



# R Markdown Reference Guide

Learn more about R Markdown at [rmarkdown.rstudio.com](http://rmarkdown.rstudio.com)

Learn more about Interactive Docs at [shiny.rstudio.com/articles](http://shiny.rstudio.com/articles)

Contents:

1. **Markdown Syntax**
2. Knitr chunk options
3. Pandoc options

## Syntax

Plain text

End a line with two spaces to start a new paragraph.

*\*italics\** and `_italics_`

**\*\*bold\*\*** and `__bold__`

superscript<sup>^2</sup>

~~strikethrough~~

[link](www.rstudio.com)

# Header 1

## Header 2

### Header 3

#### Header 4

##### Header 5

##### Header 6

endash: --

emdash: ---

ellipsis: ...

inline equation:  $A = \pi * r^2$

image: 

horizontal rule (or slide break):

\*\*\*

> block quote

\* unordered list

- \* item 2
  - + sub-item 1
  - + sub-item 2

1. ordered list

2. item 2
  - + sub-item 1
  - + sub-item 2

Table Header	Second Header
Table Cell	Cell 2
Cell 3	Cell 4

## Becomes

Plain text

End a line with two spaces to start a new paragraph.

*italics* and *italics*

**bold** and **bold**

superscript<sup>2</sup>

~~strikethrough~~

[link](#)

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## Header 2

### Header 3

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## Syntax

## Becomes

Make a code chunk with three back ticks followed by an `r` in braces. End the chunk with three back ticks:

```
```{r}
paste("Hello", "World!")
```
```

Make a code chunk with three back ticks followed by an `r` in braces. End the chunk with three back ticks:

```
paste("Hello", "World!")
```

```
## [1] "Hello World!"
```

Place code inline with a single back ticks. The first back tick must be followed by an `R`, like this ``r paste("Hello", "World!")``.

Place code inline with a single back ticks. The first back tick must be followed by an `R`, like this Hello World!.

Add chunk options within braces. For example, ``echo=FALSE`` will prevent source code from being displayed:

```
```{r eval=TRUE, echo=FALSE}
paste("Hello", "World!")
```
```

Add chunk options within braces. For example, `echo=FALSE` will prevent source code from being displayed:

```
## [1] "Hello World!"
```

Learn more about chunk options at <http://yihui.name/knitr/options>

## Chunk options

| option                 | default value | description   |
|------------------------|---------------|---|
| <b>Code evaluation</b> |               |   |
| <b>child</b>           | NULL          | A character vector of filenames. Knitr will knit the files and place them into the main document.   |
| <b>code</b>            | NULL          | Set to R code. Knitr will replace the code in the chunk with the code in the code option.   |
| <b>engine</b>          | 'R'           | Knitr will evaluate the chunk in the named language, e.g. <code>engine = 'python'</code> . Run <code>names(knitr::knit_engines\$get())</code> to see supported languages.   |
| <b>eval</b>            | TRUE          | If <code>FALSE</code> , knitr will not run the code in the code chunk.  |
| <b>include</b>         | TRUE          | If <code>FALSE</code> , knitr will run the chunk but not include the chunk in the final document.   |
| <b>purl</b>            | TRUE          | If <code>FALSE</code> , knitr will not include the chunk when running <code>purl()</code> to extract the source code.   |
| <b>Results</b>         |               |   |
| <b>collapse</b>        | FALSE         | If <code>TRUE</code> , knitr will collapse all the source and output blocks created by the chunk into a single block.   |
| <b>echo</b>            | TRUE          | If <code>FALSE</code> , knitr will not display the code in the code chunk above it's results in the final document.   |
| <b>results</b>         | 'markup'      | If <code>'hide'</code> , knitr will not display the code's results in the final document. If <code>'hold'</code> , knitr will delay displaying all output pieces until the end of the chunk. If <code>'asis'</code> , knitr will pass through results without reformatting them (useful if results return raw HTML, etc.) |
| <b>error</b>           | TRUE          | If <code>FALSE</code> , knitr will not display any error messages generated by the code.  |
| <b>message</b>         | TRUE          | If <code>FALSE</code> , knitr will not display any messages generated by the code.  |
| <b>warning</b>         | TRUE          | If <code>FALSE</code> , knitr will not display any warning messages generated by the code.  |
| <b>Code Decoration</b> |               |   |
| <b>background</b>      | '#F7F7F7'     | A background color for chunks in LaTeX output.  |
| <b>comment</b>         | '##'          | A character string. Knitr will append the string to the start of each line of results in the final document.  |
| <b>highlight</b>       | TRUE          | If <code>TRUE</code> , knitr will highlight the source code in the final output.  |
| <b>prompt</b>          | FALSE         | If <code>TRUE</code> , knitr will add <code>&gt;</code> to the start of each line of code displayed in the final document.  |
| <b>size</b>            | 'normalsize'  | Fontsize for LaTeX output.  |
| <b>strip.white</b>     | TRUE          | If <code>TRUE</code> , knitr will remove white spaces that appear at the beginning or end of a code chunk.  |
| <b>tidy</b>            | FALSE         | If <code>TRUE</code> , knitr will tidy code chunks for display with the <code>tidy_source()</code> function in the <code>formatR</code> package.  |



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## Chunk options (Continued)

| option                             | default value   | description  |
|------------------------------------|-----------------|--|
| <b>Chunks</b>                      |                 |  |
| <b>opts.label</b>                  | NULL            | The label of options set in <code>knitr::opts_template()</code> to use with the chunk.   |
| <b>R.options</b>                   | NULL            | Local R options to use with the chunk. Options are set with <code>options()</code> at start of chunk. Defaults are restored at end.  |
| <b>ref.label</b>                   | NULL            | A character vector of labels of the chunks from which the code of the current chunk is inherited.  |
| <b>Cache</b>                       |                 |  |
| <b>autodep</b>                     | FALSE           | If <b>TRUE</b> , knitr will attempt to figure out dependencies between chunks automatically by analyzing object names.   |
| <b>cache</b>                       | FALSE           | If <b>TRUE</b> , knitr will cache the results to reuse in future knits. Knitr will reuse the results until the code chunk is altered.  |
| <b>cache.comments</b>              | NULL            | If <b>FALSE</b> , knitr will not rerun the chunk if only a code comment has changed.   |
| <b>cache.lazy</b>                  | TRUE            | If <b>TRUE</b> , knitr will use <code>lazyload()</code> to load objects in chunk. If <b>FALSE</b> , knitr will use <code>load()</code> to load objects in chunk.   |
| <b>cache.path</b>                  | 'cache/'        | A file path to the directory to store cached results in. Path should begin in the directory that the .Rmd file is saved in.  |
| <b>cache.vars</b>                  | NULL            | A character vector of object names to cache if you do not wish to cache each object in the chunk.  |
| <b>dependson</b>                   | NULL            | A character vector of chunk labels to specify which other chunks a chunk depends on. Knitr will update a cached chunk if its dependencies change.  |
| <b>Animation</b>                   |                 |  |
| <b>anipots</b>                     | 'controls,loop' | Extra options for animations (see the <code>animate</code> package).   |
| <b>interval</b>                    | 1               | The number of seconds to pause between animation frames.   |
| <b>Plots</b>                       |                 |  |
| <b>dev</b>                         | 'png'           | The R function name that will be used as a graphical device to record plots, e.g. <code>dev='CairoPDF'</code> .  |
| <b>dev.args</b>                    | NULL            | Arguments to be passed to the device, e.g. <code>dev.args=list(bg='yellow', pointsize=10)</code> .   |
| <b>dpi</b>                         | 72              | A number for knitr to use as the dots per inch (dpi) in graphics (when applicable).  |
| <b>external</b>                    | TRUE            | If <b>TRUE</b> , knitr will externalize tikz graphics to save LaTeX compilation time (only for the <code>tikzDevice::tikz()</code> device).  |
| <b>fig.align</b>                   | 'default'       | How to align graphics in the final document. One of 'left', 'right', or 'center'.  |
| <b>fig.cap</b>                     | NULL            | A character string to be used as a figure caption in LaTeX.  |
| <b>fig.env</b>                     | 'figure'        | The Latex environment for figures.   |
| <b>fig.ext</b>                     | NULL            | The file extension for figure output, e.g. <code>fig.ext='png'</code> .  |
| <b>fig.height, fig.width</b>       | 7               | The width and height to use in R for plots created by the chunk (in inches).   |
| <b>fig.keep</b>                    | 'high'          | If <b>'high'</b> , knitr will merge low-level changes into high level plots. If <b>'all'</b> , knitr will keep all plots (low-level changes may produce new plots). If <b>'first'</b> , knitr will keep the first plot only. If <b>'last'</b> , knitr will keep the last plot only. If <b>'none'</b> , knitr will discard all plots. |
| <b>fig.lp</b>                      | 'fig:'          | A prefix to be used for figure labels in latex.  |
| <b>fig.path</b>                    | 'figure/'       | A file path to the directory where knitr should store the graphics files created by the chunk.   |
| <b>fig.pos</b>                     | "               | A character string to be used as the figure position arrangement in LaTeX.   |
| <b>fig.process</b>                 | NULL            | A function to post-process a figure file. Should take a filename and return a filename of a new figure source.   |
| <b>fig.retina</b>                  | 1               | Dpi multiplier for displaying HTML output on retina screens.   |
| <b>fig.scap</b>                    | NULL            | A character string to be used as a short figure caption.   |
| <b>fig.subcap</b>                  | NULL            | A character string to be used as captions in sub-figures in LaTeX.   |
| <b>fig.show</b>                    | 'asis'          | If <b>'hide'</b> , knitr will generate the plots created in the chunk, but not include them in the final document. If <b>'hold'</b> , knitr will delay displaying the plots created by the chunk until the end of the chunk. If <b>'animate'</b> , knitr will combine all of the plots created by the chunk into an animation.       |
| <b>fig.showtext</b>                | NULL            | If <b>TRUE</b> , knitr will call <code>showtext::showtext.begin()</code> before drawing plots.   |
| <b>out.extra</b>                   | NULL            | A character string of extra options for figures to be passed to LaTeX or HTML.   |
| <b>out.height, out.width</b>       | NULL            | The width and height to scale plots to in the final output. Can be in units recognized by output, e.g. <code>8\\linewidth, 50px</code>   |
| <b>resize.height, resize.width</b> | NULL            | The width and height to resize tike graphics in LaTeX, passed to <code>\resizebox{}}{}</code> .  |
| <b>sanitize</b>                    | FALSE           | If <b>TRUE</b> , knitr will sanitize tike graphics for LaTeX.  |



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| Templates             | Basic YAML                 | Template options      | Latex options               | Interactive Docs      |
|-----------------------|----------------------------|-----------------------|-----------------------------|-----------------------|
| html_document         | ---                        | ---                   | ---                         | ---                   |
| pdf_document          | title: "A Web Doc"         | title: "Chapters"     | title: "My PDF"             | title: "Slides"       |
| word_document         | author: "John Doe"         | output:               | output: pdf_document        | output:               |
| md_document           | date: "May 1, 2015"        | <b>html_document:</b> | <b>fontsize: 11pt</b>       | slidy_presentation:   |
| ioslides_presentation | <b>output: md_document</b> | <b>toc: true</b>      | <b>geometry: margin=1in</b> | incremental: true     |
| slidy_presentation    | ---                        | <b>toc_depth: 2</b>   | ---                         | <b>runtime: shiny</b> |
| beamer_presentation   | ---                        | ---                   | ---                         | ---                   |

## Syntax for slide formats (ioslides, slidy, beamer)

# Dividing slides 1

Pandoc will start a new slide at each first level header

## Header 2

... as well as each second level header

\*\*\*

You can start a new slide with a horizontal rule`\*\*\*` if you do not want a header.

## Bullets

Render bullets with

- a dash
- another dash

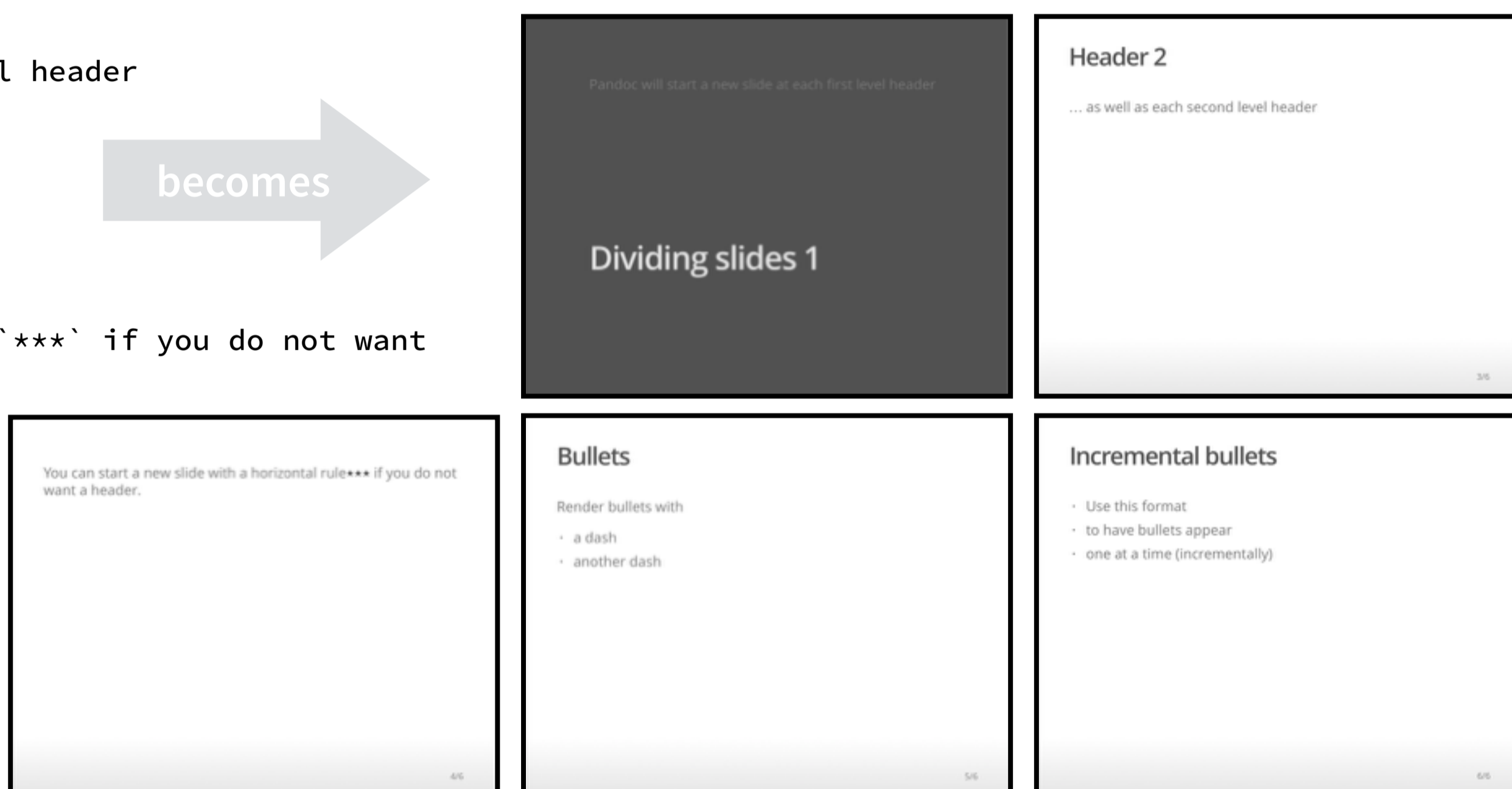
## Incremental bullets

>- Use this format

>- to have bullets appear

>- one at a time (incrementally)

becomes



## Slide display modes

Press a key below during presentation to enter display mode. Press **esc** to exit display mode.

### ioslides

- f** - enable fullscreen mode
- w** - toggle widescreen mode
- o** - enable overview mode
- h** - enable code highlight mode
- p** - show presenter notes

### slidy

- C** - show table of contents
- F** - toggle display of the footer
- A** - toggle display of current vs all slides
- S** - make fonts smaller
- B** - make fonts bigger

## Top level options to customize LaTeX (pdf) output

| option                                 | description   |
|--|---|
| lang                                   | Document language code  |
| fontsize                               | Font size (e.g. 10pt, 11pt, 12 pt)  |
| documentclass                          | Latex document class (e.g. article)   |
| classoption                            | Option for document class (e.g. oneside); may be repeated                                 |
| geometry                               | Options for geometry class (e.g. margin=1in); may be repeated                             |
| mainfont, sansfont, monofont, mathfont | Document fonts (works only with xelatex and lualatex, see the latex_engine option)        |
| linkcolor, urlcolor, citecolor         | Color for internal, external, and citation links (red, green, magenta, cyan, blue, black) |



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| option         | html | pdf | word | md | ioslides | slidy | beamer | description   |
|----------------|------|-----|------|----|----------|-------|--------|---|
| colortheme     |      |     |      |    |          |       | X      | Beamer color theme to use (e.g., <code>colortheme: "dolphin"</code> ).  |
| css            | X    |     |      |    | X        | X     |        | Filepath to CSS style to use to style document (e.g., <code>css: styles.css</code> ).   |
| duration       |      |     |      |    |          | X     |        | Add a countdown timer (in minutes) to footer of slides (e.g., <code>duration: 45</code> ).  |
| fig_caption    | X    | X   | X    |    | X        | X     | X      | Should figures be rendered with captions?   |
| fig_crop       |      | X   |      |    |          |       | X      | Should <code>pdfcrop</code> utility be automatically applied to figures (when available)?   |
| fig_height     | X    | X   | X    | X  | X        | X     | X      | Default figure height (in inches) for document.   |
| fig_retina     | X    |     |      | X  | X        | X     |        | Scaling to perform for retina displays (e.g., <code>fig_retina: 2</code> ).   |
| fig_width      | X    | X   | X    | X  | X        | X     | X      | Default figure width (in inches) for document.  |
| font_adjustmen |      |     |      |    |          | X     |        | Increase or decrease font size for entire presentation (e.g., <code>font_adjustment: -1</code> ).   |
| fonttheme      |      |     |      |    |          |       | X      | Beamer font theme to use (e.g., <code>fonttheme: "structurebold"</code> ).  |
| footer         |      |     |      |    |          | X     |        | Text to add to footer of each slide (e.g., <code>footer: "Copyright (c) 2014 RStudio"</code> ).   |
| highlight      | X    | X   |      |    |          | X     | X      | Syntax highlighting style (e.g. "tango", "pygments", "kate", "zenburn", and   |
| includes       | X    | X   |      | X  | X        | X     | X      | See below   |
| -in_header     | X    | X   |      |    | X        | X     | X      | File of content to place in document header (e.g., <code>in_header: header.html</code> ).   |
| -before_body   | X    | X   |      |    | X        | X     | X      | File of content to place before document body (e.g., <code>before_body:</code>  |
| -after_body    | X    | X   |      |    | X        | X     | X      | File of content to place after document body (e.g., <code>after_body: doc_suffix.html</code> ).   |
| incremental    |      |     |      |    | X        | X     | X      | Should bullets appear one at a time (on presenter mouse clicks)?  |
| keep_md        | X    |     |      |    | X        | X     |        | Save a copy of .md file that contains knitr output (in addition to the .Rmd and HTML files)?  |
| keep_tex       |      | X   |      |    |          |       | X      | Save a copy of .tex file that contains knitr output (in addition to the .Rmd and PDF files)?  |
| latex_engine   |      | X   |      |    |          |       |        | Engine to render latex. Should be one of "pdflatex", "xelatex", and "lua <sup>l</sup> atex".  |
| lib_dir        | X    |     |      |    | X        | X     |        | Directory of dependency files to use (Bootstrap, MathJax, etc.) (e.g., <code>lib_dir: libs</code> ).  |
| logo           |      |     |      |    | X        |       |        | File path to a logo (at least 128 x 128) to add to presentation (e.g., <code>logo: logo.png</code> ).   |
| mathjax        | X    |     |      |    | X        | X     |        | Set to <code>local</code> or a URL to use a local/URL version of MathJax to render equations  |
| number_section | X    | X   |      |    |          |       |        | Add section numbering to headers (e.g., <code>number_sections: true</code> ).   |
| pandoc_args    | X    | X   | X    | X  | X        | X     | X      | Arguments to pass to Pandoc (e.g., <code>pandoc_args: ["--title-prefix", "Foo"]</code> ).   |
| preserve_yaml  |      |     |      | X  |          |       |        | Preserve YAML front matter in final document?   |
| reference_docx |      |     | X    |    |          |       |        | A .docx file whose styles should be copied to use (e.g., <code>reference_docx:</code>   |
| self_contained | X    |     |      |    | X        | X     |        | Embed dependencies into the doc? Set to <code>false</code> to keep dependencies in external files.  |
| slide_level    |      |     |      |    |          |       | X      | The lowest heading level that defines individual slides (e.g., <code>slide_level: 2</code> ).   |
| smaller        |      |     |      |    | X        |       |        | Use the smaller font size in the presentation?  |
| smart          | X    |     |      |    | X        | X     |        | Convert straight quotes to curly, dashes to em-dashes, ... to ellipses, and so on?  |
| template       | X    | X   |      |    |          | X     | X      | Pandoc template to use when rendering file (e.g., <code>template:</code>  |
| theme          | X    |     |      |    |          |       | X      | Bootswatch or Beamer theme to use for page. Valid bootswatch themes include "cerulean", "journal", "flatly", "readable", "spacelab", "united", and "cosmo". |
| toc            | X    | X   |      | X  |          |       | X      | Add a table of contents at start of document? (e.g., <code>toc: true</code> ).  |
| toc_depth      | X    | X   |      | X  |          |       |        | The lowest level of headings to add to table of contents (e.g., <code>toc_depth: 2</code> ).  |
| transition     |      |     |      |    | X        |       |        | Speed of slide transitions should be "slower", "faster" or a number in seconds.   |
| variant        |      |     |      | X  |          |       |        | The flavor of markdown to use; one of "markdown", "markdown_strict", "markdown_github", "markdown_mmd", and "markdown_phpextra"                             |
| widescreen     |      |     |      |    | X        |       |        | Display presentation in widescreen format?  |