

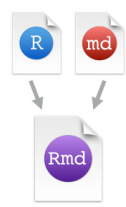
# R Markdown Cheat Sheet

learn more at [rmarkdown.rstudio.com](http://rmarkdown.rstudio.com)



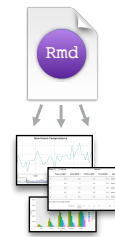
## .Rmd files

An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to reproduce your work along with the narration that a reader needs to understand your work.



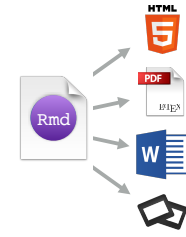
## Reproducible Research

At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.



## Dynamic Documents

You can choose to export the finished report as a html, pdf, MS Word, ODT, RTF, or markdown document; or as a html or pdf based slide show.



## Workflow

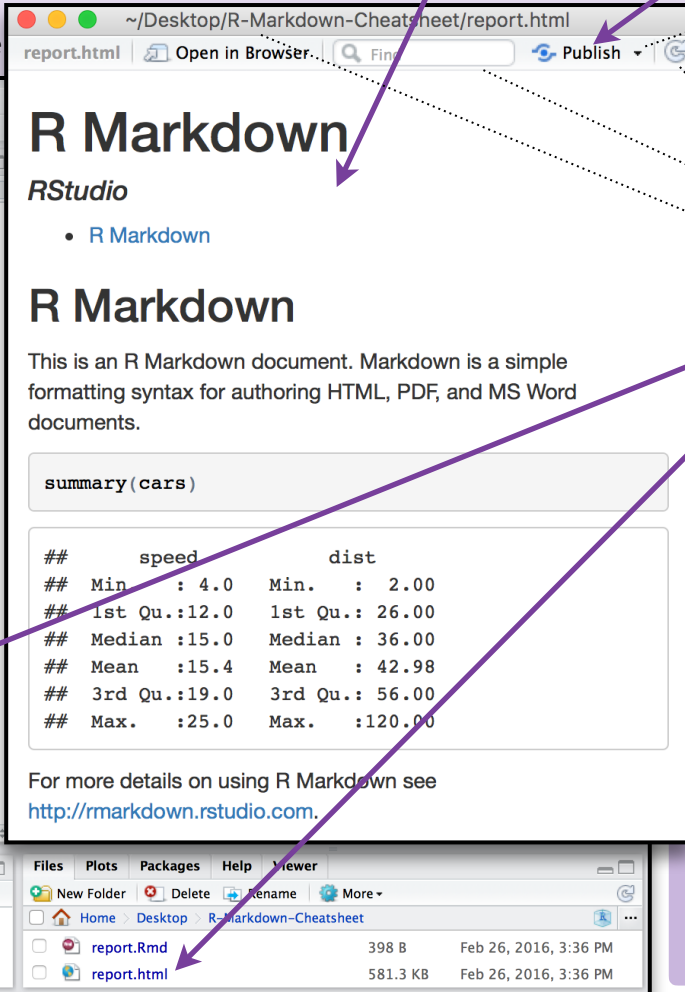
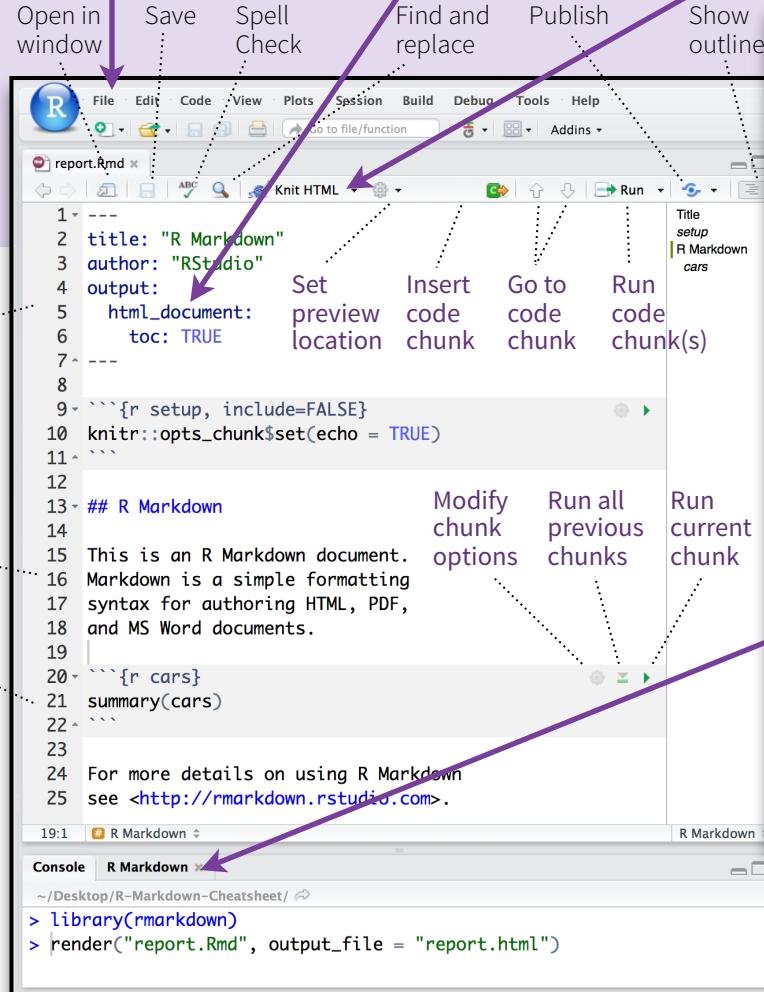
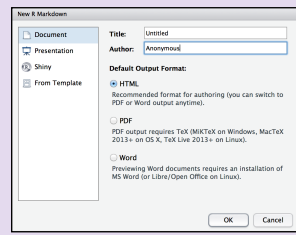
**1 Open a new .Rmd file** at File ► New File ► R Markdown. Use the wizard that opens to pre-populate the file with a template

**2 Write document** by editing template

**3 Knit document to create report** Use knit button or `render()` to knit

**4 Preview Output** in IDE window

**5 Publish** (optional) to web or server



Synch publish button to accounts at

- [rpubs.com](http://rpubs.com),
- [shinyapps.io](http://shinyapps.io)
- RStudio Connect

Reload document

Find in document

File path to output document

**6 Examine build log** in R Markdown console

**7 Use output file** that is saved alongside .Rmd

## .Rmd structure

### YAML Header

Optional section of render (e.g. pandoc) options written as key:value pairs (YAML).

- At start of file
- Between lines of ---

### Text

Narration formatted with markdown, mixed with:

### Code chunks

Chunks of embedded code. Each chunk:

- Begins with `{r}`
- ends with `}`

R Markdown will run the code and append the results to the doc.

It will use the location of the .Rmd file as the **working directory**

Set preview location

Insert code chunk

Go to code chunk

Run code chunk(s)

Modify chunk options

Run all previous chunks

Run current chunk

## render()

Use `rmarkdown::render()` to render/knit at cmd line. Important args:

**input** - file to render

**output\_format**

**output\_options** - List of render options (as in YAML)

**output\_file**

**output\_dir**

**params** - list of params to use

**envir** - environment to evaluate code chunks in

**encoding** - of input file

## Interactive Documents

Turn your report into an interactive Shiny document in 4 steps



- 1 Add runtime: shiny** to the YAML header.
- 2 Call Shiny input** functions to embed input objects.
- 3 Call Shiny render** functions to embed reactive output.
- 4 Render with `rmarkdown::run`** or click **Run Document** in RStudio IDE

```
---
output: html_document
runtime: shiny
---

{r, echo = FALSE}
numericInput("n",
  "How many cars?", 5)

renderTable({
  head(cars, input$n)
})
```

How many cars?		
	5	
	speed	dist
1	4.00	2.00
2	4.00	10.00
3	7.00	4.00
4	7.00	22.00
5	8.00	16.00

Embed a complete app into your document with `shiny::shinyAppDir()`

\* Your report will be rendered as a Shiny app, which means you must choose an html output format, like **html\_document**, and serve it with an active R Session.

## Embed code with knitr syntax

### Inline code

Insert with `{r<code>}`. Results appear as text without code.

Built with  
`{r getRversion() }`

Built with 3.2.3

### Code chunks

One or more lines surrounded with `{r}` and `}`. Place chunk options within curly braces, after `r`. Insert with

```
{r echo=TRUE}
getRversion()
```

```
getRversion()
## [1] '3.2.3'
```

### Global options

Set with `knitr::opts_chunk$set()`, e.g.

```
{r include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```

## Important chunk options

**cache** - cache results for future knits (default = FALSE)

**cache.path** - directory to save cached results in (default = "cache/")

**child** - file(s) to knit and then include (default = NULL)

**collapse** - collapse all output into single block (default = FALSE)

**comment** - prefix for each line of results (default = "##")

**dependson** - chunk dependencies for caching (default = NULL)

**echo** - Display code in output document (default = TRUE)

**engine** - code language used in chunk (default = 'R')

**error** - Display error messages in doc (TRUE) or stop render when errors occur (FALSE) (default = FALSE)

**eval** - Run code in chunk (default = TRUE)

**fig.align** - 'left', 'right', or 'center' (default = 'default')

**fig.cap** - figure caption as character string (default = NULL)

**fig.height, fig.width** - Dimensions of plots in inches

**highlight** - highlight source code (default = TRUE)

**include** - Include chunk in doc after running (default = TRUE)

**message** - display code messages in document (default = TRUE)

**results** (default = 'markup')

- 'asis' - passthrough results
- 'hide' - do not display results
- 'hold' - put all results below all code

**tidy** - tidy code for display (default = FALSE)

**warning** - display code warnings in document (default = TRUE)

Options not listed above: `R.options`, `aniopts`, `autodep`, `background`, `cache.comments`, `cache.lazy`, `cache.rebuild`, `cache.vars`, `dev`, `dev.args`, `dpi`, `engine.opts`, `engine.path`, `fig.asp`, `fig.env`, `fig.ext`, `fig.keep`, `fig.lp`, `fig.path`, `fig.pos`, `fig.process`, `fig.retina`, `fig.scap`, `fig.show`, `fig.showtext`, `fig.subcap`, `interval`, `out.extra`, `out.height`, `out.width`, `prompt`, `purl`, `ref.label`, `render`, `size`, `split`, `tidy.opts`

## Parameters

Parameterize your documents to reuse with different inputs (e.g., data sets, values, etc.)

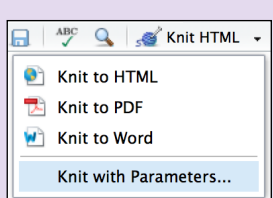
- 1 Add parameters**  
Create and set parameters in the header as sub-values of **params**

```
---
params:
  n: 100
  d: !r Sys.Date()
---
```

- 2 Call parameters**  
Call parameter values in code as **params\$<name>**

```
Today's date
is {r params$d}
```

- 3 Set parameters**  
Set values with **Knit with parameters** or the **params** argument of **render()**:



```
render("doc.Rmd",
  params = list(n = 1, d = as.Date("2015-01-01")))
```

## Pandoc's Markdown

Write with syntax on the left to create effect on right (after render)

### Plain text

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

*\*italics\** and **\*\*bold\*\***

``verbatim code``

sub/superscript<sup>^2</sup><sub>^2~</sub>

~~~~strikethrough~~~~

escaped: \\* \\_ \\\

endash: --, emdash: ---

equation:  $\$A = \pi * r^{\{2\}}$

equation block:

$$E = mc^2$$

$$E = mc^2$$

> block quote

# Header1 {#anchor}

## Header 2 {#css\_id}

### Header 3 {.#css\_class}

#### Header 4

##### Header 5

##### Header 6

<!--Text comment-->

\textbf{Tex ignored in HTML}

<em>HTML ignored in pdfs</em>

<http://www.rstudio.com>

[link](www.rstudio.com)

Jump to [Header 1](#anchor)

image:

![[Caption]](smallorb.png)

\* unordered list

+ sub-item 1

+ sub-item 2

- sub-sub-item 1

\* item 2

Continued (indent 4 spaces)

1. ordered list

2. item 2

i) sub-item 1

A. sub-sub-item 1

(@) A list whose numbering

continues after

(@) an interruption

Term 1

: Definition 1

Right Left Default Center

12 12 12 12

123 123 123 123

1 1 1 1

- slide bullet 1

- slide bullet 2

(>- to have bullets appear on click)

horizontal rule/slide break:

\*\*\*

A footnote [^1]

[^1]: Here is the footnote.

### Plain text

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

*italics* and **bold**

``verbatim code``

sub/superscript<sup>2</sup><sub>2</sub>

~~strikethrough~~

escaped: \* \_ \

endash: --, emdash: ---

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

equation block:

$$E = mc^2$$

$$E = mc^2$$

> block quote

# Header1

## Header 2

### Header 3

#### Header 4

##### Header 5

##### Header 6

<!--Text comment-->

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## Set render options with YAML

| sub-option            | description                                                                  | html | pdf | word | odt | rtf | md | github | ioslides | slidy | beamer |
|-----------------------|------------------------------------------------------------------------------|------|-----|------|-----|-----|----|--------|----------|-------|--------|
| citation_package      | The LaTeX package to process citations, natbib, biblatex or none             |      | X   |      |     |     | X  |        |          |       | X      |
| code_folding          | Let readers to toggle the display of R code, "none", "hide", or "show"       | X    |     |      |     |     |    |        |          |       |        |
| colortheme            | Beamer color theme to use                                                    |      |     |      |     |     |    |        |          |       | X      |
| css                   | CSS file to use to style document                                            | X    |     |      |     |     |    |        | X        | X     |        |
| dev                   | Graphics device to use for figure output (e.g. "png")                        | X    | X   |      |     |     | X  | X      | X        | X     | X      |
| duration              | Add a countdown timer (in minutes) to footer of slides                       |      |     |      |     |     |    |        |          | X     |        |
| fig_caption           | Should figures be rendered with captions?                                    | X    | X   | X    | X   |     |    |        | X        | X     | X      |
| fig_height, fig_width | Default figure height and width (in inches) for document                     | X    | X   | X    | X   | X   | X  | X      | X        | X     | X      |
| highlight             | Syntax highlighting: "tango", "pygments", "kate", "zenburn", "textmate"      | X    | X   | X    |     |     |    |        |          | X     | X      |
| includes              | File of content to place in document (in_header, before_body, after_body)    | X    | X   |      | X   |     | X  | X      | X        | X     | X      |
| incremental           | Should bullets appear one at a time (on presenter mouse clicks)?             |      |     |      |     |     |    |        | X        | X     | X      |
| keep_md               | Save a copy of .md file that contains knitr output                           | X    |     | X    | X   | X   |    |        | X        | X     |        |
| keep_tex              | Save a copy of .tex file that contains knitr output                          |      | X   |      |     |     |    |        |          |       | X      |
| latex_engine          | Engine to render latex, "pdflatex", "xelatex", or "lualatex"                 |      | X   |      |     |     |    |        |          |       | X      |
| lib_dir               | Directory of dependency files to use (Bootstrap, MathJax, etc.)              | X    |     |      |     |     |    |        | X        | X     |        |
| mathjax               | Set to local or a URL to use a local/URL version of MathJax to render        | X    |     |      |     |     |    |        | X        | X     |        |
| md_extensions         | Markdown extensions to add to default definition or R Markdown               | X    | X   | X    | X   | X   | X  | X      | X        | X     | X      |
| number_sections       | Add section numbering to headers                                             | X    | X   |      |     |     |    |        |          |       |        |
| pandoc_args           | Additional arguments to pass to Pandoc                                       | X    | X   | X    | X   | X   | X  | X      | X        | X     | X      |
| preserve_yaml         | Preserve YAML front matter in final document?                                |      |     |      |     |     |    | X      |          |       |        |
| reference_docx        | docx file whose styles should be copied when producing docx output           |      |     | X    |     |     |    |        |          |       |        |
| self_contained        | Embed dependencies into the doc                                              | X    |     |      |     |     |    |        | X        | X     |        |
| slide_level           | The lowest heading level that defines individual slides                      |      |     |      |     |     |    |        |          |       | X      |
| smaller               | Use the smaller font size in the presentation?                               |      |     |      |     |     |    |        | X        |       |        |
| smart                 | Convert straight quotes to curly, dashes to em-dashes, ... to ellipses, etc. | X    |     |      |     |     |    |        | X        | X     |        |
| template              | Pandoc template to use when rendering file                                   | X    | X   |      | X   |     |    |        | X        | X     |        |
| theme                 | Bootswatch or Beamer theme to use for page                                   | X    |     |      |     |     |    |        |          |       | X      |
| toc                   | Add a table of contents at start of document                                 | X    | X   | X    |     | X   | X  | X      |          |       | X      |
| toc_depth             | The lowest level of headings to add to table of contents                     | X    | X   | X    |     | X   | X  | X      |          |       |        |
| toc_float             | Float the table of contents to the left of the main content                  | X    |     |      |     |     |    |        |          |       |        |

Options not listed: extra\_dependencies, fig\_crop, fig\_retina, font\_adjustment, font\_theme, footer, logo, html\_preview, reference\_odt, transition, variant, widescreen

When you render, R Markdown

1. runs the R code, embeds results and text into .md file with knitr
2. then converts the .md file into the finished format with pandoc



Set a document's default output format in the YAML header:

```
---
output: html_document
---
```

### output value

html\_document

pdf\_document

word\_document

odt\_document

rtf\_document

md\_document

github\_document

ioslides\_presentation

slidy\_presentation

beamer\_presentation

### creates

html

pdf (requires Tex)

Microsoft Word (.docx)

OpenDocument Text

Rich Text Format

Markdown

Github compatible markdown

ioslides HTML slides

slidy HTML slides

Beamer pdf slides (requires Tex)

Customize output with sub-options (listed at right):

```
---
output:
  html_document:
    code_folding: hide
    toc_float: TRUE
---
```

### html tabsets

Use .tabset css class to place sub-headers into tabs

```
# Tabset {.tabset .tabset-fade .tabset-pills}
## Tab 1
text 1
## Tab 2
text 2
### End tabset
```

### Tabset

Tab 1 Tab 2

text 1

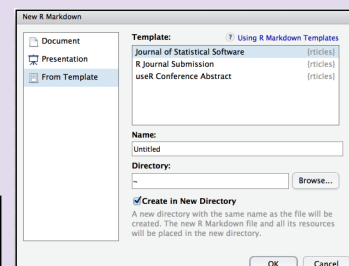
### End tabset

## Create a Reusable template

- 1 Create a new package with a inst/rmarkdown/templates directory
- 2 In the directory, Place a folder that contains:
  - template.yaml (see below)
  - skeleton.Rmd (contents of the template)
  - any supporting files
- 3 Install the package
- 4 Access template in wizard at File > New File > R Markdown

### template.yaml

```
---
name: My Template
---
```



## Table suggestions

Several functions format R data into tables

|                  |           |         |
|------------------|-----------|---------|
| Table with kable | eruptions | waiting |
| 3.600            | 79        |         |
| 1.800            | 54        |         |
| 3.333            | 74        |         |
| 2.283            | 62        |         |

|              |         |
|--------------|---------|
| eruptions    | waiting |
| 1 3.60 79.00 |         |
| 2 1.80 54.00 |         |
| 3 3.33 74.00 |         |
| 4 2.28 62.00 |         |

|                      |
|----------------------|
| Table with stargazer |
| eruptionswaiting     |
| 1 3.600 79           |
| 2 1.800 54           |
| 3 3.333 74           |
| 4 2.283 62           |

data <- faithful[1:4,]

```
`{r results = 'asis'}
knitr::kable(data, caption = "Table with kable")
`{r results = "asis"}`
```

```
`{r results = "asis"}`
print(xtable::xtable(data, caption = "Table with xtable"),
      type = "html", html.table.attributes = "border=0")
`{r results = "asis"}`
```

```
`{r results = "asis"}`
stargazer::stargazer(data, type = "html",
                      title = "Table with stargazer")
`{r results = "asis"}`
```

Learn more in the **stargazer**, **xtable**, and **knitr** packages.

## Citations and Bibliographies

Create citations with .bib, .bibtex, .copac, .enl, .json, .medline, .mods, .ris, .wos, and .xml files

- 1 Set bibliography file and CSL 1.0 Style file (optional) in the YAML header

```
---
bibliography: refs.bib
csl: style.csl
---
```

- 2 Use citation keys in text

Smith cited [Smith04].  
Smith cited without author [-Smith04].  
@Smith04 cited in line.

- 3 Render. Bibliography will be added to end of document

Smith cited (Joe Smith 2004).  
Smith cited without author (2004).  
Joe Smith (2004) cited in line.





# 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                                                                                                                                                | Becomes                                                                                                    |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------|------------|--------|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|------------|--------|--------|--------|
| Plain text                                                                                                                                            | Plain text                                                                                                 |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| End a line with two spaces to start a new paragraph.                                                                                                  | End a line with two spaces to start a new paragraph.                                                       |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>*italics*</code> and <code>_italics_</code>                                                                                                     | <i>italics</i> and <i>italics</i>                                                                          |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>**bold**</code> and <code>__bold__</code>                                                                                                       | <b>bold</b> and <b>bold</b>                                                                                |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>superscript^2^</code>                                                                                                                           | superscript <sup>2</sup>                                                                                   |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>~~strikethrough~~</code>                                                                                                                        | <del>strikethrough</del>                                                                                   |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>[link](www.rstudio.com)</code>                                                                                                                  | <a href="http://www.rstudio.com">link</a>                                                                  |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code># Header 1</code>                                                                                                                               | Header 1                                                                                                   |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>## Header 2</code>                                                                                                                              | Header 2                                                                                                   |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>### Header 3</code>                                                                                                                             | Header 3                                                                                                   |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>#### Header 4</code>                                                                                                                            | Header 4                                                                                                   |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>##### Header 5</code>                                                                                                                           | Header 5                                                                                                   |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>##### Header 6</code>                                                                                                                           | Header 6                                                                                                   |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>endash: --</code>                                                                                                                               | endash: –                                                                                                  |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>emdash: ---</code>                                                                                                                              | emdash: —                                                                                                  |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>ellipsis: ...</code>                                                                                                                            | ellipsis: ...                                                                                              |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>inline equation: \$A = \pi * r^{2}\$</code>                                                                                                     | inline equation: $A = \pi * r^2$                                                                           |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>image: </code>                                                                                                         | image:                |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>horizontal rule (or slide break):</code>                                                                                                        | horizontal rule (or slide break):                                                                          |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>***</code>                                                                                                                                      |                                                                                                            |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>&gt; block quote</code>                                                                                                                         | <div>block quote</div>                                                                                     |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>* unordered list</code>                                                                                                                         | <ul style="list-style-type: none"><li>unordered list</li></ul>                                             |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>* item 2</code>                                                                                                                                 | <ul style="list-style-type: none"><li>item 2</li></ul>                                                     |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>+ sub-item 1</code>                                                                                                                             | <ul style="list-style-type: none"><li><ul style="list-style-type: none"><li>sub-item 1</li></ul></li></ul> |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>+ sub-item 2</code>                                                                                                                             | <ul style="list-style-type: none"><li><ul style="list-style-type: none"><li>sub-item 2</li></ul></li></ul> |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>1. ordered list</code>                                                                                                                          | <ol style="list-style-type: none"><li>ordered list</li></ol>                                               |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>2. item 2</code>                                                                                                                                | <ol style="list-style-type: none"><li>item 2</li></ol>                                                     |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>+ sub-item 1</code>                                                                                                                             | <ol style="list-style-type: none"><li><ul style="list-style-type: none"><li>sub-item 1</li></ul></li></ol> |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <code>+ sub-item 2</code>                                                                                                                             | <ol style="list-style-type: none"><li><ul style="list-style-type: none"><li>sub-item 2</li></ul></li></ol> |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| <table><tr><th>Table Header</th><th>Second Header</th></tr><tr><td>Table Cell</td><td>Cell 2</td></tr><tr><td>Cell 3</td><td>Cell 4</td></tr></table> | Table Header                                                                                               | Second Header | Table Cell | Cell 2 | Cell 3 | Cell 4 | <table><tr><th>Table Header</th><th>Second Header</th></tr><tr><td>Table Cell</td><td>Cell 2</td></tr><tr><td>Cell 3</td><td>Cell 4</td></tr></table> | Table Header | Second Header | Table Cell | Cell 2 | Cell 3 | Cell 4 |
| Table Header                                                                                                                                          | Second Header                                                                                              |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| Table Cell                                                                                                                                            | Cell 2                                                                                                     |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| Cell 3                                                                                                                                                | Cell 4                                                                                                     |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| Table Header                                                                                                                                          | Second Header                                                                                              |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| Table Cell                                                                                                                                            | Cell 2                                                                                                     |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |
| Cell 3                                                                                                                                                | Cell 4                                                                                                     |               |            |        |        |        |                                                                                                                                                       |              |               |            |        |        |        |



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| Syntax                                                                                                                                                                                               | Becomes                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Make a code chunk with three back ticks followed by an <code>r</code> in braces. End the chunk with three back ticks:</p> <pre>```\${r} paste("Hello", "World!") ```</pre>                        | <p>Make a code chunk with three back ticks followed by an <code>r</code> in braces. End the chunk with three back ticks:</p> <pre>paste("Hello", "World!")  ## [1] "Hello World!"</pre> |
| <p>Place code inline with a single back ticks. The first back tick must be followed by an <code>R</code>, like this <code>`r paste("Hello", "World!")`</code>.</p>                                   | <p>Place code inline with a single back ticks. The first back tick must be followed by an <code>R</code>, like this <code>Hello World!</code>.</p>                                      |
| <p>Add chunk options within braces. For example, <code>`echo=FALSE`</code> will prevent source code from being displayed:</p> <pre>```\${r eval=TRUE, echo=FALSE} paste("Hello", "World!") ```</pre> | <p>Add chunk options within braces. For example, <code>echo=FALSE</code> will prevent source code from being displayed:</p> <pre>## [1] "Hello World!"</pre>                            |

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

| Chunk options   |               |                                                                                                                                                                                                                                                                                                                           |
|-----------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| option          | default value | description                                                                                                                                                                                                                                                                                                               |
| Code evaluation |               |                                                                                                                                                                                                                                                                                                                           |
| child           | NULL          | A character vector of filenames. Knitr will knit the files and place them into the main document.                                                                                                                                                                                                                         |
| code            | NULL          | Set to R code. Knitr will replace the code in the chunk with the code in the code option.                                                                                                                                                                                                                                 |
| engine          | '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.                                                                                                                                                 |
| eval            | TRUE          | If <code>FALSE</code> , knitr will not run the code in the code chunk.                                                                                                                                                                                                                                                    |
| include         | TRUE          | If <code>FALSE</code> , knitr will run the chunk but not include the chunk in the final document.                                                                                                                                                                                                                         |
| purl            | TRUE          | If <code>FALSE</code> , knitr will not include the chunk when running <code>purl()</code> to extract the source code.                                                                                                                                                                                                     |
| Results         |               |                                                                                                                                                                                                                                                                                                                           |
| collapse        | FALSE         | If <code>TRUE</code> , knitr will collapse all the source and output blocks created by the chunk into a single block.                                                                                                                                                                                                     |
| echo            | TRUE          | If <code>FALSE</code> , knitr will not display the code in the code chunk above it's results in the final document.                                                                                                                                                                                                       |
| results         | '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.) |
| error           | TRUE          | If <code>FALSE</code> , knitr will not display any error messages generated by the code.                                                                                                                                                                                                                                  |
| message         | TRUE          | If <code>FALSE</code> , knitr will not display any messages generated by the code.                                                                                                                                                                                                                                        |
| warning         | TRUE          | If <code>FALSE</code> , knitr will not display any warning messages generated by the code.                                                                                                                                                                                                                                |
| Code Decoration |               |                                                                                                                                                                                                                                                                                                                           |
| comment         | '###'         | A character string. Knitr will append the string to the start of each line of results in the final document.                                                                                                                                                                                                              |
| highlight       | TRUE          | If <code>TRUE</code> , knitr will highlight the source code in the final output.                                                                                                                                                                                                                                          |
| prompt          | FALSE         | If <code>TRUE</code> , knitr will add <code>&gt;</code> to the start of each line of code displayed in the final document.                                                                                                                                                                                                |
| strip.white     | TRUE          | If <code>TRUE</code> , knitr will remove white spaces that appear at the beginning or end of a code chunk.                                                                                                                                                                                                                |
| tidy            | 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                                                                                                                                                                                                                                                                                                                          |
| Chunks                      |                 |                                                                                                                                                                                                                                                                                                                                      |
| opts.label                  | NULL            | The label of options set in <code>knitr::opts_template()</code> to use with the chunk.                                                                                                                                                                                                                                               |
| R.options                   | 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.                                                                                                                                                                                                  |
| ref.label                   | NULL            | A character vector of labels of the chunks from which the code of the current chunk is inherited.                                                                                                                                                                                                                                    |
| Cache                       |                 |                                                                                                                                                                                                                                                                                                                                      |
| autodep                     | FALSE           | If <b>TRUE</b> , knitr will attempt to figure out dependencies between chunks automatically by analyzing object names.                                                                                                                                                                                                               |
| cache                       | 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.                                                                                                                                                                                                |
| cache.comments              | NULL            | If <b>FALSE</b> , knitr will not rerun the chunk if only a code comment has changed.                                                                                                                                                                                                                                                 |
| cache.lazy                  | 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.                                                                                                                                                                     |
| cache.path                  | '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.                                                                                                                                                                                                          |
| cache.vars                  | NULL            | A character vector of object names to cache if you do not wish to cache each object in the chunk.                                                                                                                                                                                                                                    |
| dependson                   | 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.                                                                                                                                                                                    |
| Animation                   |                 |                                                                                                                                                                                                                                                                                                                                      |
| anipots                     | 'controls,loop' | Extra options for animations (see the <code>animate</code> package).                                                                                                                                                                                                                                                                 |
| interval                    | 1               | The number of seconds to pause between animation frames.                                                                                                                                                                                                                                                                             |
| Plots                       |                 |                                                                                                                                                                                                                                                                                                                                      |
| dev                         | 'png'           | The R function name that will be used as a graphical device to record plots, e.g. <code>dev='CairoPDF'</code> .                                                                                                                                                                                                                      |
| dev.args                    | NULL            | Arguments to be passed to the device, e.g. <code>dev.args=list(bg='yellow', pointsize=10)</code> .                                                                                                                                                                                                                                   |
| dpi                         | 72              | A number for knitr to use as the dots per inch (dpi) in graphics (when applicable).                                                                                                                                                                                                                                                  |
| external                    | TRUE            | If <b>TRUE</b> , knitr will externalize tikz graphics to save LaTeX compilation time (only for the <code>tikzDevice::tikz()</code> device).                                                                                                                                                                                          |
| fig.align                   | 'default'       | How to align graphics in the final document. One of 'left', 'right', or 'center'.                                                                                                                                                                                                                                                    |
| fig.cap                     | NULL            | A character string to be used as a figure caption in LaTeX.                                                                                                                                                                                                                                                                          |
| fig.env                     | 'figure'        | The Latex environment for figures.                                                                                                                                                                                                                                                                                                   |
| fig.ext                     | NULL            | The file extension for figure output, e.g. <code>fig.ext='png'</code> .                                                                                                                                                                                                                                                              |
| fig.height, fig.width       | 7               | The width and height to use in R for plots created by the chunk (in inches).                                                                                                                                                                                                                                                         |
| fig.keep                    | '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. |
| fig.lp                      | 'fig:'          | A prefix to be used for figure labels in latex.                                                                                                                                                                                                                                                                                      |
| fig.path                    | 'figure/'       | A file path to the directory where knitr should store the graphics files created by the chunk.                                                                                                                                                                                                                                       |
| fig.pos                     | "               | A character string to be used as the figure position arrangement in LaTeX.                                                                                                                                                                                                                                                           |
| fig.process                 | NULL            | A function to post-process a figure file. Should take a filename and return a filename of a new figure source.                                                                                                                                                                                                                       |
| fig.retina                  | 1               | Dpi multiplier for displaying HTML output on retina screens.                                                                                                                                                                                                                                                                         |
| fig.scap                    | NULL            | A character string to be used as a short figure caption.                                                                                                                                                                                                                                                                             |
| fig.subcap                  | NULL            | A character string to be used as captions in sub-figures in LaTeX.                                                                                                                                                                                                                                                                   |
| fig.show                    | '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.       |
| fig.showtext                | NULL            | If <b>TRUE</b> , knitr will call <code>showtext::showtext.begin()</code> before drawing plots.                                                                                                                                                                                                                                       |
| out.extra                   | NULL            | A character string of extra options for figures to be passed to LaTeX or HTML.                                                                                                                                                                                                                                                       |
| out.height, out.width       | 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>                                                                                                                                                                                               |
| resize.height, resize.width | NULL            | The width and height to resize tike graphics in LaTeX, passed to <code>\resizebox{ }{ }</code> .                                                                                                                                                                                                                                     |
| sanitize                    | 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" | html_document:    | fontsize: 11pt       | slidy_presentation: |
| ioslides_presentation | output: md_document | toc: true         | geometry: margin=1in | incremental: true   |
| slidy_presentation    | ---                 | toc_depth: 2      | ---                  | runtime: shiny      |
| 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 pdfcrop 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>1</sup> latex".                                                               |
| 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?                                                                                                                  |