

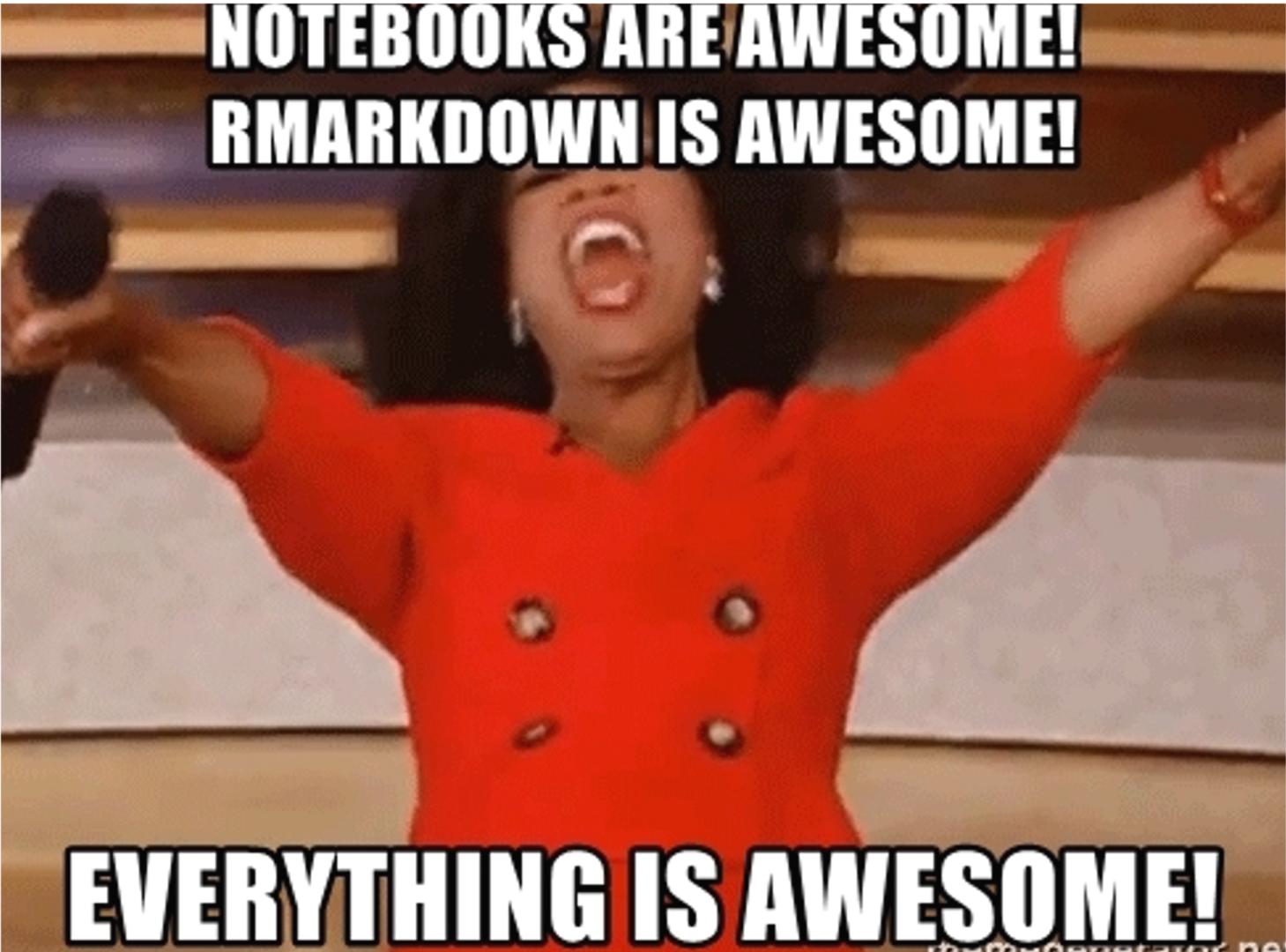
R you ready?

**IntRo to RStudio and R Markdown
for open data and reproducibility**

**Unit 6:
Code chunks in R Markdown**

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NOTEBOOKS ARE AWESOME!
RMarkdown IS AWESOME!

EVERYTHING IS AWESOME!

meme-generator.net

R Markdown: What is it?

Coding language that allows for text-to-HTML conversion

Easy-to-read and easy-to-write plain text format

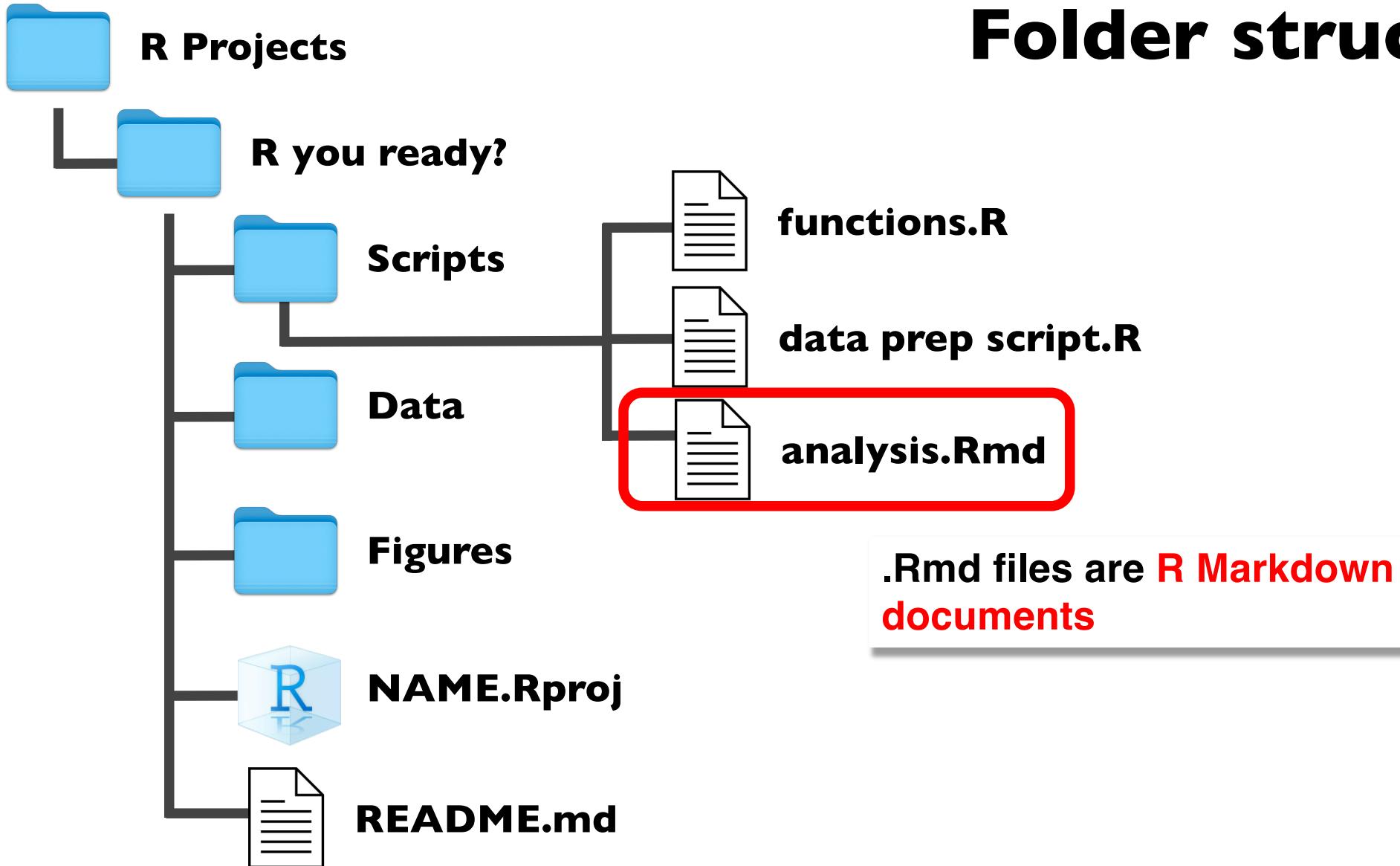
**Can create R Markdown documents (HTML, Word, PDF),
websites, Markdown books, etc.**

Websites → <https://rstudio.github.io/distill/website.html>

Books → <https://bookdown.org/yihui/bookdown/>

Documents → <https://bookdown.org/yihui/rmarkdown/>

Folder structure



```
Untitled1 x index.rmd x
ABC Knit Insert Run
1 ---  
2 title: "Untitled"  
3 author: "Olivier Gimenez"  
4 date: "10/24/2020"  
5 output: html_document  
6 ---  
7  
8 ```{r setup, include=FALSE}  
9 knitr::opts_chunk$set(echo = TRUE)  
10```  
11  
12 ## R Markdown  
13  
14 This is an R Markdown document. Markdown is a simple formatting syntax, for authoring HTML,  
PDF, and MS Word documents. For more details on using R Markdown see  
http://rmarkdown.rstudio.com.  
15  
16 When you click the **Knit** button a chunk  
well as the output of other chunks.  
17  
18 ## Including Plots  
19  
20 You can also embed plots, for example:  
21  
22```{r pressure, echo=FALSE}  
23 plot(pressure)  
24```  
25  
26 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing  
R code that generated the plot.  
27  
28  
29  
30  
31
```

Front matter

keep a thorough record of your analysis

RECORD what you have DONE!!!!

GROUP your code into CHUNKS

render the R Markdown into easy-to-read documents



```
Untitled1 x index.rmd x Insert ▾ Run ▾ A
```

Front matter

```
1 --
2 title: "Untitled"
3 author: "Olivier Gimenez"
4 date: "10/24/2020"
5 output: html_document
6 ---
```

metadata section that includes title, author, and date information as well as options for customizing output

?

```
8 ``{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 ``
11
12 ## R Markdown
13
14 This is an R Markdown document. You can
15 generate a PDF, Word or HTML
16 output by clicking the Knit button. You will
17 be able to preview the document in a browser
18 and even edit parts of it. The document
19 source code can be edited and re-run at any
20 time from this interface.
21
22 ## Including Plots
23
24 You can also embed plots, for example:
25
26 ``{r pressure, echo=FALSE}
27 plot(pressure)
28 ``
29
30 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the
31 R code that generated the plot.
```

Content

Chunk

Chunk

R Markdown



The screenshot shows an RStudio interface with an R Markdown document titled "index.rmd". The code is organized into three main sections:

- Front matter**: Lines 1-6, containing YAML metadata.
- Chunk**: Lines 8-10, containing global settings for the R Markdown script.
- Content**: Lines 12-31, containing the main text and code chunks of the document.

A red box highlights the global settings chunk (lines 8-10). A white callout box with a red border and a question mark icon points to this area, containing the text: "global settings to be applied to the R Markdown script".

```
1 ---  
2 title: "Untitled"  
3 author: "Olivier Gimenez"  
4 date: "10/24/2020"  
5 output: html_document  
6 ---  
7  
8 ```{r setup, include=FALSE}  
9 knitr::opts_chunk$set(echo = TRUE)  
10```  
11  
12 ## R Markdown  
13  
14 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML,  
PDF, and MS Word documents. For more details on using R Markdown see  
http://rmarkdown.rstudio.com.  
15  
16 When you click the **Knit** button  
well as the output of any embedded  
chunk like this:  
17  
18 ```{r cars}  
19 summary(cars)  
20```  
21  
22 ## Including Plots  
23  
24 You can also embed plots, for example:  
25  
26 ```{r pressure, echo=FALSE}  
27 plot(pressure)  
28```  
29  
30 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the  
R code that generated the plot.  
31
```



The screenshot shows an RStudio interface with two tabs: "Untitled1" and "index.rmd". The "index.rmd" tab is active, displaying an R Markdown document. The document is organized into three main sections separated by vertical dashed lines:

- Front matter** (lines 1-10): Includes YAML front matter and a code chunk setup.
- Content** (lines 11-31): The main body of the document, which includes R code chunks and descriptive text. A red rounded rectangle highlights the first R code chunk (line 18) and the descriptive text above it (lines 14-16). Below this highlighted area, another red rounded rectangle highlights the second R code chunk (line 26) and the descriptive text above it (lines 22-24).
- Chunk** (lines 32-33): A placeholder for the output of the R code chunks.

The RStudio toolbar at the top includes icons for back/forward, file operations, ABC, search, Knit, and settings. The status bar at the bottom shows "16:105" and "R Markdown".



Add content to your markdown document (e.g. descriptions, explicit info, etc.)



Untitled1 x index.rmd x

Front matter

```
1 ---  
2 title: "Untitled"  
3 author: "Olivier Gimenez"  
4 date: "10/24/2020"  
5 output: html_document  
6 ---  
7  
8 ```{r setup, include=FALSE}  
9 knitr::opts_chunk$set(echo = TRUE)  
10```  
11  
12 ## R Markdown  
13  
14 This is an R Markdown document. Markdown is a simple way to write  
PDF, and MS Word documents. For more information on Markdown, see  
http://rmarkdown.rstudio.com.  
15  
16 When you click the **Knit** button a document will be generated that includes both content as  
well as the output of any embedded R code chunks within the document. You can embed an R code  
chunk like this:
```

Chunk

```
18 ```{r cars}  
19 summary(cars)  
20```  
21  
22 ## Including Plots  
23  
24 You can also embed plots, for example:  
25  
26 ```{r pressure, echo=FALSE}  
27 plot(pressure)  
28```  
29  
30 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the  
R code that generated the plot.  
31
```

Content

Chunk

16:105 # R Markdown R Markdown



The screenshot shows the RStudio interface with an R Markdown file open. The code editor displays the following content:

```
1 1 ---  
2 2 title: "Untitled"  
3 3 author: "Olivier Gimenez"  
4 4 date: "10/24/2020"  
5 5 output: html_document  
6 6 ---  
7 7  
8 8 ````{r setup, include=FALSE}  
9 9 knitr::opts_chunk$set(echo = TRUE)  
10 10 ````  
11 11  
12 12 ## R Markdown  
13 13  
14 14 This is an R Markdown document. Marl  
15 15 PDF, and MS Word documents. For more  
16 16 <http://rmarkdown.rstudio.com>.  
17 17  
18 18 ````{r cars}  
19 19 summary(cars)  
20 20 ````  
21 21  
22 22 ## Including Plots  
23 23  
24 24 You can also embed plots, for example:  
25 25  
26 26 ````{r pressure, echo=FALSE}  
27 27 plot(pressure)  
28 28 ````  
29 29  
30 30 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the  
R code that generated the plot.  
31 31
```

A callout box highlights the code chunk from line 8 to 10, which contains the R code for setting up the document. The text inside the box reads:

Add code chunks (= sections of code that are run in the final document) to your markdown document

The code editor is divided into three vertical sections by dashed lines:

- Front matter**: The first section, containing lines 1 through 7.
- Content**: The second section, containing lines 8 through 31. It is highlighted with a red border.
- Chunk**: The third section, containing the code blocks for lines 18, 26, and 27.

Below the code editor, the status bar shows the time as 16:105 and the mode as R Markdown.



Add code chunks (= sections of code that are run in the final document) to your markdown document

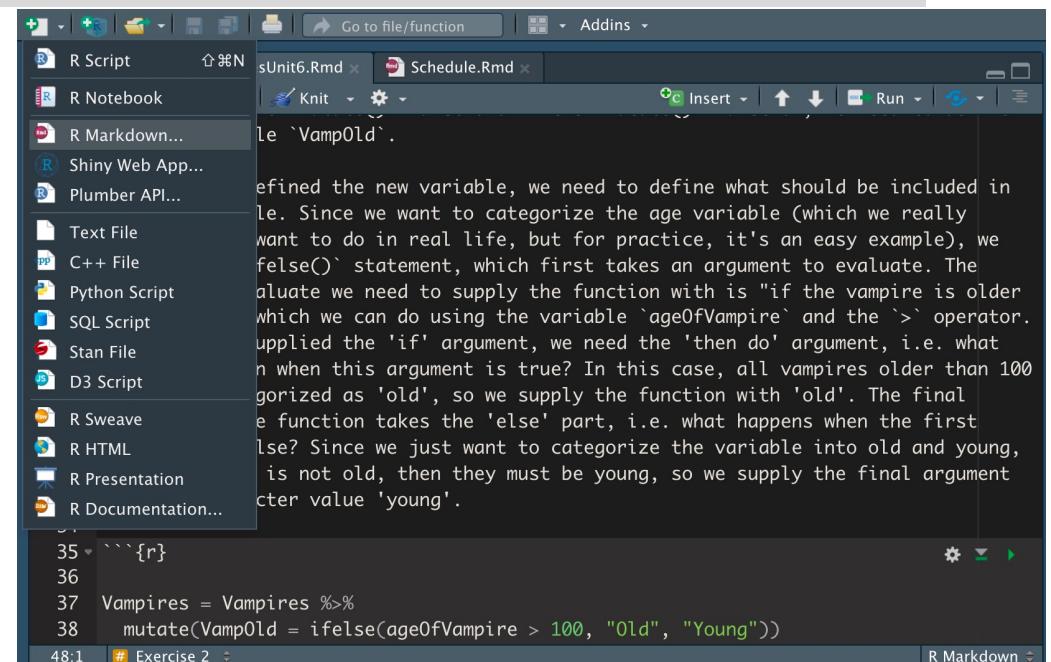
echo = FALSE, only include OUTPUT

Install R Markdown

Everyone, go ahead and type in the following code:

```
> install.packages("rmarkdown")
```

OR
open an R Markdown document → this should automatically install the package



The screenshot shows the RStudio environment with the following details:

- File Menu:** R Script, R Notebook, R Markdown..., Shiny Web App..., Plumber API..., Text File, C++ File, Python Script, SQL Script, Stan File, D3 Script, R Sweave, R HTML, R Presentation, R Documentation..
- Document Tab:** SUnit6.Rmd x, Schedule.Rmd x
- Toolbar:** Go to file/function, Addins, Knit, Insert, Run, etc.
- Code Editor:** The editor contains R code and explanatory text. The explanatory text discusses defining a new variable `VampOld` and using an `ifelse` statement to categorize vampires based on age. It mentions using the `>` operator to evaluate the condition and the `then do` argument to define the value for old vampires. It also notes the use of the `else` part for young vampires.
- Console:** The console shows the R code being run, including lines 35 through 38.
- Status Bar:** R Markdown

The screenshot shows an RStudio interface with several tabs at the top: _site.yml, ExercisesUnit6.Rmd, Schedule.Rmd, and Untitled1. The Untitled1 tab is active, displaying an R Markdown document. The code consists of the following:

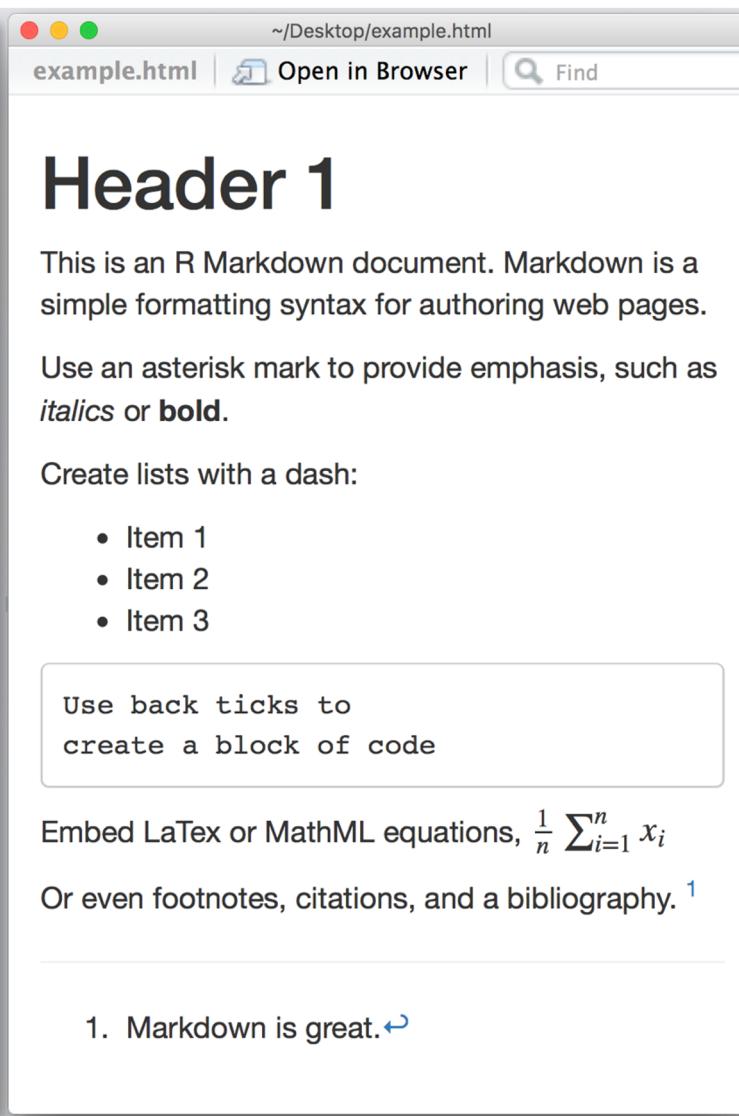
```
1 ---  
2 | title: "Untitled"  
3 | author: "Mason A. Wirtz"  
4 | date: "2/22/2022"  
5 | output: html_document  
6 ---  
7  
8 ``{r setup, include=FALSE}  
9 knitr::opts_chunk$set(echo = TRUE)  
10 ``  
11  
12 ## R Markdown  
13  
14 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.  
15  
16 When you click the **Knit** button a document will be generated that includes the output of any embedded R code chunks within the document. You can also embed plots, for example:  
17  
18 ``{r cars}  
19 summary(cars)  
20 ``  
21  
22 ## Including Plots  
23  
24 You can also embed plots, for example:  
25  
26 ``{r pressure, echo=FALSE}  
27 plot(pressure)  
28 ``  
29  
30 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.  
31
```

Red arrows point from the explanatory text in lines 14-16 and line 24 to the corresponding code chunks in lines 18 and 26.

Headings: Organize your document according to chapters

Code chunks: organize your code in chunks (1 topic/analysis → 1 code chunk)

Code chunks: only plot the output



https://rmarkdown.rstudio.com/authoring_quick_tour.html#Markdown_Basics

The screenshot shows the RStudio interface with two panes. The left pane displays the R Markdown source code, and the right pane shows the generated HTML output. A red box highlights the first two sections of the R Markdown code, which correspond to the first two sections of the rendered HTML.

example.Rmd

```
1 # Header 1
2
3 This is an R Markdown document. Markdown is a
4 simple formatting syntax for authoring webpages.
5
6 Use an asterisk mark to provide emphasis, such
7 as *italics* or **bold**.
8
9 - Item 1
10 - Item 2
11 - Item 3
12
13 ``
14 Use back ticks to
15 create a block of code
16 ``
17
18 Embed LaTex or MathML equations,
19 $\frac{1}{n} \sum_{i=1}^n x_i$ 
20
21 Or even footnotes, citations, and a
22 bibliography. [^1]
23
24 [^1]: Markdown is great.
```

Header 1

This is an R Markdown document. Markdown is a simple formatting syntax for authoring web pages.

Use an asterisk mark to provide emphasis, such as *italics* or **bold**.

Create lists with a dash:

- Item 1
- Item 2
- Item 3

Use back ticks to create a block of code

Embed LaTex or MathML equations, $\frac{1}{n} \sum_{i=1}^n x_i$

Or even footnotes, citations, and a bibliography.¹

1. Markdown is great. ↵

example.html

Open in Browser

Block-level elements

First-level

Second-level

Third-level

Inline formatting

italics

bold

https://rmarkdown.rstudio.com/authors_quick_tour.html#Markdown_Basics

The image shows a split-screen view of RStudio. On the left, the 'example.Rmd' file is open in the editor. It contains R Markdown code with various sections and lists. A red box highlights the section from line 7 to line 13, which includes a bullet list. On the right, the resulting 'example.html' page is shown in a browser window. The page features a large header and the highlighted content from the R Markdown file, demonstrating the conversion process.

```
example.Rmd
1 # Header 1
2
3 This is an R Markdown document. Markdown is a
4 simple formatting syntax for authoring webpages.
5
6 Use an asterisk mark to provide emphasis, such
7 as *italics* or **bold**.
8
9 Create lists with a dash:
10
11 - Item 1
12 - Item 2
13 - Item 3
14
15 Use back ticks to
16 create a block of code
17
18 Embed LaTex or MathML equations,
19 $\frac{1}{n} \sum_{i=1}^n x_i$
20
21 Or even footnotes, citations, and a
22 bibliography. [^1]
23
24 [^1]: Markdown is great.
```

example.html

Header 1

This is an R Markdown document. Markdown is a simple formatting syntax for authoring web pages.

Use an asterisk mark to provide emphasis, such as **italics** or **bold**.

Create lists with a dash:

- Item 1
- Item 2
- Item 3

Use back ticks to create a block of code

Embed LaTex or MathML equations, $\frac{1}{n} \sum_{i=1}^n x_i$

Or even footnotes, citations, and a bibliography.¹

1. Markdown is great. ↵

Unordered lists

- **Item 1**
- **Item 2**
- **Item 3**
 - **Item 3.1**
 - **Item 3.2**

Ordered lists

1. **Item 1**
2. **Item 2**
3. **Item 3**

https://rmarkdown.rstudio.com/authors_quick_tour.html#Markdown_Basics

chunks.Rmd x

ABC Knit HTML Chunks

1 R Code Chunks

2 =====

3

4 With R Markdown, you can insert R code

5 chunks including plots:

6 ````{r qplot, fig.width=4, fig.height=3,`

7 `message=FALSE}`

8 `# quick summary and plot`

9 `library(ggplot2)`

10 `summary(cars)`

11 `qplot(speed, dist, data=cars) +`

12 `geom_smooth()`

13 `...`

RStudio: Preview HTML

Preview: ~/chunks.html | Save As | Publish

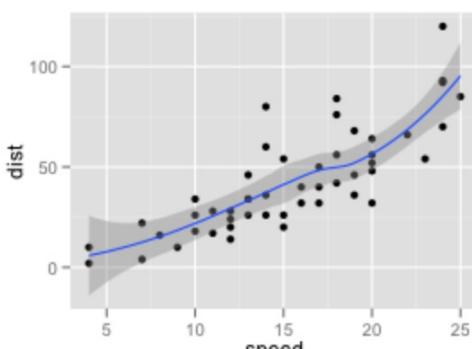
R Code Chunks

With R Markdown, you can insert R code chunks including plots:

```
# quick summary and plot
library(ggplot2)
summary(cars)
```

```
##      speed          dist
## Min.   : 4.0   Min.   : 2
## 1st Qu.:12.0   1st Qu.: 26
## Median :15.0   Median : 36
## Mean   :15.4   Mean   : 43
## 3rd Qu.:19.0   3rd Qu.: 56
## Max.   :25.0   Max.   :120
```

```
qplot(speed, dist, data = cars) + geom_smooth()
```



https://rmarkdown.rstudio.com/authoring_quick_tour.html#Markdown_Basics

chunks.Rmd x

ABC Knit HTML Chunks

```

1 R Code Chunks
2 -----
3
4 With R Markdown, you can insert R code
5 chunks including plots:
6
7 ````{r qplot, fig.width=4, fig.height=3,
8   message=FALSE}
9
10 library(ggplot2)
11 summary(cars)
12 qplot(speed, dist, data=cars) +
13   geom_smooth()
14
15 ````
```

R Code Chunks

With R Markdown, you can insert R code chunks including plots:

```
# quick summary and plot
library(ggplot2)
summary(cars)
```

	speed	dist
## Min. :	4.0	Min. : 2
## 1st Qu.:	12.0	1st Qu.: 26
## Median :	15.0	Median : 36
## Mean :	15.4	Mean : 43
## 3rd Qu.:	19.0	3rd Qu.: 56
## Max. :	25.0	Max. :120

```
qplot(speed, dist, data = cars) + geom_smooth()
```

Chunk options

- **eval**: whether to evaluate code chunk
- **echo**: whether to echo source code
- **include**: whether to include a code chunk
- **fig.width / fig.height**: output size of plots in output document
- **out.width / out.height**: output size of plots in output document, using scaling (e.g. `out.width = 80%`)
- See (<https://bookdown.org/yihui/rmarkdown/r-code.html>) for more options

https://rmarkdown.rstudio.com/authoring_quick_tour.html#Markdown_Basics

LET'S GET OUR HANDS DIRTY



makeameme.org