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Discerning Student Mathematical Thinking in Whole Class Discussion

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Supported by
Leveraging MOSTs: Developing a Theory of Productive Use of Student Mathematical Thinking
a 4-year collaborative research project funded by the National Science Foundation
(DRL-1220141, DRL-1220357, DRL-1220148)

AMTE 2015, Orlando

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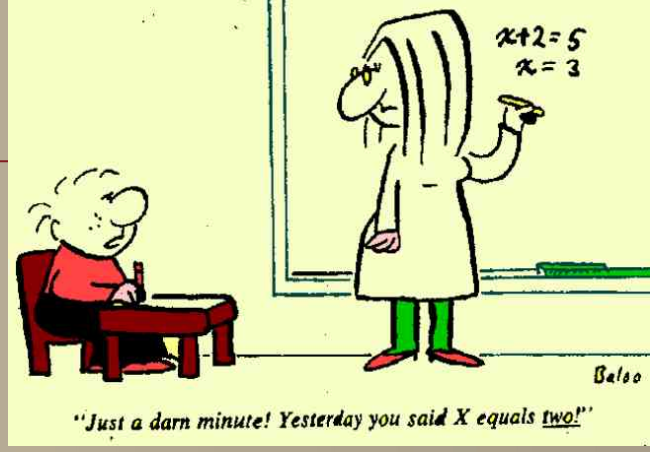
Mathematically significant pedagogical **O**pportunities to build **o**n **S**tudent **T**hinking

"Just a darn minute! Yesterday you said X equals <u>two!</u>"

MOST Characteristics



Student Mathematical Thinking

Student Mathematics

Can the student mathematics be inferred?

Mathematical Point

Is there a mathematical point closely related to the student mathematics?

Mathematically Significant

Appropriate Mathematics

Is the mathematical point accessible to students with this level of mathematical experience, but not like to be already understood?

Central Mathematics

Is understanding the mathematical point a central goal for student learning in this classroom?

Pedagogical Opportunity

Opening

Does the expression of the student mathematics seem to create an intellectual need that, if met, will contribute to understanding the mathematical point of the instance?

Timing

Is now the right time to take advantage of the opening?

Leatham, K. R., Peterson, B. E., Stockero, S. L., & Van Zoest, L. R. (2015). Conceptualizing mathematically significant pedagogical opportunities to build on student thinking. *Journal for Research in Mathematics Education, 46*, 88-124.

Mathematical Opportunities in Student Thinking

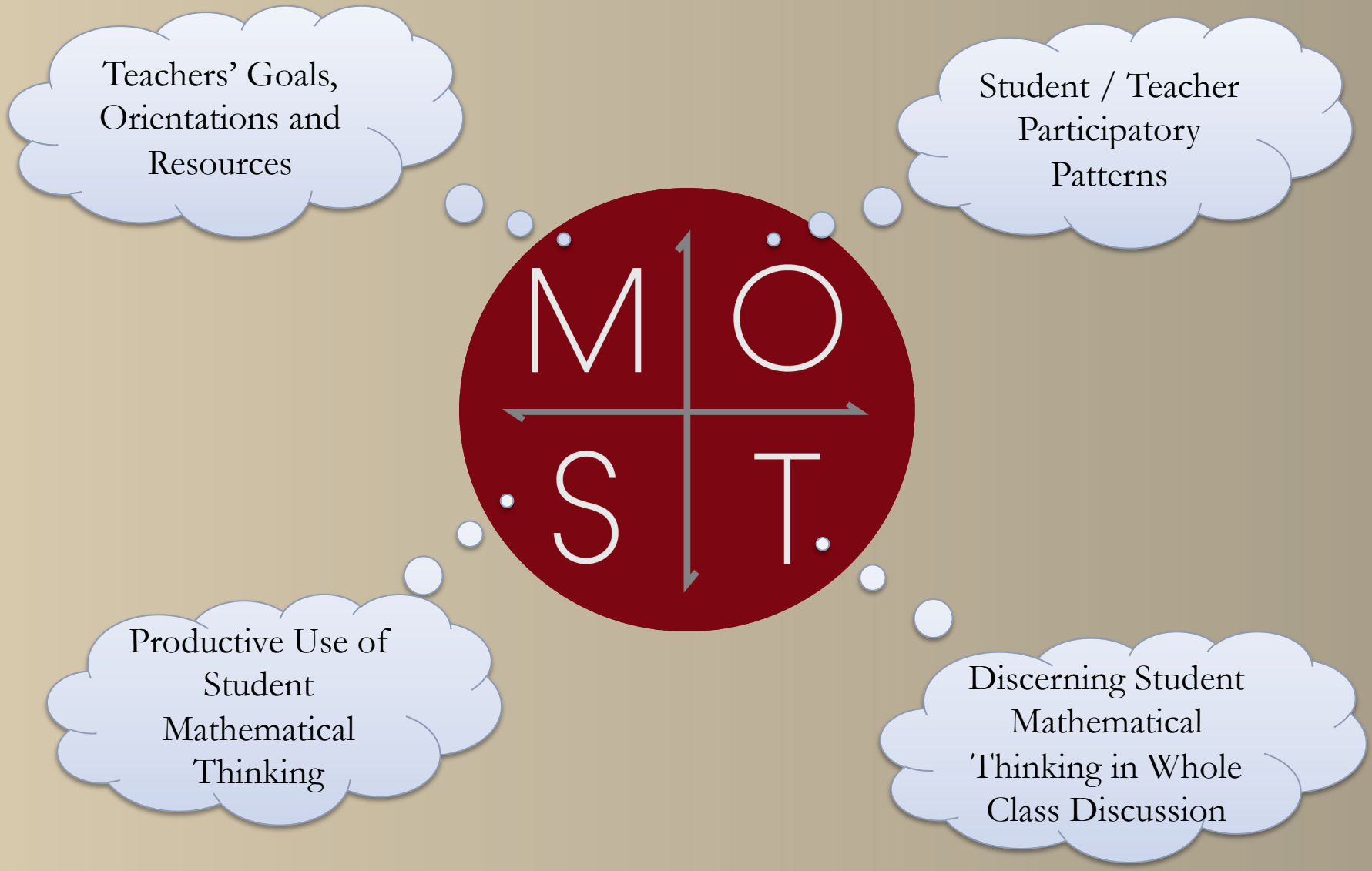
MOSTs are opportunities…

…for the teacher to make student thinking the object of consideration by the class in order to engage the class in making sense of that thinking to better understand an important mathematical idea.

…to **build** on student thinking.

Viewing Classroom Mathematics Discourse

Mathematical Opportunities in Student Thinking



Methods

- 10 mathematics lessons
- 9 teachers
- California, Michigan, Mississippi, New Mexico & Utah
- Identify each instance of student mathematical thinking
- Code for MOSTs

MOST Frequencies

Mathematical Opportunities in Student Thinking

Teacher	Minutes in whole class Interaction	Number of Instances	Instances/ Minute	Number of MOSTs	MOSTs/ Minute	% of Instances that are MOSTs
A	25	35	*1.4*	8	0.3	23
B	44	227	5.2	39	0.9	17
C	27	122	4.5	22	0.8	18
D	45	206	4.6	29	0.6	14
E	48	331	6.9	78	1.6	24
F	41	176	4.3	42	1.0	24
G	35	201	5.7	33	0.9	16
H	18	113	6.3	8	0.4	7
I1	15	38	2.5	1	*0.1*	3
I2	11	30	2.7	5	0.5	17
Total	309	1479	4.8	265	0.9	18

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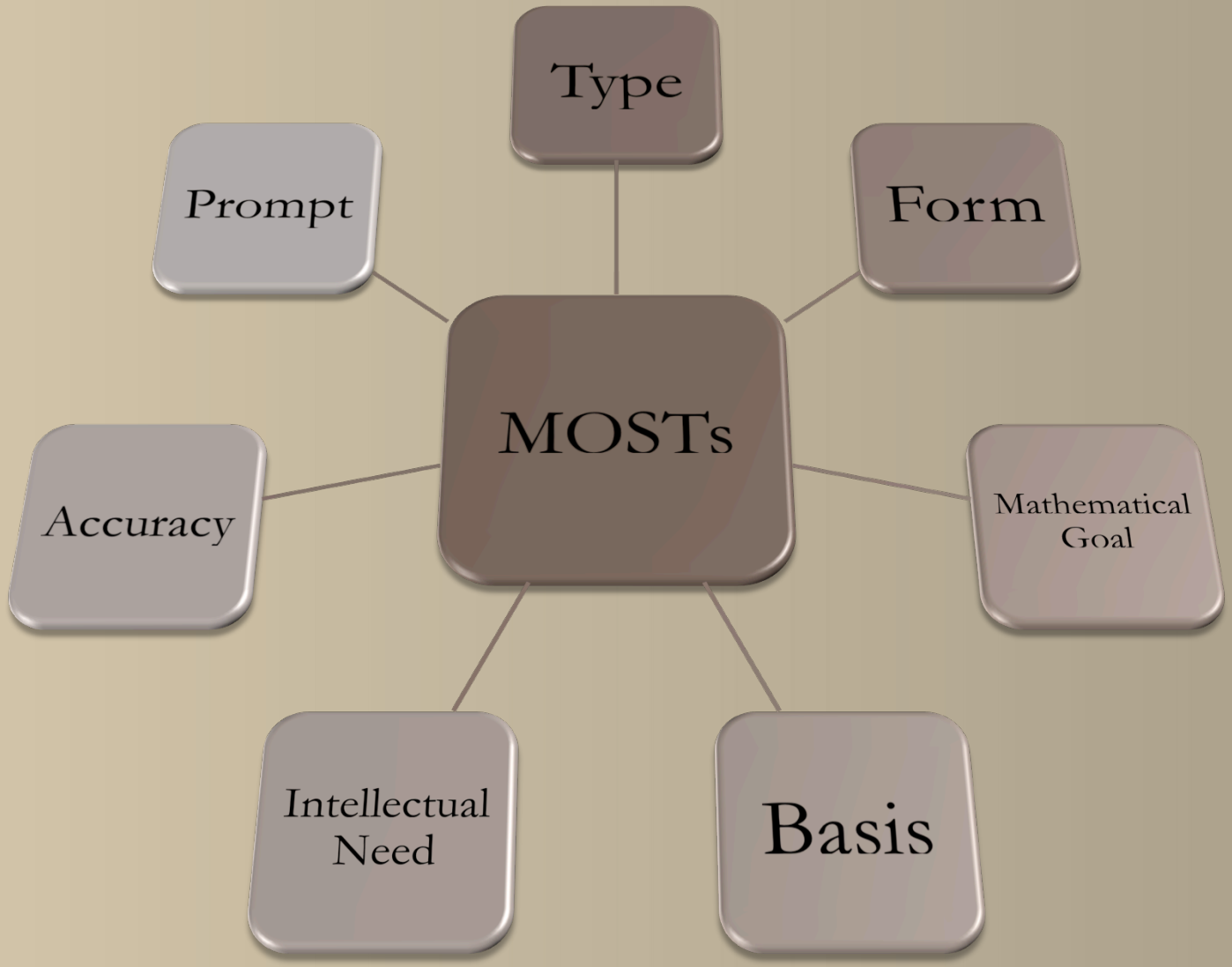
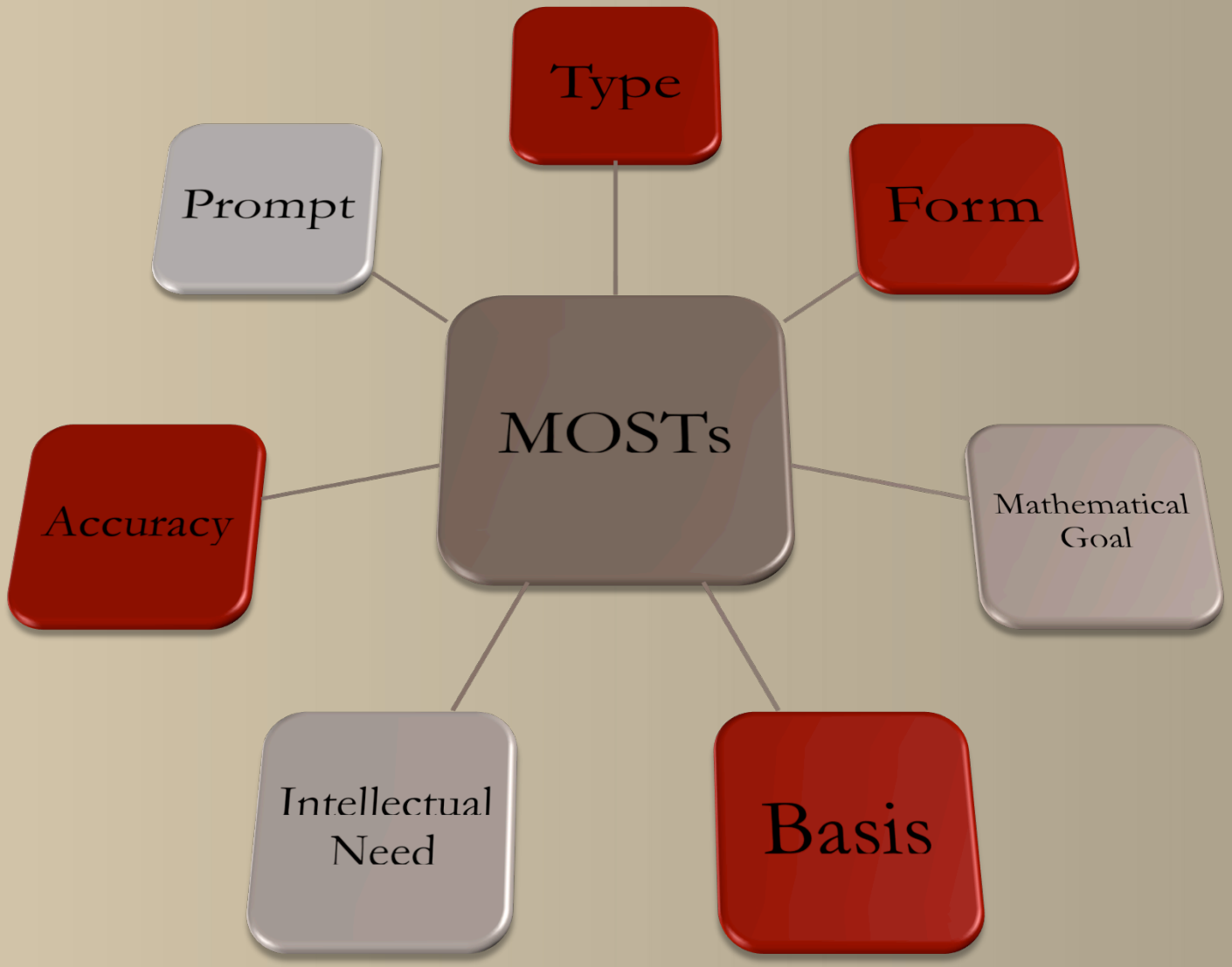
MOST Attributes

Mathematical Opportunities in Student Thinking



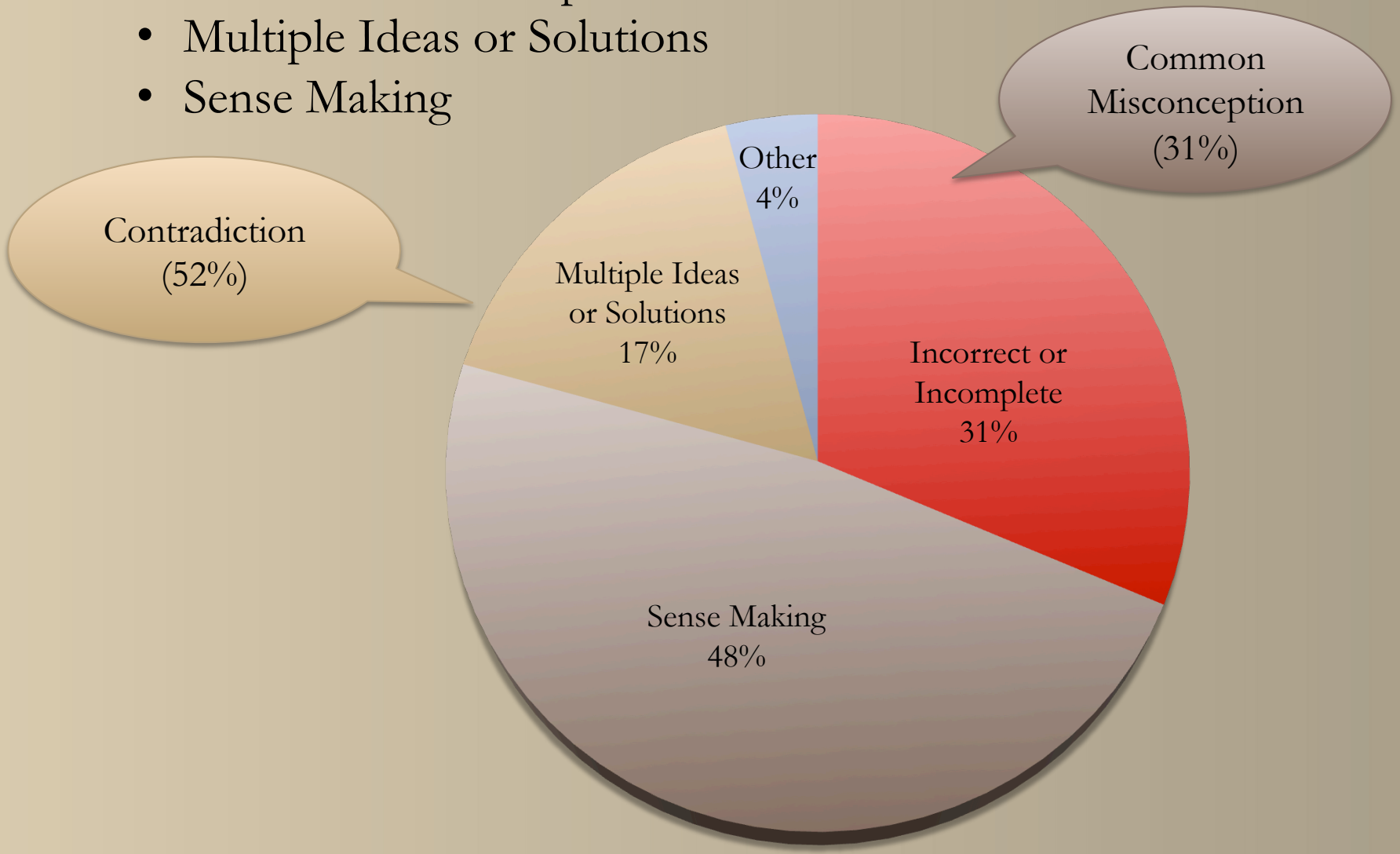
MOST Attributes

Mathematical Opportunities in Student Thinking



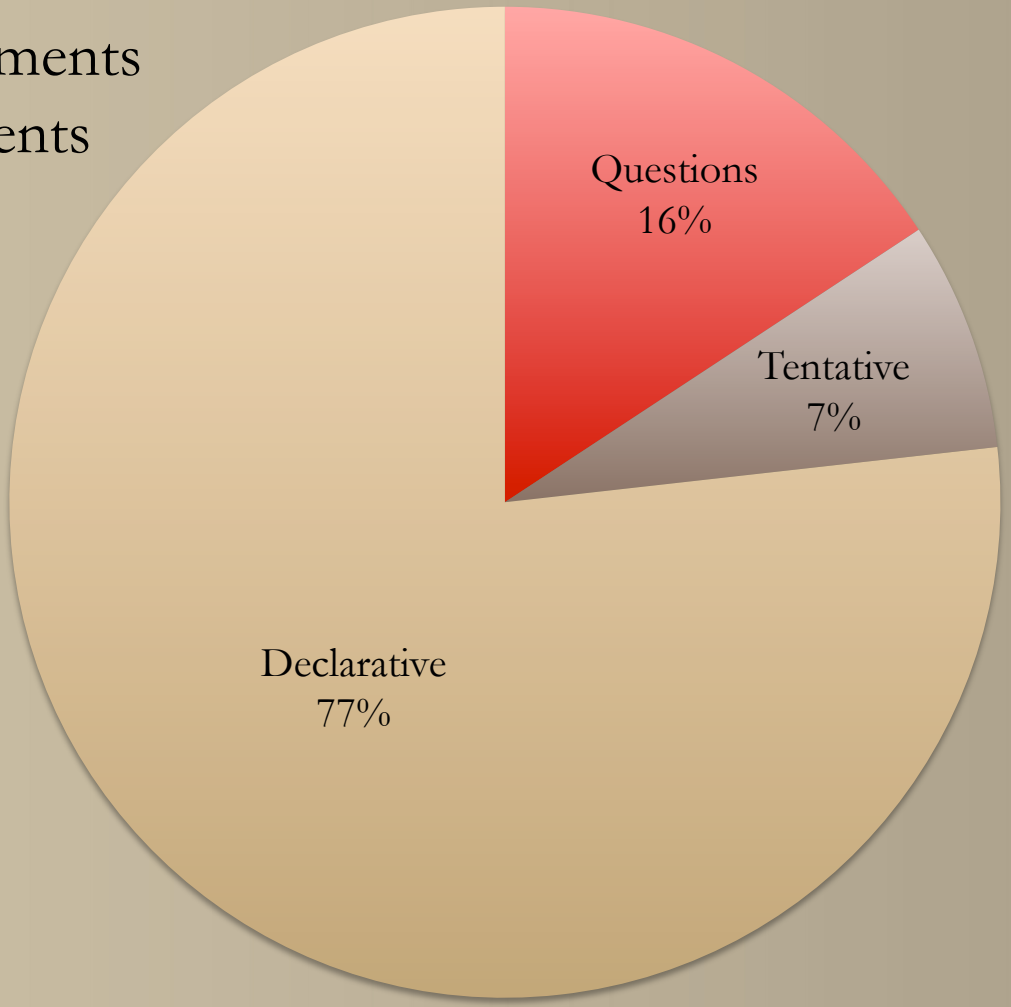
MOST Types

- Incorrect or Incomplete Ideas
- Multiple Ideas or Solutions
- Sense Making



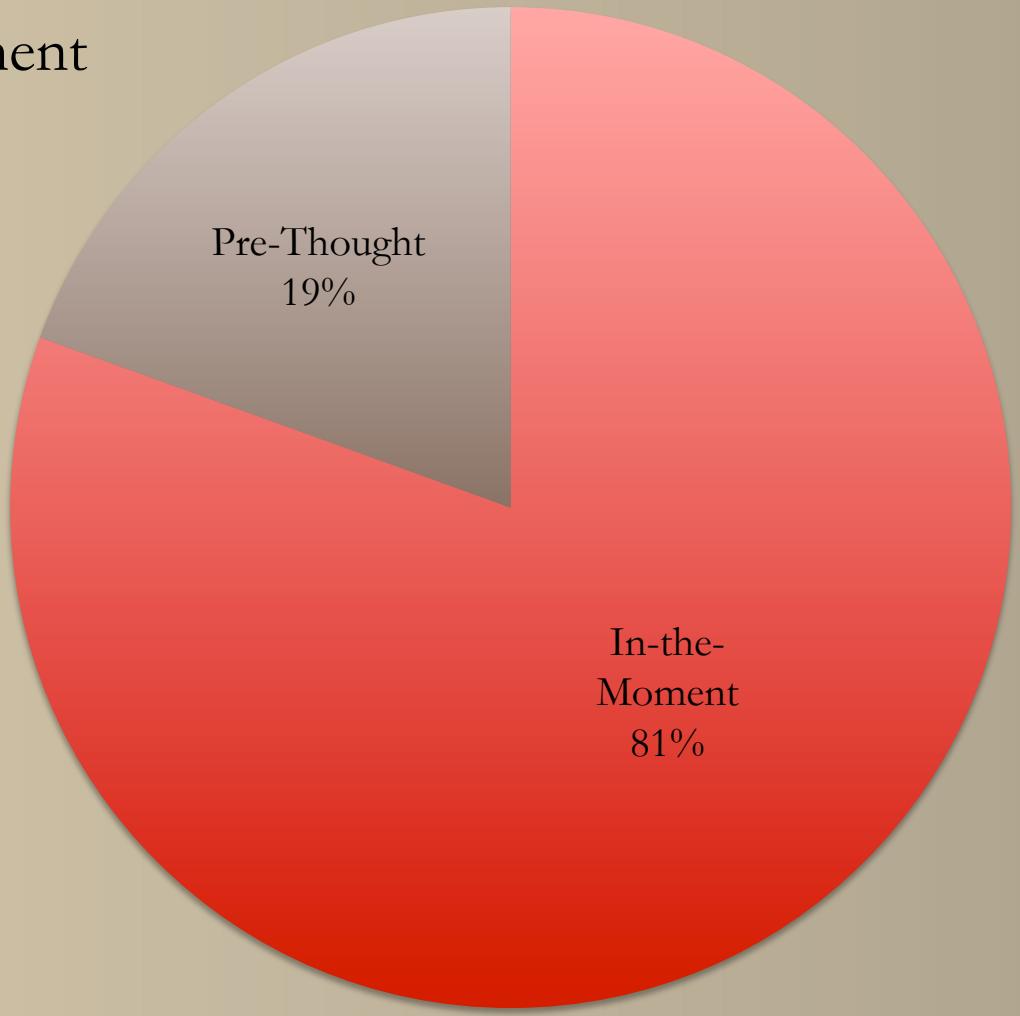
MOST Forms

- Questions
- Declarative Statements
- Tentative Statements



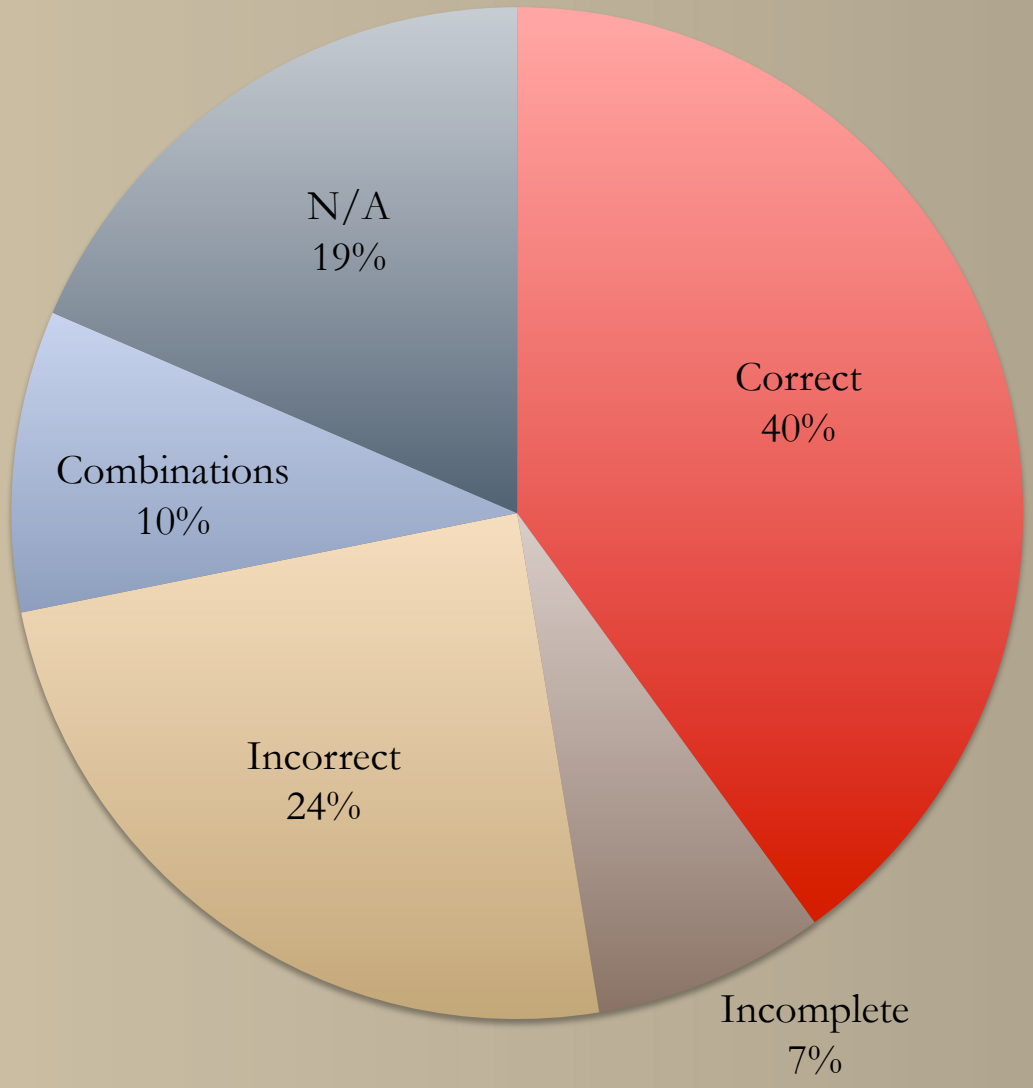
MOST Basis

- Pre-Thought
- In-the-Moment



MOST Accuracy

- Correct
- Incorrect
- Incomplete
- Combination
- N/A



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