

Math fact fluency

Problem Solved!

Teacher Guide

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Overview

Welcome to Reflex!

Reflex is an adaptive online system that helps students to become fluent with their math facts. Students who struggle to answer basic problems like 15 – 6 and 8 × 7 will be able to answer these facts quickly and effortlessly.

If you want to get started with Reflex now and read the details later, see the Reference Guide at the end of this document.



The first part of this guide will introduce you to the ideas that form the foundation of Reflex.

Math Fact Fluency

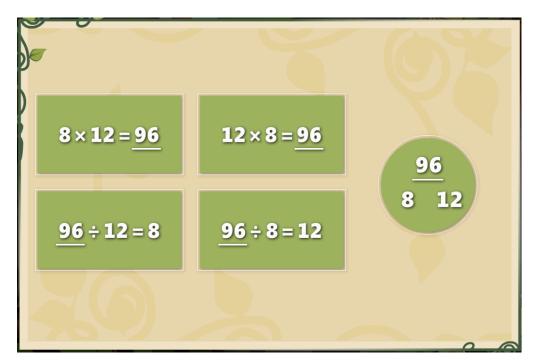
The goal of Reflex is fact fluency. By "fluency" we mean that a student is able to retrieve the correct answers to facts from memory almost instantly. A student who needs to stop and think about the answer to a math fact isn't fluent with that fact, even if she eventually arrives at the correct answer.

Is it important that students are able to answer facts this quickly? According to the research, yes! Multiple studies have shown that students who can automatically recall math facts are more capable problem solvers, learn new math skills more quickly, and are more likely to succeed in their future mathematics courses. The NCTM, National

Math Advisory Panel, and other major educational organizations highlight math fact fluency as a central pillar of every student's mathematics education.

Fact Families

Reflex uses a fact family approach when teaching new facts. As you probably already know, a fact family (sometimes called a number family) is a group of related facts that use the same numbers.



Instead of first learning all the addition facts and then all the subtraction facts (or multiplication facts and then division facts), students learn both operations at the same time.

This method has several advantages. It helps students understand the nature of inverse operations. It provides a less intimidating way to think about learning facts. (Instead of learning "169 multiplication and 156 division facts", students learn "91 fact families.") And, learning related facts at the same time is ultimately easier and more efficient than other approaches.

Individualized Instruction

Reflex adapts itself to each individual student. Over the course of a student's first few sessions, Reflex learns which facts and families the student is not yet fluent with. It uses this information when making instructional decisions for that student. This means that students won't spend time learning facts that they already know.

Reflex also continually monitors student progress. What a student does today is based on how well they retained the lesson from yesterday. This ensures that every student is practicing the right facts at the right time.

Game-based

Attaining math fact fluency requires a lot of practice, but the practice doesn't have to be boring!

In Reflex, practice occurs in fluency development games. These games are a lot of fun and they're designed to give students serious amounts of practice with answering facts. Students are also motivated to practice because the games provide engagement and challenge.

The games are also smart. Since Reflex continually monitors student progress, it always knows the best facts to use in the games for each student.









Before you begin

Which students should use Reflex?

Any student who understands the basic concepts behind the mathematical operations (addition and subtraction, or multiplication and division) is ready to start working in Reflex. Each student can be assigned an operation set (Addition-Subtraction or Multiplication-Division) and a range (0-9, 0-10, or 0-12) depending on their grade level and your curriculum.

Reflex will adapt to the pre-existing knowledge of each student. Some students might only need to work on a handful of troublesome facts and families. Other students might not know any of their facts at all. Reflex can be used with all of these students.

Working on math fact fluency is usually associated with students in grades two through six, but we all know that there are many older students who struggle with math because they can't recall their facts. Reflex can be used with these students as well.

For students whose primary language is Spanish, the student experience in Reflex (games, coaching, assessment, and student views of reports) is available in Spanish as well as English. The Reference Guide at the end of this document provides instructions on how to change a student's language assignment to Spanish.

How much time does it take to use Reflex?

A single Reflex session is typically completed within 10 – 20 minutes. The sessions can be longer – in fact, you might find it difficult to pry students away from the games! Because Reflex is an online system, students can log in from home for more gamebased practice. There are no restrictions on student use: students can log in as frequently as they want and practice for as long as they want.

Although there is no limit on the length or frequency of sessions, Reflex will only teach a certain number of new facts in a given day. Learning new facts is a process that occurs over time, and trying to "cram" a large number of new facts into memory in a few days just doesn't work.

When planning for Reflex, keep in mind that shorter, more frequent sessions will be more effective than longer, less frequent sessions. Consider two students: one uses Reflex twice a week for 45 minutes and another who uses it five times a week for 15 minutes. The first student is "spending more time" per week learning facts. But because of the way memory works, the student who uses Reflex for 15 minutes every day will likely become fluent more quickly.

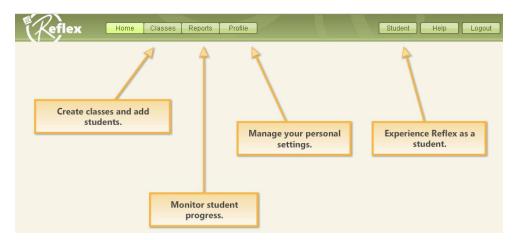
How can I integrate *Reflex* into my instructional program?

Here are some ideas for how to implement *Reflex*:

- If your school has a math intervention program, dedicate 15 minutes of every session to using Reflex.
- Self-contained classrooms can set up a math facts station that students use throughout the day.
- If you have enough computers to make it work, spend the beginning of every math period on *Reflex*.
- You can assign students to work on Reflex outside of class time either in a computer lab or at home. Reflex allows you to easily monitor when and for how long each student is using the system.
- Reflex makes noise. The instruction uses audio (particularly for the first few lessons), and the games have sound effects and music. For that reason, you might want to have students use headphones.

When you log in

When you log in to Reflex for the first time, you will be taken to your Home screen. There are several callouts visible that will help orient you to the system and help you get started with creating your classes and adding students to them. If further support is desired, at the bottom of the Home screen are links to two videos: Getting Started with Reflex and Monitoring Student Progress. You can also find detailed instructions in the Reference Guide at the end of this document.



Note: It is vitally important that each student uses his or her own Reflex account. A student should never "borrow" another student's login and password. Reflex continually monitors each student's performance, and sharing accounts—even for just one session—will compromise the data and hinder student progress.

The first day

You've got your classes and student accounts ready, and it's time for your students to start using Reflex. What can you expect on the first day?

Let's quickly walk through what your students will experience.

Avatar

The first time students log in, they are greeted by Crabby, the friendly crustacean guide to Reflex. He will help students create avatars – virtual representations of themselves that they'll see whenever they use Reflex. The options for customizing the avatar are very limited on the first day. This is so students can get started as quickly as possible. In later sessions, students will have the chance to go back and adjust their avatar's appearance in more detail.

After students create their avatar, Crabby will introduce the Speed Cube Challenge.

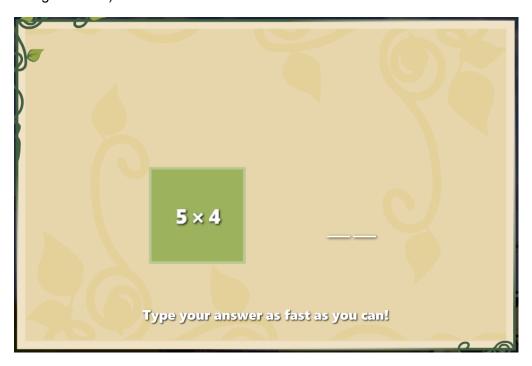


Speed Cube Challenge

Every Reflex session begins with a short assessment called Speed Cube Challenge. It's the job of Speed Cube Challenge to determine a student's level of fluency with facts and families.

During a student's first several sessions, Speed Cube Challenge will ask a wide range of facts as it assesses the student's pre-existing fluency. After this initial exploration, Speed Cube Challenge will primarily assess how students are doing with facts that they have recently been taught.

(You'll notice that some of the items in the challenge only ask a student to type in a given number. This is done so that Reflex can measure how fast a student types, something it needs to take into account when measuring how quickly a student can answer a given fact.)



Reflex Island

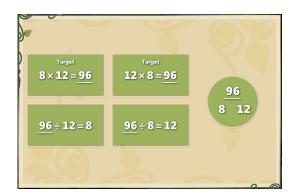
After completing Speed Cube Challenge, students are taken to the Reflex Island. Here they can choose which game they would like to play. They select a game by clicking on its tree house.

The game choice is entirely up to them. Over time, some students might discover that they like to play some games more than others, whereas others might enjoy playing a wide range of games. But on the first day, they're just going to have to pick one and see what happens!

Coaching

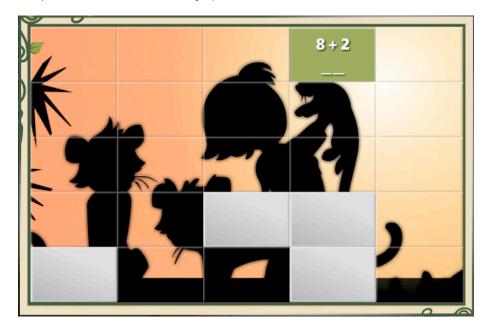
When students click on a game's tree house, they are greeted outside by Coach Penny. It's her job to get students ready to play the fluency development games by teaching them new facts and families. Exactly what Coach Penny teaches on a given day depends on what an individual student needs.

Coaching usually has two parts. The first part is a short study segment where the new facts are presented and then practiced by the student.





This is followed by a quick round of practice in "Coach Penny's Picture Puzzle." (We say "usually" has two parts because sometimes coaching will not present new study material to the student and instead skip straight to Picture Puzzle practice. You can consider this the *Reflex* equivalent of a "review day.")



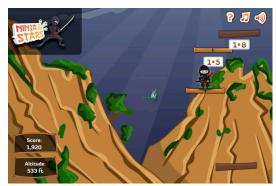
The goal of coaching is to get the students answering their new facts from memory. Then the fluency development games solidify and increase the speed of the recall until the facts are fluent.

Fluency Games (practice)

The fluency games are where students take facts that they have learned in coaching and answer them repeatedly. All the games in Reflex use an adaptive practice engine to ensure that each student receives customized, systematic practice appropriate to his or her individual needs. It's this "smart practice" that turns known facts into fluent facts.

At any time, students can leave the game they're currently playing. This will take them to the main island environment where they can choose another game. Early on, students might be eager to try out several different games. Don't worry if this happens. There's no instructional value in "sticking with one game." Reflex makes sure that students get the practice they need, regardless of which game they're playing.





Tokens

You'll notice that as students use Reflex. they earn tokens. These tokens can be used to purchase in-game rewards. Students earn tokens for Speed Cube Challenge, Coaching, and playing games. (In fact, the more they play the games, the more tokens they earn.) Students also earn tokens whenever they become fluent with a new fact or family.



Students spend their tokens in the Reflex Store. The store can be accessed from the island—but not until students have completed the recommended daily minimum amount of practice.

Students generally do not receive more than 120 tokens in a given day. This allows students to earn extra tokens through extended or repeated sessions, but it discourages extra-long game sessions, which are ultimately less effective than shorter, daily practice.

Progress Tree

The Progress Tree is a visual indicator of how many fact families a student has mastered. During the third Reflex session, each student plants an acorn on Reflex Island. The resulting tree grows larger as the student becomes fluent with more math fact families. Once the tree reaches a certain size (usually after about 10 days), students

can customize it with purchases from the Reflex



Clicking the Check Progress button next to the tree brings up a cross-section view of the tree. Each ring in the cross section depicts the fluent fact families that have fueled the tree's growth.

Daily Usage Requirement and the Green Light

Once a student has answered a certain number of facts correctly on a given day, a Green Light illuminates in the upper right corner of the screen. This indicates that the student has met the Daily Usage Requirement.



The Green Light serves two purposes. One, until the requirement is met and the light turns on, students are blocked from spending time on non-

instructional activities such as browsing the store or modifying their avatars or progress trees.

Two, it serves as an indication that a Reflex session is complete. Students can of course continue to practice by playing the fluency development games, but once they've completed the Daily Usage Requirement, they can stop the session if they (or you) so choose.

Green Light notes:

- Once the Green Light is illuminated, it will stay on for any subsequent sessions that day. And if a student does not reach the Daily Usage Requirement in her first session of the day, if she logs in later, she will build on the progress she has already made.
- Students can typically get to the Green Light in 15 minutes of concentrated use. Students new to Reflex may take longer at first as they are mastering the different games, but the time should go down with continued use. For students that are struggling to reach the Green Light within the time available, we recommend Ninja to the Stars and Egyptian Conniption as games in which many facts can be solved very quickly.

Summary

Although talking crabs, space ships, and math ninjas probably aren't part of your regular classroom routine, you've probably noticed that at heart, Reflex operates on a familiar lesson structure:

Instruction	Coaching
Practice	Fluency Development Games
Assessment	Speed Cube Challenge

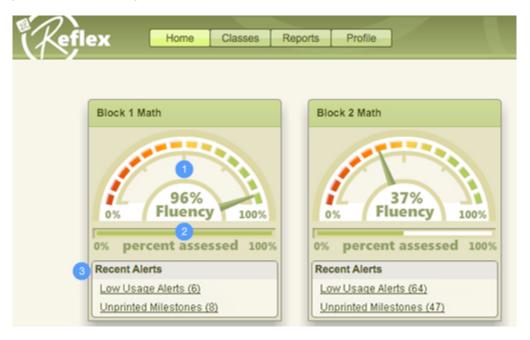
If you're interested in more details on how Reflex works, please see the Reflex White Paper. You can find it at www.reflexmath.com in the Learn More section.

Teaching with Reflex

Teacher Dashboard

When you log into your teacher account, you will see the teacher dashboard. The dashboard shows overview information and alerts for your classes and provides a way to access more detailed reports.

You can return to the dashboard at any time by clicking the **Home** button immediately to the right of the *Reflex* logo.



The dashboard has a status display for each of your classes. Each status display shows:

- A fluency meter that measures the overall total fluency of the class
- 2 The total percentage of the class's facts that have been assessed
- 3 Recent alerts including usage notifications and milestones

You can click on the usage and milestone alerts to get more information. And you can click on the fluency meter to jump directly to the **Group Status** report for that class.

Using Reports

Reflex provides a powerful reporting system that helps you monitor your students' usage, track their progress, and reward their achievements.

To access reports, log in to your teacher account and click the **Reports** button at the top of the screen.

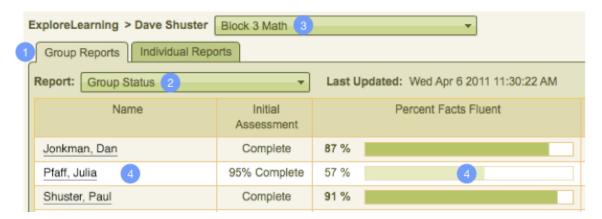


There are two kinds of reports:

Individual Reports that provide detail on an individual student.

Group Reports that provide summary data on a class.

Here are some general tips for using reports:



- 1 Use the two tabs to choose between group reports and individual reports.
- Use the Report menu to select the specific report you want to view.
- You can use the menu at the top to view group reports by class or to view one group report for all your classes.
- 4 You can click on many of the report cells to get more detail.

And every report can be printed to share with students, parents, or administrators.

That's all you need to know to explore the different *Reflex* reports on your own. All of the reports are listed in the back of this guide as well. For now, let's look at how the different reports can help you do your job as a teacher.

Filtering Reports

You can filter reports by usage and/or demographic data. (Demographic data can only be used if this information was included when enrolling students.) To add a filter, click the **Add Custom Filter** button at top right and select the criteria from the resulting menu. When the filter is in place, only those students that meet the criteria you set will be visible.





For example, if you wish to see how much progress students with at least 10 days of usage are making, select 10+ from the **Total Usage This School Year** menu. If this is done, all group reports will only include data from students with 10 or more days of usage. Reports can also be filtered by gender, LEP status, economic status, special education status, and ethnicity.

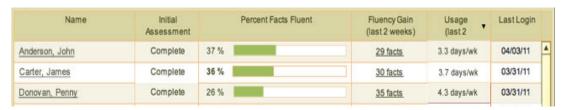
Custom filters can be changed by clicking Change Filter or removed by clicking Remove Filter.

Monitoring use

The fastest way to achieving full fact fluency with *Reflex* is frequent, consistent use.

An easy way to get a quick overview of your class's usage is the **Group Status** report. You can get to this report through the **Reports** menu or by clicking on a class in the teacher dashboard.

This report will show all of your students along with the date of their last login and their usage over the last two weeks.



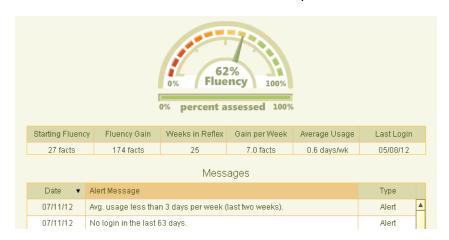
To get more information on an individual student's usage, you can click on their usage or last login numbers. This will take you to their individual **Usage Detail** report.



If you mouse over a bar in the graph, a tooltip will show you the exact date and duration of the session and if the student met the daily usage requirement.

You can also filter the report by date using the **Date Range** drop-down menu at the top right of the graph. This is an option available on many *Reflex* reports.

Reflex also provides alerts when a student's average usage is low or when they haven't logged in for an unusually long period of time. These alerts are found in both the teacher dashboard and the individual **School Year Overview** report.



Encouraging use

Reports provide a way to monitor student use of *Reflex*. But how can you as a teacher encourage use?

One way is to emphasize students can succeed and become good at math through effort. You can tell your students that learning facts is like learning to play a sport or a musical instrument. It takes regular practice. Athletes and musicians don't practice for several hours in a row one day a week. They practice a little bit every day. That's how students should learn their facts with *Reflex*.

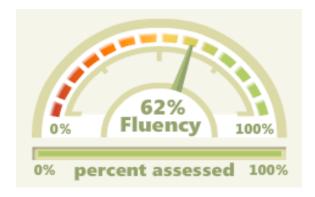
You can also encourage students by talking to them about their experiences with using *Reflex*. Some suggestions:

- Ask students to share any tips or strategies they've learned about their favorite *Reflex* game.
- Create a friendly competition between classes to see which class can solve more problems or gain more total facts.
- Make a "leader board" display where you post the names of students who solve a large number of problems per week or who have a high average days/week usage.
- Set goals for students and award students who achieve fun milestones, such as buying cat ears, a treehouse, a leopard, or anything else.
- Post high scores for individual Reflex games.
- Schedule time for students to show off their avatars and progress trees.
- Celebrate both individual and classroom milestones (discussed later).

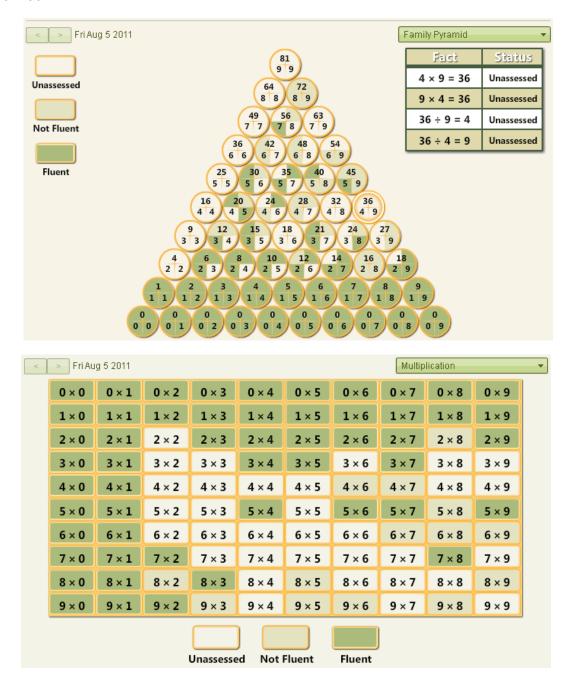
Track progress

There are several reports that can help you monitor your students' progress and current level of fluency.

The individual **School Year Overview** report provides a "fluency meter" that shows how far along students are on the path to fluency:



To see which particular facts a student knows and doesn't know, use the **Fact Detail** report. This report is available in both a fact family pyramid and a traditional "fact grid" format.



At the top left of the fact detail report are two arrows and a date. You can use the arrows to change the date, and the report will update to reflect the student's knowledge on the given date. This allows you to "step back in time" and see how a student's fluency has changed over time in *Reflex*.

The **Fluency Growth** report provides another way to monitor a student's fluency growth. The report graphs a student's number of fluent facts versus time. You can use the radio buttons at the top left of the graph to choose graphing a student's **Fluency Gain** (facts

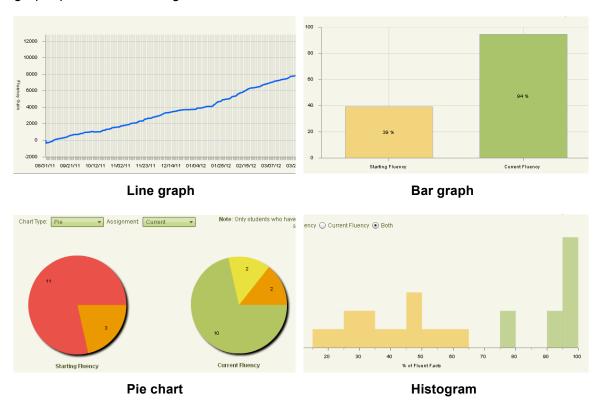
the student acquired in *Reflex*) or **Total Fluent Facts**. A student's starting and ending fluency are displayed below the graph. The **Date Range** menu at top right gives several options for date ranges to look at, including a custom option. This report provides an ata-glance visual representation of a student's progress towards fluency – perfect for teachers implementing *Reflex* within a Response to Intervention framework.

One additional feature of this report: by selecting the **Show Usage** checkbox, you can also see the student's usage in the graph (expressed as total minutes – see the axis on the right side of the graph). Below the *x*-axis a dropdown menu allows you to look at the raw date or only dates of usage.



In addition to the individual reports, you can view several **Group Reports** that track the progress of a whole class. In addition to the **Group Status** report mentioned above, you can view a **Usage Summary** pie chart, a **Milestones** report, and a **Fluency Growth** report that provides aggregated fluency gains for the class, including the total number of facts mastered in *Reflex*, average student gain, average usage days, and percentage of usage days that the students got a Green Light and met the daily usage requirement. All group fluency information is only given for the current school year.

A handy feature of the fluency growth report is the ability to view the data in several formats. In addition to the line graph, the fluency growth can be displayed as a bar graph, pie chart, or histogram.



Recognizing progress

Students receive recognition within *Reflex* for both their effort and their progress. However, it's certainly helpful and encouraging for you to do the same for both individual students and classes.

If you print and post the group **Fluency Summary** chart, your students can track the class's progress towards total fluency (without singling out individual students who might be less fluent).

Progress can be communicated to parents by printing out a student's individual **Overview** report. This will show both how hard the student has been working and their overall progress.

Reflex also provides another way to recognize and reward progress – milestones.

Milestones and Certificates

The Reflex reporting system tracks milestones for both individual students and groups. In general, there are two types of milestones:

- Those that mark effort "1000 Total Facts Solved!"
- Those that mark fluency progress "50 New Fluent Facts!"

For any milestone, you can print out a certificate to celebrate the accomplishment.



When a student reaches a milestone, there is an alert in that student's individual Overview report. To see all a student's milestones or to print certificates, select the Milestone individual report. Milestone alerts are also displayed on the teacher dashboard. Clicking on the alert takes you directly to the group Milestone report.

You can select the milestones for which you want to print certificates. Reflex also remembers which certificates you've already printed. To make things easier, you can just use the Print All Unprinted button to make sure that you're up to date with certificate printing!

To view and print certificates for group milestones, select the group **Milestone** report. (You can also print certificates for individual students from this report.) Milestone data is only available for the current school year.

Milestones are a great way to recognize and rewards students. They can also be used to set goals for your class. You can challenge your class to solve a certain number of total facts by the end of the week. You can use the reports to update your class about their progress towards meeting the challenge as the week goes by. Then, if they've managed to meet the goal, they can be rewarded with extra Reflex time to shop in the Reflex store, customize their avatars, and of course play the fluency development games.

Reference Guide

Who should use Reflex

Any student who understands the concepts behind the operations they'll be working with is ready to start building fluency.

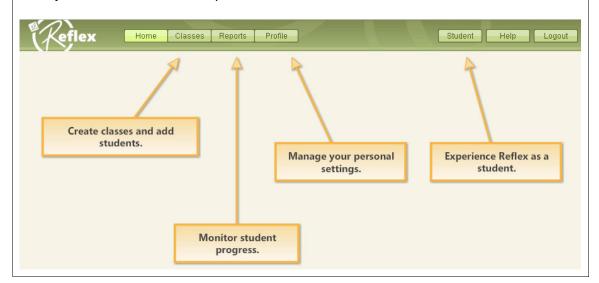
Operation assignments

An assignment is an operation set and a range. The operation sets are Addition/ Subtraction and Multiplication/Division. The ranges are 0-9, 0-10, and 0-12.

Main Navigation

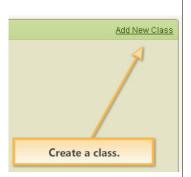
From the top navigation bar, you may select any of the following options:

- Home: Once you have created your classes and added students to them, the home screen provides a summary of each class's progress.
- Classes: Manage your classes and student assignments.
- Reports: Monitor student progress.
- Profile: View and modify your personal information.
- Student: Experience Reflex as a student would. (Note: This feature is intended for teachers only. No data is recorded during these sessions.)
- Help: Access the Reflex Help Center.



Creating classes

- Go to your class management area by clicking Classes in the navigation bar.
- Click Add New Class and enter the class name.
- If most or all of your students will have the same assignment, you can choose a default assignment for the class. All of the students added to the class will then have this assignment unless you specify otherwise.
- Click Save.



Adding students to classes

If your school has a site license – your school's Reflex administrator may have already uploaded your students into the system. You will just need to add them to your classes:

- Add/Remove Students Click
- Select the students you want to add to your class and click Add. To add all the students to your class, click Add All. If your students are not in the system, contact your building's Reflex administrator.

If you have a teacher license – you will need to add your own students to the system. You can add students individually or as a group via a CSV file.

- Add/Remove Students Click
- In the bottom left of the dialog, click on the link <u>Click here if student does not</u> appear in either list to begin adding students.
- To add students individually, select Input students individually. Enter the information for each student. Fields marked with an * are required. When you are done, click Create Student.
- Click Create Another Student to keep adding students. Click Done when you're finished adding students to your class.
- To add students as a group, select Import a group of students using a **CSV file**. Follow the on-screen instructions to create a CSV file. A sample CSV file can be downloaded to help with formatting.
- When the file is ready, click **Browse** and select the file.
- Click **Import** to import the student information.

Deleting students

If you have a <u>teacher license</u> – you can delete a student to free up available seats. Clicking **Add/Remove Students** gives you the option to delete students. But remember that when you delete a student, <u>all of that student's data is lost</u>. You may want to print off any desired *Reflex* reports for the student before proceeding.

Modifying student information

You can modify student information manually or via a CSV file. To modify student information manually, do the following:

- From the **Classes** page, select the class and student you wish to modify.
- Under Student Details, click Edit.
- In the **Edit Student** window you can modify the student name, password, parent email, ID, grade level, assignment, or assigned language.

To modify student information with a CSV file, do the following:

- From the Classes page, select Add/Remove Students.
- Click Click here if student doesn't appear in either list.
- Select Input a group of students using a CSV file.
- Prepare a CSV file with corrected information. Note: corrections to a student's last name or student ID must be done manually.
- Select and import the CSV file with updated information.

To change the language a student experiences to Spanish, select their name from the Classes page. Under Student Details, click Edit. At the bottom, next to Language, select Spanish. Grade Level: * Grade 4 Assignment: * Multiplying and Dividing 0 - 12 Language: Spanish Save Cancel

Giving students access

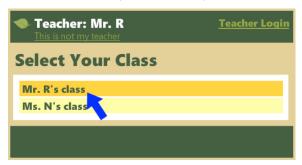
When a class roster is complete, click Print Login Cards for each class. Pass out the login cards and tell students to keep them in their notebooks.

To log in, students will:

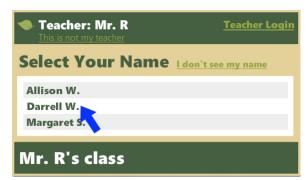
1. Enter their teacher's username



2. Select a class (if you have only one class, students won't need to do this)



3. Select their name from the list of students in the class

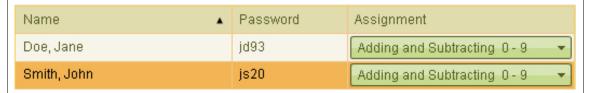


4. Enter their password

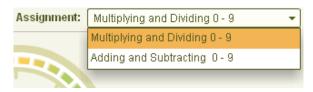


Changing assignments

Students can only be given one assignment at a time. To change a student's assignment, select the desired assignment from the dropdown list.



- If the assignment change is within a given operation, such as changing Multiplying and Dividing 0 10 to Multiplying and Dividing 0 12, all of the student's usage, milestone, and applicable fluency data are retained. In addition, the student's avatar, tokens, progress tree, and store purchases are preserved.
- If the assignment change is from one operation to another, such as from Adding and Subtracting to Multiplying and Dividing, students retain their avatar, tokens, and store purchases. The Progress Tree will start from a seed again with the new assignment. Data from either assignment can be viewed by selecting from the **Assignment** dropdown menu.



 Note: Switching operations twice (such as from Adding and Subtracting to Multiplying and Dividing then back to Adding and Subtracting) will result in loss of data from the original assignment.

Reflex is designed to support one assignment at a time for each student. If you wish for a student to work in an addition/subtraction and multiplication/division assignment simultaneously, a second account must be created for that student. Note that you will also need to create a new student ID for the new account.

Managing use

- Headphones are recommended for classroom use.
- When students reach the Daily Usage Requirement, a Green Light will come on in the upper right corner of the screen. This should take about 15 minutes. (Some of the earliest sessions might take slightly longer.)
- The store and student avatar are only available once the Green Light is on.
- Students can earn a maximum of 120 tokens per day.

Using reports

- Access reports through the teacher dashboard or by clicking Reports in the navigation bar.
- There are two types of report individual reports and group reports. Use the tabs to select the type of report you want to view.
- Select a specific report by using the drop-down **Report** menu.
- You can view a group report for one class or for all your classes. Choose this using the drop-down menu next to your name.
- Many report cells can be clicked on to get more detail.
- All reports can be printed.

Printing certificates

- Click on a milestone alert in the teacher dashboard or select the group Milestone report.
- Class milestones are displayed at the top and student milestones at the bottom.
 (You can also view a student's milestones using the individual student Milestone report.)
- To quickly print certificates for new milestones, click **Print All Unprinted**.
- You can re-print specific certificates by clicking the **Print** action next to each milestone.

Customer support

Have a technical issue or question? Select the **Help & Support** section at www.reflexmath.com and click **Email Customer Support**.