The neoschool Class

Version : 1.0.2 — Author : Razik Ikhlef

The neoschool class provides secondary school teachers with a comprehensive set of tools to create their educational documents (assessments, course materials, exercise sheets with solutions, etc.). To meet various needs, it offers eight predefined color themes, diverse class options for layout and typography, specialized environments, dedicated commands, and different preformatted header styles for each type of document. It integrates dozens of commonly used LaTeX packages (see list below), which significantly reduces the preamble and avoids compatibility issues as much as possible. It's multilingual, supporting French, English, and German.

Contents

1 Loaded Packages

The following packages are automatically loaded by the `neoschool` class:

adforn, adjustbox, algpseudocode, amssymb, babel, bookmark, calc, changespace, cuted, environ, fancyvrb, fontawesome5, forest, iftex, ifthen, kvoptions, lastpage, marginnote, microtype, mismath (which loads mathtools), multicol, needspace, pdftexcmds, pgffor, pgfplots, qrcode, scrlayer-scrpage, silence, siunitx, tabularray, tasks, tcolorbox (with the most option loading listings and minted packagess), textcase, tikz, tikzpagenodes, tikzsymbols, ulem (with normalem option), xcolor (with table, svgnames, dvipsnames, and x11names options), xhfill, xkeyval, xsim (with use-files and clear-aux options), xstring.

Compilation in pdflatex loads fonttenc (with T1 option), inputenc (with utf8 option), newpxtext, and newpxmath. Compilation in lualatex makes available fontspec, luacas, lua-ul, luacolor packagess and applies TeX Gyre PagellaX and TeX Gyre Heros fonts in addition to newpxmath.

The graphics option loads graphicx and wrapfig, the draft option loads blindtext and lipsum, and the mathastext option loads the mathastext packages.

The math option loads annotate-equations, bm, cancel, mathrsfs, nncomma, numprint, tdsfrmath (with suite and taupe options), tkz-euclide, witharrows, and xlop.

The notes option enables colored and framed notes in the left and right margins alternately and loads the todonotes packages.

The apmep option, which allows direct compilation of examination papers from the association of the same name, defines a set of mathematical commands and loads esvect, fourier-ons, numprint (with np option), pstricks (and many packages from the pstricks ecosystem), tabularx, and textcomp.

The mathics option enables computer algebra via mathics (free version of mathematica) and loads asymptote and latexalpha2 packagess.

② Configuration Options

2.1 Language

- **english, french, german**: Activates translations and conventions for each language. These options affect theorem and environment titles, typography, and mathematical conventions.
- **nofrenchlist**: Disables French-style lists (restores dots instead of dashes).
- **frenchlistaspar**: Treats lists as paragraphs in French.
- **frenchmath**: Applies French mathematical conventions (upright capitals and Greek letters).

2.2 Global Appearance

2.2.1 Predefined Themes

The **theme** = theme-name option sets the document's color theme. Available themes are: cyprus, kassio, frost, spring, arbutus, duo, navy, royal. Most of them are inspired by the *ef-themes* for *Emacs* by Protesilaos Stavrou.

2.2.2 Color Modes

- **normal**: Uses different colors for each type of environment.
- **unicolor**: Uses a single color for all environments:
  - The title color is used as the base
  - Variations are obtained through transparency
- **print**: Converts all colors to black for printing.
- **gradientheadpalette**: Uses a gradient of the title color for other headings (sections, subsections, theorem titles, etc.).

2.2.3 Custom Colors

- **globalcolor** = `color`: Sets the text color.
- **titlecolor** = `color` or **titlehexcolor** = `hex code`: Sets the title color.
- **headcolor** = `color`: Sets the section header color.
- **subcolor** = `color`: Sets the subsection color.
- **subsubcolor** = `color`: Sets the subsubsection color.
- **headfootcolor** = `color`: Sets the header and footer color.

2.2.4 Display Options

- **noframe**: Removes environment frames.
- **noback**: Removes colored backgrounds.
- **nocodeframe**: Removes code block frames.
- **scale**: Harmonizes font dimensions in `lualatex`.

2.3 Abstract Customization

The `abstracttitle` option allows customization of the `abstract` environment title:

```
\documentclass[abstracttitle=Summary]{neoschool}

% In the document
\begin{abstract}
    Abstract content...
\end{abstract}
```

2.4 Typography

- **sfbody**: Activates sans-serif font for body text.
- **sfall**: Activates sans-serif font for the entire document.
- **mathastext**: Uses text font for mathematics.
- **mainface** = `font`: Main document font.
- **mainfaceoptions** = `options`: Main font options.
- **sansface** = `font`: Sans-serif font.
- **sansfaceoptions** = `options`: Sans-serif font options.
- **monoface** = `font`: Monospace font.
- **monofaceoptions** = `options`: Monospace font options.
- **mathface** = `font`: Mathematical font.
- **mathfaceoptions** = `options`: Mathematical font options (only in `pdflatex`).
- **facefamily** = `family`: Complete font family.
- **facefamilyoptions** = `options`: Font family options.

2.5 Layout

2.5.1 Margins and Spacing

- **margin** = `length`: Sets horizontal margin width (2.5cm default); vertical margins adjust accordingly.
- **notes** = `length`: Activates *todonotes* in margins and sets their width.
- **noindent**: Removes paragraph indentation.
- **indent** = `length`: Sets indentation width (1em default).
- **compact**:
  - Reduces paragraph spacing
  - Decreases environment margins
  - Compresses line spacing

2.5.2 Output Options

- **2a5toa4**: Displays two copies of A5 page on A4 in landscape.
- **2a4toa3**: Displays two copies of A4 page on A3 in landscape.
- **4a5toa3**: Displays four copies of A5 page on A3.
- **2toa3**: Displays two different A4 pages on A3 in landscape.
- **bookleta5**: Generates A5 booklet (four pages per A4 sheet).
- **bookleta4**: Generates A4 booklet (four pages per A3 sheet).

2.5.3 Headers and Footers

- **fullheader**: Activates complete header and footer.
  - Header: document type on left, title in center, class level on right.
  - Footer: date on left, institution in center, pagination on right.
- **headrule**: Adds line under header.
- **footrule**: Adds line above footer.
- **headfootrule**: Activates both lines.

3 Document Styles

3.1 Title Styles

3.1.1 Exam Styles

- **exam**: Complete style for exams with detailed header.

```
\documentclass[exam]{neoschool}

\neoheader{
    type = Test,
    school = Poincarré High School,
    level = Senior Year,
    duration = 2h,
    calculator = true  % or false or exam
}
```

- **shortexam**: Compact style for exams with simplified header.
- **mockexam**: Style for mock exams with standardized cover page.

3.1.2 Assessment Styles

- **eval**: Standard style for assessments.

```
\documentclass[eval]{neoschool}

\neoheader{
    type = Quiz,
    school = Alan Turing Middle School,
    level = 8th Grade
}
```

- **evalicons**: Adds icons to `eval` header.
- **evalgrade**: Adds grading banner.
- **evaliconsgrade**: Complete style with icons and grading.
- **shorteval**: Compact style for assessments.

3.1.3 Bubble Styles

- **bubbles**: Style with colored bubble background.
- **shortbubbles**: Compact version of bubble style.

3.1.4 Other Title Styles

- **titleornament**: Adds ornaments below title.
- **titlerule**: Adds line under title.
- **titlemidrule**: Adds center line under title.
- **titlefullrule**: Adds full-width line under title.
- **fancybox**: Title with elegant gray box.
- **onlytitleleft**: Displays only title, left-aligned.
- **onlytitle**: Displays only title, centered.
- **onlytitleright**: Displays only title, right-aligned.
- **shorttitle**: Compact title style.
- **shortlesson**: Compact style for lessons.

3.2 Header Configuration

The document header can be configured with the `\neoheader` command:

```
\neoheader{
    type = {Document Type},
    school = {School Name},
```

```
    academy = {Academy Name},
    level = {Grade Level},
    duration = {Duration},
    calculator = {true/false/exam},
    leftcontent = {\faIcon{...}},
    rightcontent = {\faIcon{...}},
}
```

3.3 Title Formatting Options

3.3.1 Global Styles

- **headstyle** = `style`: Font style for all headers (`sffamily` default).
  - Sections, subsections, etc.
  - Theorem and exercise headers.

```
\documentclass[headstyle=rmfamily]{neoschool}
```

- **headweight** = `weight`: Weight for all headers (`bfseries` default).

```
\documentclass[
  headstyle=sffamily,
  headweight=mdseries
]{neoschool}
```

- **headshape** = `shape`: Shape for all headers (`scshape` default).

```
\documentclass[
  headstyle=sffamily,
  headshape=upshape
]{neoschool}
```

3.3.2 Main Title Style

- **titlestyle** = `style`: Style for main title (inherits from `headstyle`).
- **titleweight** = `weight`: Weight for main title (inherits from `headweight`).
- **titleshape** = `shape`: Shape for main title (`upshape` default).
- **titlealign** = `alignment`: Title alignment (`center` default).

```
\documentclass[
    titlestyle=sffamily,
    titleweight=bfseries,
    titleshape=upshape,
    titlealign=left
]{neoschool}
```

3.3.3 Section Style

- **sectionnumstyle** = `style`: Numbering style.
  - `circle`: Circled number.
  - `box`: Boxed number.
  - `dash`: Dash after number.
  - `plain`: Simple number.
- **sectiontextstyle** = `style`: Text style.
  - `sc`: Small caps.
  - `upper`: Uppercase.
  - `lower`: Lowercase.
- **sectionstyle** = `style`: Global section style.
  - `ornaments`: With decorative ornaments.
  - `underline`: Underlined.
  - `normal`: Simple style.
  - `highlighted`: With highlighting.
  - `shadedline`: With shaded line.
- **sectionalign** = `alignment`: Section alignment.
  - `left`: Left-aligned.
  - `center`: Centered.
  - `right`: Right-aligned.

```
\documentclass[
    sectionnumstyle=circle,
    sectiontextstyle=upper,
    sectionstyle=highlighted,
    sectionalign=left
]{neoschool}
```

3.3.4 Header/Footer Style

- **headfootstyle** = `style`: Header/footer style (based on `headstyle`).

```
\documentclass[headfootstyle=sffamily]{neoschool}
```

3.3.5 Complete Configuration Example

```
\documentclass[
    % Global style
    headstyle=sffamily,
    headweight=bfseries,
    headshape=scshape,

    % Main title
    titlestyle=sffamily,
    titleweight=bfseries,
    titleshape=upshape,
    titlealign=center,

    % Sections
    sectionnumstyle=circle,
    sectiontextstyle=upper,
    sectionstyle=highlighted,
    sectionalign=left,

    % Headers/footers
    headfootstyle=sffamily
]{neoschool}
```

4 Content Layout

4.1 Absolute Object Positioning

The `\positionobject` command allows precise placement of elements on the page:

```
\positionobject{x-shift}{y-shift}{scale}{content}

\begin{itemize}
\item \texttt{x-shift}: Horizontal offset from top-left corner.
\item \texttt{y-shift}: Vertical offset from top-left corner.
\item \texttt{scale}: Scale factor for content.
\item \texttt{content}: Element to position (image, text, etc.).
\end{itemize}

% Example: Image in top-right corner
\positionobject{15cm}{1cm}{0.5}{\includegraphics{logo.png}}

% Example: Special footer text
\positionobject{2cm}{25cm}{1}{Special footer note}
```

4.2 Two-Column Layout

The **\splitcontent** command divides content horizontally:

```
% Example with custom values
\splitcontent[0.6][0.05]{
    This part takes up 60%
    of total width
}{
    This part takes up 35%
    (5% space between)
}

% Example with default values (50% / 50%)
\splitcontent{
    First column
}{
    Second column
}
```

4.3 Side-by-Side Environments

The `sidebyside` environment creates two-column boxes with consistent styling:

```
\begin{sidebyside}[options]
    % Left content
    \tcblower
    % Right content
\end{sidebyside}
```

Options are those of `tcolorbox`.

```
\begin{sidebyside}[
    title=Comparison,
    colback=exampleColor!5,
    colbacklower=exampleColor!10
]
    First version
    \tcblower
    Improved version
\end{sidebyside}
```

4.4 Text and Image Combination

The **\textwithimage** command combines text and image:

```
% Star (*) reverses image position (right by default)

% Image on right (30% width)
\textwithimage{0.3}{0.95}{
    This text describes the adjacent image...
}{images/figure.png}

% Image on left (40% width)
\textwithimage*{0.4}{0.9}{
    Description to the right of the image...
```

```
}{images/schema.png}
```

4.5 QR Codes and Content

The **\withqrcode** command integrates a QR code with associated content:

```
% Star (*) places QR code on right (left by default)

% QR code on left (2cm default)
\withqrcode{https://example.com}{
    Scan for more information
}

% 3cm QR code on right
\withqrcode*[3cm]{https://exercises.com}{
    Access online exercises
}
```

4.6 Grids and Papers

4.6.1 Custom Grids

- **\grid**: Small square grid.

```
\grid[blue]{10cm}{5cm}  % Blue grid 10 x 5 cm
```

- **\customgrid**: Grid with custom spacing.

```
\customgrid[red][4mm][4mm]{12cm}{8cm}  % Red grid, 4mm mesh
```

- **\frenchgrid**: Seyes-style grid.

```
\frenchgrid{15cm}{10cm}  % French-style notebook grid
```

4.6.2 Full Pages

- **\notebook**: Notebook-style page with horizontal lines and red margin.

```
\notebook  % Activates lined notebook style
```

- **\nbminorgrid**: Page fully covered with small squares.

```
\nbminorgrid  % Activates fine grid
```

- **\nbmajorgrid**: Page fully covered with large squares.

```
\nbmajorgrid  % Activates Seyes grid
```

4.7 Simple Boxes

The neobox environment provides a quick way to create simple boxes. It comes in two variants: neobox with frame and neobox* without visible frame:

```
% Standard box
\begin{neobox}[colframe=blue,colback=blue!5]
    Text in a box...
\end{neobox}

% Frameless box with colored background
\begin{neobox*}[colback=gray!10]
    Text on gray background...
\end{neobox*}
```

5 Exercises

5.1 Exercises and Assessments

5.1.1 Exercise Configuration

The exercise environment accepts the following options:

- **points** = number: Points for the exercise.
- **level** = number: Difficulty level (displayed as stars).
- **subtitle** = text: Exercise subtitle or description.
- **icon** = icon: Custom icon (uses Font Awesome library).
- **topic** = theme: Related theme or chapter.
- **subject** = subject: Related subject.
- **ID** = identifier: Unique identifier for referencing.
- **template** = style: Specific display style for this exercise.

```
\begin{exercise}[
    points=4,
    level=2,
    subtitle=Derivatives,
    icon=\faPencil,
    topic=Analysis,
    subject=Mathematics,
    ID=der01,
    template=elegant-box
]
    Calculate the derivative of the function $f$ defined on $]0 ; +\infty[$
    by $f(x)=x^2\ln(x)$.
\end{exercise}
```

```
The \texttt{solution} environment must immediately follow its corresponding \texttt{
    exercise} environment. Exercise solutions are not displayed by default.

\begin{solution}
    We use the product rule...
\end{solution}

% To reference the exercise elsewhere:
As seen in exercise~\exercisenumber{der01}.
```

5.1.2 Global Options

- **exerciseicons**: Activates icons for all exercises.
- **answers**: Automatically displays all exercise solutions.
- **shuffle**: Randomizes answer choices in multiple choice questions.
- **sectionthmcounter**: Numbers exercises by section.
- **sharedexcounter**: Shares counter with theorems.

5.1.3 Exercise Templates

The class offers numerous predefined styles for exercises:

- **box**: Standard box with border and title.
- **elegant-box**: Box with colored sidebar.
- **shaded-box**: Box with shading and banner title.
- **slanted-box**: Box with slanted banner title.
- **sober-box**: Minimalist box with colored title.
- **classic-box**: Classic box with banner title.
- **classy-box**: Sophisticated box with decorative title.
- **rect-box**: Simple rectangular box.
- **rect-box-outlined**: Rectangular box with outline.
- **num-box**: Compact numbered box.
- **num-box-outlined**: Numbered box with outline.
- **ex-num-box**: Numbered "Ex." box.
- **ex-num-box-outlined**: Numbered "Ex." box with outline.
- **box-hrule**: Box with horizontal rule.
- **box-hrule-out**: Box with horizontal rule and outline.
- **box-hrule-in**: Box with inner horizontal rule.
- **boxed**: Simple box with title.

- **boxed-out**: Box with outline and title.
- **inline**: Inline text with title.
- **section**: Section-style title.
- **subsection**: Subsection-style title.
- **terminal**: Console style with terminal icon.
- **block**: Minimalist style.
- **hrule**: With horizontal rule.

To set a template for the entire document, use the `\xsimsetup` command in the preamble:

```
\xsimsetup{
    exercise/template = elegant-box,    % exercise template
    solution/template = sol-box         % solution template
}
```

5.1.4 Multiple Choice Questions

- **choices**: For single-answer MCQs.

```
\begin{exercise}[points=2,ID=mcq01]
    What is the derivative of $e^x$?
    \begin{choices}
        \choice $x e^x$
        \choice[\correct] $e^x$
        \choice $e^{x-1}$
        \choice $\ln(x)$
    \end{choices}
\end{exercise}
```

- **checkboxes**: For multiple-answer MCQs.

```
\begin{exercise}[points=3,ID=mcq02]
    Which of these numbers are prime?
    \begin{checkboxes}
        \checkbox[\correct*] 2
        \checkbox[\correct*] 3
        \checkbox 4
        \checkbox[\correct*] 5
    \end{checkboxes}
\end{exercise}
```

6 Math Environments

6.1 Theorem Styles

The following styles are available for all theorem-type environments: **amslikethm** (minimalist style), **boxedthm**, **classicthm**, **classythm**, **elegantthm**, **shadedthm**, **slantedthm**, **soberthm**.

Common options:

- **title** = `text`: Theorem title.
- **label** = `name`: Label for referencing.
- **colback** = `color`: Background color.
- **colframe** = `color`: Frame color.
- **coltitle** = `color`: Title color.
- **fonttitle** = `commands`: Title style.

6.2 Numbering Options

- **sectionthmcounter**: Counters relative to each section.
- **sharedthmcounter**: Counter shared between all environments.
- **theoremgroup**: Groups certain theorem environments.
- **thmgroupcounter**: Activates counter for groups.

6.3 Mathematical Environments

- **theorem**: For theorems.

```
\begin{theorem}[title=Pythagorean Theorem,label=pyth]
    In a right triangle, the square of the
    hypotenuse equals the sum of squares
    of the other two sides.
\end{theorem}

% Referencing:
According to theorem~\ref{thm:pyth}
```

- **lemma**: For lemmas.

```
\begin{lemma}[title=Preparatory Lemma,label=prep]
    Lemma content...
\end{lemma}

% Referencing:
According to lemma~\ref{lem:prep}
```

- **corollary**: For corollaries.

```
\begin{corollary}[
    title=Pythagorean Converse,
    label=pythrecip
]
    If $a^2 + b^2 = c^2$, then the triangle is
    right-angled at $A$.
\end{corollary}

% Referencing:
According to corollary~\ref{cor:pythrecip}
```

- **proposition**: For propositions (**propo** for referencing).
- **property**: For properties (**prop** for referencing).
- **definition**: For definitions (**def** for referencing).
- **method**: For methods (**meth** for referencing).
- **activity**: For activities (**act** for referencing).
- **application**: For applications (**appl** for referencing).
- **remark**: For remarks.
- **remarks**: For a series of remarks.
- **example**: For examples.
- **examples**: For a series of examples.

7 Listings

The `neoschool` class offers two options for code handling.

- **listings** (default): Uses the `listings` package.
- **minted**: Uses the `minted` package (requires Python and the `Pygments` library).

7.1 `listings` Option

7.1.1 Available Code Styles

- **lststyle** = `style`: Coloring style.
  - `colorful`: Complete coloring (default).
  - `minimal`: Minimalist style.
  - `academic`: "Academic" style with line numbers.
  - `modern`: "Modern" style with colored background.

7.1.2 Custom Code Boxes

The class defines the code environment with the following structure:

```
\begin{code}[options]{language}[title][box-style]
    source code...
\end{code}
```

Box styles: **box-minimal**, **box-fancy**, **box-classic**, **box-elegant**, **box-diagonal**, **box-bevel**, **box-corner**, **box-rounded**, **box-downhill**, **box-bottomtitle**, **box-bottomtitlef**.

```
\begin{code}[numbers=left]{python}[Function Example][box-fancy]
def hello(name):
    print(f"Hello, {name}!")
\end{code}
```

7.1.3 Preconfigured Languages and Styles

- Python
- Java
- C++
- JavaScript
- SQL
- LaTeX
- Bash
- Assembly
- Lisp
- JSON
- YAML
- TOML
- CSV
- Markdown

7.1.4 Additional Commands

- **\codeinline**: Inline code.

```
\codeinline[python]{print("Hello")}
```

- **\codeinput**: Code loaded from file.

```
\codeinput[options]{language}{file.py}[title][box-style]
```

7.2 `minted` Option

When the **minted** option is activated, code environments use `Pygments` for syntax highlighting. The `code` environment is also available with the `minted` option, using the same syntax:

```
\usemintedstyle{tango}
\begin{code}[linenos,highlightlines={2,3}]{python}[Function][box-fancy]
def greet(name):
    message = f"Hello, {name}!"
    print(message)
    return message
\end{code}
```

8 Notes and Annotations

8.1 Margin Notes

Notes can be placed in the margin with different options:

- **\tdnote**: Colored and framed notes in the margin, alternating between left and right.

```
\tdnote{Important point to remember}
\tdnote[backgroundcolor=blue!5]{Note with light blue background}
```

- **\boxnote/\tdmark**: Since the `todonote` package doesn't allow direct note placement in environments, use an anchor point (**\tdmark**) with the same label as the note content (**\boxnote**).

```
\boxnote[thm1]{This theorem is important}
\begin{theorem}
    \tdmark[thm1]  % Reference point for note (same label)
    Theorem content...
\end{theorem}
```

Available note options:

- **backgroundcolor** = `color`: Background color.
- **color** = `color`: Text color.
- **bordercolor** = `color`: Border color.
- **width** = `length`: Note width.
- **linecolor** = `color`: Reference line color.

8.2 Admonitions

Admonition environments highlight important information. Each type has its default color and icon.

- **note**: General remarks.

```
\begin{note}[Important Note][\faInfo]
    Points to remember...
\end{note}
```

- **info**: Additional information.

```
\begin{info}[Further Reading]
    Additional information...
\end{info}
```

- **warning**: Warnings.

```
\begin{warning}[Caution!][\faExclamationTriangle]
    Critical points to remember...
\end{warning}
```

- **important**: Essential points.

```
\begin{important}[Key Point]
    Fundamental concept...
\end{important}
```

- **tip**: Tips and tricks.

```
\begin{tip}[Calculation Tip][\faLightbulb]
    A faster method...
\end{tip}
```

- **reminder**: Points to remember.

```
\begin{reminder}[Memorize]
    Essential formulas...
\end{reminder}
```

- **summary**: Summaries.

```
\begin{summary}[In Brief]
    Main chapter points...
\end{summary}
```

- **toolbox**: Toolbox.

```
\begin{toolbox}[Required Tools]
  \begin{itemize}
    \item Calculator
    \item Ruler
    \item Compass
  \end{itemize}
\end{toolbox}
```

All admonitions accept three optional parameters: - An optional title - A custom icon - Customization options (colors, borders)

9 Grading and Correction

9.1 Grading Tools

- **\gradingstrip**: Grading banner (grade and comments).

```
\gradingstrip

% Banner with specified total
\gradingstrip[20]
```

The **totalpoints** option sets the default total points.

```
\documentclass[totalpoints=20]{neoschool}
```

- **\mrk**, **\mrks**: Points in margin.

```
\mrk[Well done!]{1}     % Right margin with comment
\mrk*{1}                # Left margin

% Multiple points
\mrks{3}                % 3 points right margin
\mrks*[Scale]{3}        % 3 points left margin with text
```

9.2 Answer Areas

- **\answerfield**: Answer area with colored background.

```
\answerfield{3}

% Area 80% width, 5 lines
\answerfield[0.8\linewidth]{5}
```

- **\answerframe**: Framed answer area.

```
\answerframe{3}

% Frame 80% width, 5 lines
\answerframe[0.8\linewidth]{5}
```

- **\vardots**: Variable-length dotted line.

```
\vardots

% 5cm dotted line
\vardots[5cm]
```

9.3 Markers and Symbols

- **\cmark**: Check mark symbol (✓)
- **\xmark**: Error symbol (✗)
- **\unchecked**: Empty checkbox

☐

- **\done**: Checked box with

☑

- **\wontfix**: Checked box with

☒

```
\begin{itemize}
    \unchecked Goal 1 to complete
    \done      Goal 2 completed
    \wontfix   Goal 3 abandoned
\end{itemize}
```

9.4 Skills and Assessment

- **\competencies**: Skills assessment table.

```
\competencies{
    Calculate derivatives\\
    Study variations\\
    Solve equations
}
```

The table automatically displays: - 4 mastery levels with emojis - Checkboxes for assessment

10 Math Commands and Special Tools

10.1 Math Commands

10.1.1 Highlighting and Coloring

- **\mhl**: Highlighting math expressions.

```
$\mhl{x^2}$

% Custom highlighting
$\mhl[blue!20]{f'(x)}$

% In multi-line equations
\begin{align*}
    f(x) &= x^2 + \mhl{2x} + 1 \\
```

```
    f'(x) &= 2x + \mhl{2}
\end{align*}
```

- **\mc**: Coloring math expressions.

```
$\mc{f(x)}$

% Custom color
$\mc[red]{g(x)}$

% In equation
\[ \mc{f'(x)} = \lim_{h \to 0} \mc[blue]{\frac{f(x+h)-f(x)}{h}} \]
```

10.1.2 APMEP Support

When the **apmep** option is activated, the following commands become available:

- Vector commands:

```
\vect{u}          % Vector u with arrow
\vectt{AB}        % Vector AB with spacing
```

- Reference frames and coordinates:

```
\Oij              % Frame (O; i,j)
\Oijk             % Frame (O; i,j,k)
\Ouv              % Frame (O; u,v)
```

- Special commands:

```
\euro             % Euro symbol
\cg               % Left bracket
\cd               % Right bracket
\pg               % Greater than or equal
\pp               % Less than or equal
\barre{x}         % Overlined x
\ds               % \displaystyle
```

10.2 Special Tools

10.2.1 Trees and Graphs

- Trees with `forest` package:

```
\begin{neotree}
A
    [B
        [D]
        [E]
    ]
```

```
    [C
        [F]
        [G]
    ]
\end{neotree}

% With edge weights
\begin{neotree}
A
    [B, w=\frac{1}{3}
        [D]
        [E]
    ]
    [C, w=\frac{2}{3}]
\end{neotree}
```

- Graphs (only with `lualatex` compilation):

```
\neograph{
    A -- {B, C, D, F},
    B -- {C, D, F},
    C -> ["3"] D,
    D -- [bend left=10] {E},
    E -- [bend left=10] {D},
    E -- [bend left=10] {F},
    F -- [bend left=10] {E},
    A -- [loop] A
}
```

10.2.2 Math Grid

The `mathgrid` environment allows arranging equations in a grid:

```
\begin{mathgrid}{3}
    \neoline
    \neocol{
        T &= 7xx+9x\\
          &= (7+9)x \\
          &= 16x
    }
    \neocol{
        U &= 8x^{2}-5x^{2}+x^{2}\\
          &= (8-5+1)x^{2} \\
          &= 4x^{2}
    }
    \neocol{
        V &= 5a^{2}-6a\\
          &= a(5a-6)
    }
    \neoline
    \neocol[2]{
        W &= 5a^{2}-6a+3+7a^{2}+a-6\\
          &= (5+7)a^{2}+(-6+1)a+(3-6)\\
          &= 12a^{2}-5a-3
```

```
    }
    \neocol{
        A &= 2x + 3x\\
          &= 5x
    }
\end{mathgrid}
```