



# REDBIRD

## MATHEMATICS

### Product Guide

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## Welcome

Thank you for getting started with *Redbird Mathematics, K-7!*

This digital curriculum uniquely combines rigorous, adaptive, and personalized math instruction with integrated STEM themes and digital project-based learning.

100% of the standards hit within *Redbird Mathematics* are identified by the National Math Panel to be the “critical foundations of algebra.” The mathematics content was built from the ground up to be rigorous, focused, and coherent.

The following pages provide an overview of the program, including the adaptive motion system, course features, and, functionality.

## Course Overview

*Redbird Mathematics* is organized around coherent units of instruction comprised of concept-specific lessons. Students build conceptual understanding through multiple forms of instruction and then apply their knowledge to highly scaffolded practice items, games, and contextualized word problems.

After initial placement in the course, students proceed at their own pace and through their own unique pathway. The course is designed to provide students with the mathematics they need, when they need it.

Throughout the course, students are introduced to STEM themes and careers, making connections between the mathematics they are learning and authentic real-world applications.

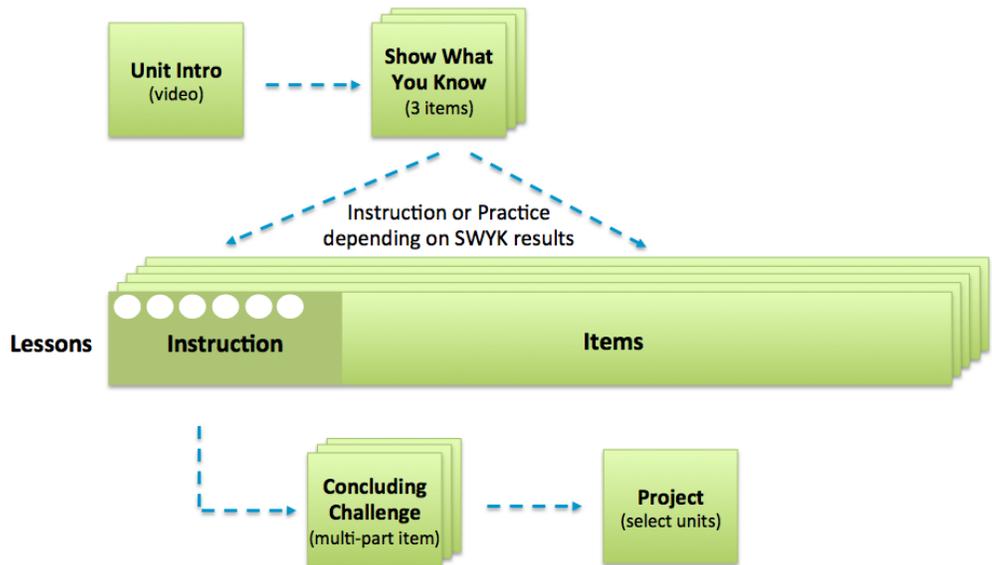
Unit Content							
<b>Kindergarten</b>	Numbers to 10	Numbers to 20	Compare Numbers to 10	Understand Addition within 10	Understand Subtraction within 10	Place Value with Teen Numbers	Number Patterns
<b>1<sup>st</sup> Grade</b>	Problem Solving: Addition	Problem Solving: Subtraction	Addition and Subtraction Strategies	More Work with Addition	Understand Place Value	Use Place Value and Prop. of Ops. to Add and Subtract	Number Strategies and Measurement
<b>2<sup>nd</sup> Grade</b>	Use Models to Add and Subtract	Use Strategies to Add and Subtract	Numbers to 1,000 and Place Value	Add with Multi-Digit Numbers	Subtract with Multi-Digit Numbers	Measure Length	Add and Subtract Length
<b>3<sup>rd</sup> Grade</b>	Understand Multiplication	Concept of Area	Patterns in Multiplication	Understand Division	Use Mixed Ops. To Solve Problems	Measurement: Time, Volume, Mass	Fraction Concepts
<b>4<sup>th</sup> Grade</b>	Foundations in Base 10	Extend Concepts: Multiplication and Division	Operations in Multiplication	Operations in Division	Equivalent Fractions	Operations with Fractions	Decimal Fraction Concepts
<b>5<sup>th</sup> Grade</b>	Whole Numbers: Place Value and Multiplication	Whole Numbers: Division	Decimals: Place Value and Operations	Fractions: Addition and Subtraction	Fractions: Multiplication and Division	Volume: Right Rectangular Prisms	Coordinate Graphs
<b>6<sup>th</sup> Grade</b>	Rational Numbers and Absolute Value	Rational Numbers in Coordinate Plane	Division of Fractions	Ratios and Rates	Proportions and Proportional Reasoning	Algebraic Reasoning (Exp)	Equations and Inequalities
<b>7<sup>th</sup> Grade</b>	Operations with Integers	Operations with Rational Numbers	Unit Rates and Proportional Reasoning	Proportional Reasoning and Percents	Algebraic Expressions	Writing and Solving Equations (Real)	Equations in Measurement and Geometry

## Unit Structure

Each unit begins with a video introducing the STEM theme and mathematics of the unit.

Students then proceed to a brief assessment (Show What You Know) to determine their level of proficiency in the material of the unit.

Depending on the assessment results, the unit presents students with either lesson instruction and items, or just a few items to confirm proficiency.



Units conclude with a multi-part challenge requiring synthesis of the unit's skills and concepts. In select units, a digital project-based experience deeply engages students in a real-world problem and allows them to create solutions using the design, simulation, and coding tools of STEM professionals.

## Adaptive Motion

The adaptive motion engine that drives student progress is the result of decades of research at Stanford University. Real-time evaluation of student performance enables *Redbird Mathematics* to personalize the experience for each user by delivering the most appropriate path through the curriculum. This adaptivity allows the course to serve as a remediation and/or intervention resource for students working below grade-level, as well as an excellent supplemental resource for on-grade-level learners. Additionally, advanced learners benefit from the acceleration and enrichment the course provides.

There are 3 key elements to adaptivity in *Redbird Mathematics*:

- 1) Instructional items that are responsive to student input, provide instructional scaffolding, including student-initiated concept specific or in-depth instruction
- 2) Sets of instructional items that expand or contract depending on student need for more practice or acceleration
- 3) Learning Pathway changes based on student performance

When a student is reviewing material they already know, and answering each item correctly, the program recognizes the student is proficient and quickly moves them along to their zone of proximal development.



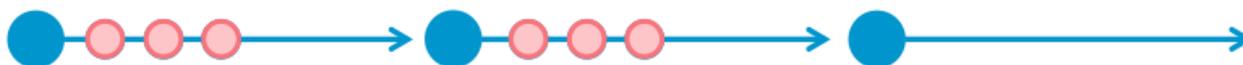
## Responsive Instructional Items

When a student is in their zone of proximal development, additional support unfolds as needed.

- On-demand help for the teachable moment of the problem and student-initiated in-depth instruction for the lesson focus.
- Incorrect responses carry hints that are specific to common errors and misconceptions, including a conceptual nudge towards the correct answer.
- Repeated incorrect responses trigger feedback that reveals the path to the correct answer and an opportunity to try another item.

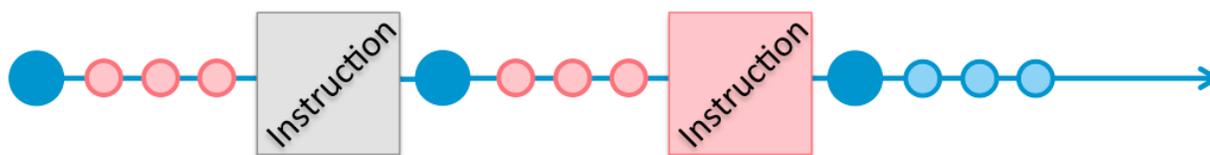
## Expandable Item Sets

If a student is not solving items correctly, additional similar items are added to the set to provide more practice. When students demonstrate proficiency, the item sets contract and fewer items are presented. The adaptive motion algorithm determines the number of items presented.

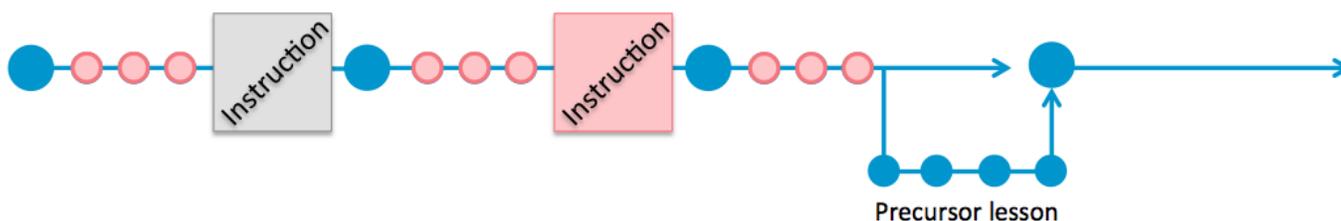


## Changes in Learning Pathway

Struggling students receive expanded instruction to develop understanding before proceeding to the next item set. If students do not demonstrate proficiency, an additional instruction is presented, covering the same topic but in a different way. These multiple forms of instruction help meet the needs of students with different learning styles.



If a student continues to struggle after multiple forms of instruction, a precursor lesson will be presented. The precursor lesson provides a stronger foundation for learning the on-level lesson. Depending upon the on-level lesson, multiple precursors may be available. After completing a precursor, the student returns to the on-level lesson.



This adaptive motion system results in 3 types of student motion:

**Accelerated** — Student is demonstrating proficiency and lesson pathways are shortened

**On-level** — Student is working in their Zone of Proximal Development, receiving instruction as needed

**Remedial** — Student is filling in some gaps in foundational understanding through precursor lessons

## Course Walkthrough

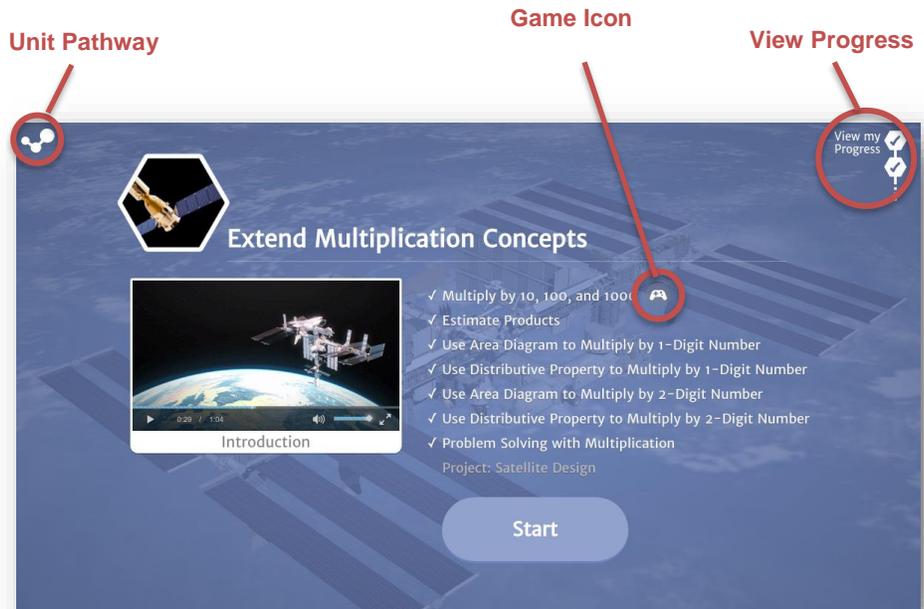
### Unit Introduction

Upon course launch, students will see a Unit Intro screen for the first unit of their grade. Lessons in the unit are listed, and the introductory video for the unit can be played.

Every unit begins with this screen to welcome students and make connections to the real-world applications and STEM careers.

Checkmarks appear next to the lesson titles as students complete them. Lessons with embedded games are indicated with the Game Icon.

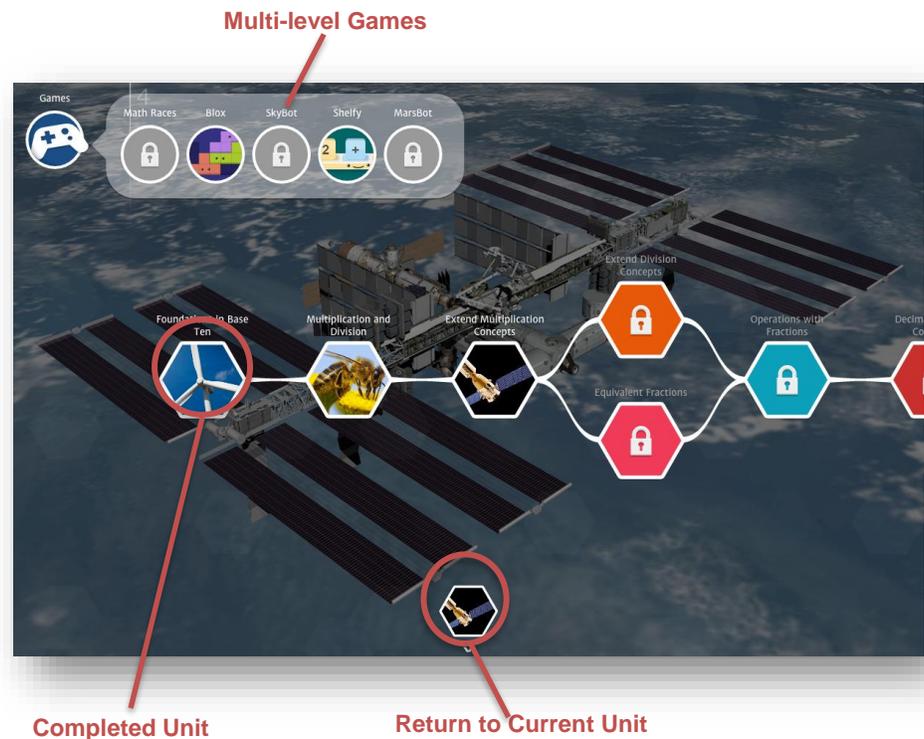
These games are unlocked and automatically played when the lesson is reached. Clicking the icon will allow the game to be replayed. Clicking the icon in the upper left corner of the Unit Intro will take students to the **Unit Pathway** screen. The **View Progress** icon will take you to a detailed report of progress in the current session and in the overall course.



### Unit Pathway

In the **Unit Pathway** screen, students can see the units they've completed and the units that lie ahead. As units are completed, more units are unlocked. Units can only be accessed in the sequence they are presented.

Multi-level games are also available from this screen and are unlocked as students' progress through the curriculum. These games provide additional skill building practice, promote automaticity, and offer expanded experience with geometry and logic.

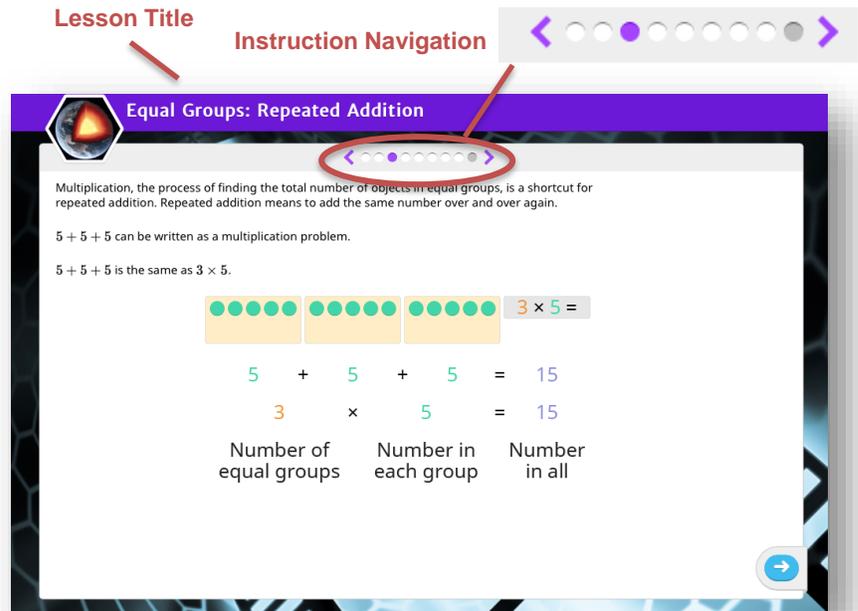


## In-depth Instruction

When students are engaged in receiving instruction and building their understanding of a concept, the top of the screen will indicate their progress through the instruction as shown. Students can navigate back to prior screens at any time.

In-depth Instruction for each lesson consists of several screens of material. There are always introduction and conclusion screens that summarize key ideas for the lesson. Between these, students encounter a variety of learning experiences including short videos, animations, digital manipulatives, guided practice, and direct instruction. For key lessons, there are two versions of in-depth instruction. If the learner needs additional instruction, they receive the second version, so they get a different experience around the same concepts.

**Important Note:** Mistakes and errors are a natural part of learning. Redbird Mathematics encourages students to learn from their mistakes therefore the items presented do not count towards final scores, correct percentages, or skill proficiency. Each screen of the instructional mode is intended to be a learning experience.



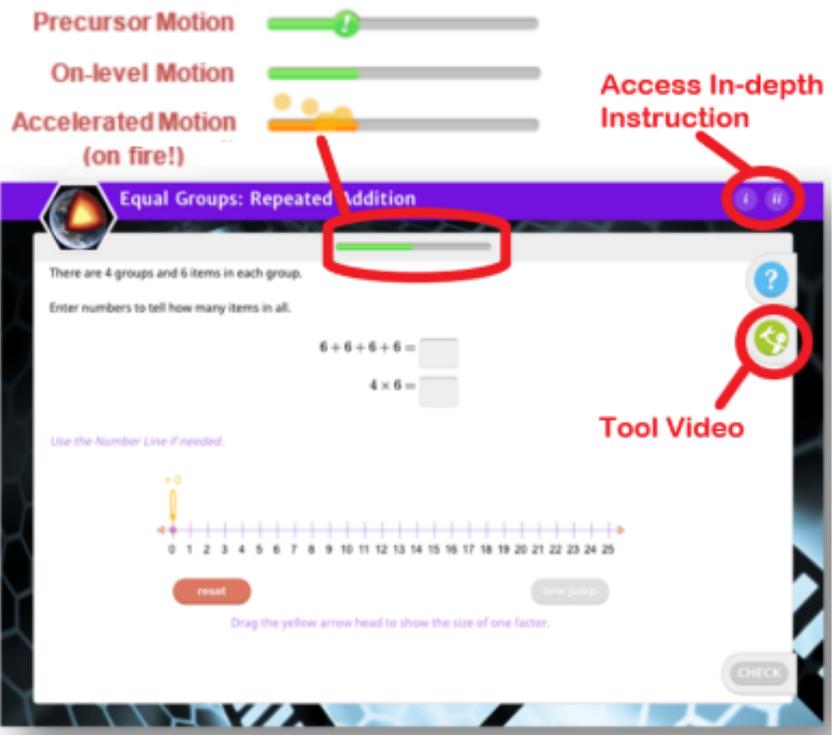
## Items Sets

As students work through item sets, a progress bar at the top of the screen indicates the percentage completed and the current motion through the lesson.

Item sets within a lesson build in difficulty, starting with a check for basic conceptual understanding and skill fluency, and advancing towards more complex applications and word problems.

When a digital tool or manipulative is presented, a video will explain its use.

At any time, students can review the In-depth Instruction using the controls in the upper right corner. When more than one version of instruction is available, multiple controls will be presented.



Students can review the instructional material at their own pace, and return to their previous location when done by clicking the 'x.'

## Help, Hints, and Feedback

For each item, on-demand Help provides targeted instruction on the key concept for the item.



When students answer incorrectly, a hint is provided to help guide them towards the correct answer and address common errors or misconceptions.

If a student answers incorrectly on the last attempt, the correct answer is shown (in yellow) along with the student's answer (in red). Additional feedback is also provided explaining the answer in greater detail. For lengthier solutions, a 'Solution' button will be shown.

A circle has a circumference 119.32 m. What is its radius?

The radius is 18 m.

Use a formula for the circumference of a circle. Substitute the known values and solve for the unknown value.

**Circumference of a Circle**

A circle has a circumference 119.32 m. What is its radius? Use 3.14 for  $\pi$ .

The radius is 18 m. **Student Answer**

19 m. **Correct Answer**

**Feedback**

Use the formula  $C = 2\pi r$ . Substitute 119.32 for  $C$  and 3.14 for  $\pi$ .

$119.32 = 2(3.14r)$	Simplify on the right side.
$119.32 = 6.28r$	Divide both sides by 6.28.
$19 = r$	

## Games and Projects

Embedded in many lessons are learning games that provide students with additional practice and conceptual reinforcement. Each game begins with a quick orientation on how to play, and gameplay typically lasts 3-5 minutes. Students can exit the game at any time and replay the game using the icon on the Unit Intro Screen while in that unit.

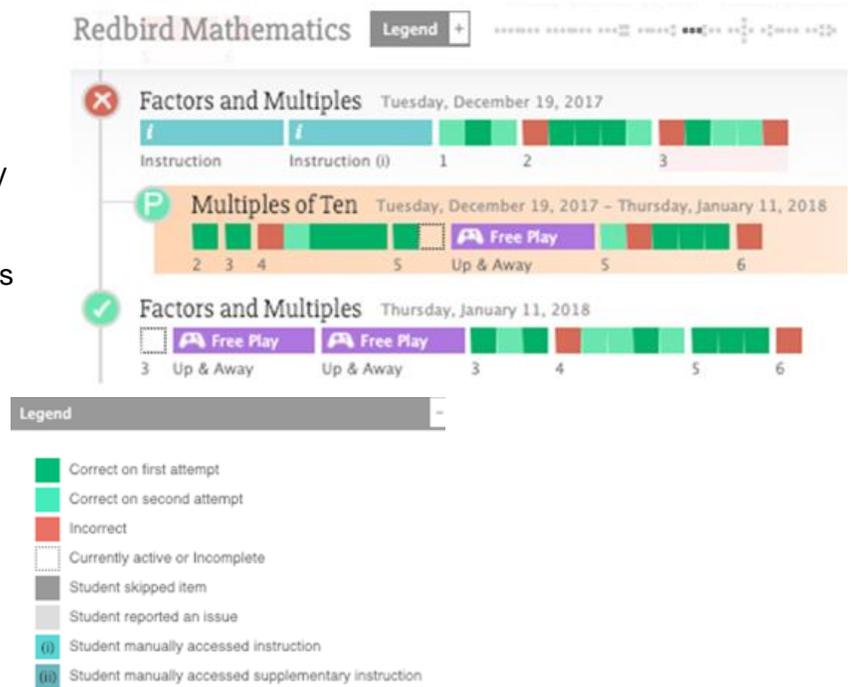
Select units conclude with a digital project-based experience that allows students to demonstrate true mastery of the unit's skills and concepts. Each project begins with introductory videos designed to engage students with the STEM topic, project goals, and introduce them to STEM careers. Following the videos students work through a series of complex mathematics tasks, applying skills towards a real-world problem. Projects conclude with a design, simulation, or coding tool, challenging students to create a solution for the project's goal.



## Student Progress

As students work with the course their activity and performance are constantly monitored and recorded. By clicking **View Progress** from the top right corner of the Unit Cover, a complete report can instantly be accessed, showing the student's pathway through the curriculum.

Within each lesson, correctly answered items are shown in green and incorrect in red. Numbers indicate the item set within a lesson. The occurrences of instruction and additional instruction are also shown.

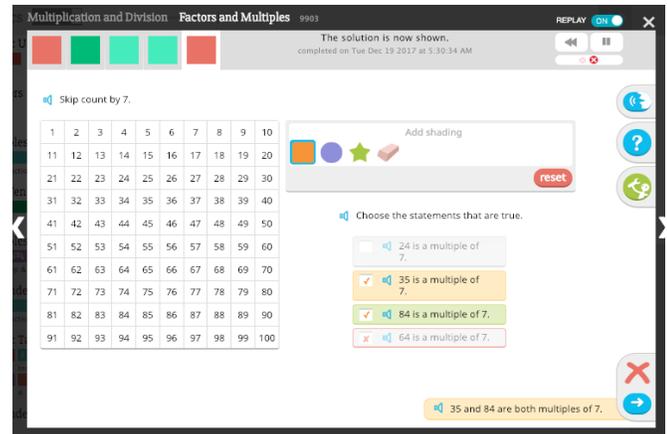


## Replay

A replay of actual student responses to items can be accessed from the progress view. Clicking any box will launch a replay of the exercises in the item set or instruction.

The replay will start automatically and show every action taken by the student, including typing/editing answers, and using on-screen controls. Watching a replay provides the same experience as watching a student interact with the curriculum and offers valuable insight into student thinking.

When viewing multiple exercises in a group, clicking on the green and red boxes in the upper left of the replay control will enable replay of specific items. Clicking the 'X' control in the upper right corner will close the replay interface.



## Redbird Learning Center

### Overview

Redbird Learning Center, or RLC, is the educator's window into students' progress throughout *Redbird Mathematics*. Once logged in, teachers have access to real-time data reporting, progress monitoring, and roster management tools for each of their classes.

See the Report Overview document for more information.