Gesture · Semiotics · Abstract algebra · Undergraduate teaching

1 Introduction & background

Lecture is the dominant mode of instruction in proof-based undergraduate mathematics classes (Mills, 2011). There is a small body of work that has attempted to characterize proof-based mathematics lectures in order to describe what students might learn from them. This research has typically focused on the instructor's written and spoken presentation of proof (e.g., Fukawa-Connelly, 2012; Weber, 2004) or on instructors' uses of examples during lecture (e.g., Fukawa-Connelly & Newton, 2014; Mills 2012). These studies have examined the mathematical content of instruction as expressed through speech and writing, rather than communicational aspects of lectures or, in particular, the interplay of speech, writing, and

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Pick an **idea** from your last presentation.

Brainstorm a **gesture** you could have used to help your audience **understand** the idea better.

Share your **gesture** with a **classmate** and see what they think!

