

Motivating Students



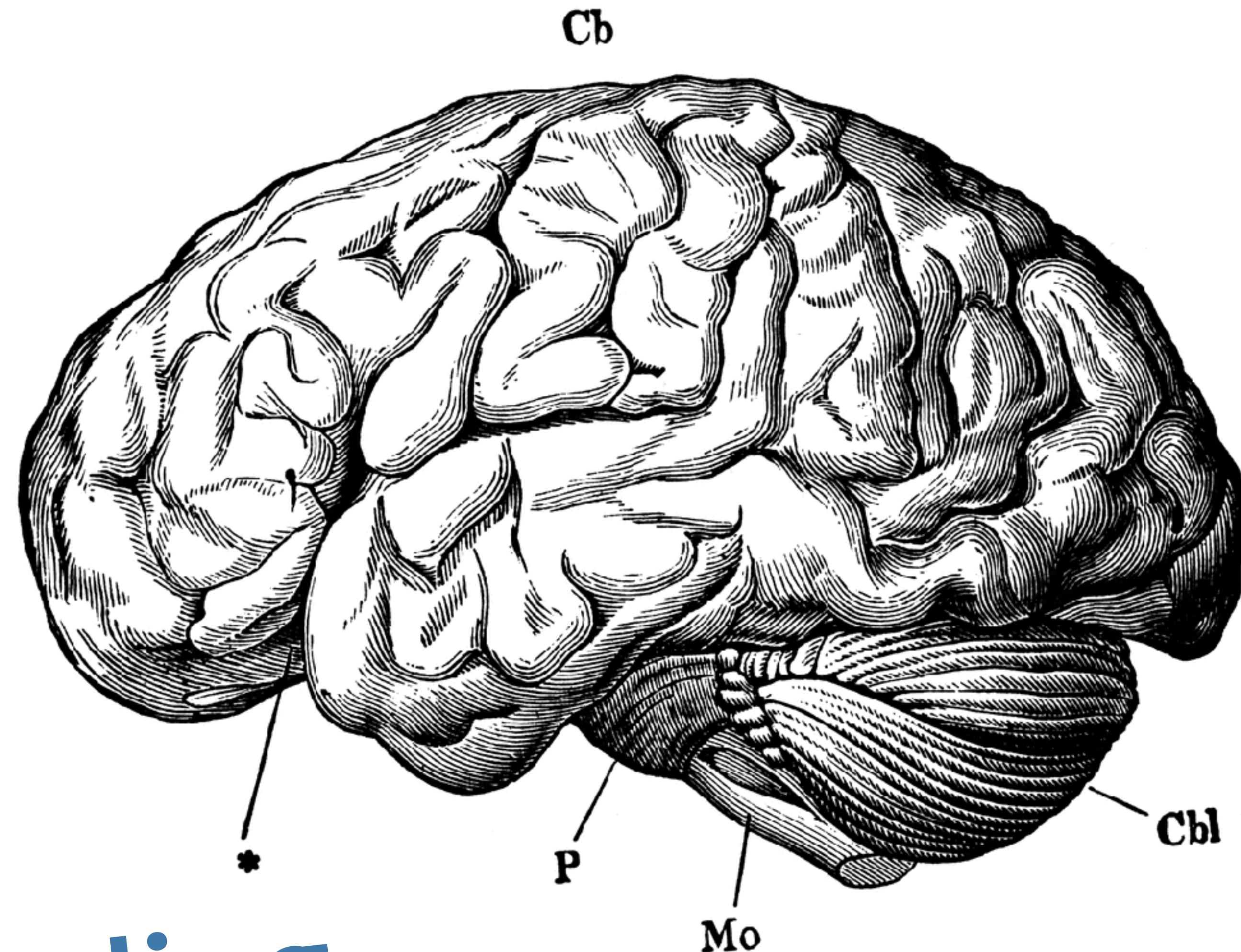
Your Turn

Read through the questions in the motivation handout. Keep them in mind as we work through this sections material.

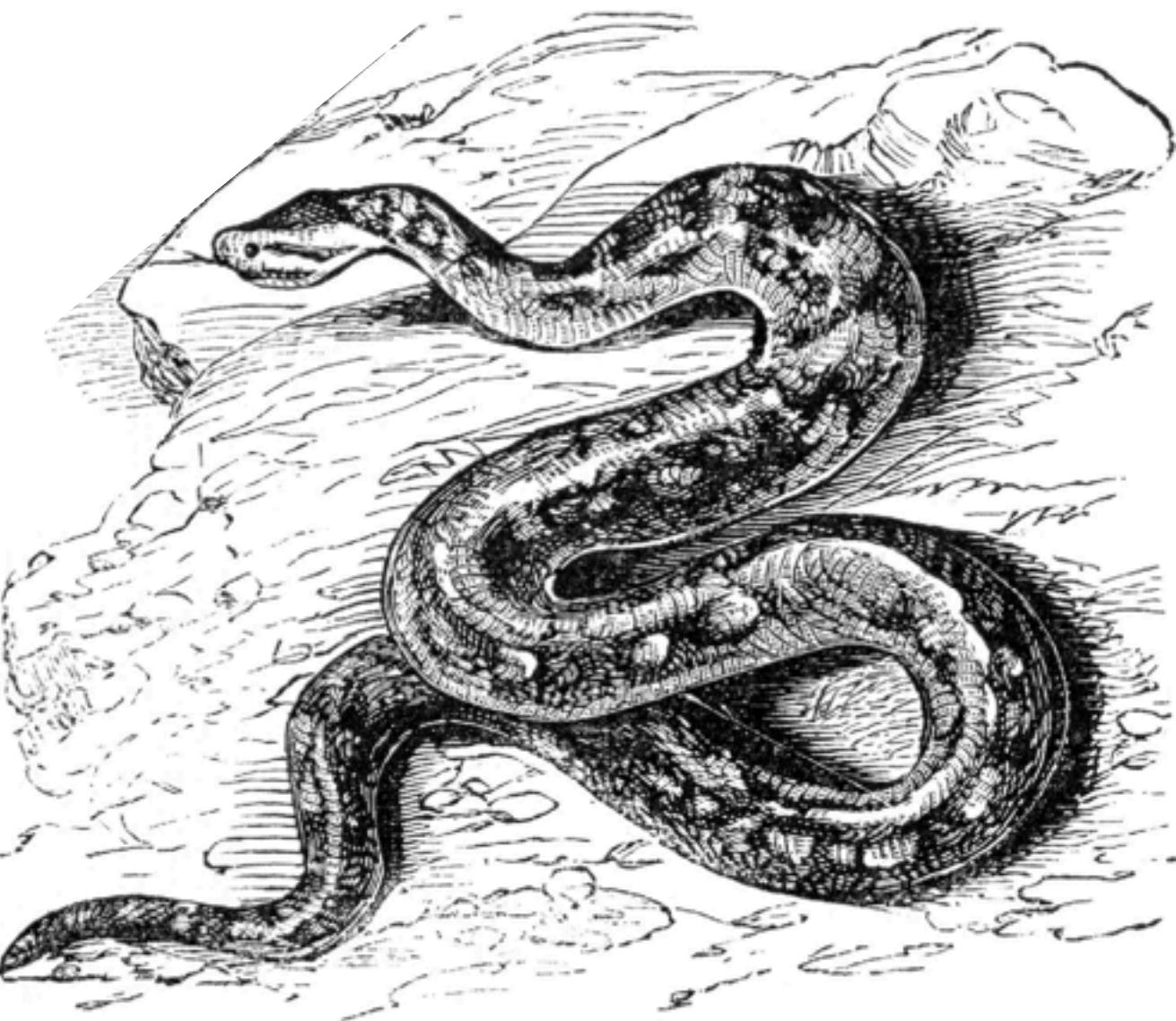


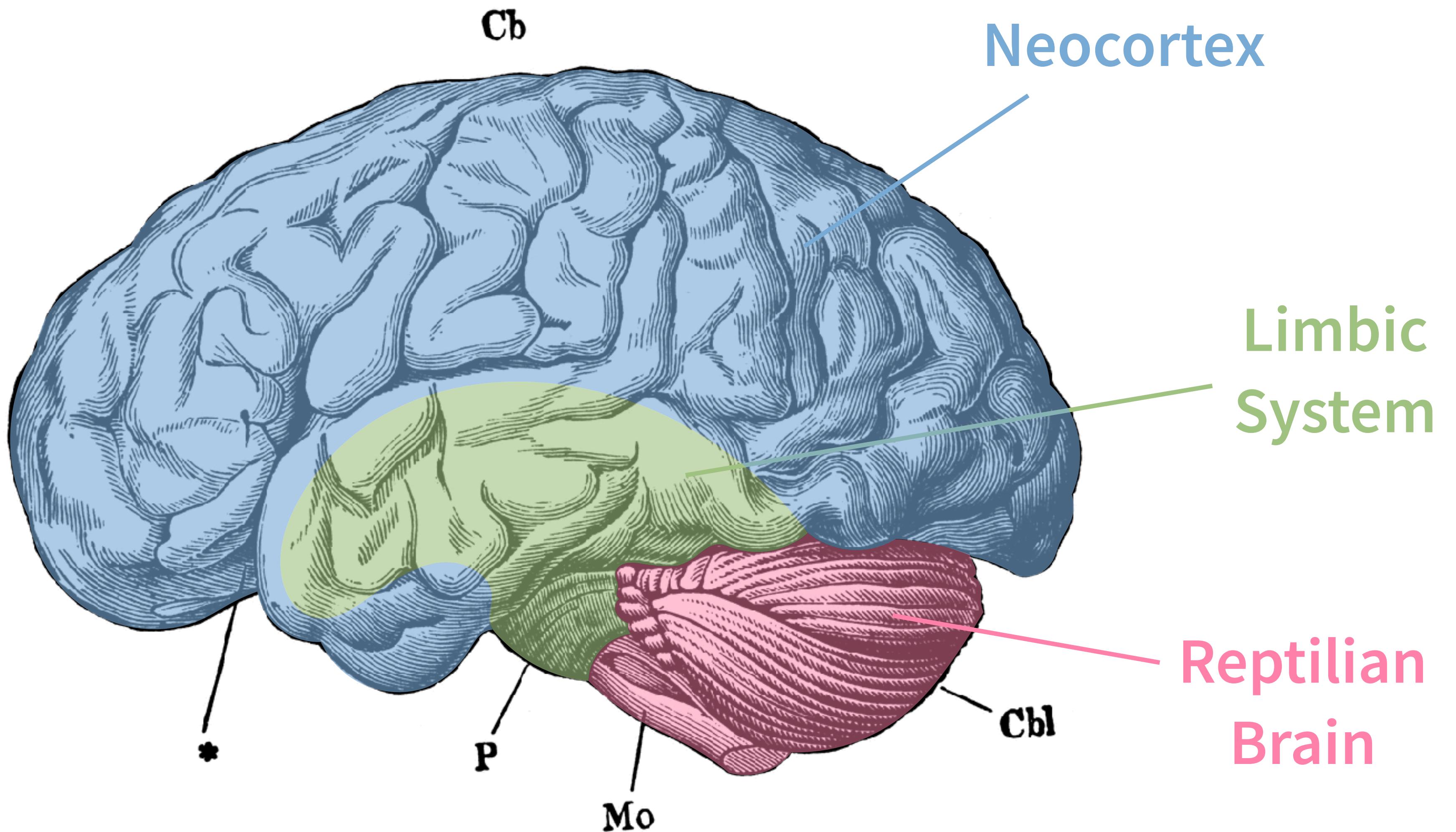
Motivation

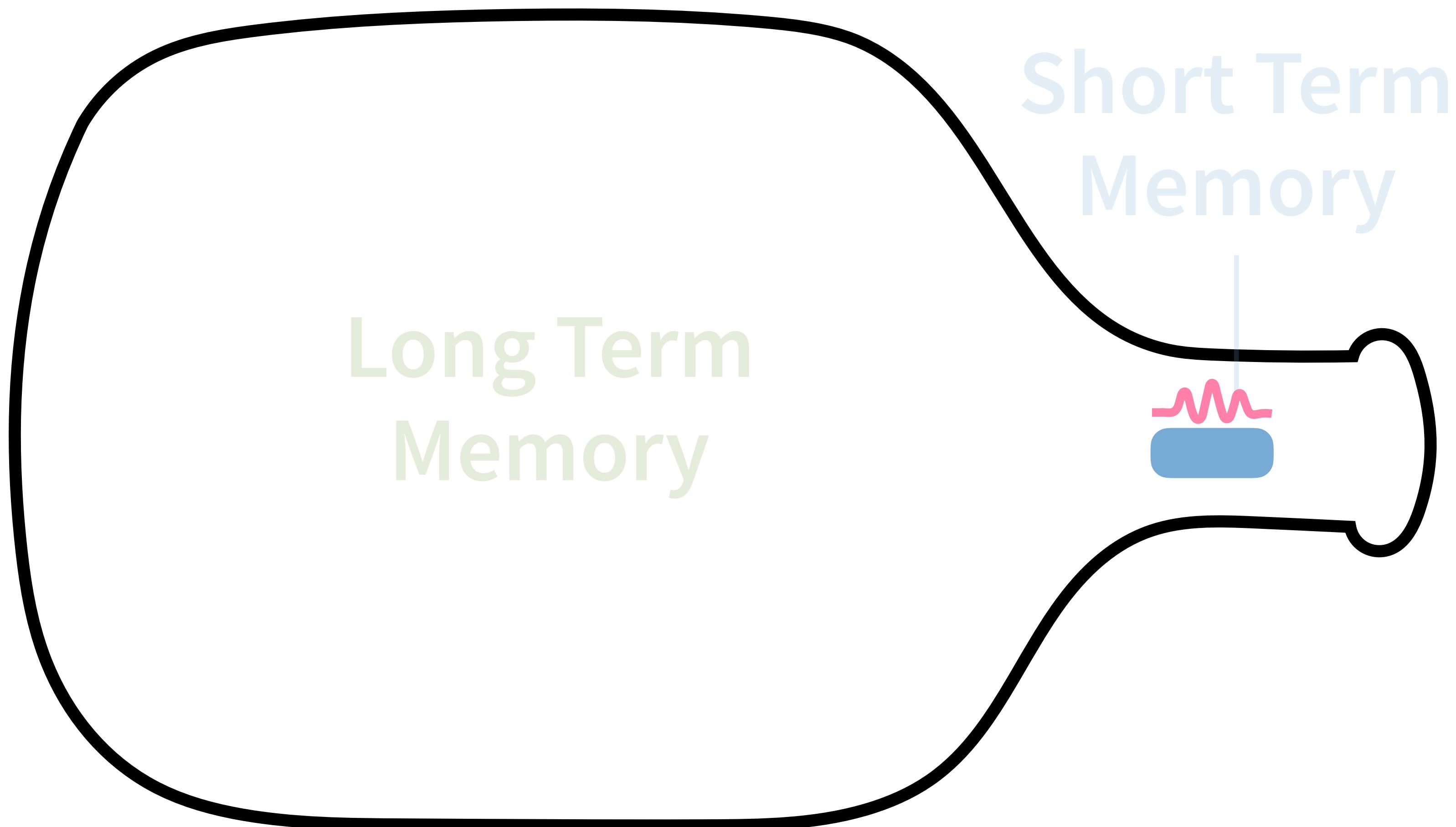
R

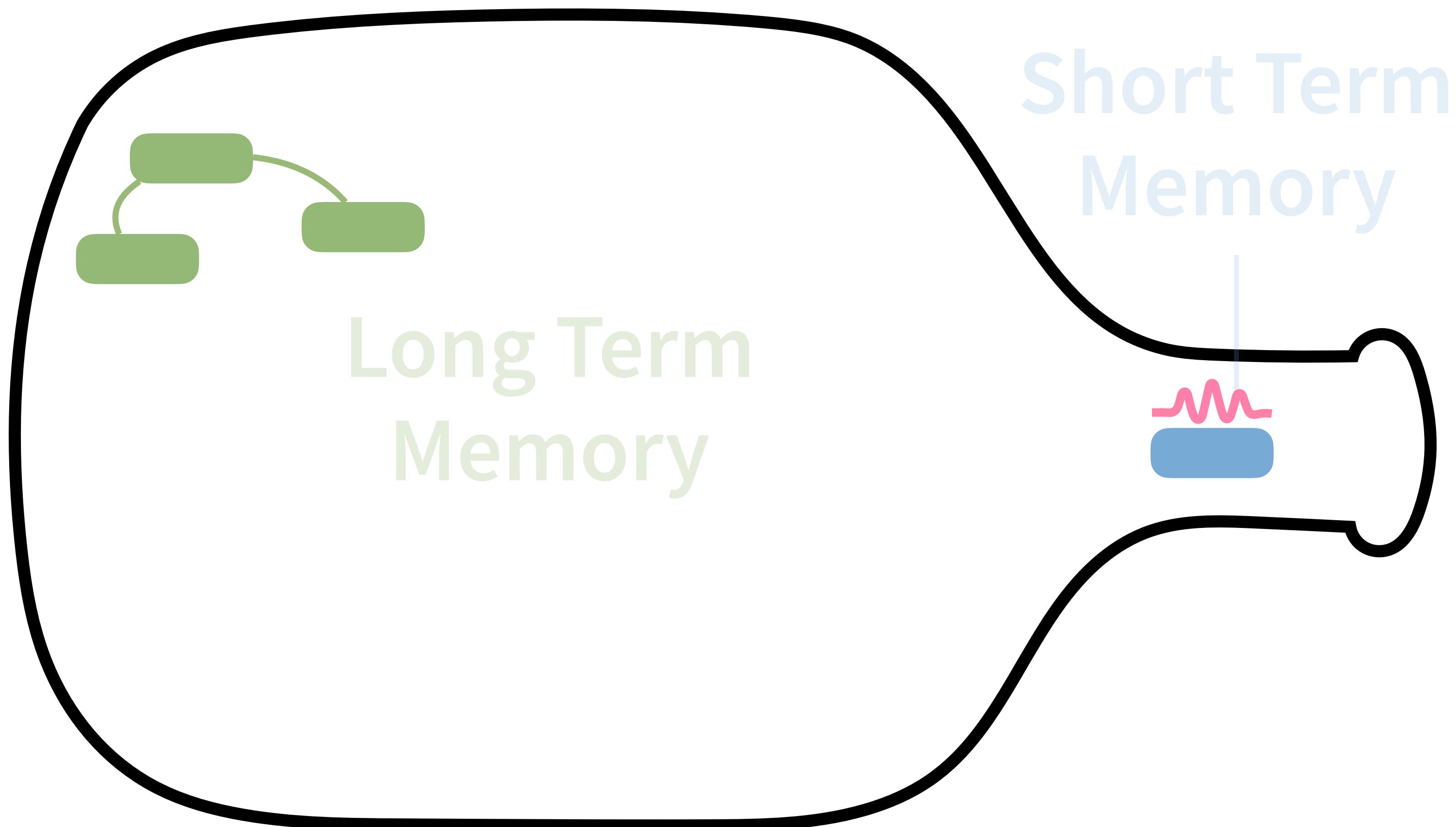


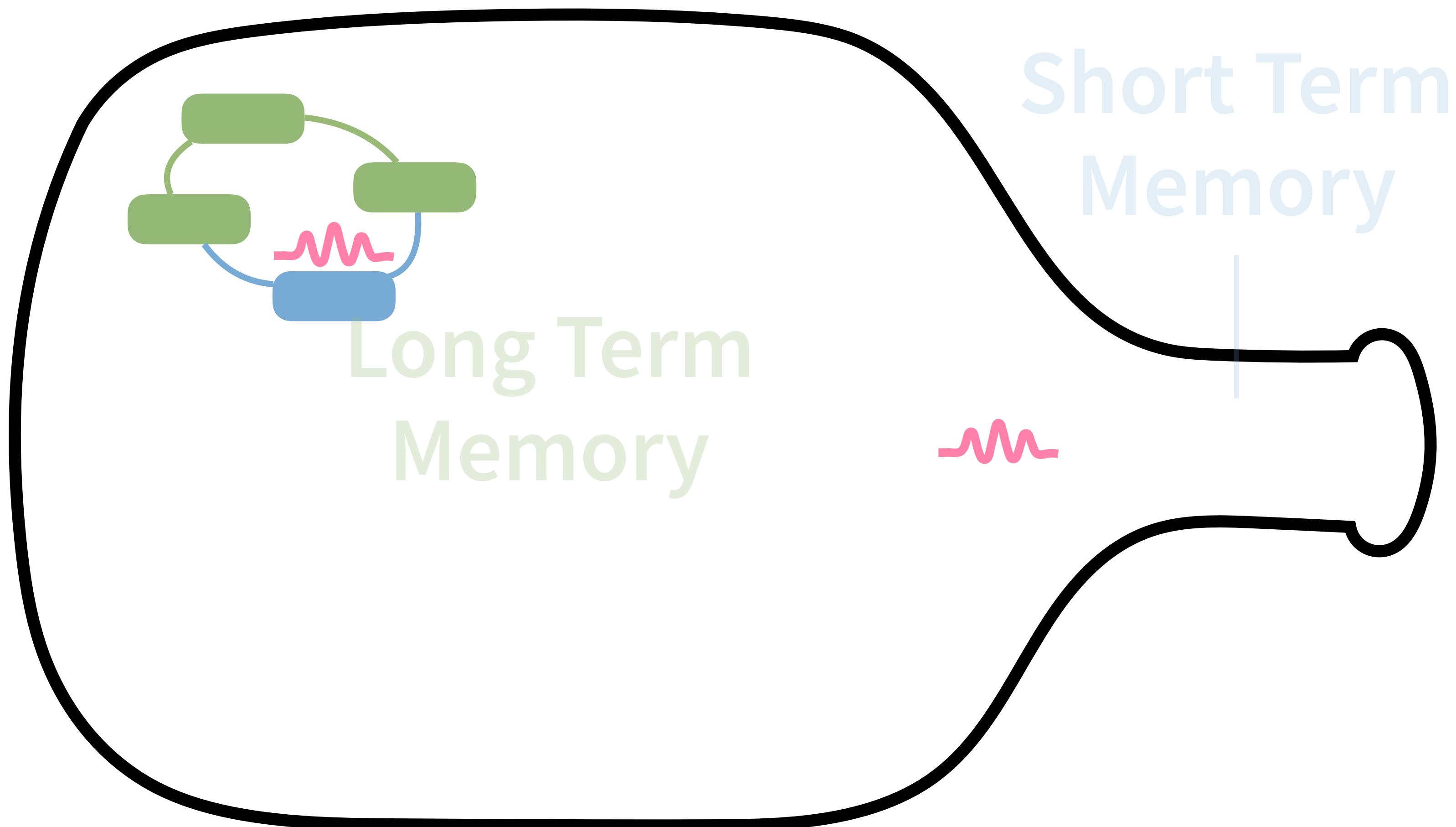
Feeling
Thinking machine











Fill in the blank

Which answer would **motivate** you the most?

If you do that, people will say _____ on twitter.

- A. nice things about data science
- B. nice things about your company
- C. nice things about you
- D. bad things about you

Which answer would motivate you the most?

If you do that, people will say _____ on twitter.

A. nice things about data science

B. nice things about your company

C. nice things about you

D. bad things about you

Your Turn

In your groups, share something that a teacher has said that you have found demotivating.



03 : 00

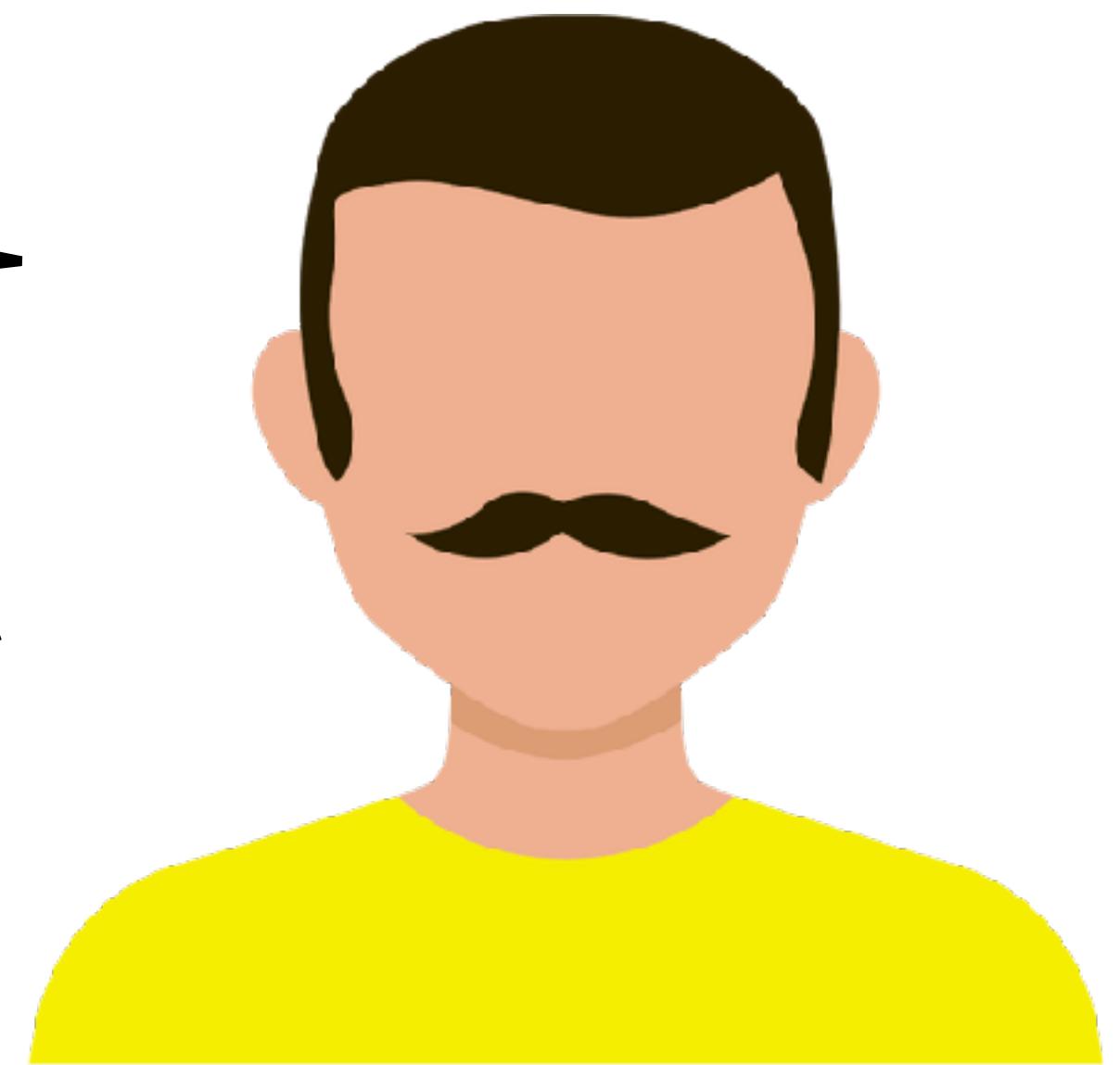


Easy

Simple

Just

Expert



Students are motivated when:

1. They see **how it benefits them**
2. They believe **they can master the material**
3. They believe **the class will help them master the material**

How it benefits them

R

Your Turn

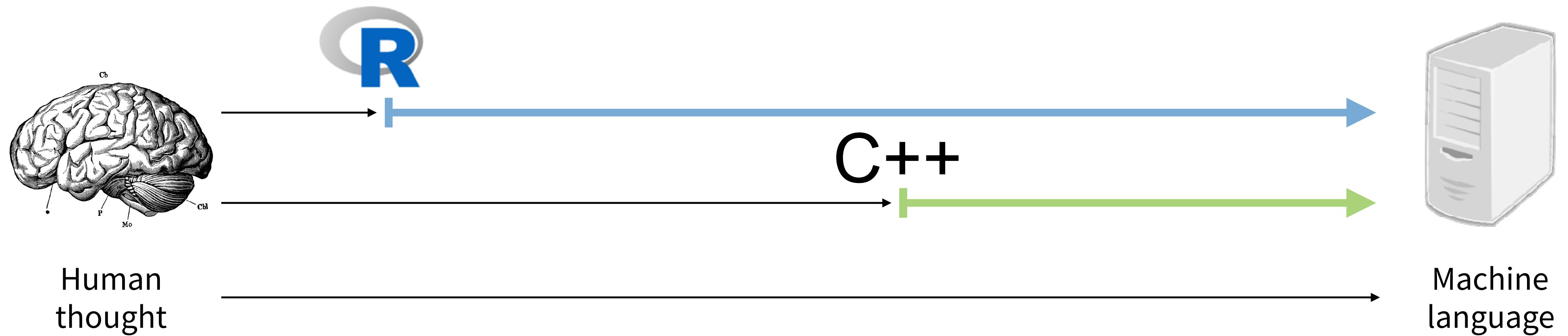
As a group, brainstorm ways to introduce R that would

- 1) motivate Data Scientists to use R. and
- 2) build on Data Scientists' day-to-day experiences.

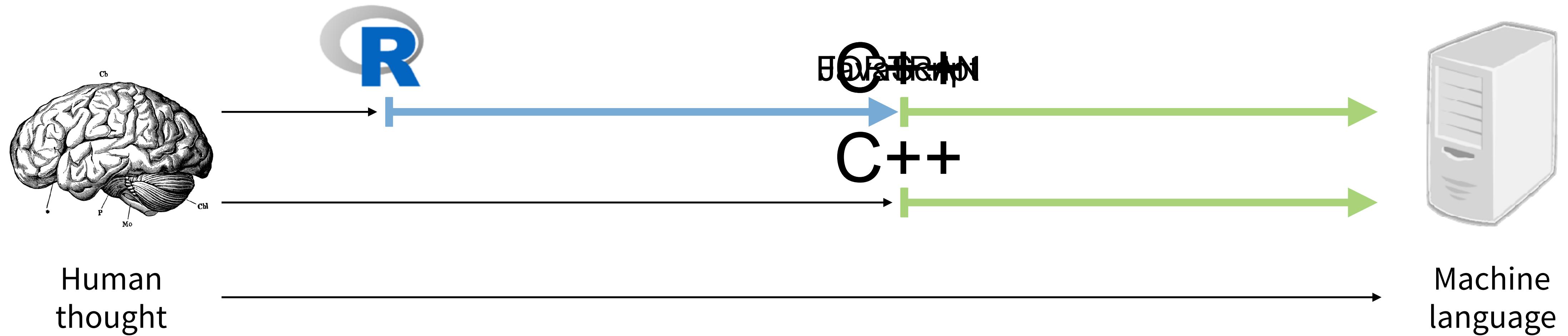
Compile your group notes into an outline of an introduction.



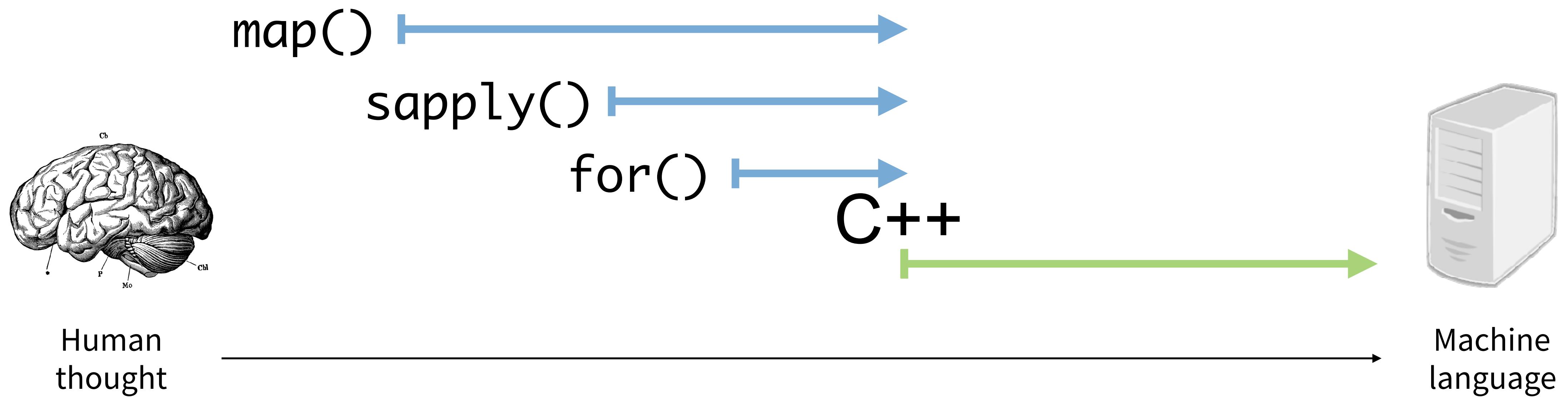
R - A computer language for scientists



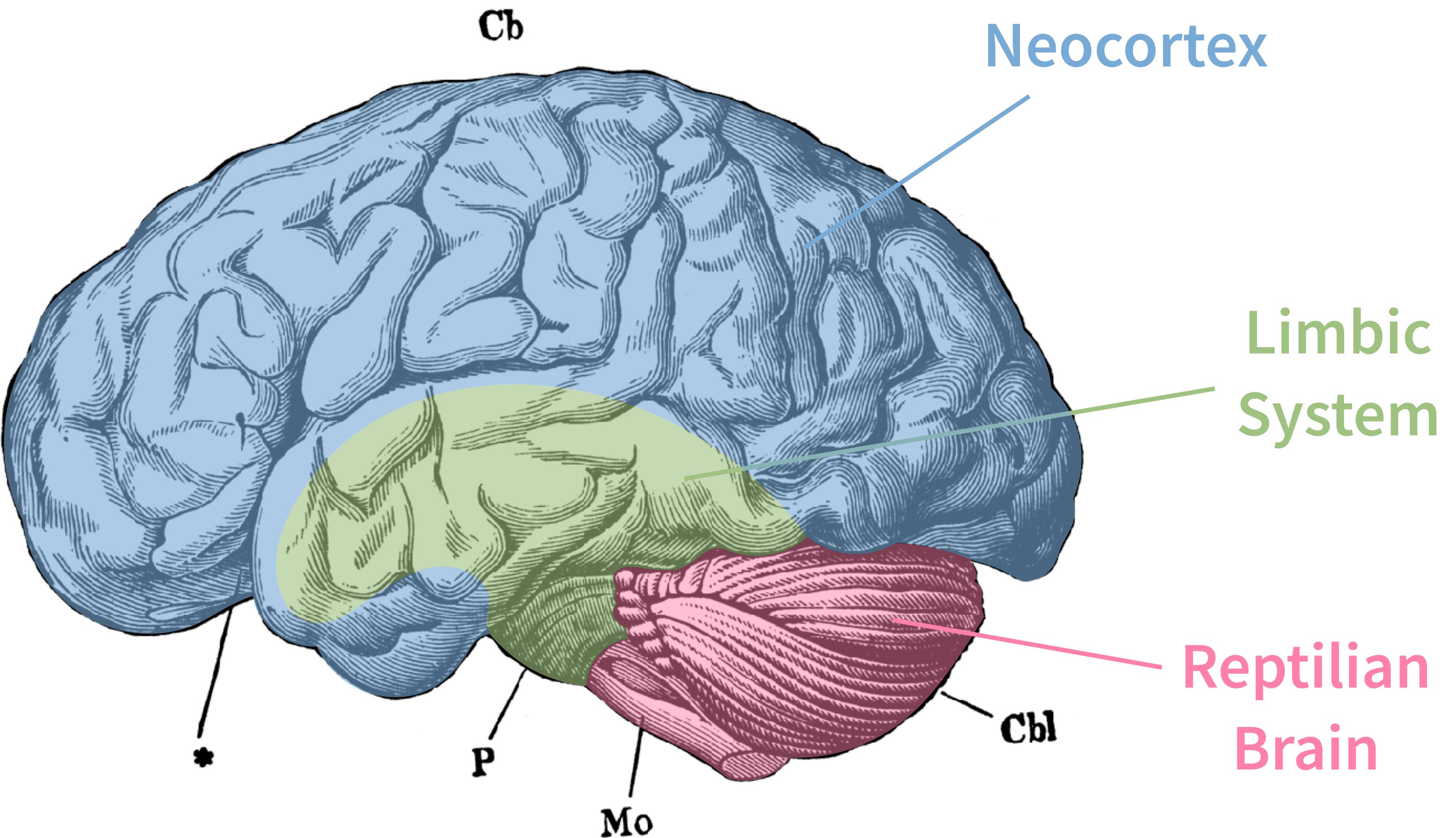
R - A computer language for scientists



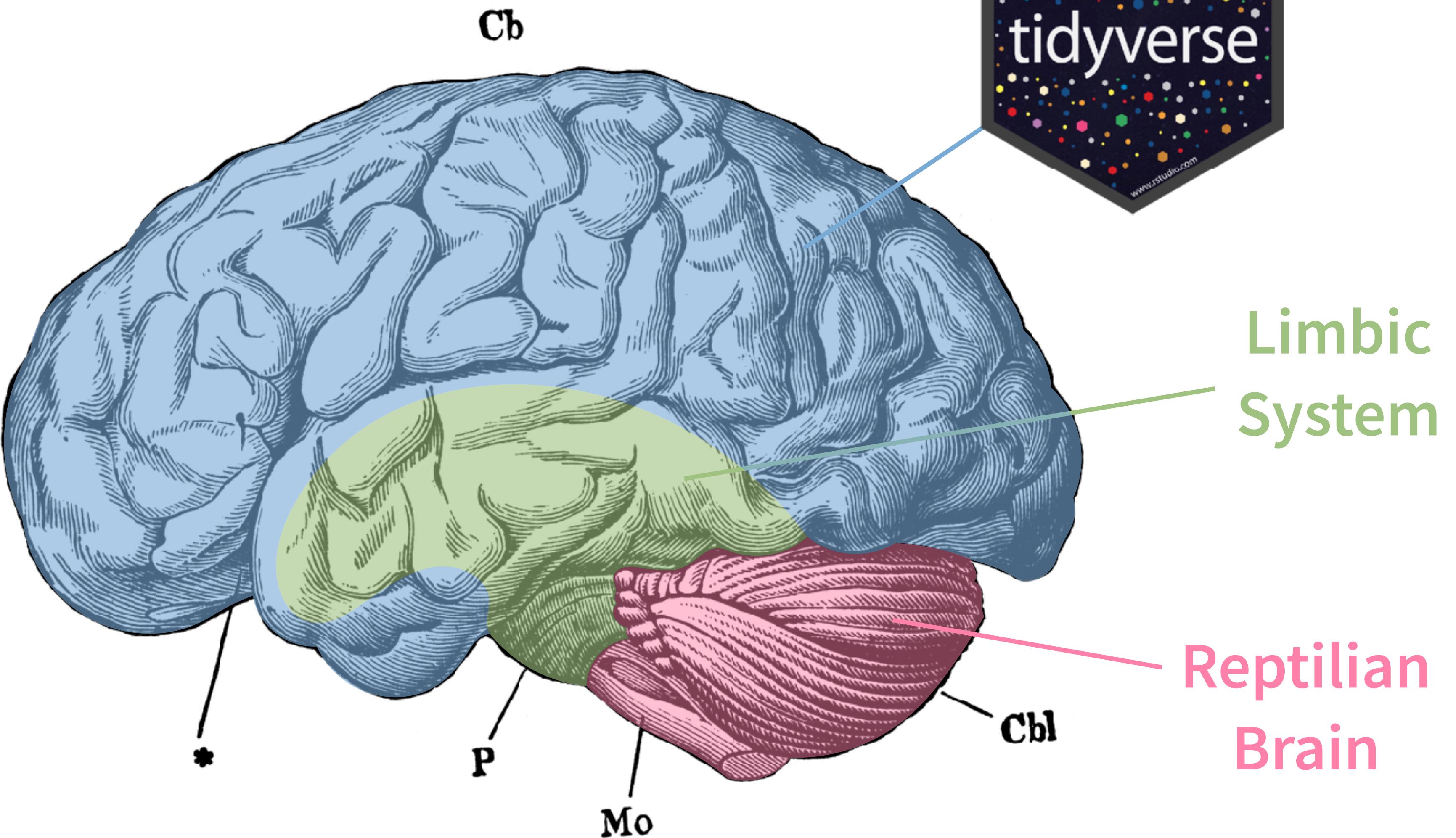
R - A computer language for scientists



O-Introduction



O-Introduction



Think-Pair-Share

With your partner, identify and refine a problem that could motivate your topic from yesterday. Is it your learning objective?

Think

02 : 00

Share

03 : 00

Students are motivated when:

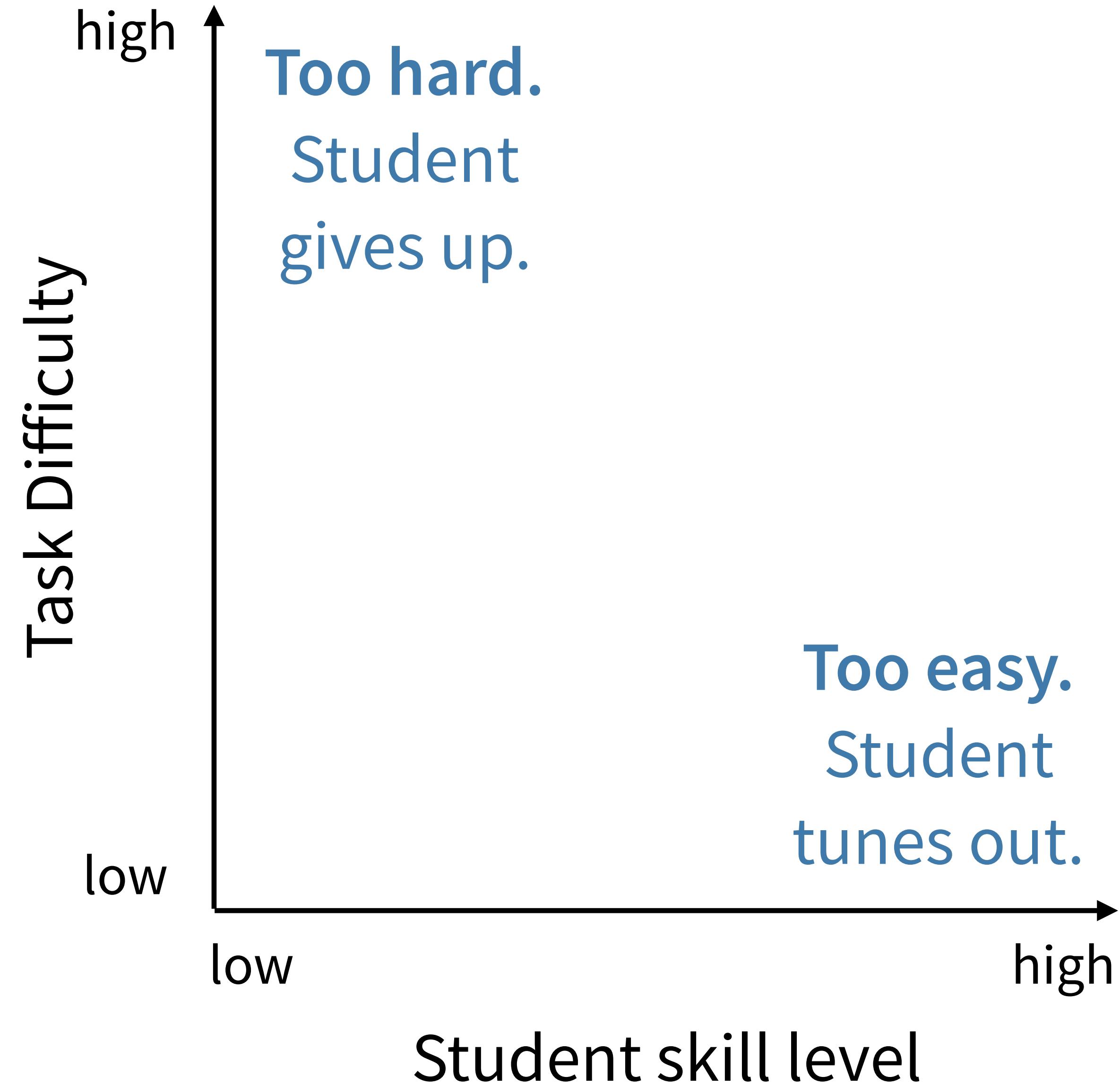
1. They see **how it benefits them**
2. They believe **they can master the material**
3. They believe **the class will help them master the material**

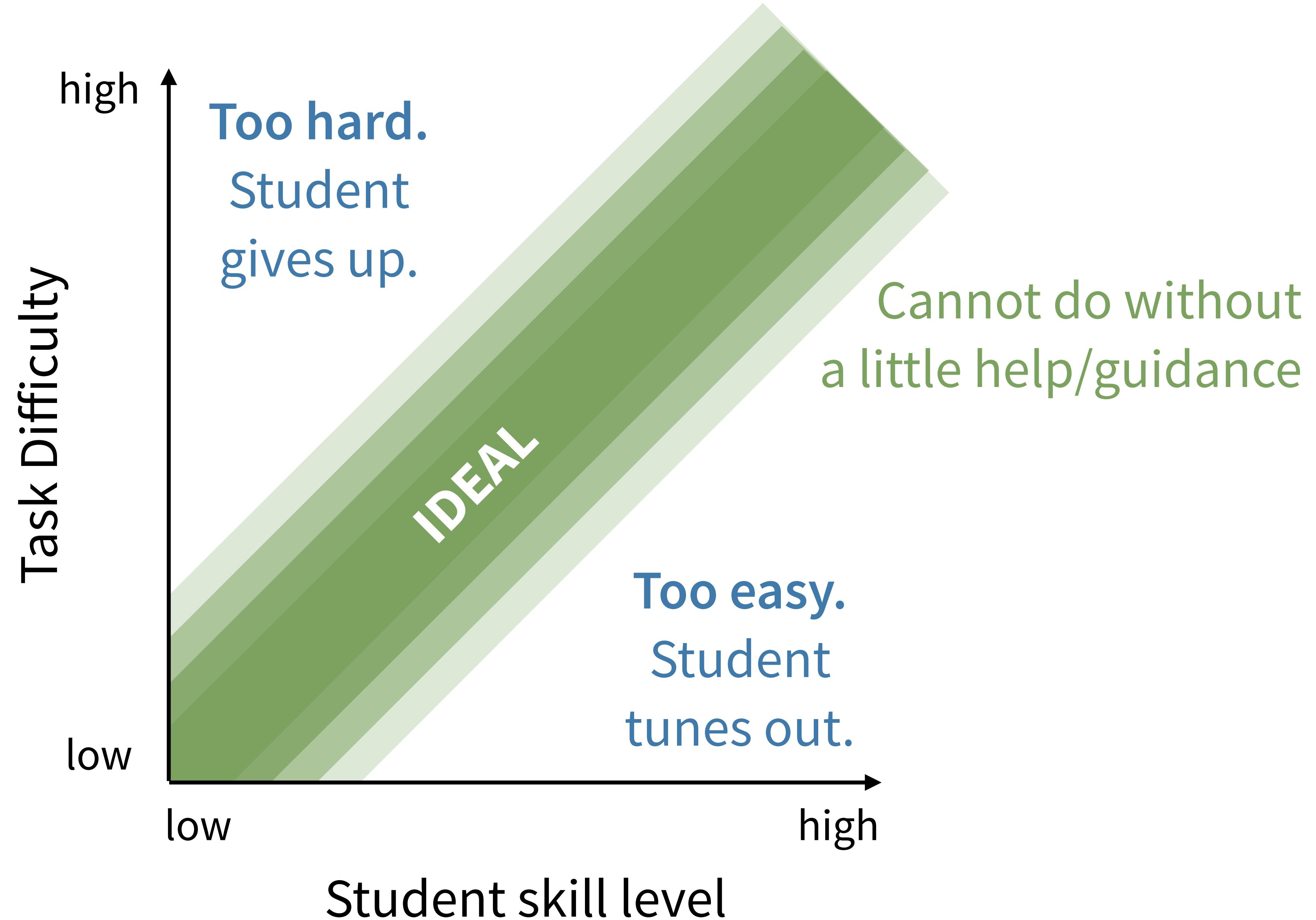
They can master
the material

R

(Difficulty)

R





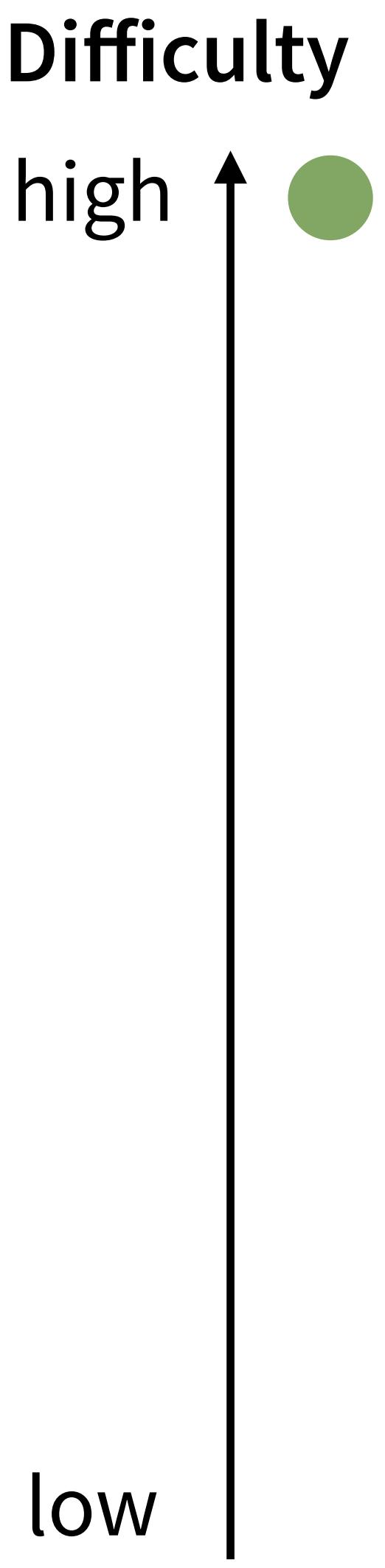
Scaffolding Exercises

Find the most popular names by sex
from 1880 to 2015.

```
babynames %>%  
  group_by(name, sex) %>%  
  summarise(total = sum(n)) %>%  
  arrange(desc(total))  
  
# # # # #  
#   name    sex total  
# 1 James     M 5120990  
# 2 John      M 5095674  
# 3 Robert    M 4803068  
# 4 Michael   M 4323928  
# 5 Mary      F 4118058  
# 6 William   M 4071645  
# 7 David     M 3589754  
# 8 Joseph    M 2581785  
# 9 Richard   M 2558165  
# 10 Charles  M 2371621  
# ... with 105,376 more rows
```

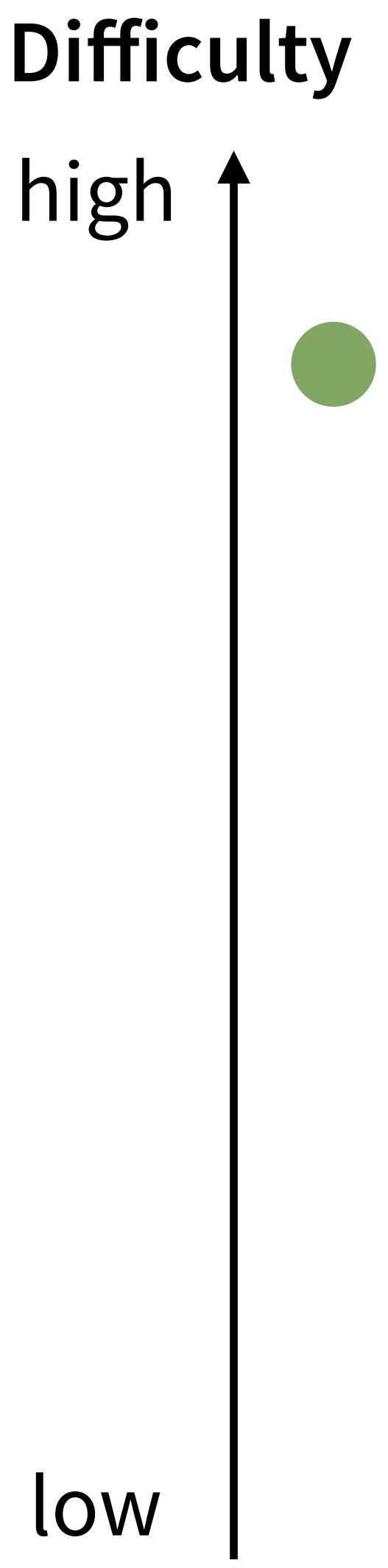
Scaffolding Exercises

Find the most popular names by sex
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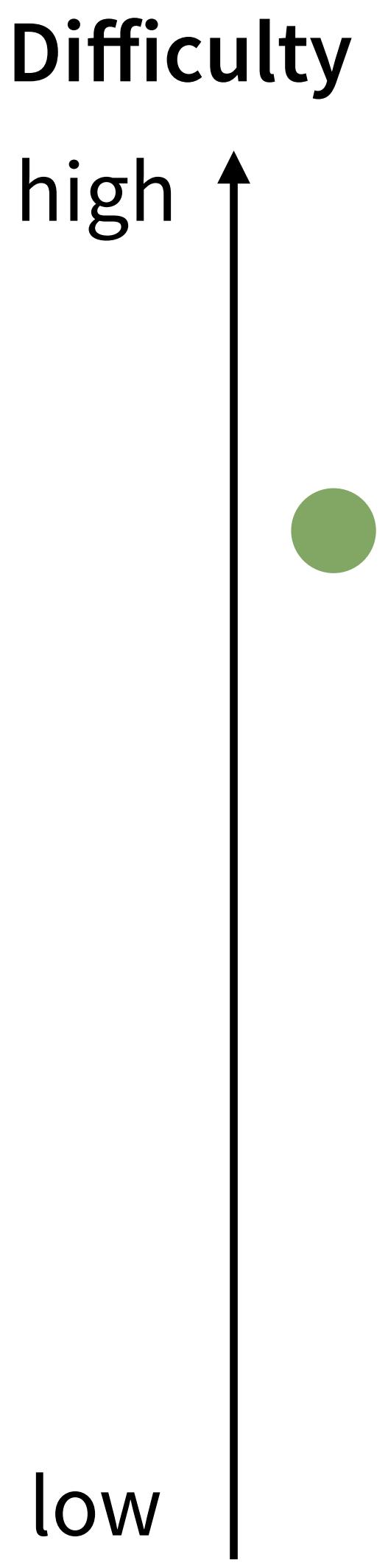
Scaffolding Exercises

Use **dplyr** commands and the **babynames** data set to find the most popular names by sex from 1880 to 2015.



Scaffolding Exercises

Use **group_by()** and **summarise()** to find the most popular names by sex from 1880 to 2015.



Scaffolding Exercises

Fill in the blanks to....

----- %>%

----- %>%

----- %>%

----- %>%

Difficulty

high ↑



low

Scaffolding Exercises

Fill in the blanks to....

```
babynames %>%
```

```
----- %>%
```

```
arrange(desc(total))
```

Difficulty

high ↑



low

Scaffolding Exercises

Fill in the blanks to....

```
babynames %>%  
  group_by(____, ____) %>%  
  summarise(____) %>%  
  arrange(desc(total))
```

Difficulty

high

low



Scaffolding Exercises

What goes wrong? Can you fix it?

```
babynames %>%  
  group_by(name) %>%  
  summarise(total = sum(n)) %>%  
  arrange(desc(total))
```

Difficulty

high ↑

low



Scaffolding Exercises

Predict what the code will do

```
babynames %>%  
  group_by(name, sex) %>%  
  summarise(total = sum(n)) %>%  
  arrange(desc(total))
```

Difficulty

high ↑

low



Scaffolding Exercises

Difficulty

high ↑

Which chunk will find the most popular names?

A

```
babynames %>%  
  group_by(name, sex) %>%  
  summarise(total = sum(n)) %>%  
  arrange(desc(total))
```

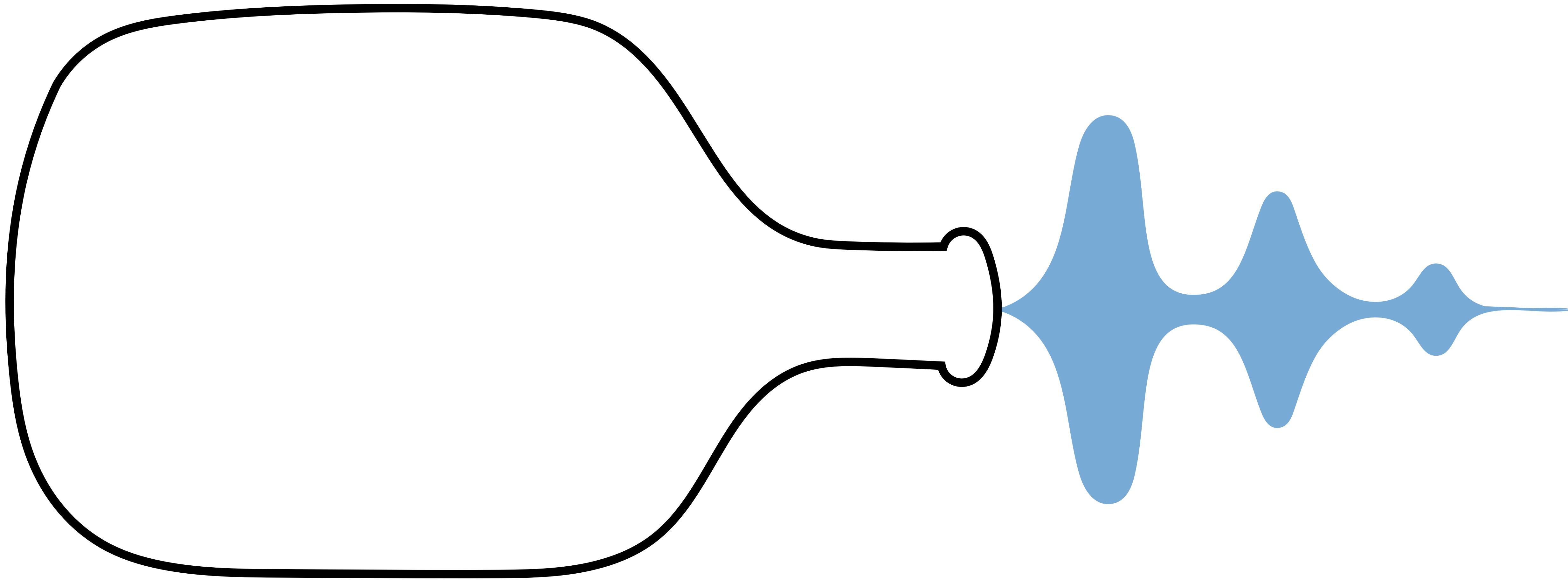
B

```
babynames %>%  
  filter(year == 2015,  
         sex == "F") %>%  
  select(name, n)
```

low



Scaffolding Exercises



Scaffolding Ideas

Difficulty

high

Open ended question

Fill in the blank

Multiple choice

True or False

Matching

Fix the code

What will go wrong?

What will the code return?

rearrange lines of code

Solve with code

Write the code

Extend the code

Modify the code

Fill in the blanks

low

General
Knowledge

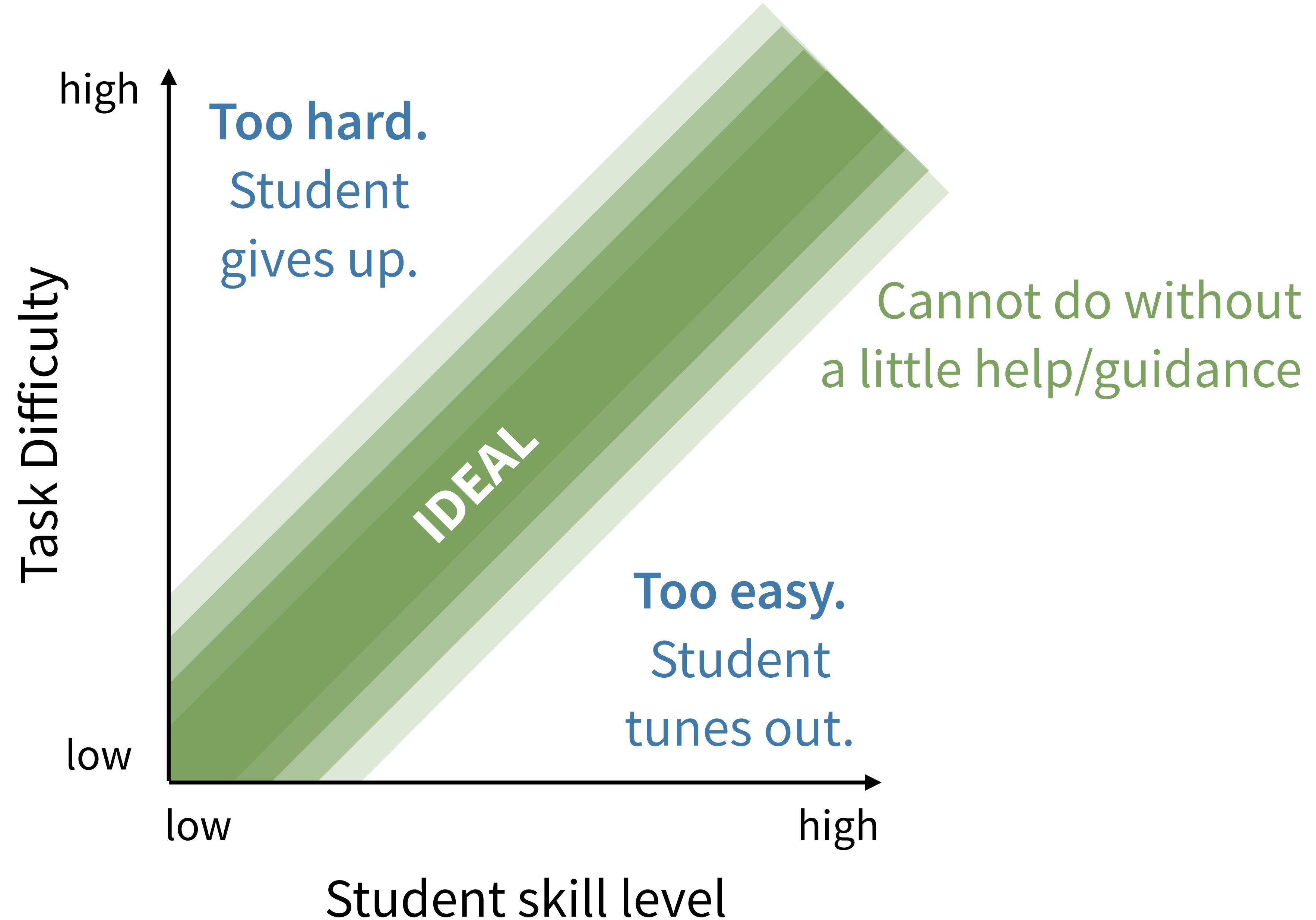
Thinking
about code

Writing
code

Scaffolding Ideas

Extend the pipe to arrange the results by total n.

```
babynames %>%  
  group_by(name, sex) %>%  
  summarise(total = sum(n))
```



Your Turn

Scaffold your series of exercises to become progressively harder

or choose one exercise from the series and expand it into a sequence of scaffolded exercises.



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The class will
help them

R

Quiz

How do you know if a class will help you?

Workshops – RStudio x Master the tidyverse – RStudio x

Garrett

Secure | https://www.rstudio.com/workshops/master-the-tidyverse/

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MASTER THE TIDYVERSE

THURSDAY, OCTOBER 5, 2017, 9 A.M. - FRIDAY, OCTOBER 6, 2017, 5 P.M.

WASHINGTON, DC

[REGISTER](#)



An introduction to R for data science

This two-day workshop covers the new book “R for Data Science” from Hadley Wickham and Garrett Grolemund. The workshop provides a comprehensive overview of what is now called the Tidyverse, a core set of R packages that are essential to Data Science. We will visualize, transform, and model data in R and work with date-times, character strings,

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The dashboard has sections for Cheatsheets, Webinars, and Shiny Tutorials.

Garrett

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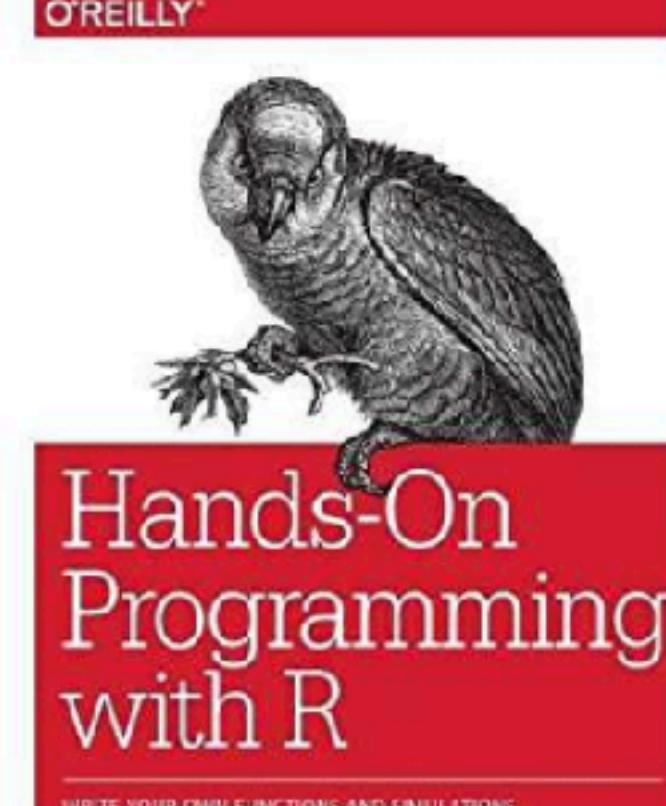
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 **R for Data Science**
IMPORT, TIDY, TRANSFORM, VISUALIZE, AND MODEL DATA
Hadley Wickham & Garrett Grolemund

 **Hands-On Programming with R**
WRITE YOUR OWN FUNCTIONS AND SIMULATIONS
Garrett Grolemund
Foreword by Hadley Wickham

R for Data Science: Import, Tidy, Transform, Visualize, and Model Data Jan 5, 2017
\$17.26 - \$18.17
prime | FREE One-Day
Paperback, Kindle Edition

Hands-On Programming with R: Write Your Own Functions and Simulations Aug 2, 2014
\$17.27 - \$33.68 prime
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All Data Science Courses

 Data Manipulation in R with dplyr

Master techniques for data manipulation using the select, mutate, filter, arrange, and summarise functions in dplyr.

4 hours

 GARRETT GROLEMUND
Data Scientist at RStudio

 Joining Data in R with dplyr

This course will show you how to combine data sets with dplyr's two table verbs.

4 hours 

 GARRETT GROLEMUND
Data Scientist at RStudio

 Reporting with R Markdown

Learn to create interactive analyses and automated reports with R Markdown.

3 hours

 GARRETT GROLEMUND
Data Scientist at RStudio

 Working with the RStudio IDE (Part 1)

Learn the basics of the important features of the RStudio IDE.

 Working with the RStudio IDE (Part 2)

Further your knowledge of RStudio and learn how to integrate Git, LaTeX, and Shiny.

 Data Visualization in R with ggvis

Learn to create interactive graphs to display distributions, relationships, model fits, and

Think-Pair-Share

Outline a way to introduce yourself that advertises

1. Your expertise

2. Your desire to help the students

Share the introduction with your partner for feedback.

Think

05 : 00

Share

05 : 00

Your Turn

Take a moment to answer the questions in the motivation handout.



Course Design



Students are motivated when:

1. They see **how it benefits them**
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Quick Wins

R

Students are motivated when:

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Quiz

Are your students attempting to become
Data Scientists or Computer Scientists?

Think-Pair-Share

Generate two lists:

What R topics do **Data Scientists** want to know?

What R topics do **Computer Scientists** want to know?

Think

03 : 00

Share

02 : 00

1. Basics of RStudio
2. Data Structures
3. Subsetting
4. For Loops

5. Writing Functions
6. Writing Data
7. Data Manipulation
8. Writing Reports

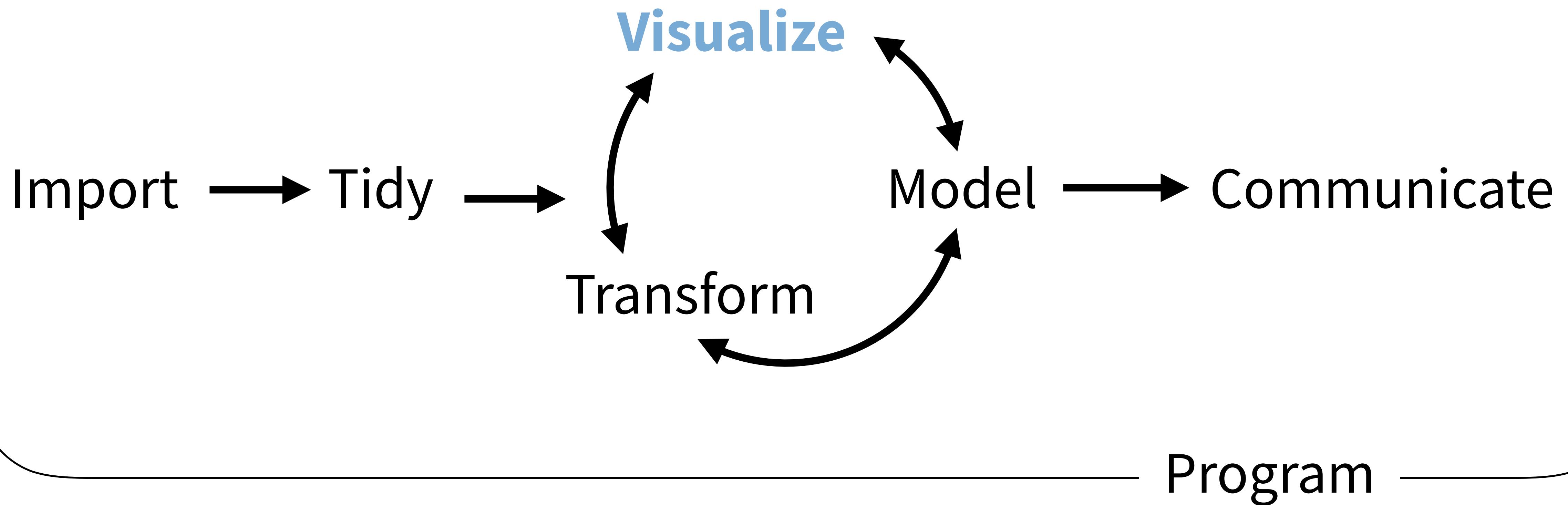
Data Science or
Computer Science?

1. Visualize Data
2. Transform Data
3. Tidy Data
4. Import Data

5. Data Types
6. Iteration
7. Models
8. List Columns

Data Science or
Computer Science?

(Applied) Data Science



Poll

Did you first learn R as a programming language?

1. Basics of RStudio

2. Data Structures

3. Subsetting

4. For Loops

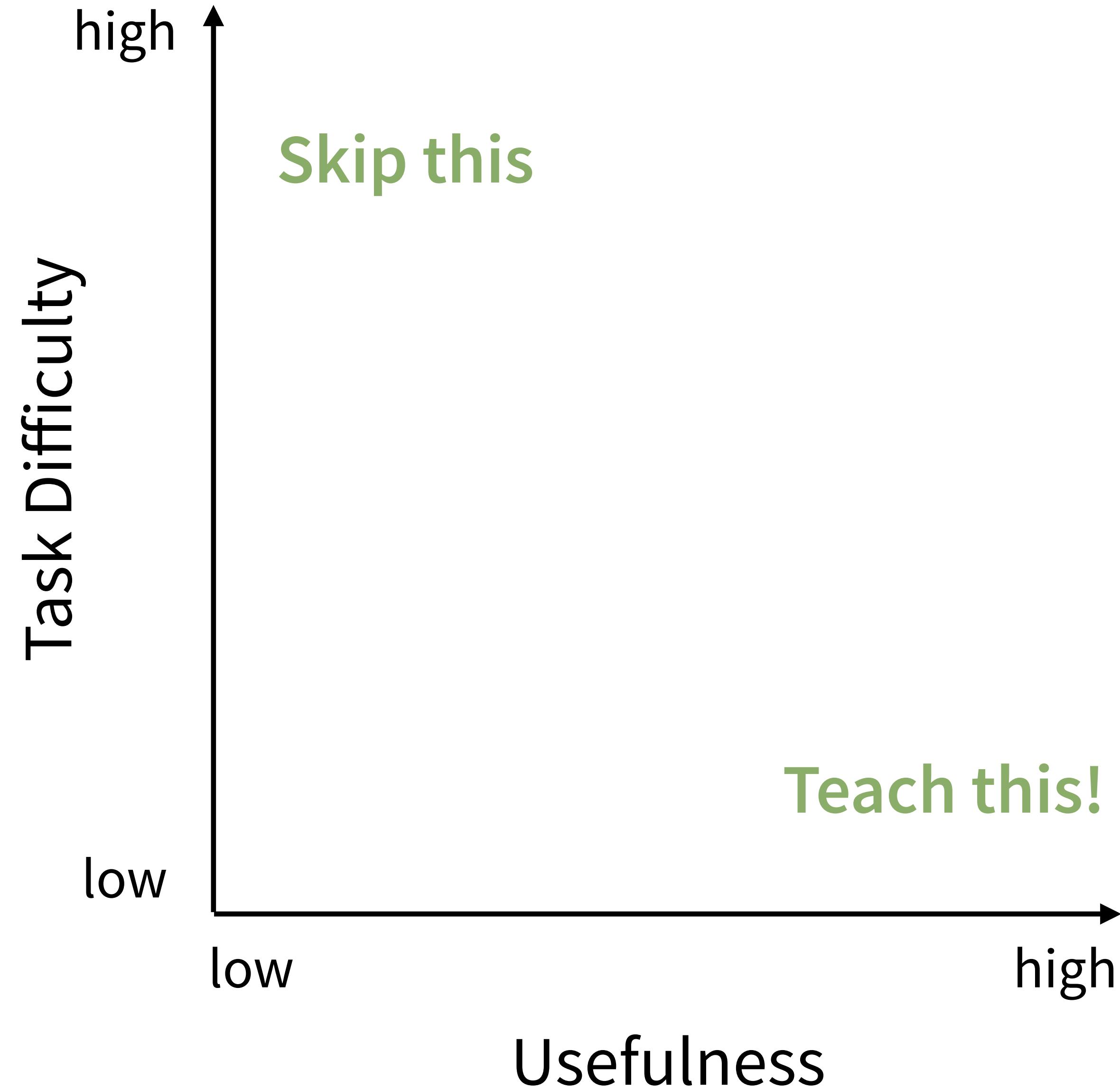
5. Writing Functions

6. Writing Data

7. Data Manipulation

8. Writing Reports





Just In Time Learning

R

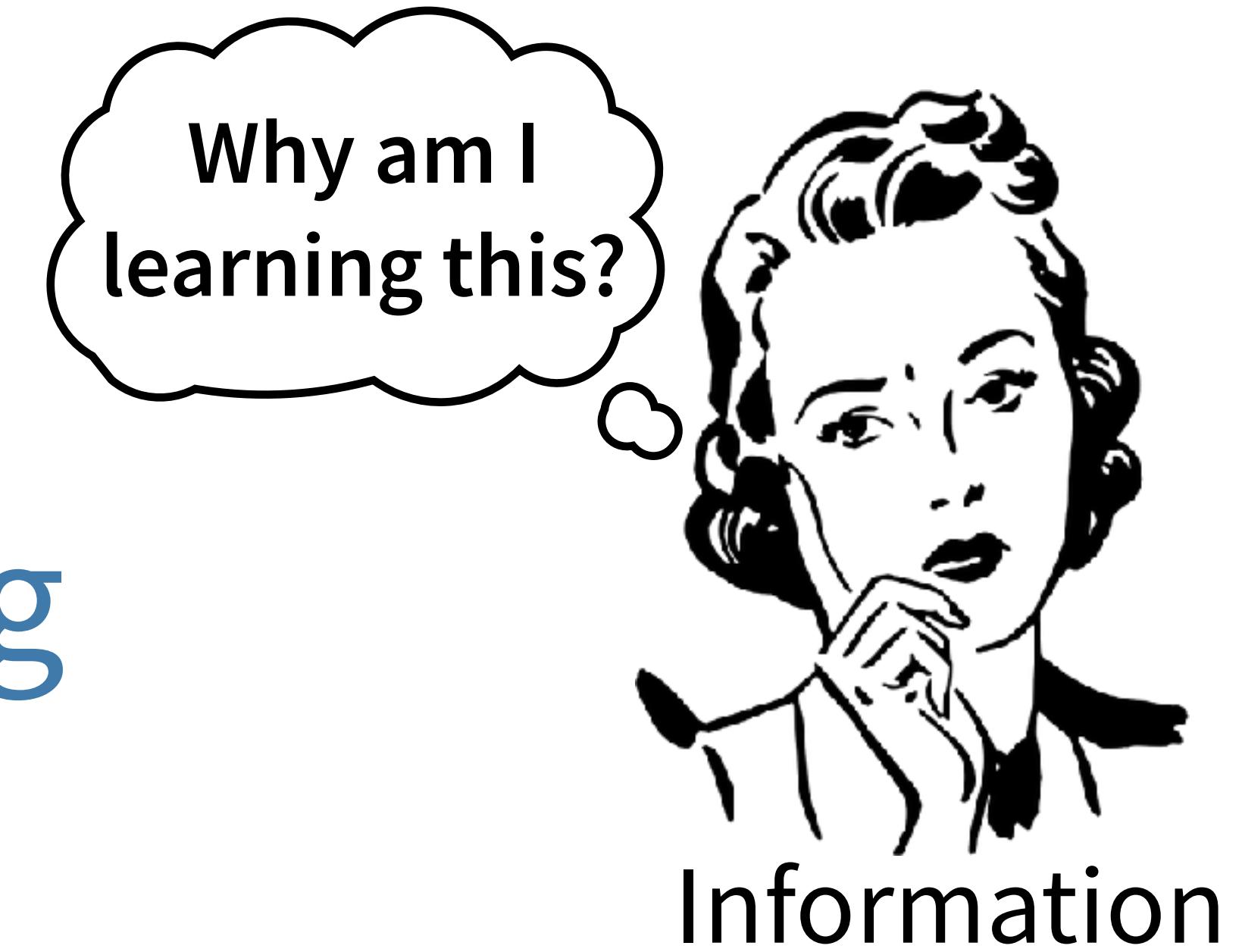
Trivia

What does this mean:

Trivia

What does this mean: Wax On, Wax Off.

Ahead of time learning



Information



Task

Just in time learning



Task



Information

Your Turn

Add a motivating introduction to your topic outline.
Then interleave your scaffolded exercises into the
outline in a way that motivates a Just In Time
presentation of your subtopics.



Class Participation

Survey

Which would better promote your participation?

A

Meeting and talking
to classmates.

B

30 minutes of
lecture

Survey

Which would better promote your participation?

A

Anyone? Anyone?

B

Being personally
asked for an answer.

Survey

Which would better promote your participation?

A

Being cold called.

B

Having time to
prepare an answer
with a group.

Survey

Which would better promote your participation?

A

Individual exercises.

B

Group or pair work.

Survey

Which would better promote your participation?

A

Getting praised.

B

Getting ignored.

Motivating Students

