



Managing Math in Moodle

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Bob Mathews
Design Science, Inc.
bobm@dessci.com

Moodle

“Moodle is a free learning management system that enables you to create powerful, flexible, and engaging online learning experiences.”¹

This talk is not a tutorial on how to use Moodle, but rather an overview of the possibilities of including math and science notation in a Moodle course.

Filters, plug-ins, and other add-ons

Moodle is infinitely extensible, if not literally so then practically so. If a particular module doesn't exist for the capability you need, you can write your own (assuming you have the knowledge and resources necessary to do so). Moodle uses the term **filter** to refer to a very specific piece of the Moodle architecture, but we will use the term more loosely to refer to any added capability, whether that addition is in the form of a filter, a plug-in, or any other add-on.

As of December 28, 2007, there are 271 filters available for Moodle.² Although there are no doubt more math-related filters than what we have time to list or discuss here, we will deal with these six in the order listed:

- Algebra Notation filter
- TeX filter
- ASCIIMathML.js
- DragMath Equation Editor
- WIRIS
- jsMath filter

Summary of capabilities

Some of these Moodle add-ins allow you to copy equations to and or from MathType, and some do not. Some have excellent print quality; some do not. So if these things are important to you, consider using these:

If it's important to be able to create equations in MathType and paste into Moodle, consider using the built-in TeX filter, WIRIS, or jsMath.

If it's important to be able to copy equations from Moodle and paste them into MathType 6 to re-use, consider using the built-in TeX filter, DragMath, or jsMath.

If print quality is important, consider using ASCIIMathML.js or jsMath.

If all of these things are important, your only real choice is jsMath.

¹ Rice, W. H. (2006). *Moodle: E-Learning Course Development*. Birmingham, UK: Packt Publishing.

² <http://moodle.org/mod/data/view.php?id=6009>

Algebra Notation filter

This filter converts algebra code into GIF images.³ These images display fine on the screen, but they print at low resolution, as you can see below. It requires the TeX filter to be installed, but that is not an issue, since both are installed by default when you install Moodle. To use this filter, use notation similar to what you'd use in a spreadsheet, such as **1/2** or **a^n**. Useful only for simple algebraic notation, and some calculus. Not very useful for more complicated expressions. Delimiter is double “at” symbols: @@.

Examples:⁴

This:

@@a^m a^n=a^(m+n)@@

@@sqrt(ab)=sqrt(a)sqrt(b)@@

Results in this:

$$a^m a^n = a^{m+n}$$

$$\sqrt{ab} = \sqrt{a}\sqrt{b}$$

TeX filter

The TeX Filter converts TeX or LaTeX code into GIF images.⁵ Like the images produced by the Algebra Notation filter, these images will print at low resolution. If you choose to use the TeX filter, there is no need to disable the Algebra Notation filter, but there's not much reason to keep them both enabled. Delimiter is the single or double dollar sign.

Examples:

This:

\$\$a^m a^n = a^{m+n}\$\$

$\int \frac{dx}{\sqrt{a+bx}} = \frac{2\sqrt{a+bx}}{b}$

Results in this:

$$a^m a^n = a^{m+n}$$

$$\int \frac{dx}{\sqrt{a+bx}} = \frac{2\sqrt{a+bx}}{b}$$

ASCIIMathML.js⁶

Uses “ASCII notation”, such as **1/2** and **a^n**. Delimiter is the “backquote”: ` . Also recognizes TeX delimiters by default, but this feature can be turned off. Requires a MathML-capable browser configuration. Doesn't produce images, so prints at full printer resolution. Retains other advantages of using MathML – accessible to screen readers, re-sizable with the text of the document, no images to upload, etc.

Examples on next page...

³ <http://moodle.org/mod/data/view.php?d=13&rid=334>

⁴ More examples here: <http://moodle.org/mod/forum/discuss.php?d=5402>

⁵ <http://moodle.org/mod/data/view.php?d=13&rid=337>

⁶ <http://www.chapman.edu/~jipsen/mathml/asciimath.html>

Examples of ASCIIMathML.js rendering:⁷

This:

$$`a^{\frac{m}{n}}=\rootn{a^m}`$$

Results in this:

$$a^{\frac{m}{n}} = \sqrt[n]{a^m}$$

$$`\sin(1/2A)=\text{sqrt}((s-b)(s-c)/(bc))`$$

$$\sin\left(\frac{1}{2}A\right) = \sqrt{(s-b)\frac{s-c}{bc}}$$

DragMath Equation Editor

“DragMath is a drag and drop equation editor in the form of a Java applet. Once an expression is created the user can convert it into a variety of different linear syntax for mathematics, including MathML, LaTeX, Maple, Maxima or any user defined style.”⁸ The interface and overall user experience is not at all like MathType, so if that’s what you’re used to, be prepared for some frustration as you learn the DragMath interface. DragMath produces low-resolution GIFs, the same as the Algebra Notation filter and TeX filter.

Examples:

This:

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

Results in this:

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$\sum_{i=1}^{\infty} a_i^2$$

$$\sum_{i=1}^{\infty} a_i^2$$

WIRIS⁹

Provides a WYSIWYG interface for authoring & editing equations. Can interpret MathML and display an image created from the MathML markup.

Examples:

This:

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

Results in this:

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

⁷ More examples on the demo page: <http://www1.chapman.edu/~jipsen/mathml/asciimathdemo.html>

⁸ <http://sourceforge.net/projects/dragmath>. See also <http://moodle.org/mod/data/view.php?d=13&rid=953>

⁹ <http://moodle.org/mod/data/view.php?d=13&rid=927>. See also <http://www.wiris.com>

WIRIS Examples (cont):

This:

$$\int \frac{dx}{\sqrt{a+bx}} = \frac{2\sqrt{a+bx}}{b}$$

Results in this:

$$\int \frac{dx}{\sqrt{a+bx}} = \frac{2\sqrt{a+bx}}{b}$$

jsMath filter¹⁰

Uses TeX/LaTeX markup. Must turn off the built-in Algebra and TeX filters prior to use. Delimiters are `\(... \)` for inline equations and `\[... \]` for display equations. It uses native fonts (when available) so will scale and print properly just like other text, or like MathML, but does not use MathML.

Examples:

This:

`\(\sqrt{ab} = \sqrt{a} \sqrt{b} \)`

`\[\int \frac{dx}{\sqrt{a+bx}} = \frac{2\sqrt{a+bx}}{b} \]`

Results in this:

$$\sqrt{ab} = \sqrt{a}\sqrt{b}$$

$$\int \frac{dx}{\sqrt{a+bx}} = \frac{2\sqrt{a+bx}}{b}$$

Copy/paste capability to & from MathType:

Add-in	Copy from MathType 5+ to Moodle (or into the plug-in GUI, if applicable)?	Copy from Moodle to MathType 6?
Algebra Notation filter	No	Yes
TeX filter	Yes, as TeX or LaTeX	Yes
ASCIIMathML.js	No	No
DragMath Equation Editor	No	Yes
WIRIS	Yes, as MathML	No
jsMath filter	Yes, as TeX or LaTeX	Yes, from "view source" only (not via copy/paste from browser)

¹⁰ <http://moodle.org/mod/data/view.php?d=13&rid=709>

Using MathType in Moodle

It's also possible to use MathType in Moodle without using any of the previously-mentioned plug-ins. You have two choices.

Save the MathType equation as a GIF

Create the math in MathType as you normally would, then use the File>Save command to save the equation as a GIF image. Use Moodle's Insert Image icon on the HTML Editor toolbar to insert the GIF. (Must insert the `` tag into items that provide only a text box, such as a multiple choice answer on a quiz.) Print quality is low resolution.

Use the Export to MathPage Option (*Publish to MathPage* in Word 2007)

Create your document in Word as you normally would. Click the *Export to MathPage* icon on Word's MathType toolbar. (If using Word 2007, this command is in the Publish group on the Ribbon's MathType tab.) Set the option to save the equations as "MathML using XHTML+MathML". Upload the resulting file to your Moodle course. Viewing the file obviously requires a MathML-capable browser, but it prints at full printer resolution, and retains the other advantages of using MathML.