

# MAA IP GUIDE: ENTRY POINTS FOR FOSTERING STUDENT ENGAGEMENT IN THE CLASSROOM

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# Acknowledgement

This material is derived from the [MAA Instructional Practices Guide](#) (2017).

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# MAA IP Guide

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- Classroom Practices
  - ▣ Fostering Student Engagement
  - ▣ Selecting Appropriate Mathematical Tasks
- Assessment Practices
- Design Practices
- Cross-cutting Themes (technology, equity)

# Fostering Student Engagement

- CP.1.1 Building a Classroom Community
- CP.1.2 Wait Time
- CP.1.3 Responding to Student Contributions in the Classroom
- CP.1.4 One-minute Paper or Exit Ticket
- CP.1.5 Collaborative Learning Strategies
- CP.1.6 Just-in-Time Teaching (JiTT)
- CP.1.7 Developing Persistence in Problem Solving
- CP.1.8 Inquiry-based Teaching and Learning Strategies
- CP.1.9 Peer Instruction and Technology

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# Building a Classroom Community

- Connection between student success and student engagement
- Need a more deliberate approach to establishing a classroom community that supports engagement  
(Community College Survey of Student Engagement as cited in MAA IP Guide, 2017)
- Quality of active engagement enhanced by
  - ▣ Establishing norms for active engagement
  - ▣ Increasing students' sense of belonging

# Building a Classroom Community

## Classroom Vignette (First Day)

(MAA IP Guide, 2017, p. 11)

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# Wait Time

- To engage meaningfully, giving students enough time to think about questions posed and to respond is critical.
- The time instructors allow for student responses to questions posed is called *wait time*.

# Wait Time

What is the average time that instructors wait before they either answer their own question or ask a follow-up question?

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- Can result in *lowering* the cognitive demand of tasks.
- May *discourage* students' deep engagement in the mathematics.

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According to research, how much wait time is “enough” to encourage student participation?

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- At least seven seconds
- “Average wait time greater than three seconds is a threshold for changing instructor-student discourse.”  
(MAA IP Guide, 2017, p. 13)



# Wait Time

- *Classroom Vignette*: Example from a Calculus 2 class where the instructor's goal is to develop the integral formula for work done by a non-constant force
- *Discussion*: Includes a discussion of the vignette
- *Practical Tips*: Lists some practical tips such as “After asking a question, actually keep track of how many seconds you wait. Some instructors count to seven on their fingers behind their back.” (MAA IP Guide, 2017, p. 14)

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# One-minute Paper or Exit Ticket

- Quickly assess what students learned from a class session or general thoughts about the course
- May enhance student engagement because students are required to reflect upon their learning, demonstrate a skill, or communicate a concept at the close of a topic or class session.

# One-minute Paper

- Takes approximately a minute to complete
- Typically integrated at the end of a class session or topic
- Instructor poses a question that prompts students to reflect on their learning
- Students answer the question in writing and turn it in. However, they could also submit their response via an online learning system.

# One-minute Paper

Enables “instructors to review submissions quickly and obtain formative feedback about student learning.” (p. 17)

# Exit Tickets

Exit tickets function like a one-minute paper except they consist of a short-answer question or a multiple choice question.

# Classroom Vignette: One-Minute Exit Ticket

In second-semester calculus Dr. Kessler introduced Taylor series during his class. He wants to assess what students understood from the class session as well as what they felt they did not fully grasp in order to address these points in the next class session. As such, at the end of the class period, he asks them to take one minute to explain in concise, complete sentences:

- What are the three most significant things you learned today about Taylor series?
- What are you left wondering about Taylor series?
- Is there anything that still is unclear about Taylor series for you?
- Why are you studying Taylor series?

(MAA IP Guide, 2017, p.



# Classroom Vignette: One-Minute Exit Ticket

He collects the one-minute papers and reviews them before the next class. He uses responses to

- the first question to determine how much students said they learned,
- the second question to connect student “wonderings” to the next class session, and
- the third question to construct follow up in-class or homework tasks.

He also makes sure students write their names on the paper, so he can plan individualized follow up if necessary with some students. ? (MAA IP Guide, 2017, p. 17)

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# Thank you!



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