Mathematics Modeling and Reasoning Pilot
Course Description

Target Student: A student who needs a third or fourth credit in mathematics and is not intending to pursue a career that requires calculus.

This course would be especially appropriate for students with **some** of the following characteristics:
- Anticipating a career in the arts or behavior sciences;
- Anticipating a career that emphasizes utilizing measurements or units;
- Pursuing a pathway that does not require calculus; and/or
- Enjoys hands-on, collaborative work within real-world contexts.

This course will prepare students to enter directly into a credit-bearing math course at the postsecondary level or to go directly into a career field.

Description of Course This course is designed to promote reasoning, problem-solving and modeling through thematic units focused on mathematical practices while reinforcing and extending content in Number and Quantity, Algebra, Functions, Statistics and Probability, and Geometry. It is a yearlong course taught using student-centered pedagogy.

Course Pathways
The pilot will be a yearlong course and can be considered an Algebra 2 equivalent (A2E) course. The pilot will explore multiple pathways for the future, such as the following:
- A one-credit course;
- A one-credit course followed by another high school math course such as Algebra 2 or an Algebra 2 equivalent course (Statistics & Probability, Data Science Foundations, Computer Science/Discrete Math).
- A one-credit course followed by a College Credit Plus (CCP) math course. Although students deemed remediation-free can take any CCP course, this course lends itself nicely to CCP Quantitative Reasoning and CCP Technical Math.
- A one-credit course followed by an AP math course; this course lends itself nicely to prepare students for an AP Statistics and Probability course.

Student Eligibility
Prior to enrollment students are recommended to have completed the following:
- At least two units of credit in high school mathematics; and
- Algebra and Geometry end-of-course state tests or Math 1 and Math 2 end-of-course state tests.

Professional Learning
It is imperative that teachers who teach this course participate in the accompanying professional learning opportunities. These include face-to-face meetings and virtual hangouts. Piloting teachers will attend a multi-day professional learning session in the summer preceding the pilot focused on quantitative reasoning and modeling. Administrators will have an informational meeting at the same time. Piloting teachers are expected to participate in the following professional learning opportunities throughout the school year:
- Weekly online meetings for August and September;
- Bi-monthly online meetings in October and November;
- A face-to-face meeting in January;
- Monthly online meetings from February to May;
- End-of-year face-to-face meeting to reflect on the year; and
- Ongoing collaboration with higher education faculty as needed.

Data Collection and Evaluation

Schools/districts participating in the pilot will be expected to collect data on their students. Specifics are still being determined but may include evaluation tools such as ACT/SAT scores, pre- and post-growth mindset tests, pre- and post-quantitative reasoning tests and/or student reflection statements. Pilot teachers also may be required to provide documentation that they implemented the lessons that were created by the planning group with fidelity. In addition, there may be people such as higher education collaborators, peer mentors, Ohio Department of Education staff, members of the research team and/or others interested in the pilot course periodically visiting the classrooms to observe the lessons.

Overall Timeline
- Spring/summer 2018
  - *Begin development of the course.*
- 2018-2019 school year
  - *Implement developmental pre-pilot where the pre-pilot teacher provides feedback and creates materials to help flesh out and refine the course.*
- 2019-2020 school year
  - *Implement full pilot.*
- 2020-2021 school year
  - *Launch course Phase 1.*
- 2021-2022 school year
  - *Launch course Phase 2.*
- 2022-2023 school year
  - *Launch course Phase 3.*

Policy Environment

It is strongly recommended this course be offered as a one credit math course as a third or fourth credit. A full mathematics credit should be granted to a student successfully completing this course. This course satisfies a credit toward mathematics' graduation requirements and satisfies the requirement of an Algebra 2 equivalent course.

An example description of the course for a district course book:

Prerequisite: Algebra 1 and Geometry (or Math 1 and Math 2)

Time frame: One year

Grades: 10-12

Credit: 1.0

> Critical thinking and reasoning are the primary objectives and outcomes of this advanced quantitative reasoning course. It includes the application of mathematical skills including algebraic methods to the analysis and interpretation of quantitative information (numbers in context) in real-world situations to make decisions that are relevant to daily life. Additionally, the course emphasizes interpretation, precision, representation, calculation, analysis/synthesis, use of assumptions and communication through student presentations and writing. Students combine problem solving with modeling to analyze real-life situations and devise solution strategies. These habits and skills cut across disciplines, promote perseverance, and provide a gateway into successful postsecondary education and a variety of careers.

EMIS code guidance:

Use the following:
- 111350 Modeling and Quantitative Reasoning