

Symbolic Equation

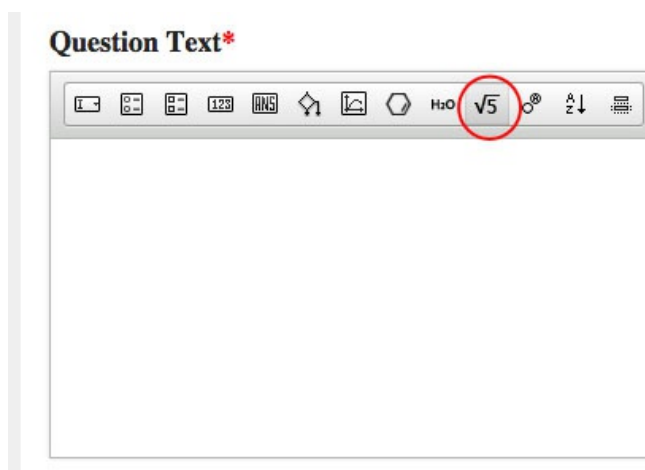
Last Modified on 07/31/2020 11:34 am EDT

The Symbolic Equation Module is used to insert mathematical equations into questions. The Symbolic Equation Module Editor allows authors to create static symbolic equations and graded symbolic equations. Static symbolic equations are unable to be edited by students. Graded symbolic equations allow students to create and submit symbolic equations for a grade.

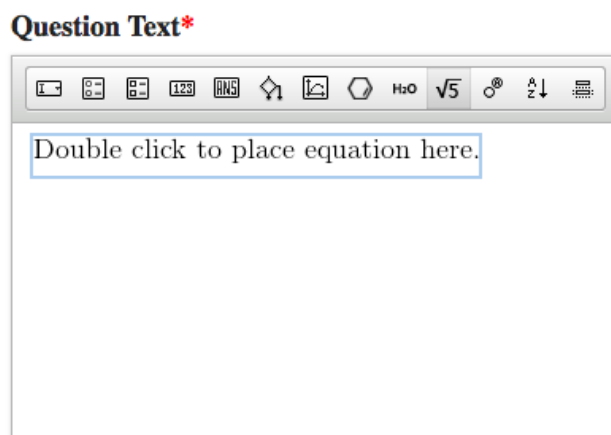
Hide All Answers

Getting Started

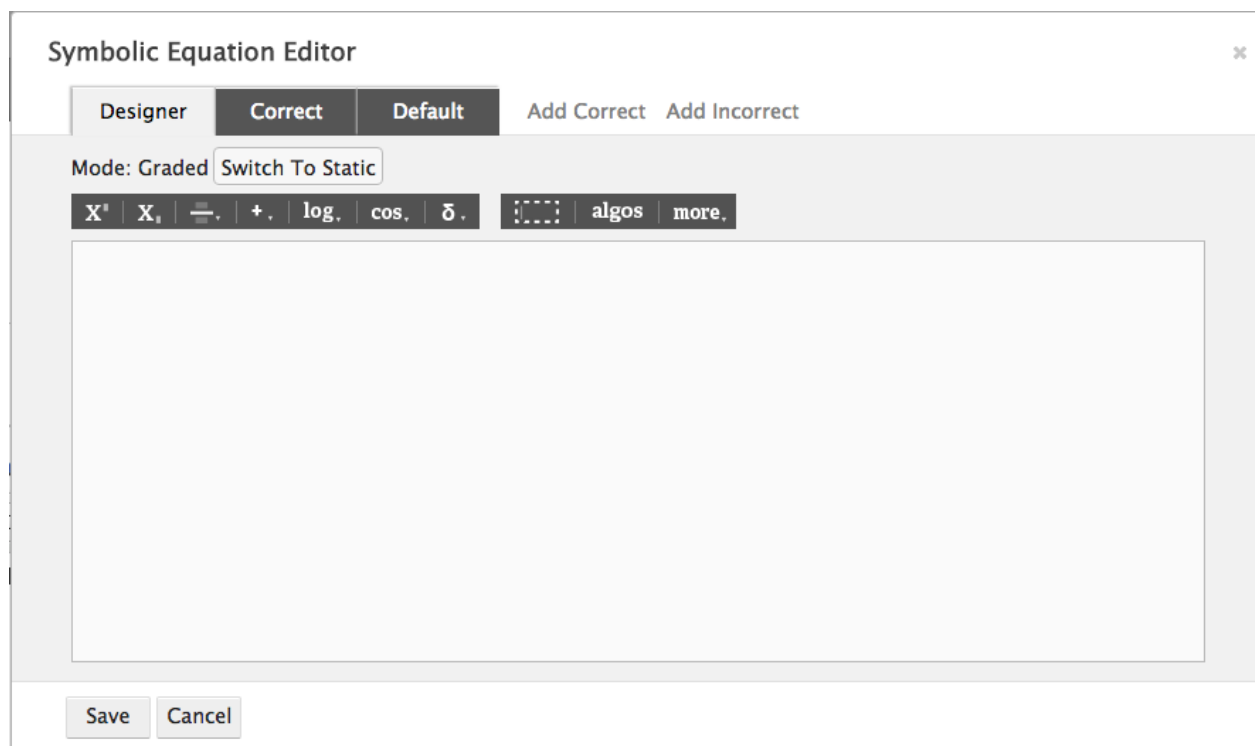
1. To insert the Symbolic Equation Module in to the Question Text section, click the symbolic equation button in the Question Type Palette. The symbol on this button is " $\sqrt{5}$ ".



2. Once inserted into the Question text section, the module will always appear as a rectangle with the words "Double click to place equation here," as exemplified in the screenshot below:



3. To open the Symbolic Equation Module editor, double click on the module.



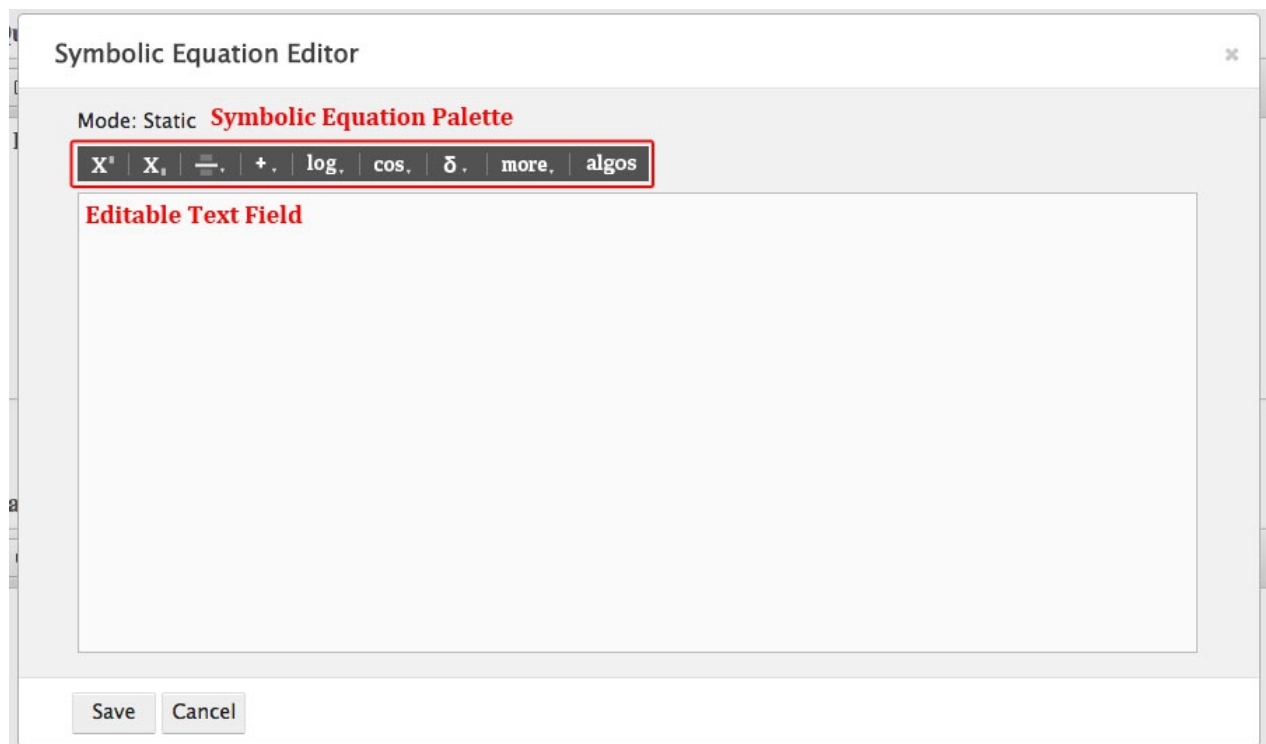
The Chemical Equation Editor has two modes: Graded and Static. In Static Mode you can create symbolic equations that cannot be edited by students. In Graded Mode you can create symbolic equation problems that students can edit and manipulate for a grade.

Graded Mode allows you to mix static elements with elements that students can manipulate. Static Mode does not allow you to do this.

The Symbolic Equation Editor also has a "Save" button, which you can use to save your work and exit the module, and a "Cancel" button, which allows you to exit the module without saving.

Creating Static Equations

Overview of the Static Chemical Equation Editor



The Static Symbolic Equation editor contains an Editable Text Field and a Symbolic Equation Palette, which allows you to insert special characters and format your equation. You can insert a Static Symbolic Equation in the Introduction section, the Question Text section, the Hint section, the Part Solution section, and the Summary Solution section.

Symbolic Equation Palette



From left to right, the Symbolic Equation Palette allows you to do the following:

- Insert a subscript
- Insert a superscript
- Insert bracketing functions

This button expands to offer the following buttons (from left to right):



- Insert a fraction
- Insert parenthesis
- Insert brackets
- Insert absolute value brackets

- Insert math symbols

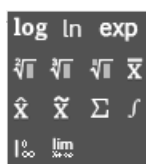
This button expands to offer the following buttons (from left to right):



- Insert an addition sign
- Insert a subtraction sign
- Insert a multiplication sign
- Insert a division sign
- Insert an equal sign
- Insert a greater-than sign
- Insert a less-than sign
- Insert a greater-than-or-equal-to sign
- Insert a less-than-or-equal-to sign
- Insert a plus-or-minus sign
- Insert an inequality sign
- Insert an approximately equal to sign
- Insert a tilde
- Insert a single quote
- Insert pi
- Insert a percentage sign
- Insert scientific notation
- Insert an infinity symbol

- Insert advanced math functions

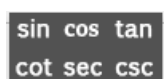
This list expands to offer the following buttons (from left to right):



- Insert a logarithm
- Insert a natural logarithm

- Insert an exponent
 - Insert a square root
 - Insert a cube root
 - Insert an n -th root
 - Insert a bar
 - Insert a caret
 - Insert a tilde
 - Insert a summation sign
 - Insert an integral
 - Insert a vertical bar
 - Insert a limit
- Insert trig functions

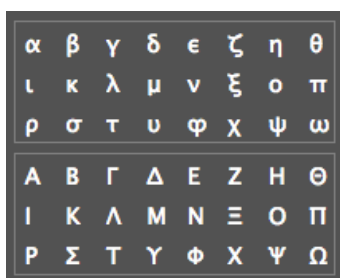
This button expands to offer the following buttons (from left to right):



- Insert sine
- Insert cosine
- Insert tangent
- Insert cotangent
- Insert secant
- Insert cosecant

- Insert Greek letters

This button expands to offer the following buttons



- Insert more characters

This button expands to offer the following buttons (from left to right):



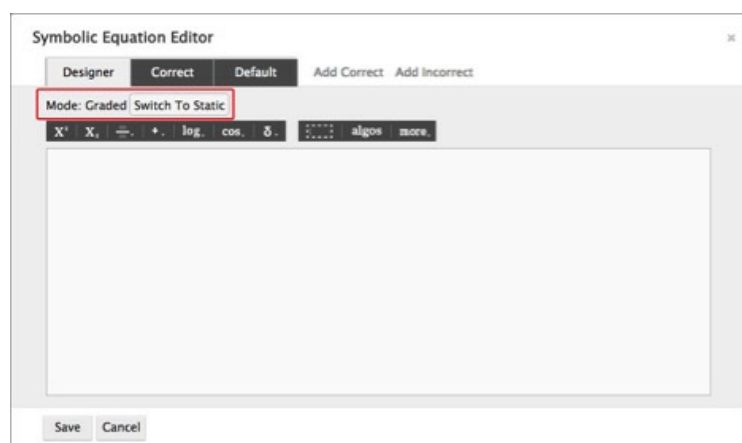
- Insert a double bond
- Insert a triple bond

- Insert a degree symbol
- Insert a length symbol
- Insert algorithmic variables. For an in-depth description of Algorithmic Variables, please see the [Algorithmic Variable](#) help notes.

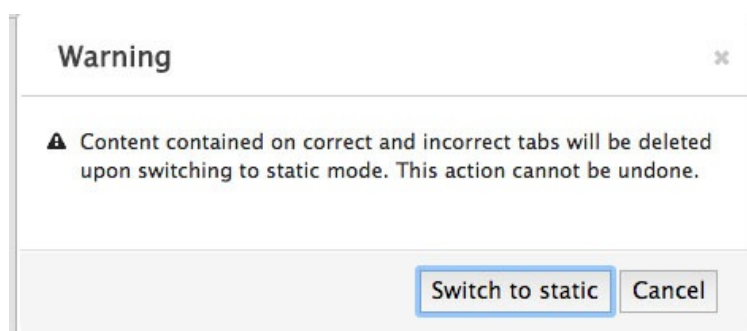
How to Create a Static Symbolic Equation

To create a static Symbolic Equation, do the following:

1. In the Mode section of the Symbolic Equation editor, click the “Switch to Static” button.



- a. A Warning Message will pop up that says, “Content contained on correct and incorrect tabs will be deleted upon switching to static mode.” This means that any feedback or answers you may have written on those tabs will be lost once you switch to static.
- b. Click “Switch to static.”



- c. You cannot toggle back and forth between static and graded mode. This means that once you save the module as static, you cannot make it a graded module.
2. Type your Symbolic Equation into the Editable text field, using the Symbolic Equation palette.
 - a. You can also use following keyboard shortcuts.
 - i. “+” for addition
 - ii. “-” for subtraction

iii. “*” for multiplication

iv. “/” for division and fractions

v. “=” for equals

vi. “~” for approximately equal to

vii. “()” for parenthesis

viii. “[]” for brackets

ix. “{}” for braces

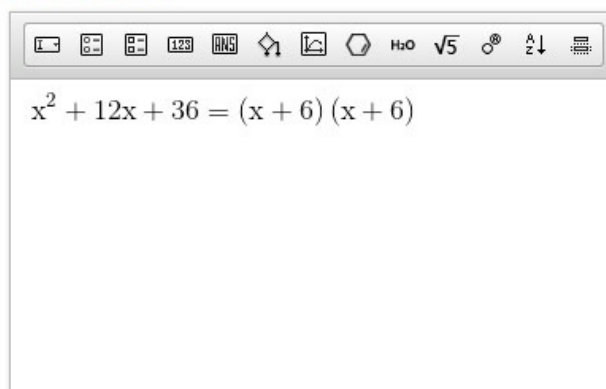
x. “%” for percentage

xi. “^” for superscript

xii. “_” for subscript

3. Save your equation. It will appear in the Question Text section of the Question Editor.

Question Text*

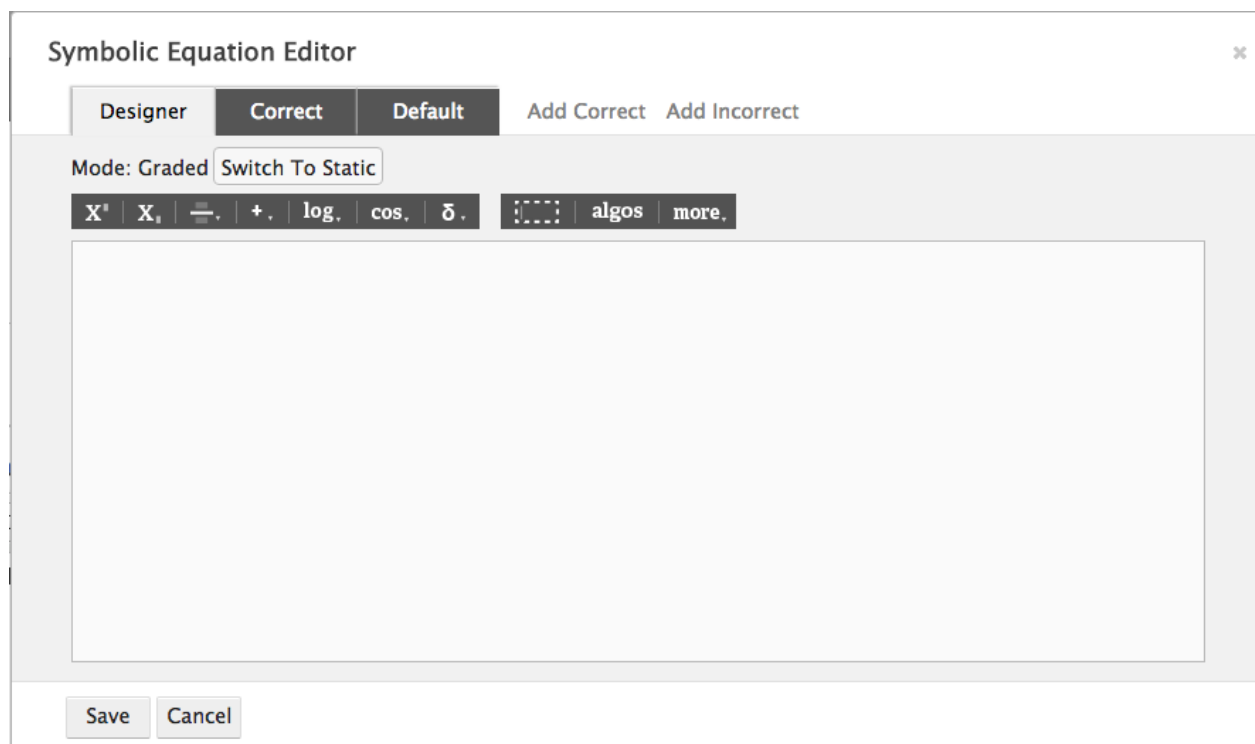


The screenshot shows a web-based editor for creating questions. At the top is a toolbar with icons for text alignment, bulleted and numbered lists, indentation, undo, redo, link, unlink, image, chemical formula (H₂O), square root (√5), subscript (x₂), and superscript (x²). Below the toolbar is a text area containing the equation $x^2 + 12x + 36 = (x + 6)(x + 6)$.

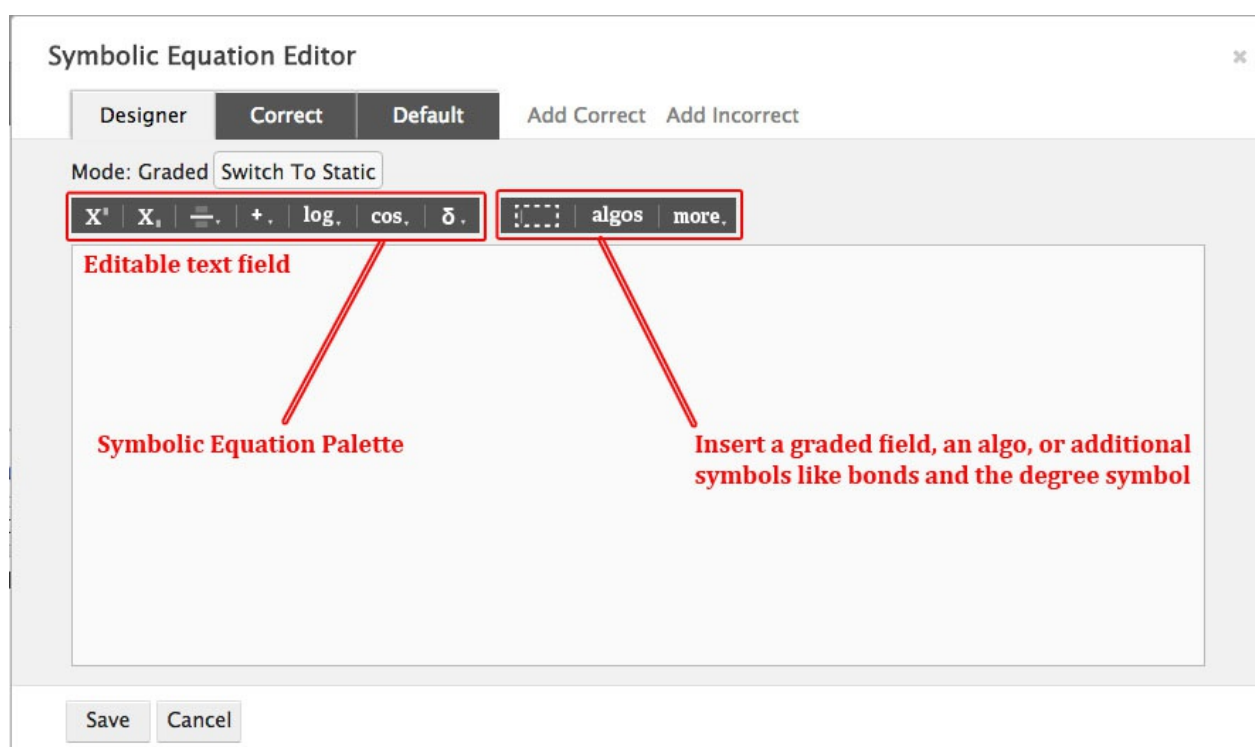
Creating Graded Equations

Graded Symbolic Equations allow students to create and submit chemical equations for a grade. Authors can choose to make the entire chemical equation graded, or only part of the chemical equation graded.

The Graded Symbolic Equation Editor initially contains three tabs: A designer tab, in which you set up your graded chemical equation; a correct tab, in which you set the correct answer and correct feedback for your graded symbolic equation; and a default tab, in which you write the feedback students will see when they incorrectly set their portion of the symbolic equation. Additionally, if there are multiple ways to write the symbolic equation correctly, you can set another correct answer by clicking on the “Add Correct” tab. You can also add feedback for specific incorrect answers by clicking on the “Add Incorrect” tab.



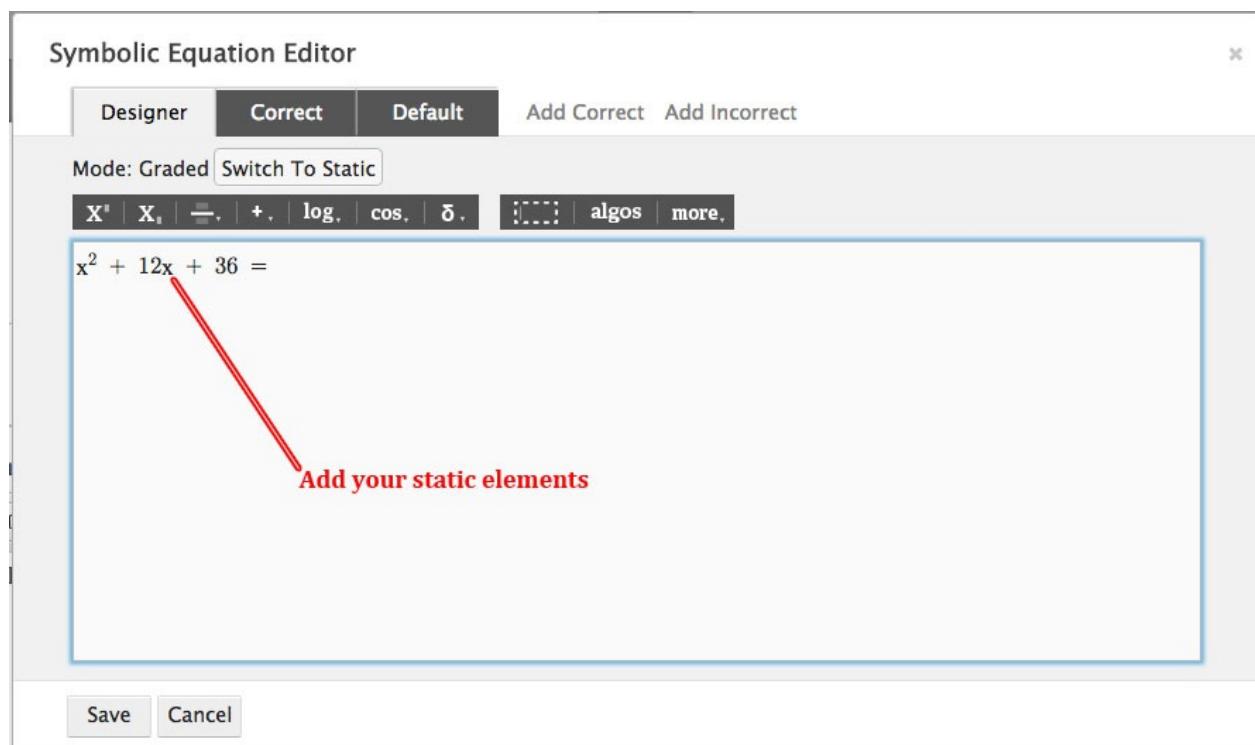
Symbolic Equation Editor



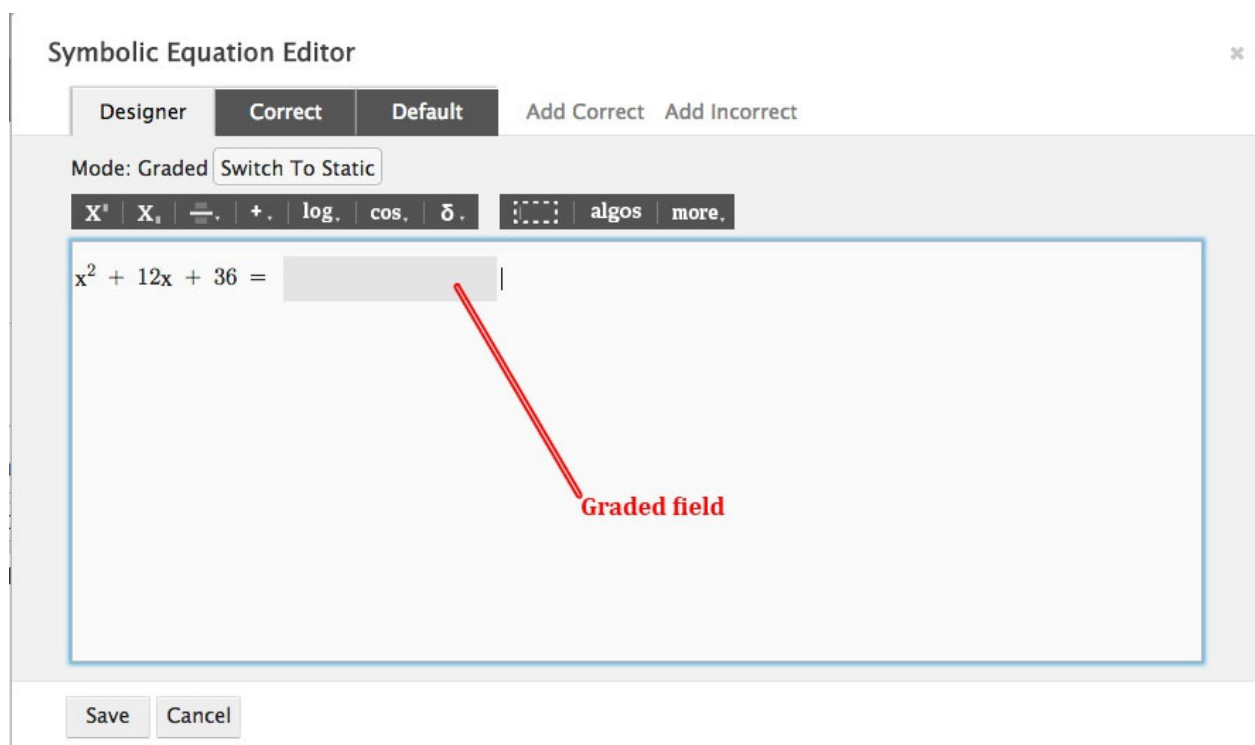
Just like the Static Symbolic Equation editor, the Graded Symbolic Equation editor contains a Symbolic Equation Palette that allows you to insert superscripts, subscripts, mathematical symbols, and Greek symbols. The Graded Symbolic Equation editor also has a second palette that allows you to add a graded field, insert algorithmic variables, and additional symbols like bonds, and degree symbols. The graded field expands depending on the length of the answer you program into the correct tab(s).

To set up a graded equation, do the following:

1. In Graded Mode, go to the designer tab of the Symbolic Equation editor.
2. Determine if you want your entire equation to be graded, or if you want only part of your equation to be graded. If you want part of your equation to be graded, type out the static elements of your symbolic equation using the Symbolic Equation Palette.



3. Add a graded field where you want students to input their answers.

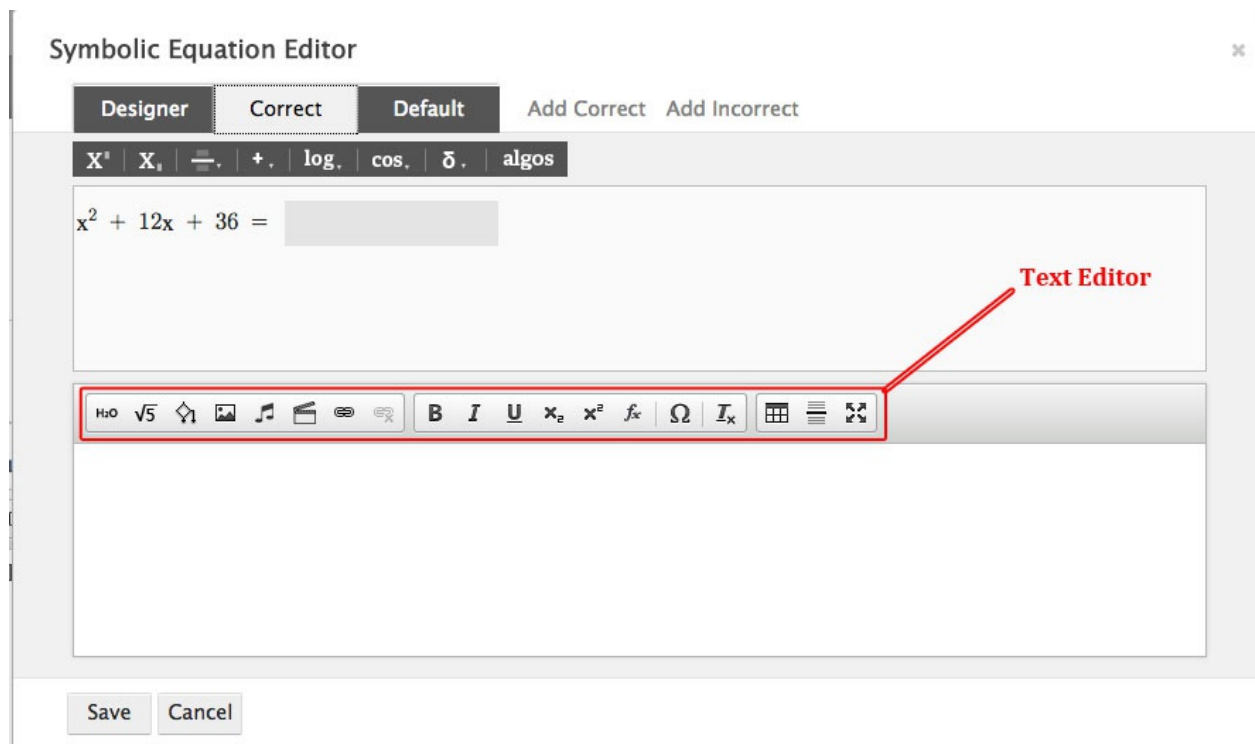


- a. When writing their answers, students will have access to the Symbolic Equation Palette shown in the

designer tab (the student palette does not include the algos or graded field buttons).

- b. In the designer tab, you can type part of the symbolic equation into the graded field. Students will see whatever you type as pre-populated in the graded field. However, please keep in mind that students can edit anything in the graded field. Check with your editor to see if it would be better to make something static.

Setting the Correct Answer



Grading in the Symbolic Equation Editor is transitive for a select number of mathematical functions. This means that the system will recognize different ways of writing correct answers that contain multiplication, division, addition, or parentheses. For example, if the correct answer is $5*x*y$, students can enter their answers as $5(x)(y)$, $x*5*y$, $(x)(y)(5)$, $x5y$, etc, and the system will recognize their answer as correct.

Note: When programming correct answers that contain numbers and letters, please program the numbers first and the letters second for the system to allow transitive answers. For example, if you program your answer to be $xy5$, the system will NOT recognize $5xy$ as correct.

Grading is NOT transitive for subtraction, meaning that if you programmed answer to be $5-x$, the system will not recognize $-x+5$ as correct. In order for this variation to be recognized as correct, you must create a new correct tab.

For an in-depth look at transitive grading, click [here](#).

Text Editor

Each Feedback tab contains a text editor, which allows you to add text and other multimedia to the feedback.

Important Note: Copying and pasting text from a Word Document into Smartwork could insert formatting that will corrupt the module. Please enter the text directly into the Text Editor, or copy and paste from a plain text document.

The Media Palette allows you to insert multimedia into your feedback.



From left to right, the Media Palette allows you to do the following:

- Insert static Chemical Equations
- Insert static Symbolic Equations
- Insert algorithmic variables
- Insert image files
- Insert music files
- Insert video files
- Insert hyperlinks
- Remove the hyperlinks

The Text Formatting Palette allows you to format text, as well as add special characters.



From left to right, the Text Formatting Palette allows you to do the following:

- Bold text
- Italicize text
- Underline text
- Insert subscripts
- Insert superscripts
- Insert math formulas
- Insert special characters
- Remove any formatting applied to the text

Furthermore, the Feedback Formatting Palette allows you to do the following:



- Insert tables
- Insert line breaks
- Edit text in full screen mode

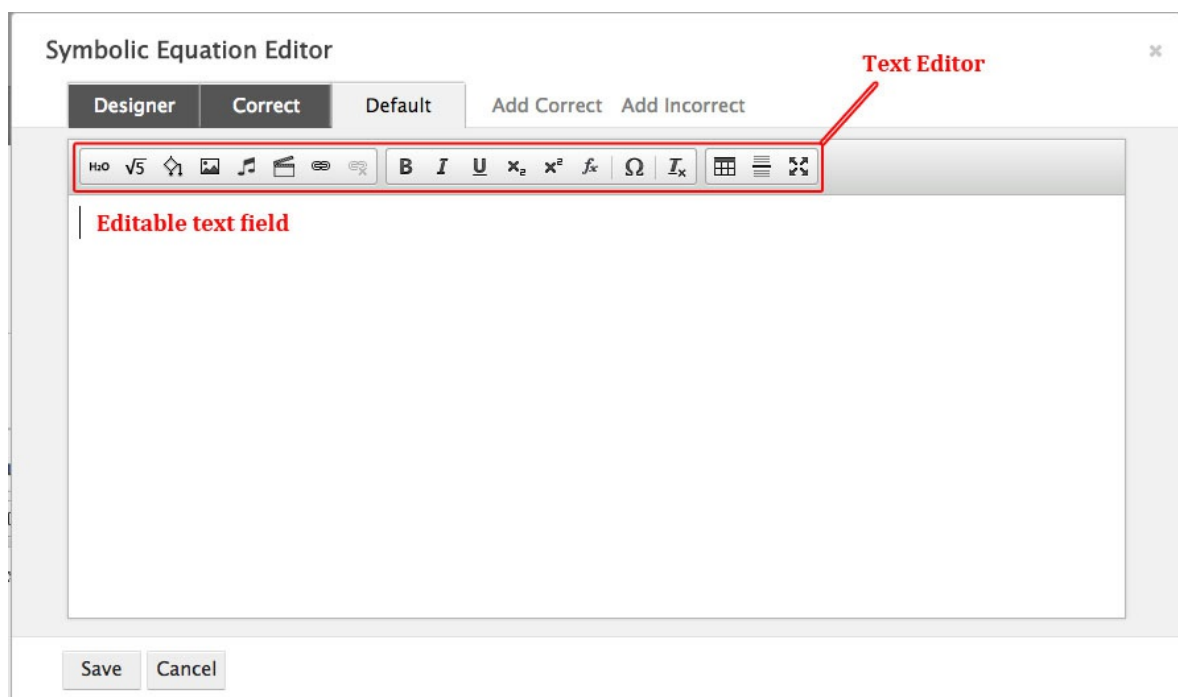
To set the correct answer, do the following:

1. Go to the correct tab of the Symbolic Equation Editor. Type out the first version of your correct answer in the graded field(s). Format your answer as desired.

- a. Grading is not transitive in the correct tab, which means that the order in which you type your equation matters. If a student switches the two products when answering the question, the system will mark her answer as correct.
 - b. You can delete correct tabs by clicking on the trash can in the upper right hand corner of the tab you want to delete.
6. Type in the second version of your correct answer and add feedback.
 7. Save the module, and test that the feedback is working correctly in Preview mode.

Creating Default Feedback

Students see default feedback when they give an unspecific incorrect answer, or if they fail to give an answer.



To create default feedback, do the following:

1. In the Chemical Equation Editor, click on the default tab.
2. In the editable text field, type out what you want the student to see when she gives an incorrect answer.
3. Save the module.
4. Go to Preview Mode in the Question editor. Test that your feedback is working correctly by typing out an incorrect answer.

Creating Feedback for Specific Incorrect Answers

You can also create feedback for specific incorrect answers, allowing you to trap for specific mistakes a student may make. Like in the Correct Tabs, grading in the Incorrect Tabs is transitive.

Symbolic Equation Editor

Designer
Correct
Default
Incorrect

Add Correct
Add Incorrect

$x^2 + 12x + 36 =$

Click here to add an incorrect tab

Type your specific incorrect answer here

H_2O
 $\sqrt{5}$
 $\frac{\square}{\square}$
 π
 \log
 \cos
 δ
 algos

\mathbf{B}
 \mathbf{I}
 \mathbf{U}
 x_2
 x^2
 f_x
 Ω
 I_x

Type the feedback you want students to see here

Save
Cancel

To create incorrect feedback for specific answers, do the following:

1. In the Chemical Equation Editor, click on the “Add Incorrect” tab. This will create a specific incorrect feedback tab. To delete specific incorrect tabs, click on the trash can in the upper-right-hand corner of the tab you want to delete.
2. In the graded field, type out the specific incorrect answer you want to trap for.
3. In the editable text field, type out the feedback you want students to see when they give that specific incorrect answer.

Symbolic Equation Editor

Designer
Correct
Default
Incorrect

Add Correct
Add Incorrect

$x^2 + 12x + 36 = (x - 6)(x - 6)$

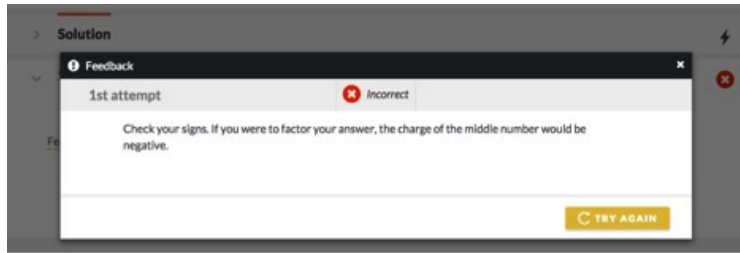
H_2O
 $\sqrt{5}$
 $\frac{\square}{\square}$
 π
 \log
 \cos
 δ
 algos

\mathbf{B}
 \mathbf{I}
 \mathbf{U}
 x_2
 x^2
 f_x
 Ω
 I_x

Check your signs. If you were to factor your answer, the charge of the middle number would be negative.

Save
Cancel

4. Save the module.
5. In Preview Mode, test that your feedback is working correctly by typing out that specific incorrect answer.



6. If there are multiple ways to write your incorrect answer, create additional incorrect feedback tabs as needed.
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