

Mathematics Update

ODHE/OMI/OTM

November 3, 2017

3 Concurrent Projects



Multiple Pathways



Revising Guidelines



Shortening Pathway

3 Concurrent Projects



Multiple Pathways

Excursions

Logic



Calculus 2

Calculus 1

Trigonometry

College Algebra

Developmental Level

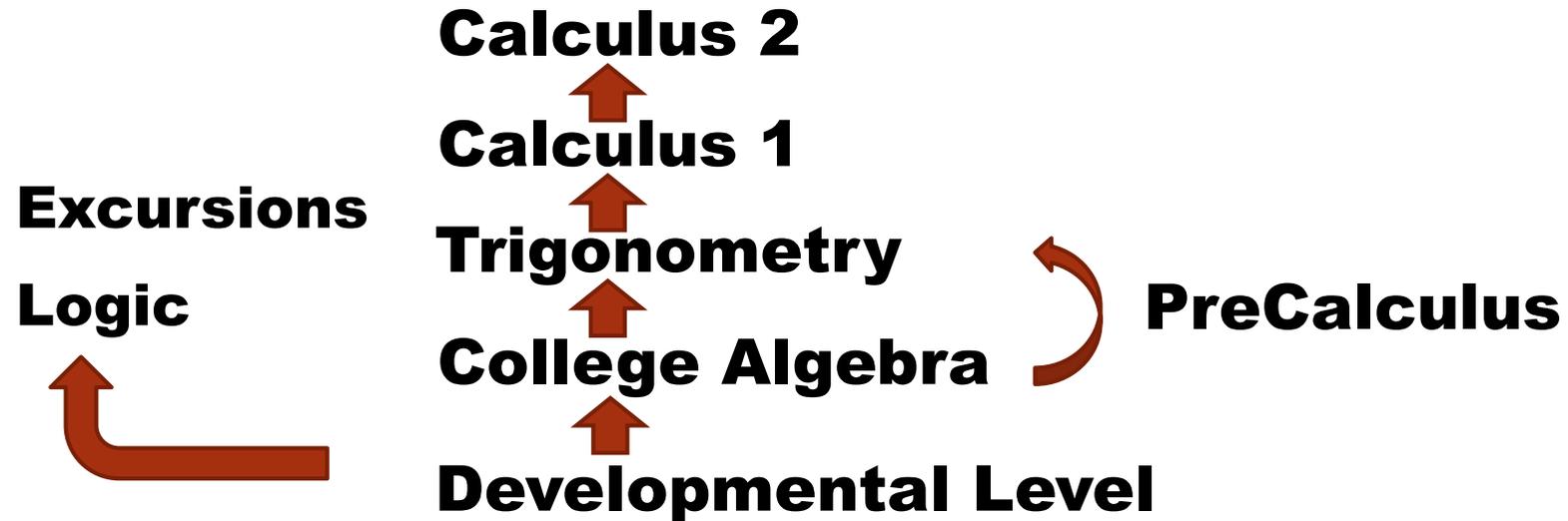


PreCalculus

3 Concurrent Projects



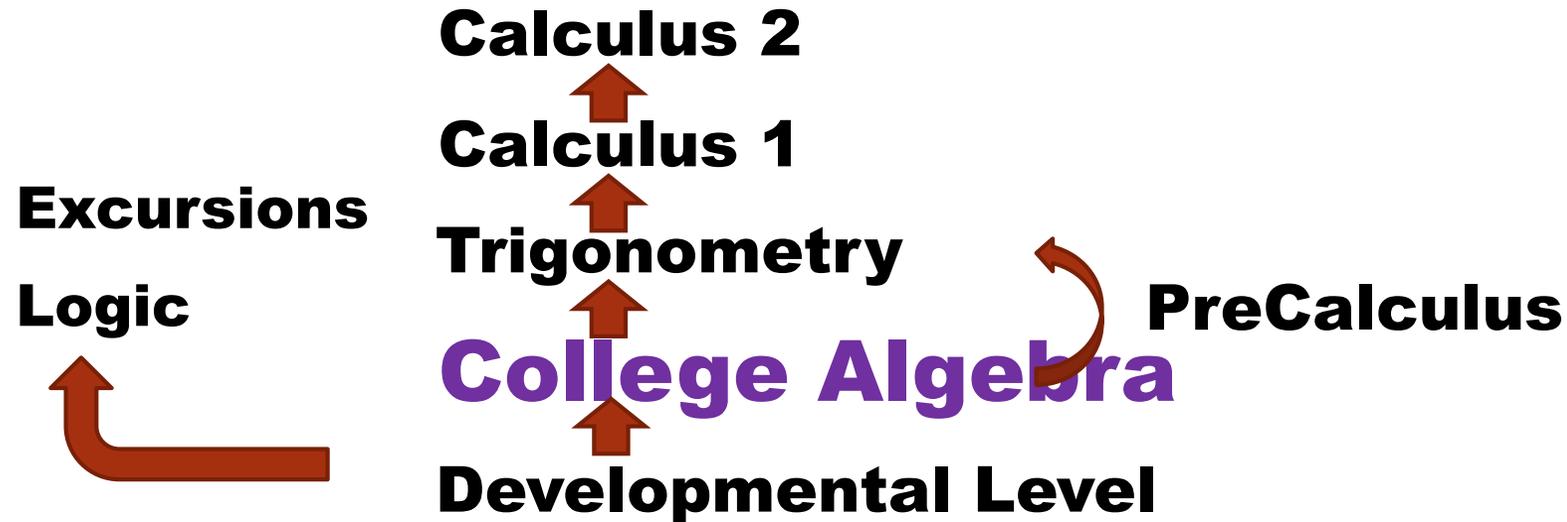
Multiple Pathways



3 Concurrent Projects



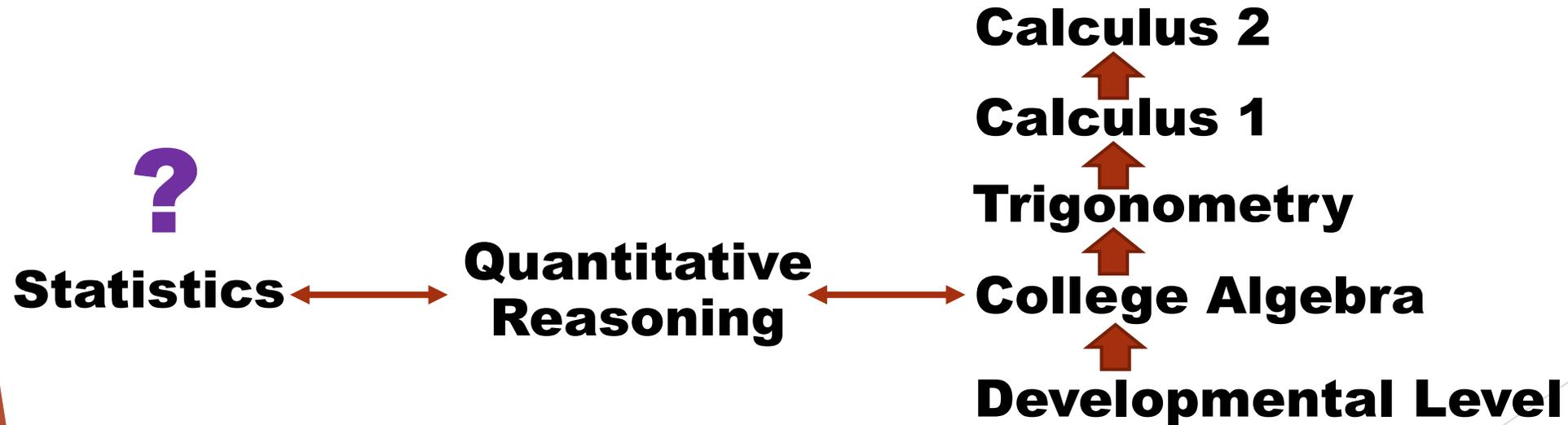
Multiple Pathways



3 Concurrent Projects



Multiple Pathways



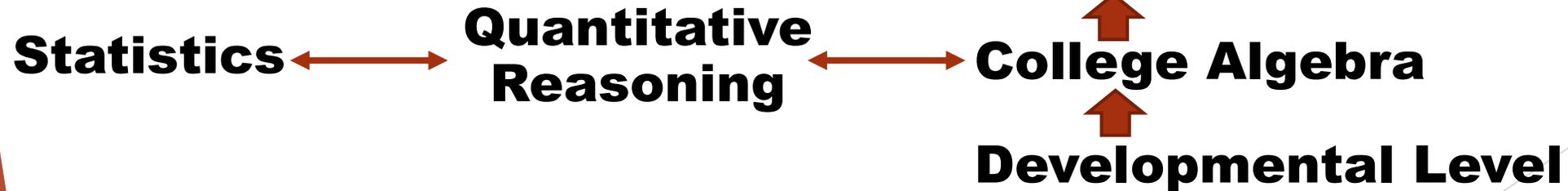
3 Concurrent Projects



Multiple Pathways

nonSTEM

STEM



3 Concurrent Projects



Multiple Pathways

nonSTEM

STEM

Statistics

Quantitative Reasoning

Calculus 2

Calculus 1

Trigonometry

College Algebra

Developmental Level



3 Concurrent Projects



Multiple Pathways

nonSTEM

STEM

Statistics

Quantitative Reasoning

Calculus 2

Calculus 1

Trigonometry

College Algebra

Developmental Level



3 Concurrent Projects



Multiple Pathways

STEM

Calculus 2



Calculus 1



Trigonometry



College Algebra



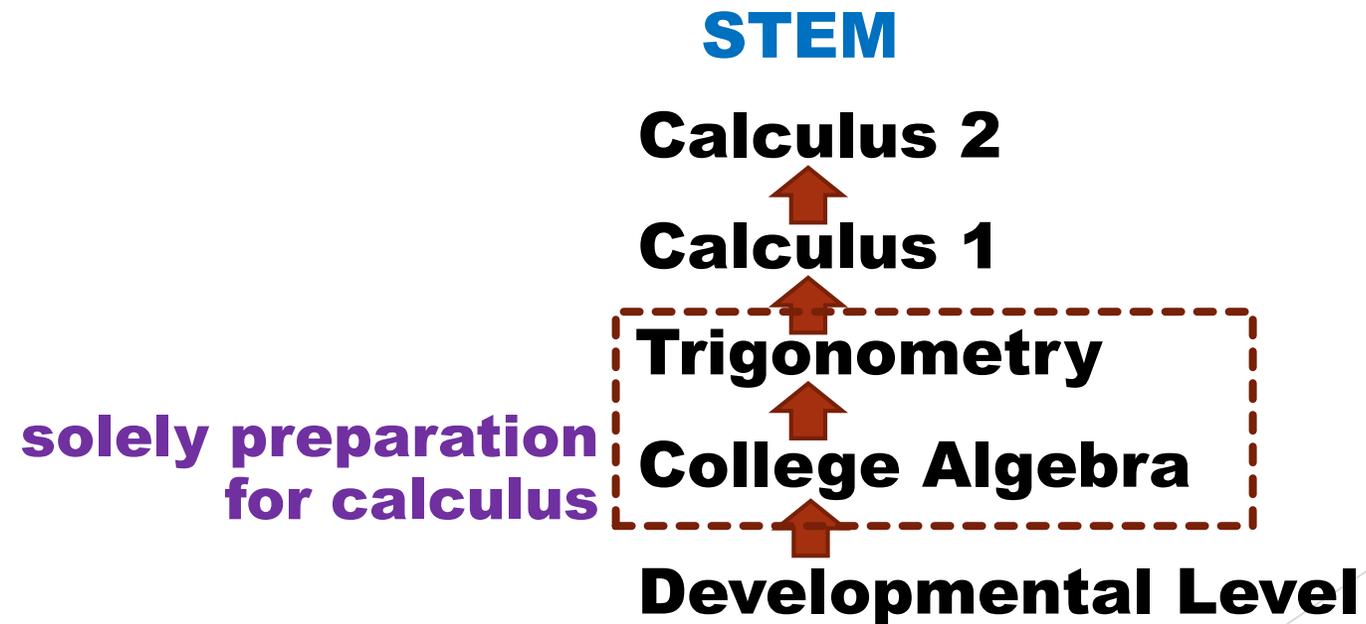
Developmental Level

**solely preparation
for calculus**

3 Concurrent Projects



Multiple Pathways



3 Concurrent Projects



Revising Guidelines

nonSTEM

Quantitative Reasoning

TMM011

STEM

Calculus 2

Calculus 1

Trigonometry

College Algebra

Developmental Level



3 Concurrent Projects



Revising Guidelines

STEM

Calculus 2



Calculus 1



Trigonometry



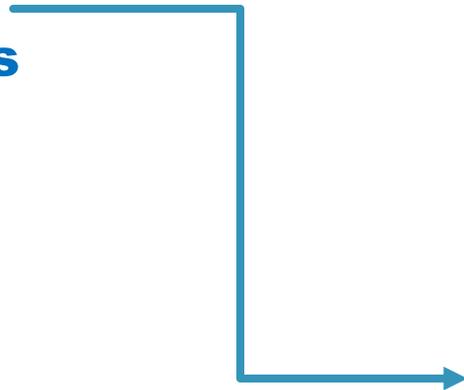
College Algebra



Developmental Level

Intermediate Algebra

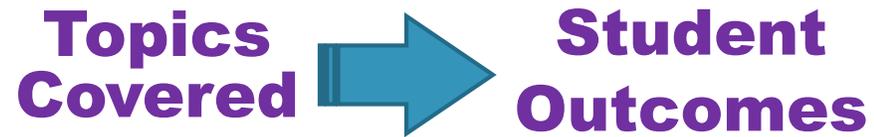
**No
Prescribed
Prerequisites**



3 Concurrent Projects



Revising Guidelines



STEM

Calculus 2



Calculus 1



Trigonometry **TMM003**



College Algebra **TMM001**



Developmental Level

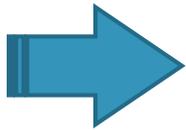
TMM002

3 Concurrent Projects



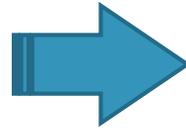
Revising Guidelines

Topics Covered



Student Outcomes

Calculus Preparation



Function Language

STEM

Calculus 2



Calculus 1



Trigonometry

TMM003



College Algebra

TMM001



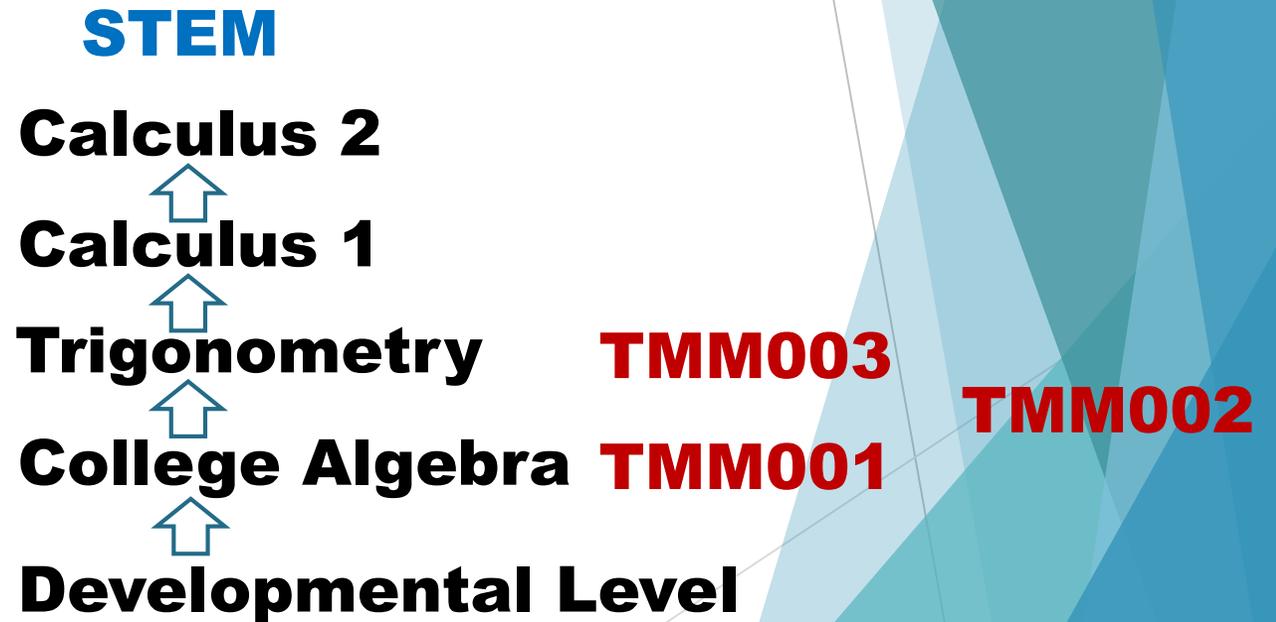
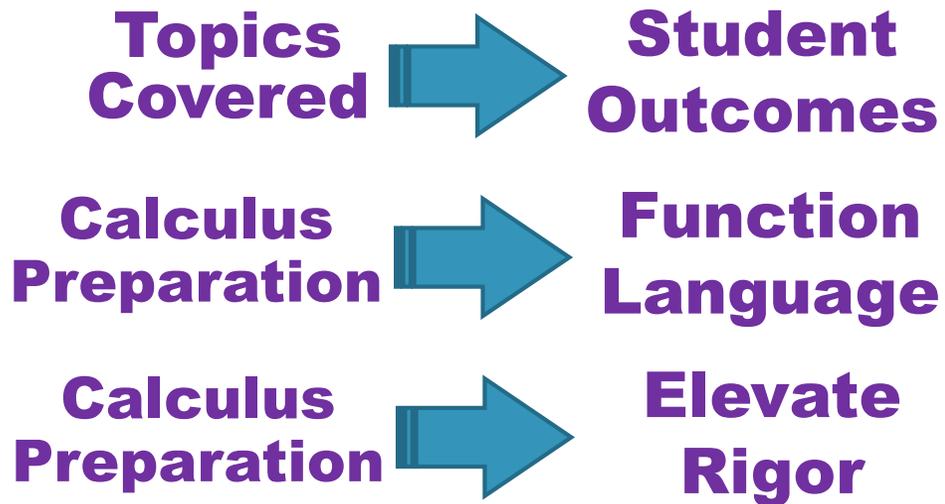
Developmental Level

TMM002

3 Concurrent Projects



Revising Guidelines



PAUSE

3 Concurrent Projects



Shortening Pathways

Bridges to Success

Barriers to STEM Pathway

Co-Requisite Strategies

STEM

Calculus 2



Calculus 1



Trigonometry



College Algebra



Developmental Level

3 Concurrent Projects



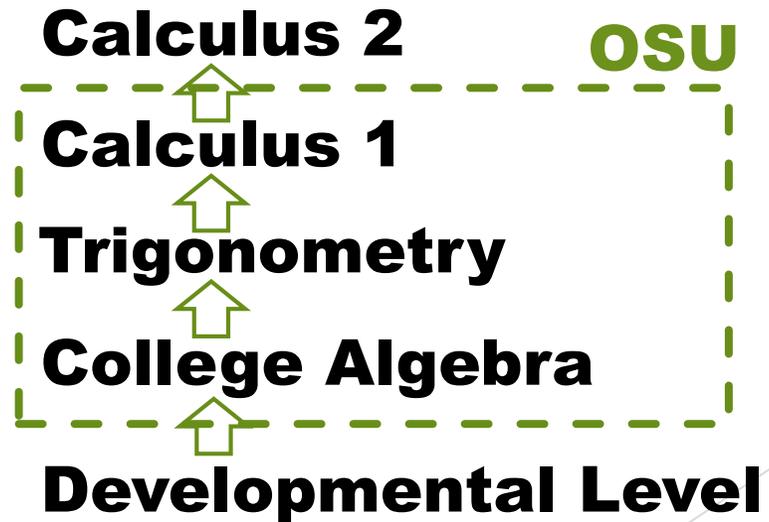
Shortening Pathways

Bridges to Success

Barriers to STEM Pathway

Co-Requisite Strategies

STEM



3 Concurrent Projects



Shortening Pathways

Bridges to Success

Barriers to STEM Pathway

Co-Requisite Strategies

STEM

Calculus 2



Calculus 1

CSCC



Trigonometry



College Algebra



Developmental Level



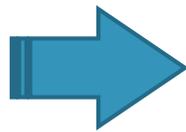
3 Concurrent Projects

Calculus



Revising^v Guidelines

Topics Covered



Student Outcomes

STEM

Calculus 2

TMM006

Calculus 1

TMM005

Trigonometry

College Algebra

Developmental Level

3 Concurrent Projects



Revising Guidelines

Topics Covered → **Student Outcomes**

Paul Sampson
(Natural Sciences Panel)

STEM

Calculus 2

TMM006

Calculus 1

TMM005

Trigonometry

College Algebra

Developmental Level

3 Concurrent Projects



Revising Guidelines

Topics Covered → **Student Outcomes**

Mathematics is not

- a collection of facts
- a collection of skills
- a collection of procedures

STEM

Calculus 2

TMM006

↑
Calculus 1

TMM005

↑
Trigonometry

↑
College Algebra

↑
Developmental Level

3 Concurrent Projects



Revising Guidelines

Topics Covered → **Student Outcomes**

Mathematical thinking is about

- **patterns**
- **structure**
- **relationships**
- **systems**

STEM

Calculus 2

TMM006

↑
Calculus 1

TMM005

↑
Trigonometry

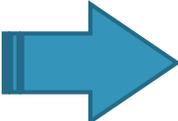
↑
College Algebra

↑
Developmental Level

3 Concurrent Projects



Revising Guidelines

Topics Covered  Student Outcomes



USE

STEM

Calculus 2

TMM006

Calculus 1

TMM005

Trigonometry

College Algebra

Developmental Level

3 Concurrent Projects



Revising Guidelines

In a Calculus I (TMM005) course, students should:

- develop effective thinking and communication skills.
- operate at a high level of detail.
- state problems carefully, articulate assumptions, understand the importance of precise definition, and reason logically to conclusions;
- identify and model essential features of a complex situation, modify models as necessary for tractability, and draw useful conclusions;
- deduce general principles from particular instances;
- use and compare analytical, visual, and numerical perspectives in exploring mathematics;
- assess the correctness of solutions, create and explore examples, carry out mathematical experiments, and devise and test conjectures;
- recognize and make mathematically rigorous arguments;
- read mathematics with understanding;
- communicate mathematical ideas clearly and coherently both verbally and in writing to audiences of varying mathematical sophistication;
- approach mathematical problems with curiosity and creativity and persist in the face of difficulties; and work creatively and self-sufficiently with mathematics.
- learn to link applications and theory.
- learn to use technological tools.
- develop mathematical independence and experience open-ended inquiry.

3 Concurrent Projects



Revising Guidelines

Topics Covered → **Student Outcomes**

You cannot watch someone else think mathematically.

You have to engage in the thinking, the abstraction, the rigor.

STEM

Calculus 2

TMM006

↑
Calculus 1

TMM005

↑
Trigonometry

↑
College Algebra

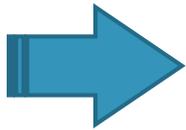
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Developmental Level

3 Concurrent Projects

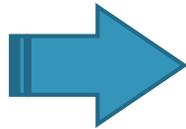


Revising Guidelines

Topics Covered



Student Outcomes



Encourage Active Classrooms

STEM

Calculus 2

TMM006



Calculus 1

TMM005



Trigonometry



College Algebra



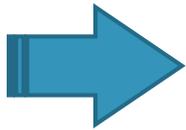
Developmental Level

3 Concurrent Projects

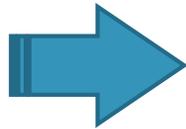


Revising Guidelines

Topics Covered



Student Outcomes
Encourage Active Classrooms



decision making
quantitative reasoning
conceptual thinking
critical thinking
problem solving
toolbelt

STEM

Calculus 2

TMM006



Calculus 1

TMM005



Trigonometry



College Algebra



Developmental Level

3 Concurrent Projects



Revising Guidelines

LIMITS

DIFFERENTIATION

INTEGRATION

decision making
quantitative reasoning
conceptual thinking
critical thinking
problem solving
toolbelt

STEM

Calculus 2

TMM006

Calculus 1

TMM005

Trigonometry

College Algebra

Developmental Level

3 Concurrent Projects



Revising Guidelines

analysis

LIMITS

DIFFERENTIATION

INTEGRATION

decision making
quantitative reasoning
conceptual thinking
critical thinking
problem solving
toolbelt

STEM

Calculus 2

TMM006

Calculus 1

TMM005

Trigonometry

College Algebra

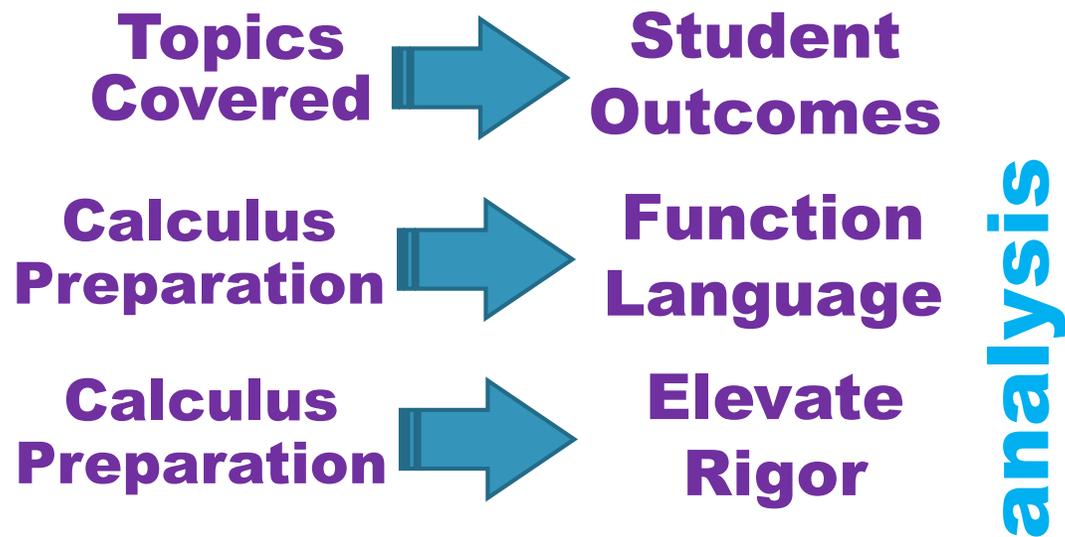
Developmental Level

3 Concurrent Projects

PreCalculus



Revising^v Guidelines



STEM

Calculus 2

Calculus 1

Trigonometry

College Algebra

Developmental Level

TMM003

TMM001

TMM002

PAUSE

3 Concurrent Projects



Revising Guidelines

**TMM005 ready for review
and edits**

TMM006 Spring?

STEM

Calculus 2

TMM006

Calculus 1

TMM005

Trigonometry

College Algebra

Developmental Level

Fourth Concurrent Project



Multiple Pathways

Related STEM Fields
Math/STEM TAG Panels

- **More Multivariable**

Resequencing

Another Pathway

Options

STEM

Calculus 2

TMM006

Calculus 1

TMM005

Trigonometry

College Algebra

Developmental Level

Fourth Concurrent Project



Multiple Pathways

Related STEM Fields
Math/STEM TAG Panels

- More Multivariable

Resequencing

Another Pathway

Options

STEM

Calculus 2

TMM006

Calculus 1

TMM005

Trigonometry

College Algebra

Developmental Level

3 Concurrent Projects



Revising Guidelines

STEM

Calculus 2

TMM006



Calculus 1

TMM005



Trigonometry



College Algebra



Developmental Level

Preparation for Calculus
Encourage/Support

UNPAUSE

AU 2018 ?

Fifth Concurrent Projects



Reduce Cost of Materials

Mathematics Update

ODHE/OMI/OTM

Thoughts?

Calculus Resequencing

Calculus Preparation

Shortening Pathway

Quantitative Reasoning

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