Their Turn

Warm Up

The code below computes the mean of a vector named **x** (e.g. **x <- 1:10**).

sum(x) / length(x)

Save it in your computer's memory in such a way that you can access it later and *apply* it to take the mean of any vector.

```
my_mean <- function(x) {
  sum(x) / length(x)
}
```

```r
my_mean <- function(x) {
  sum(x) / length(x)
}

my_mean(c(1, 1, 1, 4))
# [1] 1.75
```

Learning is a three part process, in which a student:

1. **Receives** information accurately
2. **Remembers** the information (long term memory)
3. In such a way that they can **reapply** the information when appropriate

```
my_mean <- function(x) {
  sum(x) / length(x)
}
```

1. **Receives** information accurately

```
my_mean <- function(x) {
  sum(x) * length(x)
}
```

1. **Receives** information accurately

```
my_mean <- function(x) {
  sum(x) / length(x)
}
```

1. **Receives** information accurately
2. **Remembers** the information (long term memory)

```
function(x) {
  sum(x) / length(x)
}
```

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my_mean <- function(x) {
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```

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```
x <- 1:10
my_mean <- function() {
  sum(x) / length(x)
}

my_mean()
# Error in my_mean(c(1, 1, 1, 4)) : unused argument (c(1, 1, 1, 4))
```

1. **Receives** information accurately
2. **Remembers** the information (long term memory)
3. In such a way that they can **reapply** the information when appropriate

programming is to computer
as
teaching is to brain

Your Turn

Think of one way in which this analogy fails:

programming is to computer

as

teaching is to brain

Then pair up with the person next to you and compare your thoughts.

	Day 1	Day 2
9:00 - 10:30	Two Ways to Teach	**Their Turn**
Morning Break		
10:45 - 12:00	How to Teach a Workshop	Motivating Students
Lunch		
1:00 - 2:45	The Cognitive Craft	Providing R
Afternoon Break		
3:00 - 5:00	Make It Clear	Make it Stick


Dodgers

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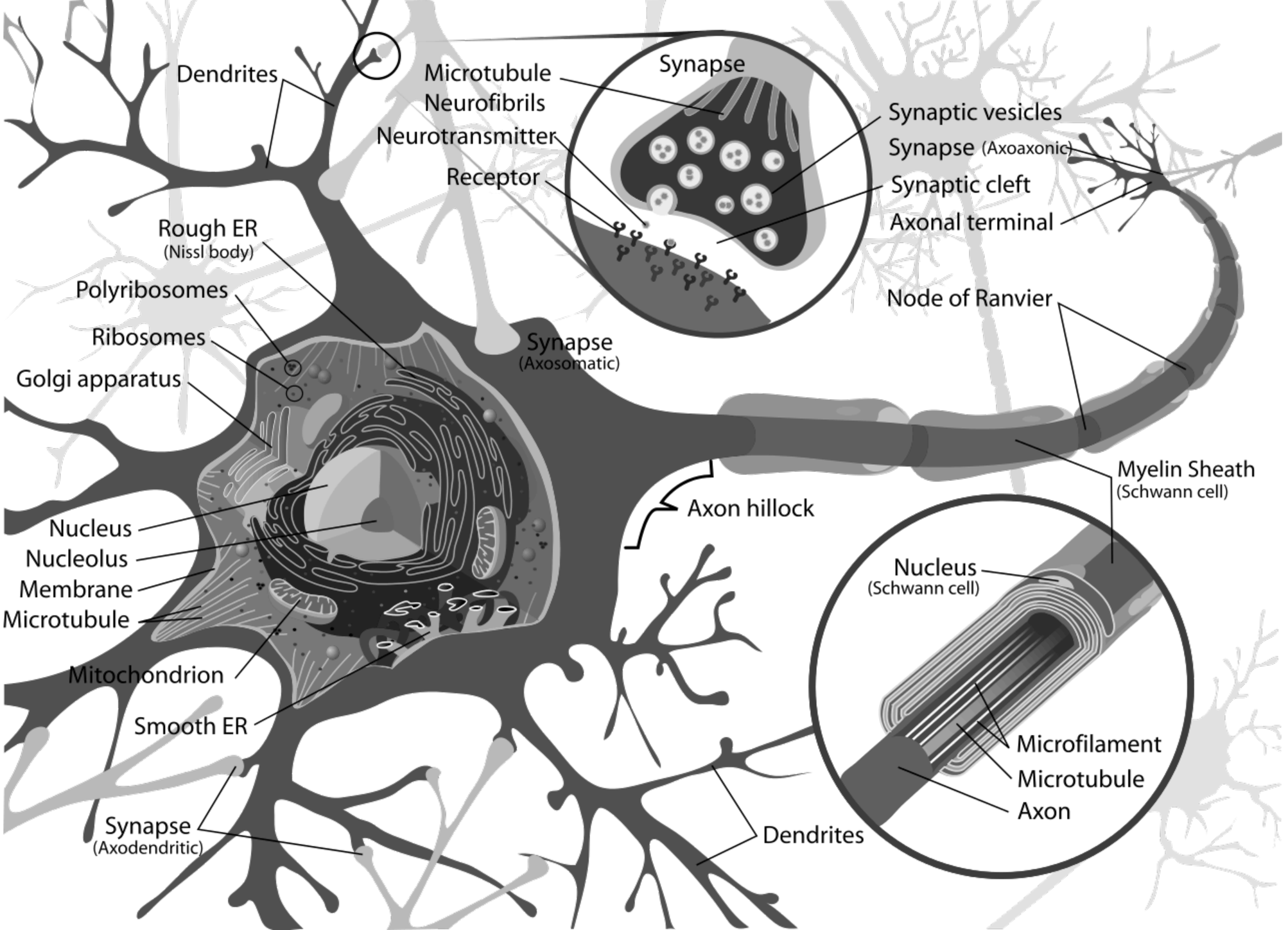
The Brain



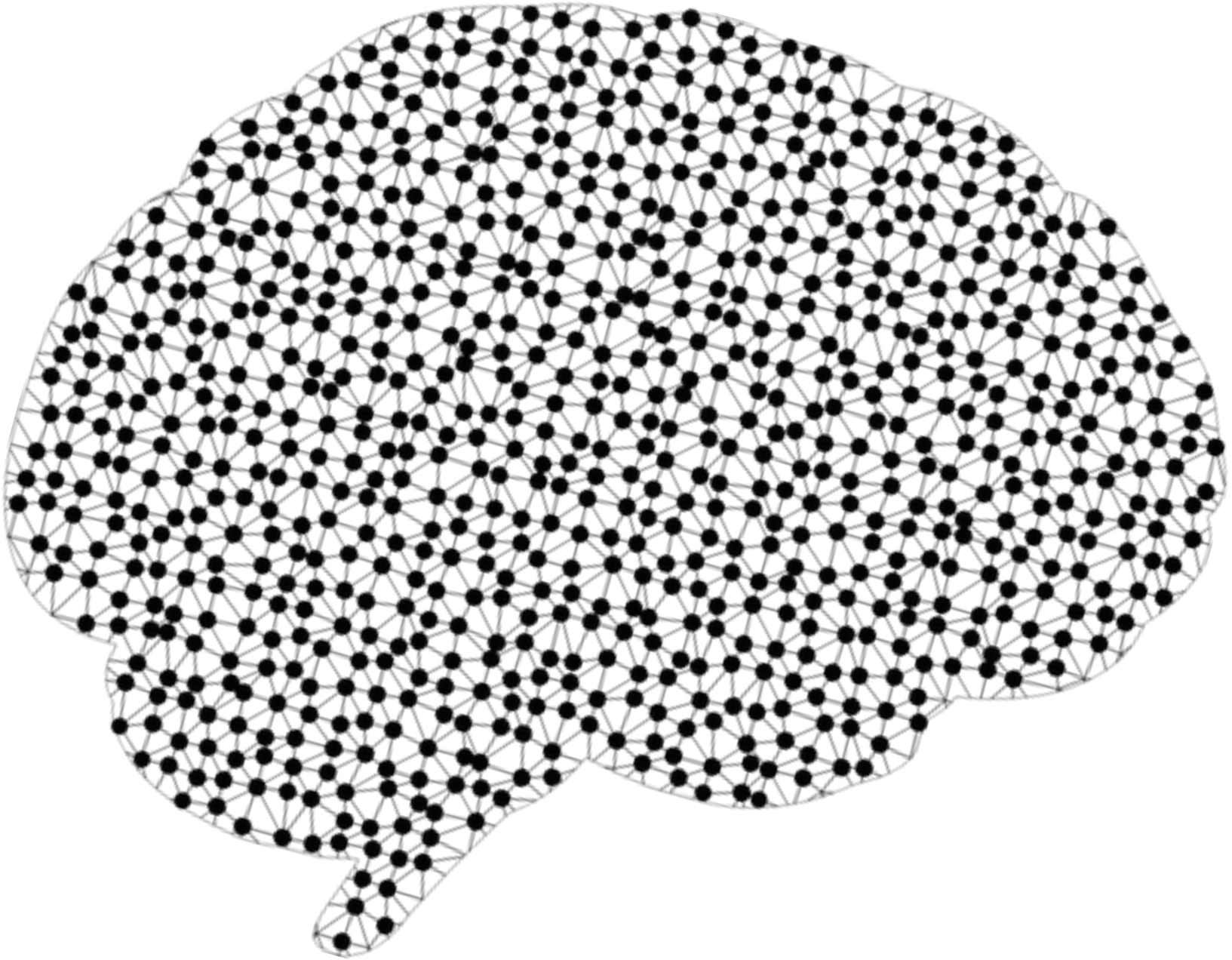
Quiz

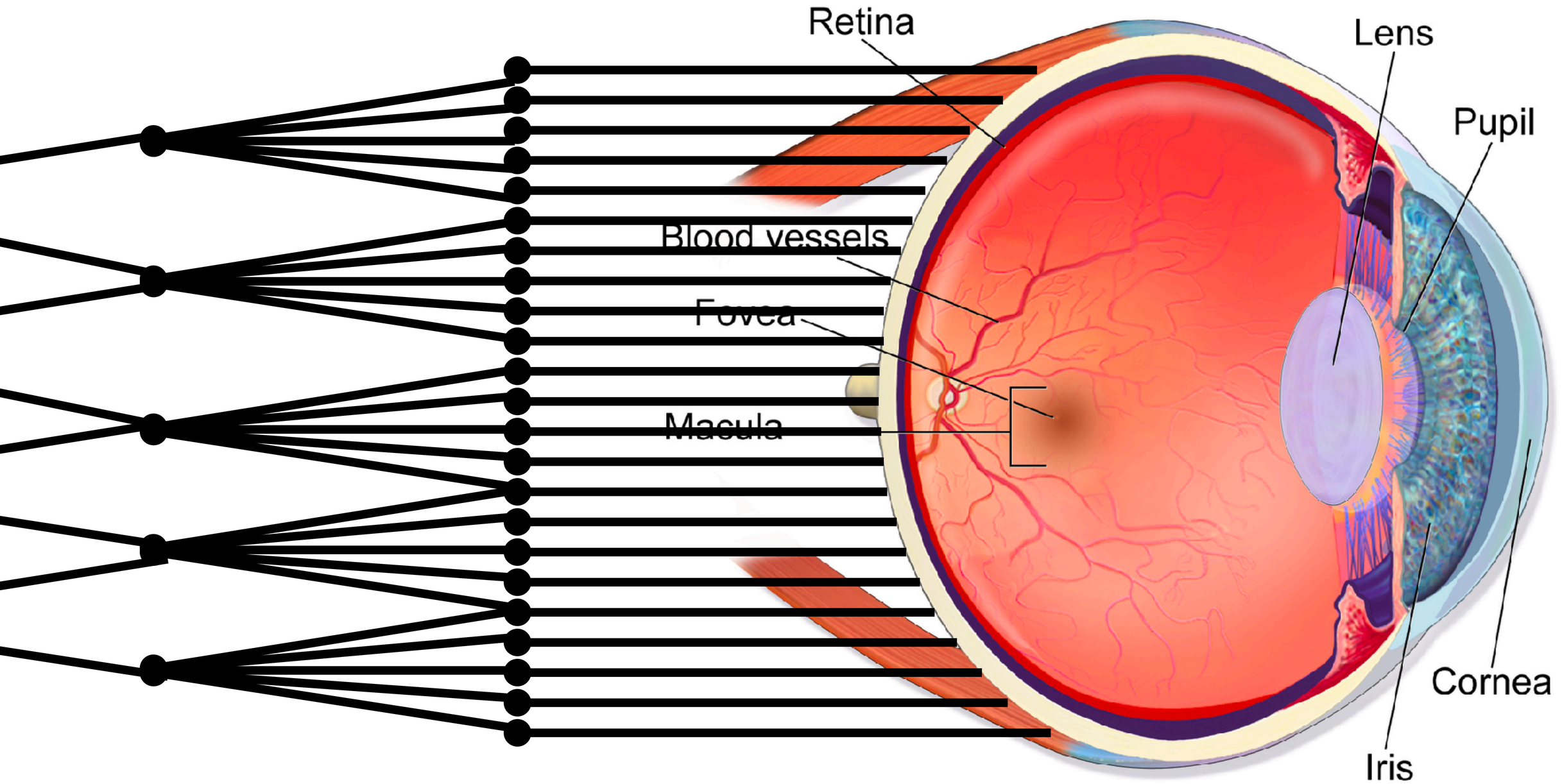
How long is a neuron?

Quiz

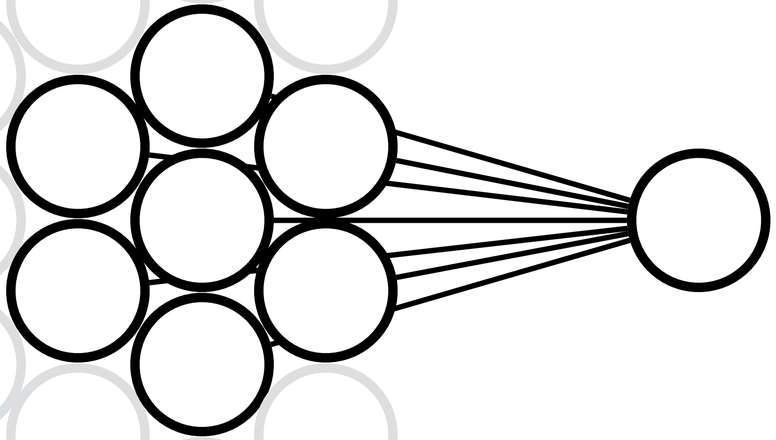
How long is a neuron?

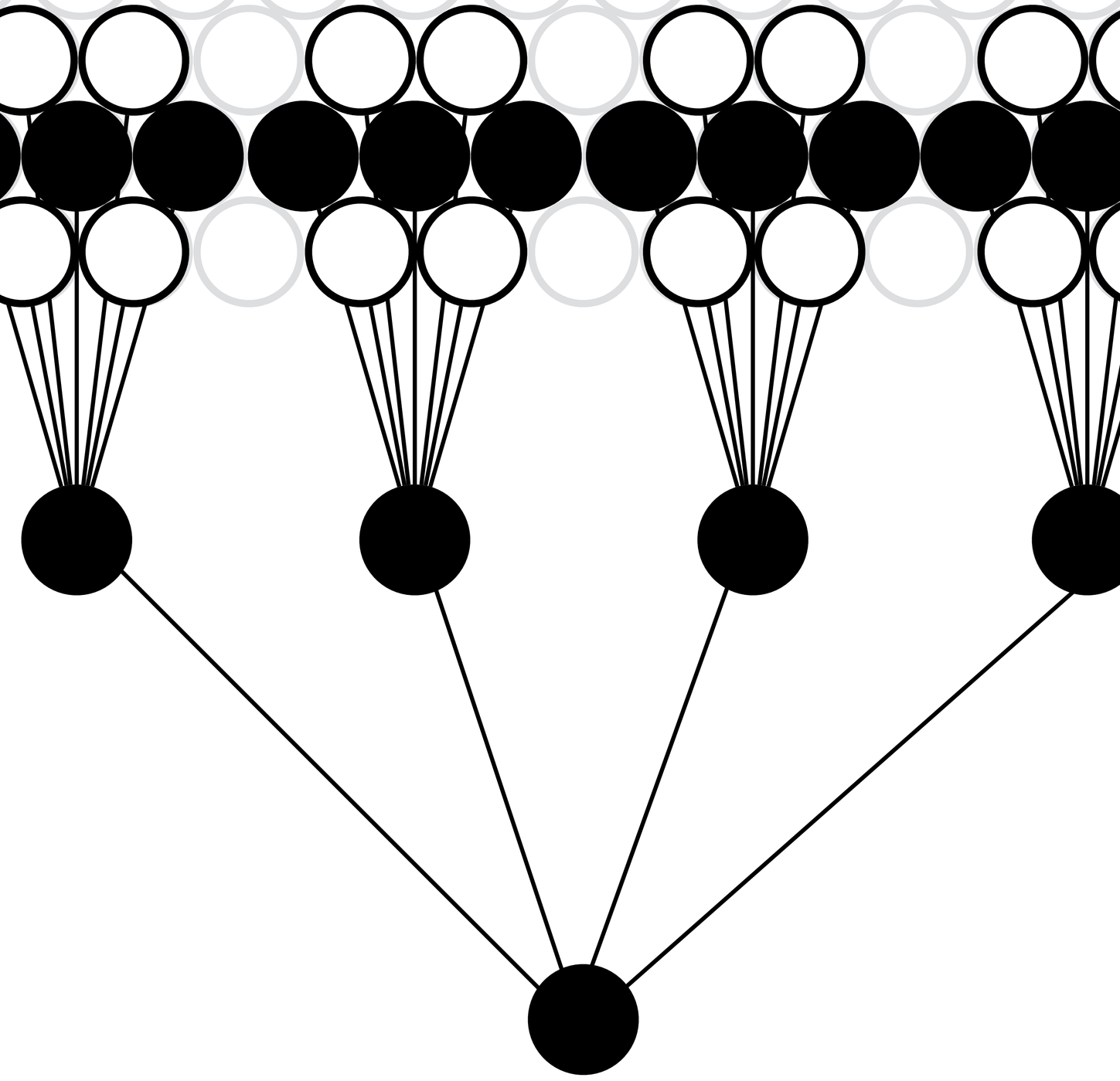
The longest can reach ~5 feet in adults



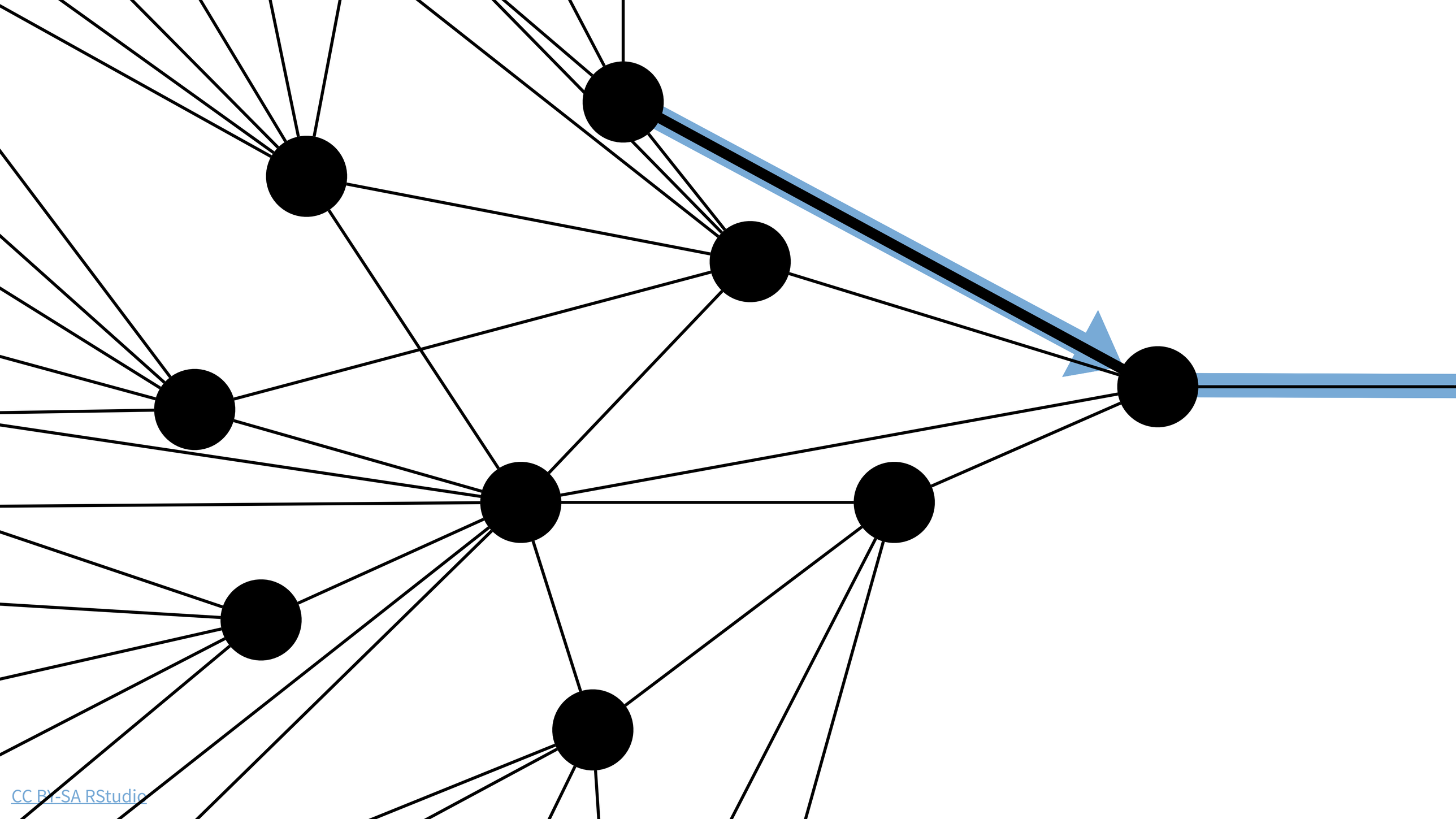


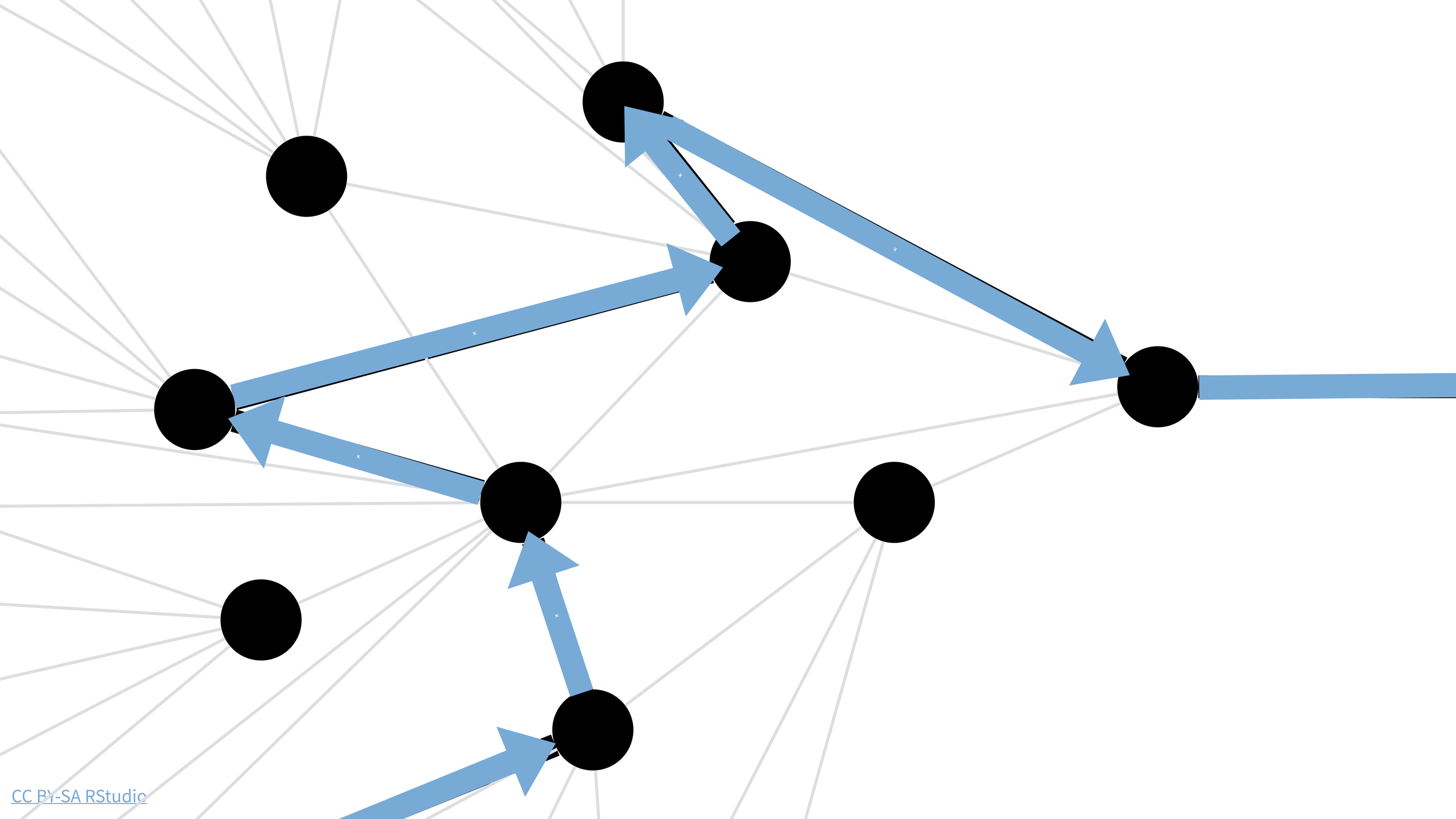
Eye Anatomy





Neurons that fire together, wire together.





Quiz

What is the key ingredient for strengthening neural connections?

repetition

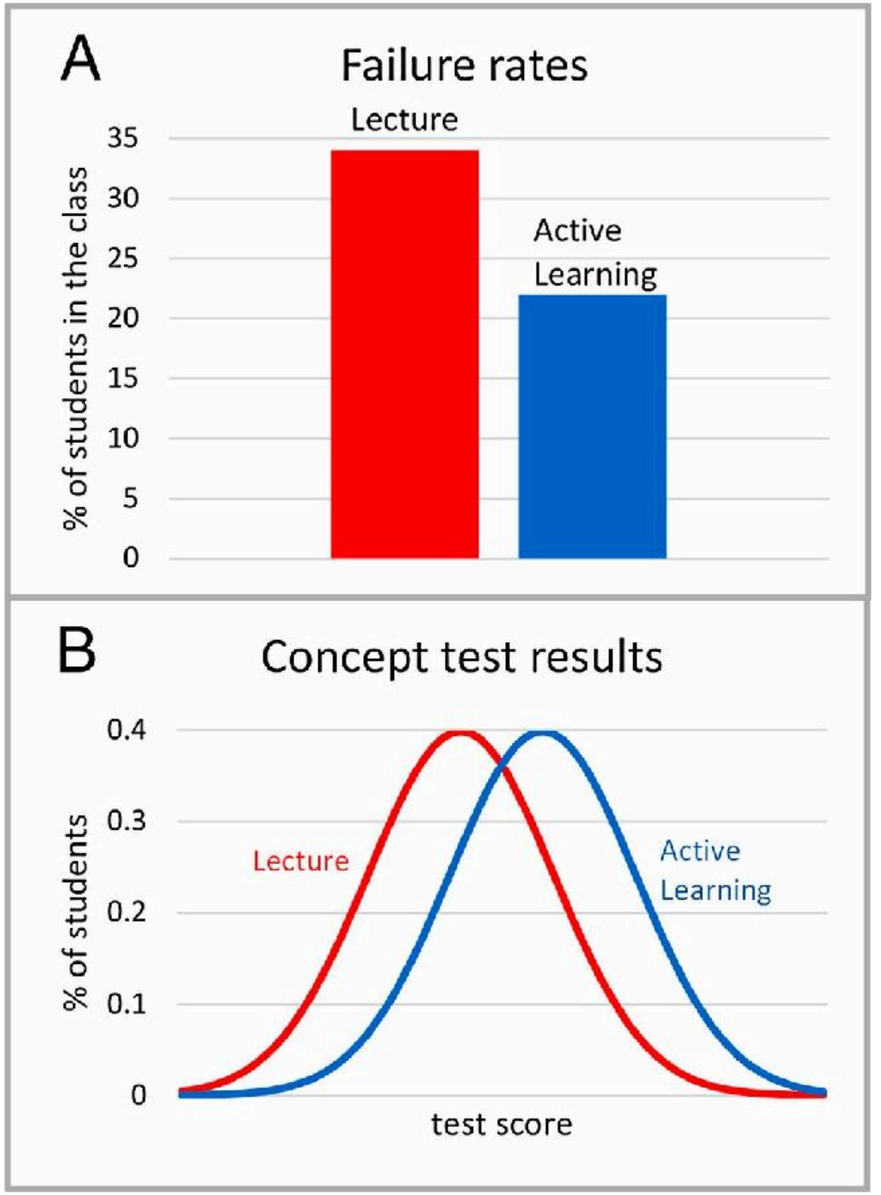
(repeated firing)

Practice

Active learning is any method that requires students to:

1. do something
2. think about what they are doing

- Wieman, C. E. (2014). Large-scale comparison of science teaching methods sends clear message. Proceedings of the National Academy of Sciences, 111(23), 8319-8320.



Learning objectives

Learning objective

The goal of a course or section stated in a way that is

1. **clear**, a student should be able to understand
2. **observable** a student (and you) should be able to easily check whether or not thay have attained the objective

Why use?

1. identify **material to cut**
2. ensure **cohesion** (section objectives should lead to course objective)
3. help **students self-monitor**
4. suggest **exercises**

Your Turn

Choose a learning objective for a workshop on the R package that you explained yesterday.

Then create a concept map of the skills needed to perform the objective.

Exercises

Options for teaching a complex subject

Teach **all at once** then **test**

Teach **simplified summary**

Teach **isolated elements** test after each

Teach **simplified summary** then expand

“Data!data!data!" he cried impatiently.
"I can't make bricks without clay.”

- Sherlock Holmes, The Adventure of the Copper Beeches

Your Turn

Examine the data set packages. Devise a series of exercises that test the skills in your concept map and (if possible) build on each other. How will you provide feedback?

Formative Feedback

Feedback

Should be

1. **helpful**, explain how the student could improve
2. **useable** a student should have a chance to apply it immediately

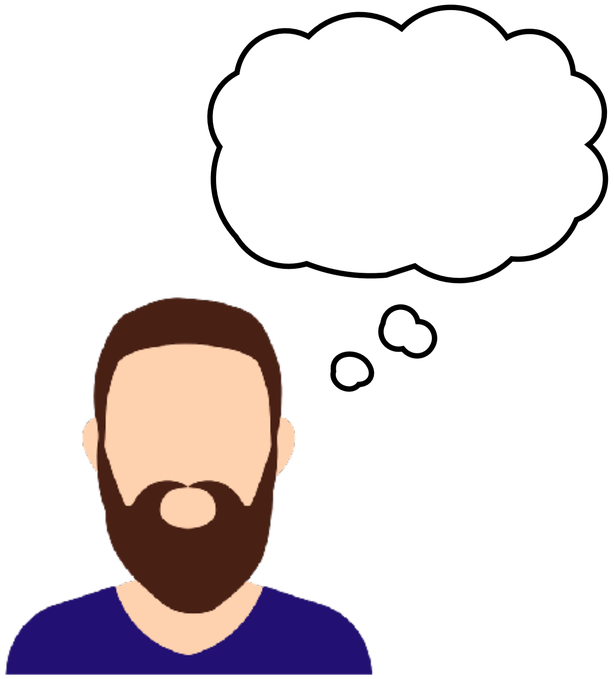
Your Turn

Choose a partner to share your learning objectives with. Then take turns providing feedback on each other's ideas.

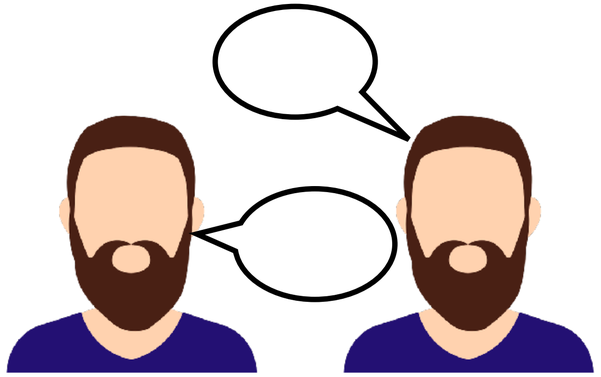
What is one thing you like?

What is one thing you are skeptical of?

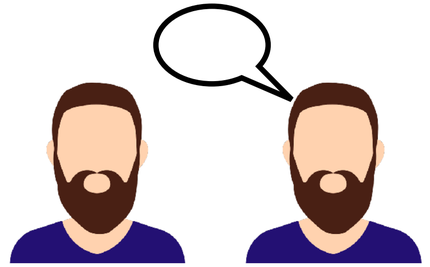
What is one genuinely useful contribution you can make?

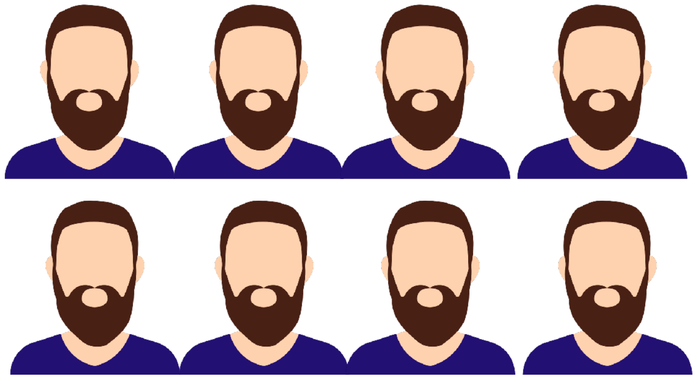


Think



Pair





Share

Think-Pair-Share

Think of ways to ensure that a student receives useful feedback for an R coding exercise.

Then explain your ideas to a partner.

Together, choose one idea to share with the class.

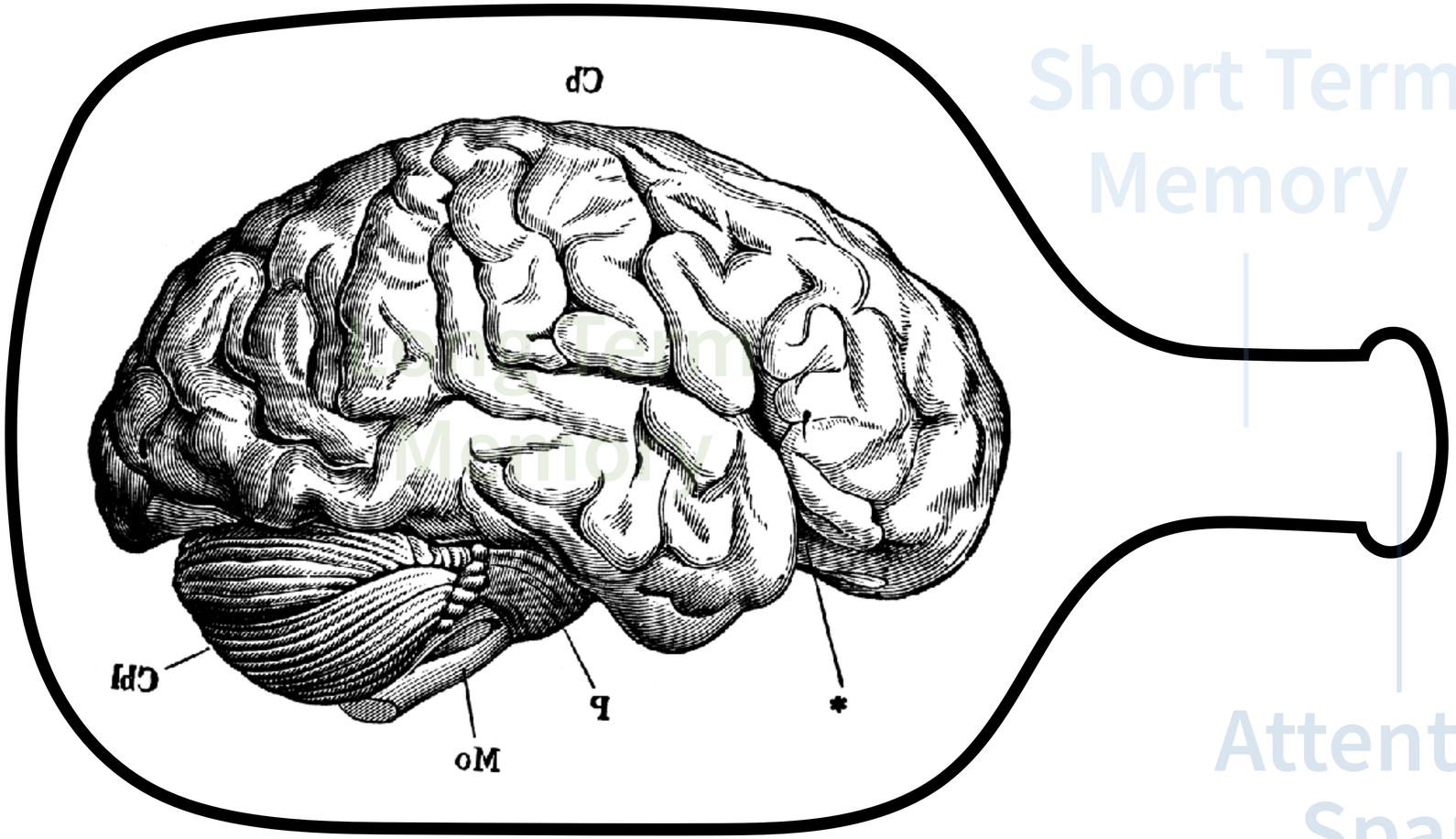
Think 

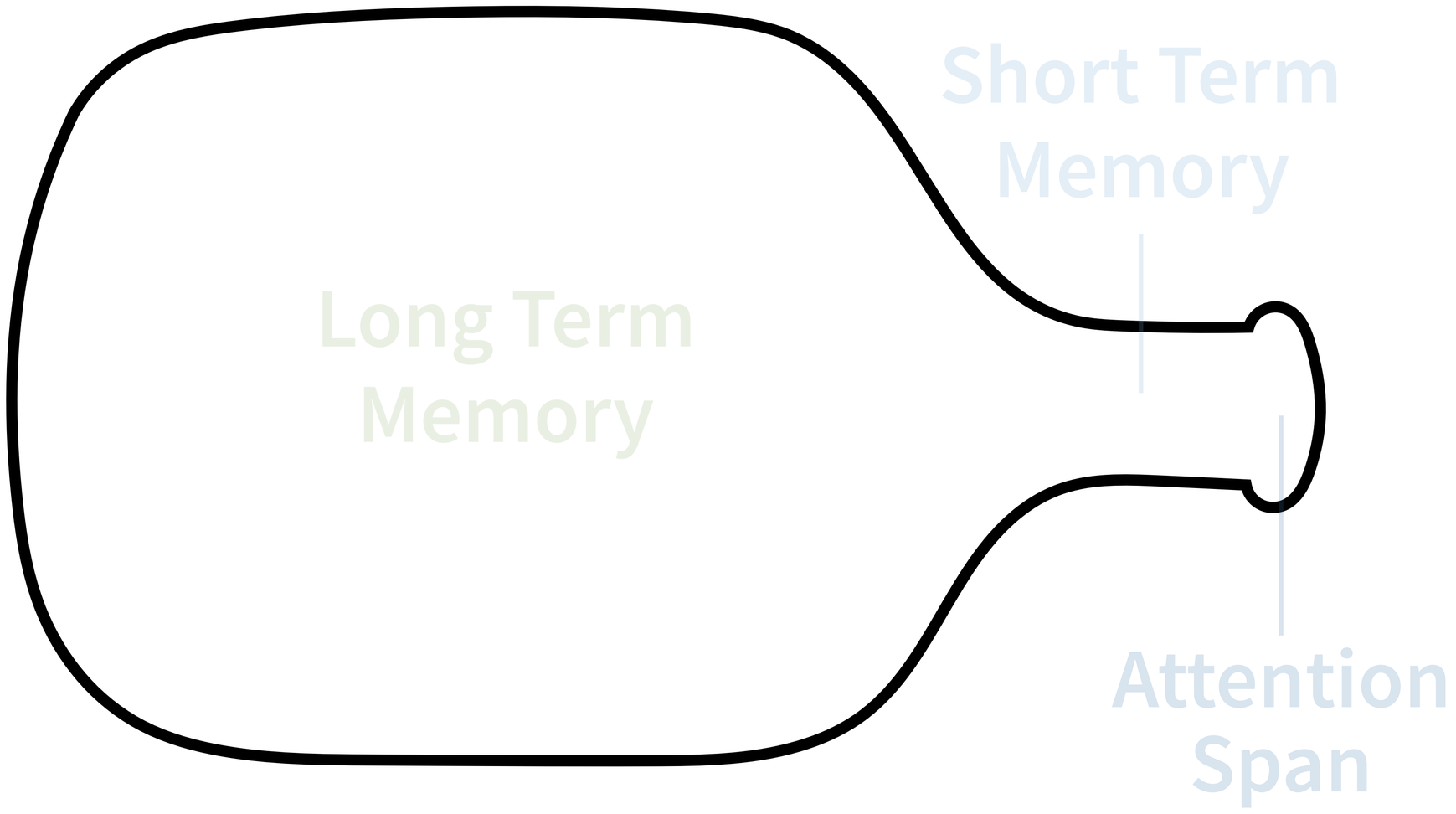
Share 

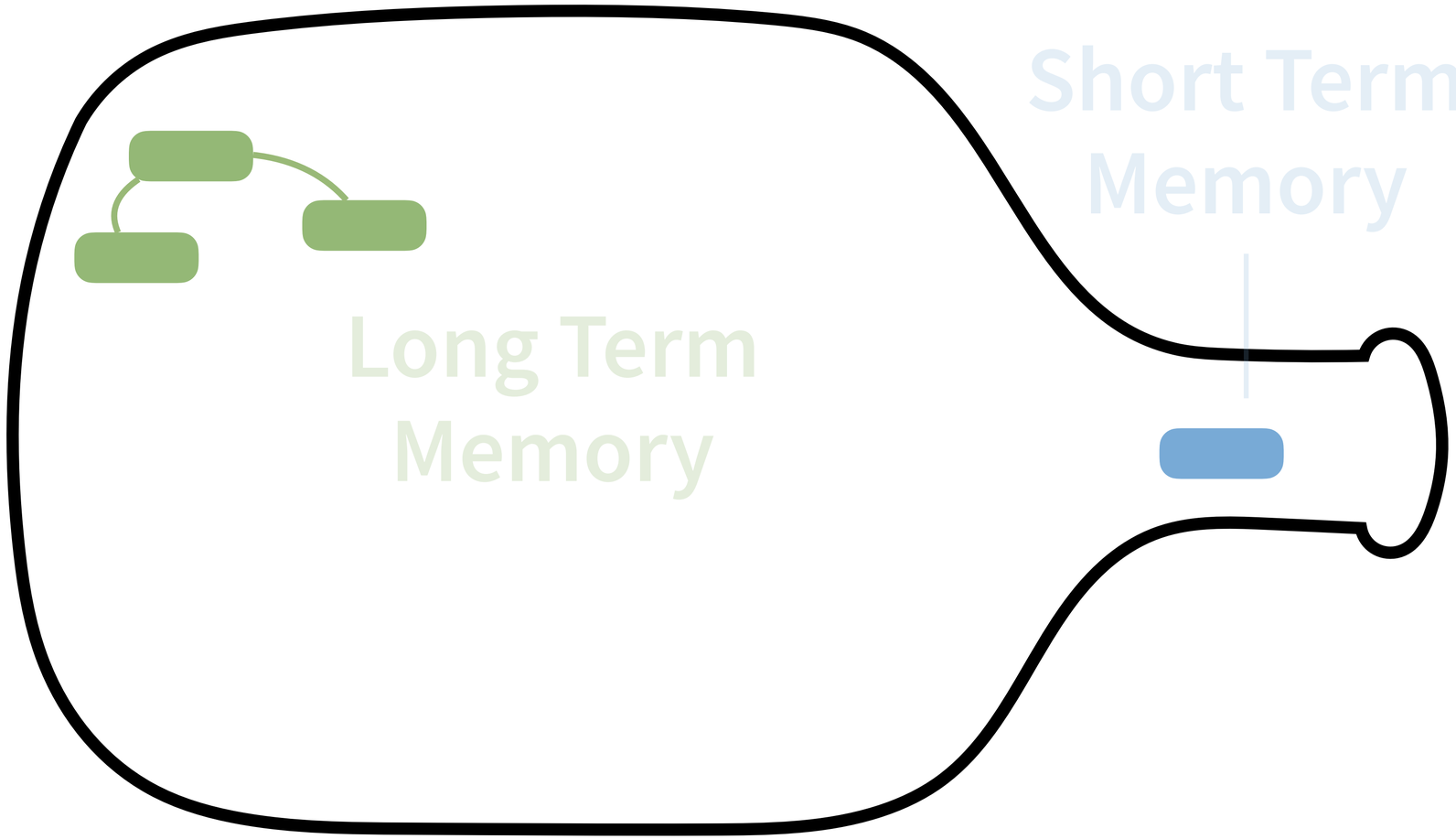
Your Turn

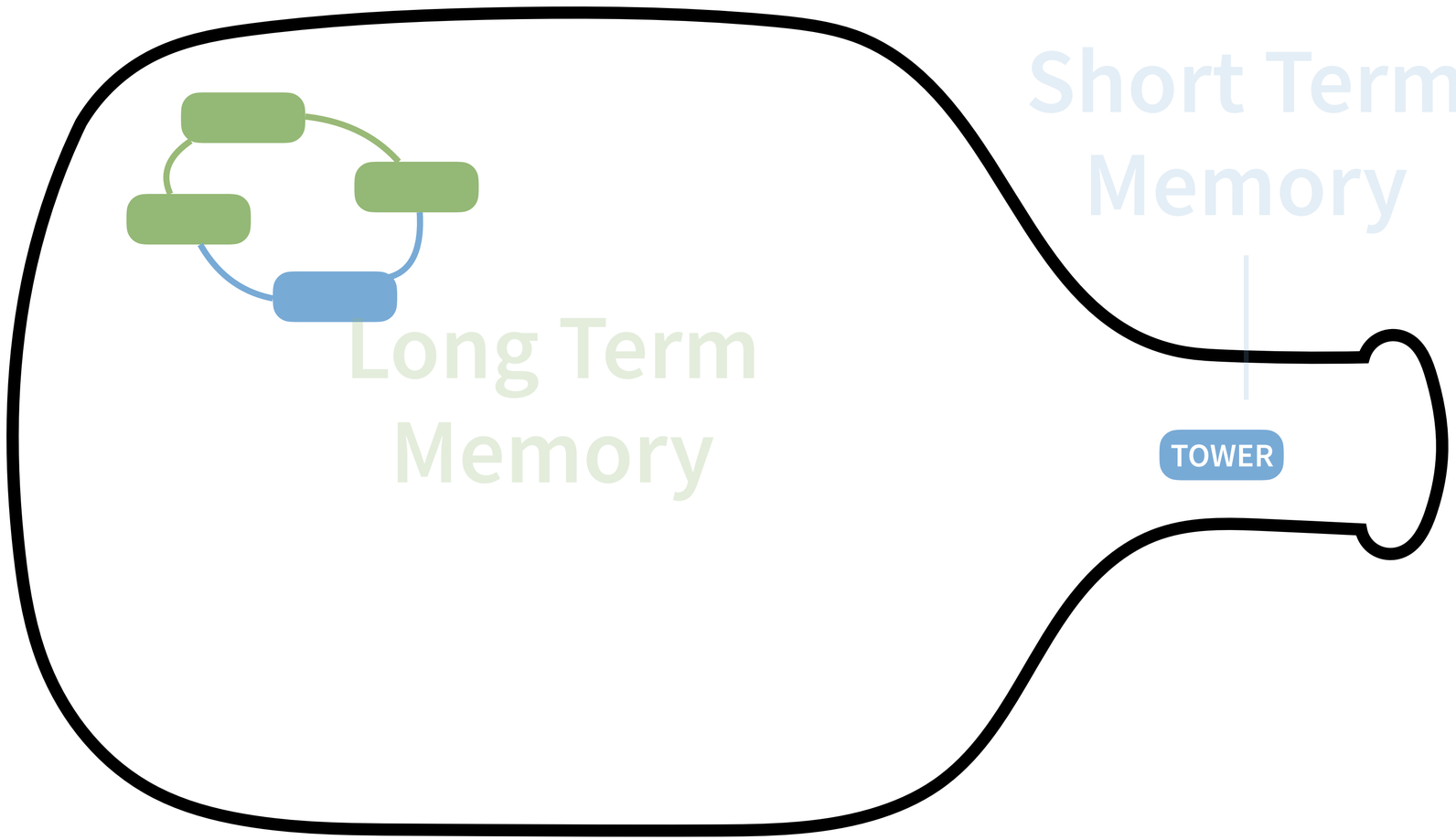
Use the class ideas to choose how you will provide feedback for each exercise. Alter your exercises if necessary.

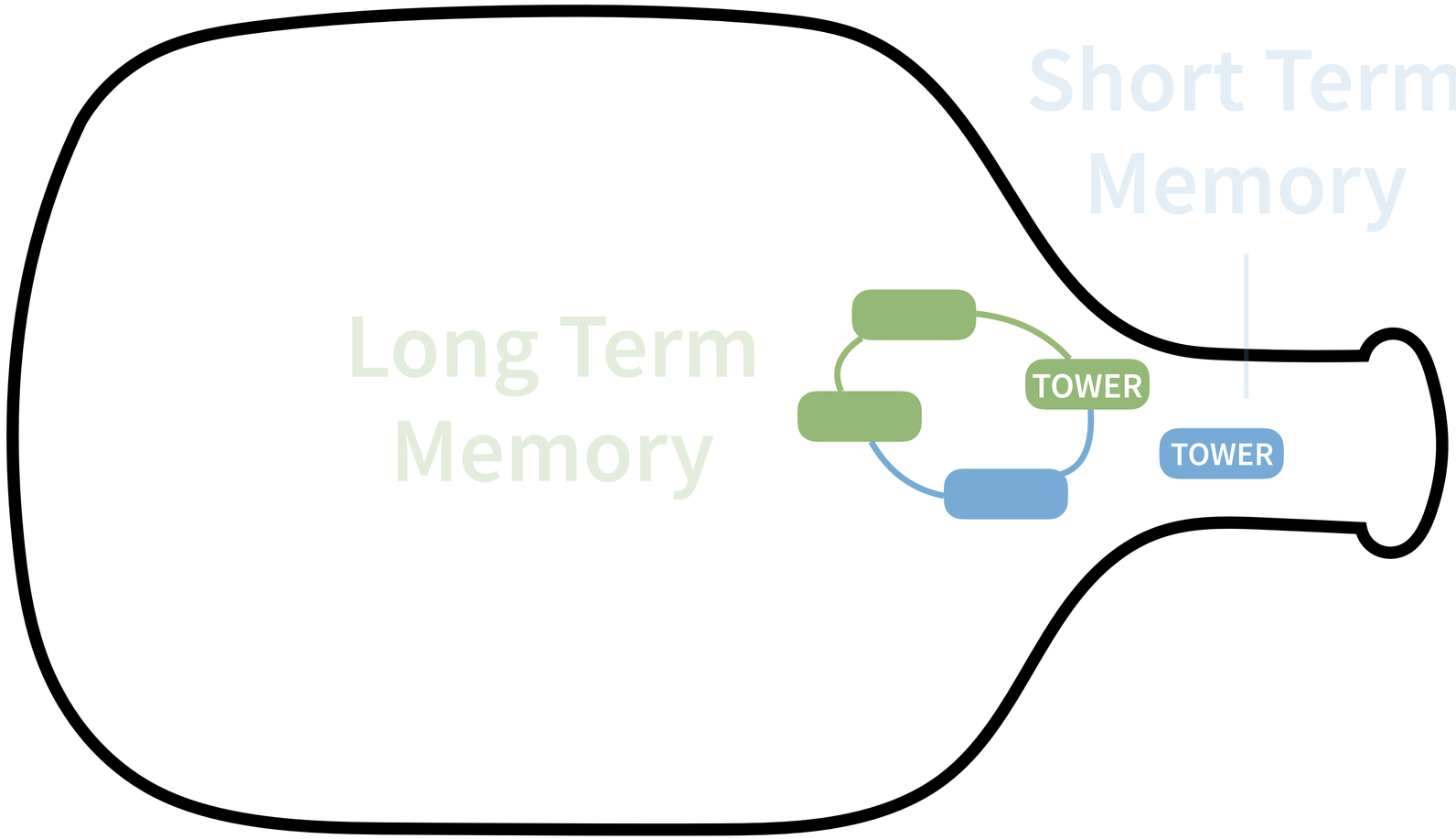
Transfer

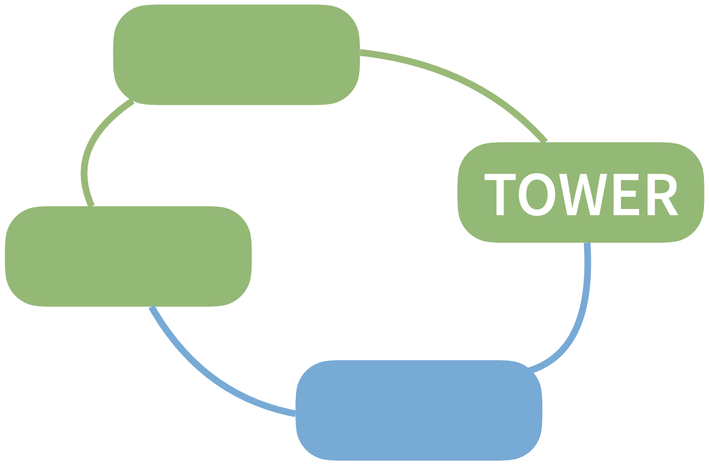


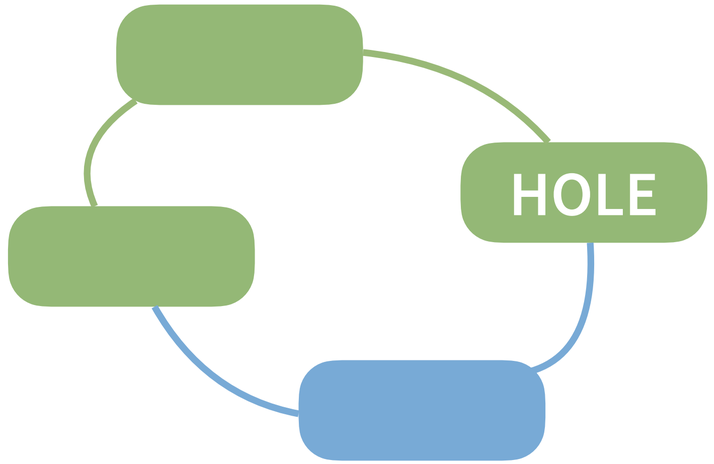


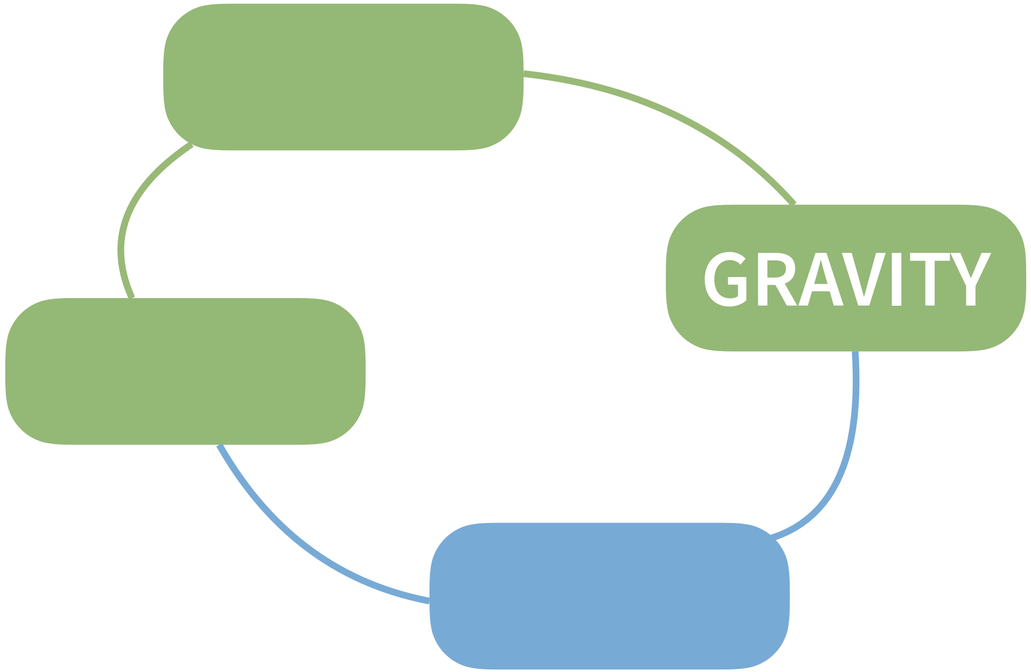


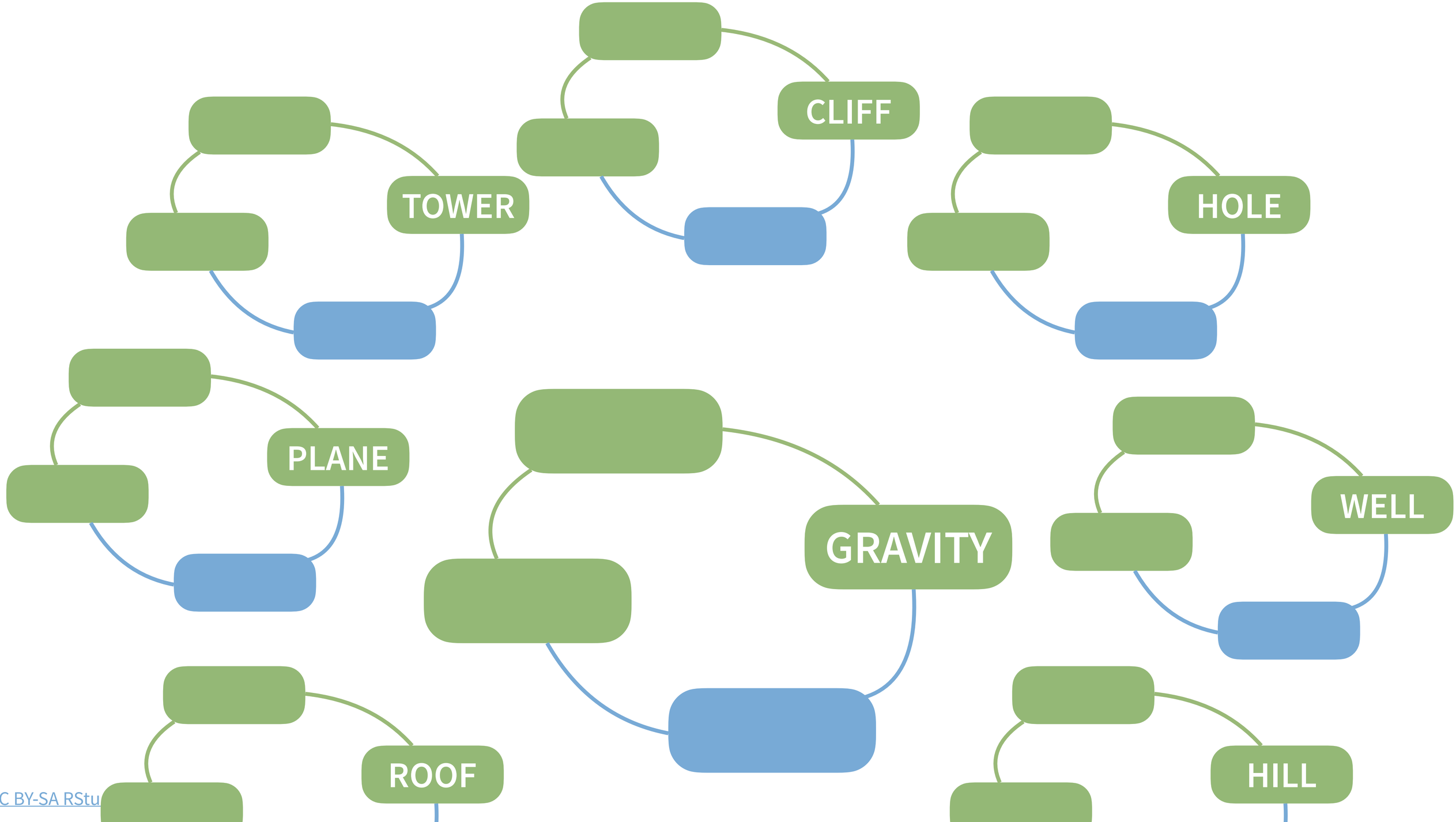












Your Turn

Complete the **Their Turn** handout.

Their Turn