How do Knewton recommendations work?

The Study Plan for courses built on select Pearson MyLab titles is now enhanced by Knewton. When Knewton recommendations are enabled, Knewton will determine the next best thing for each student to work on as he or she moves through the course.

Knewton recommendations take into account many factors, including:

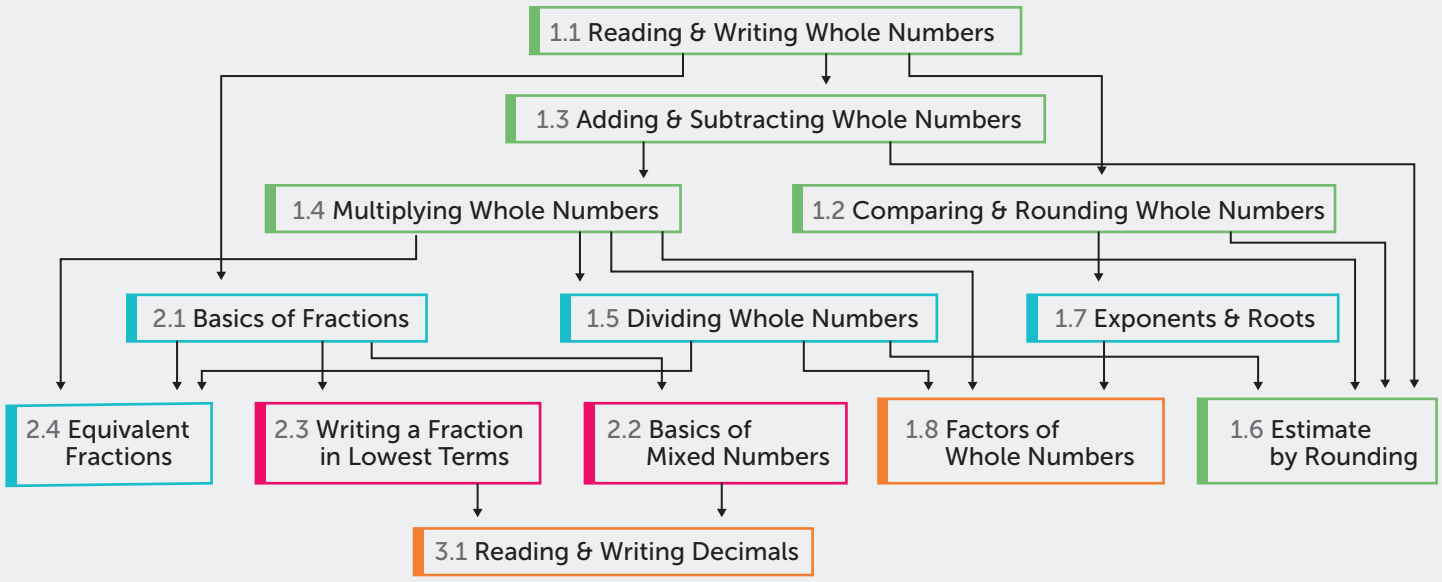
- Each student's individual knowledge base (what the student knows and does not know, as indicated by performance on course exercises)
- The structure of content in the domain of the course (e.g., Intermediate Algebra)
- The learning activities that have been most effective for similar students in the course
- The goals of the course

Knewton's recommendation engine also utilizes a "knowledge graph" created by Pearson subject matter experts.

What is a knowledge graph?
A knowledge graph is a description of the prerequisite relationships that the concepts in a knowledge domain (or textbook) have to one another.

In MyMathLab titles, these concepts are known as "objectives." In MyEconLab, these concepts are known as "sections." In MyFoundationsLab, they are known as "topics."

The knowledge graph for a MyMathLab title defines what objectives a student must master in order to be prepared for later objectives. Though a later section in the book will only rarely be prerequisite to an earlier section, these prerequisite relationships should not be confused with the sequential relationships established by a typical table of contents.



In this graph, green indicates mastered concepts, pink indicates failed concepts, blue indicates currently recommended concepts, and orange indicates concepts students have not yet seen. Note that pink (failed) concepts may also be currently recommended.

The arrows in the graph above indicate the prerequisite relationships between a selection of concepts in the course (note the direct arrow between "1.1 Reading and Writing Whole Numbers" to "2.1. Basics of Fractions").

If a skill taught in "Section 1.1 Reading and Writing Whole Numbers" is required again in "Section 2.1 Basics of Fractions", and no other concepts in Section 1 are prerequisite to understanding "Basics of Fractions," a direct connection will exist between "Reading and Writing Whole Numbers" and "Basics of Fractions." Theoretically, then, a student could successfully attempt "Basics of Fractions" after mastering "Reading and Writing Whole Numbers."

We can see from this diagram that Knewton is both remediating students on the concepts they failed ("2.2 Basics of Mixed Numbers" and "2.3 Writing a Fraction in Lowest Terms"), as well as recommending a concept they are prepared for ("1.7 Exponents and Roots").

Recommended course structure

Assignments and due dates

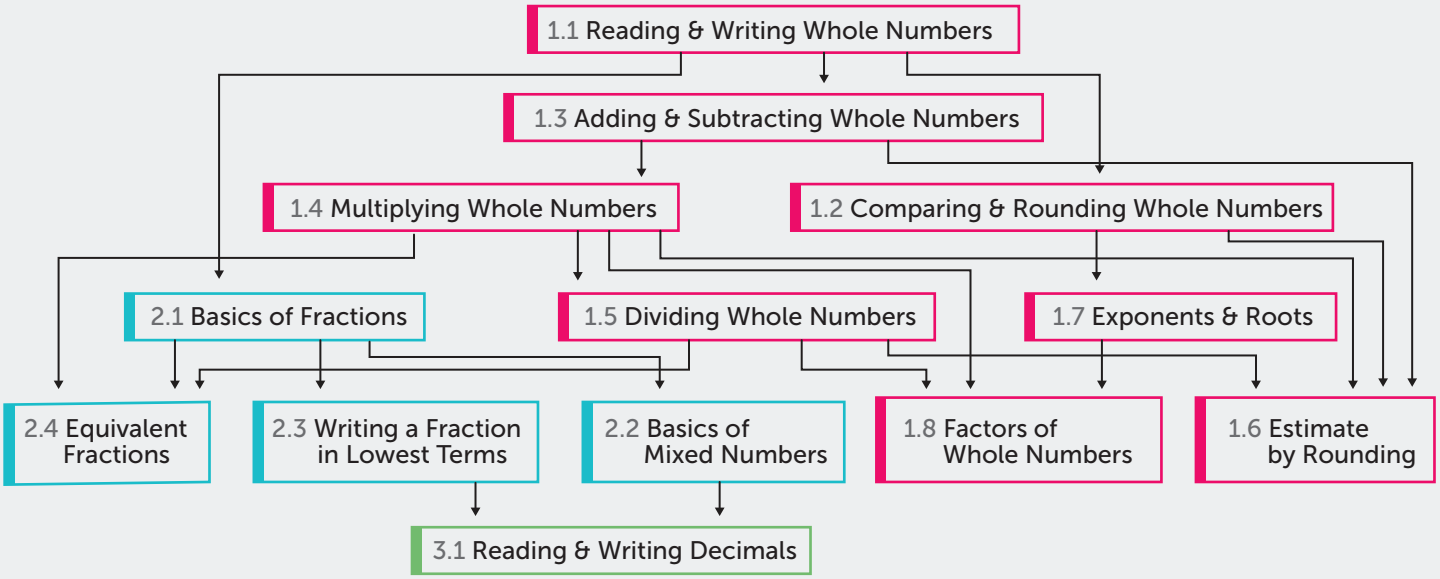
Though it is not required, Knewton strongly recommends that instructors create assignments with due dates for students in their courses. This allows Knewton to determine the "target" concepts of the knowledge graph, i.e. those concepts the instructor has deemed most important for students to master. By creating assignments with due dates, instructors guide the Knewton learning recommendation while allowing it to determine the quickest path to mastery.

How do assignments affect the Study Plan?

In a course with assignments, Study Plan recommendations will focus on preparing students for those target concepts, navigating through the prerequisites to get students to these goals as efficiently as possible. Any concepts that are not included in the designated assignments will still be recommended when they are prerequisites to target concepts.

How does adding due dates to assignments affect the Study Plan?

When instructors add due dates to assignments, Knewton intelligently prioritizes those concepts that carry an earlier due date. Past concepts (those assigned to earlier due dates) will still be recommended to students if they were failed or if they are prerequisites to upcoming target assignments.



In this graph, pink indicates due date 1, blue indicates due date 2, and green indicates due date 3. As indicated by the direct line from "1.1 Reading and Writing Whole Numbers" to "2.1 Basics of Fractions," "Reading and Writing Whole Numbers" is the only prerequisite for "Basics of Fractions."

In a course without assignments, "Basics of Fractions" could theoretically be recommended immediately after "Reading and Writing Whole Numbers." This might be undesirable for an instructor who prefers students to work through sections in a specific order. Creating assignments allows teachers to make this preference known. If an instructor does not want students to see Chapter 2 concepts until after they've seen Chapter 1 material, he or she can create assignments for both chapters and put a later date on the Chapter 2 assignment (as can be seen in the graph above).

How does Knewton create a sense of continuity within the course?
Knewton is committed to maintaining a sense of continuity for students within the course — despite the fact that course concepts are sometimes recommended in an order different from the order provided by the table of contents. Knewton's engine balances its focus on remediation and preparation with the need to provide a logical flow within the course.

If a student fails a given concept, Knewton will likely direct the student to specific prerequisites of that concept. This ensures that a student fully understands all the building blocks of the failed concept before he or she tackles it again.

Knewton is also responsive to student activity. For example, if a student ignores Knewton's top recommendation and instead works on a Study Plan concept of his or her own choosing, new recommendations are generated that take his or her performance on that concept into account.

What happens if the Knewton feature is turned off in a MyLab with Knewton Adaptive Learning?
Some teachers may want their students to work through a course in a linear sequence (1.1, 1.2, 1.3, etc.). Even in this case, we strongly recommend that teachers do not turn Knewton off. Instead, teachers can indicate a linear sequence by assigning sequential due dates for the different sections of the course (assignment 1.1 due this week, assignment 1.2 due next week, etc.). In this configuration, Knewton will focus the student on the upcoming work — with the added benefit of remediating individual students as necessary, by continuing to recommend appropriate prerequisites after a student has failed a concept. In this configuration, Knewton will focus the student on the upcoming work — with the added benefit of remediating individual students as necessary, by continuing to recommend appropriate prerequisites after a student has failed a concept.

Other benefits of Knewton
Since concepts often have multiple prerequisites, there are many different ways that students can move through a given course. As a continuously adaptive system, Knewton takes into account not only a student's most recent activity in the system, but also the student's performance throughout the duration of the course. After a student has spent time working in a course, Knewton factors this knowledge into its recommendation system. This ensures that each student is recommended concepts in the order that is most likely to maximize his or her learning at that particular point in time.