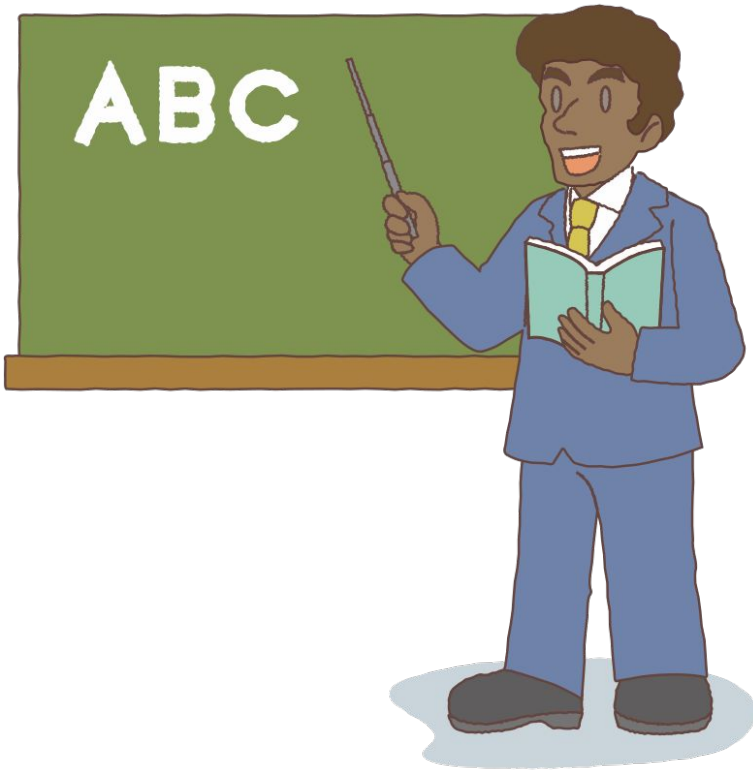
RStudio®

What Every Data Scientist Should Know About Education

The Pitch



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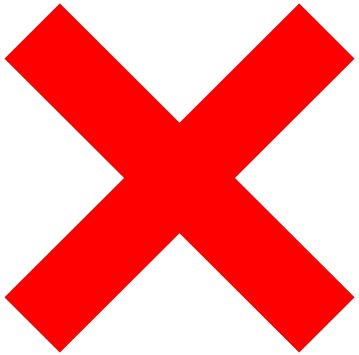
The Pitch



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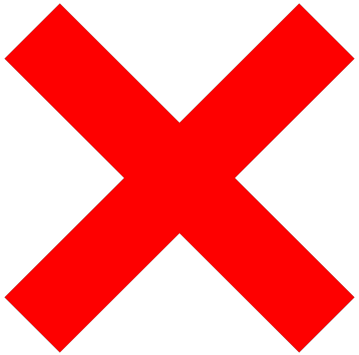
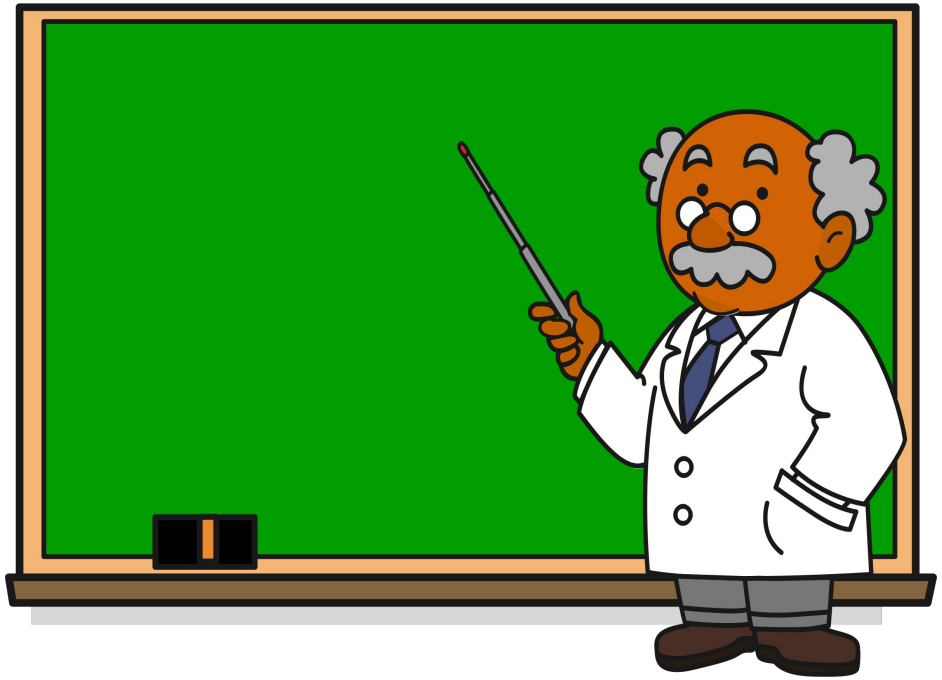
The Pitch





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The Pitch

1. Build more effective lessons
2. In less time and with less effort
3. That are easier for peers to find and reuse
4. And know what impact they're having

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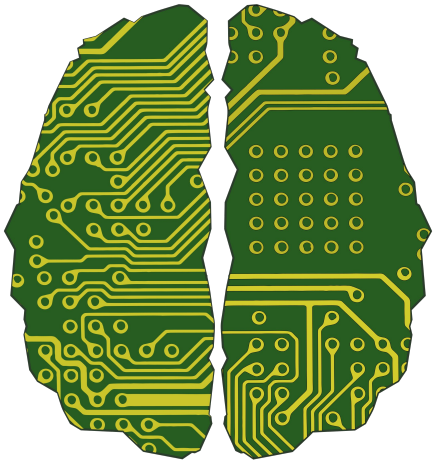
Starting Point



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Step 1: Learner Personas

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Meet Jeri: General Background

- Born and raised in Trinidad
- Moved to Canada to do a PhD in genetics
- Enjoys skating, but still doesn't like the cold

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Meet Jeri: Starting Point

- Has been analyzing data with Excel for almost ten years
- Did an intensive one-day workshop in R at a conference
- Tried to learn Git on her own once, found it frustrating

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Meet Jeri: Needs

- Is going to run 300 experiments in the next six months
- Doesn't want to have to do all the analyses by hand
- And wants nicer charts for her thesis than she can produce in Excel

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Meet Jeri: Special Considerations

- Very uncomfortable speaking in front of groups

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Meet Jeri: How You Can Help

"This one-week hands-on introduction to the tidyverse will show learners how to load, clean, explore, visualize, and analyze tabular data in a reproducible way."

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Multiple Personas

1. General background
2. Relevant experience
3. Their perceived needs
4. Special considerations

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Step 2: Mental Models

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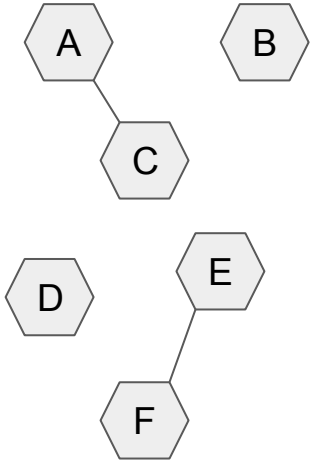

Novice

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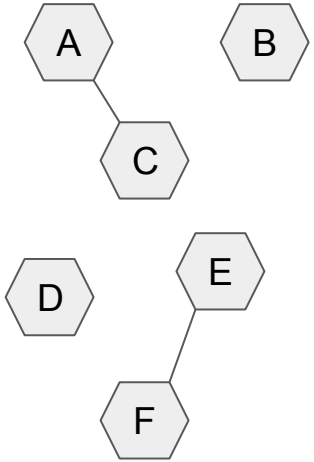
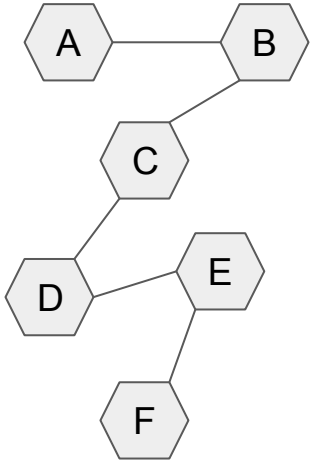


Novice



Competent

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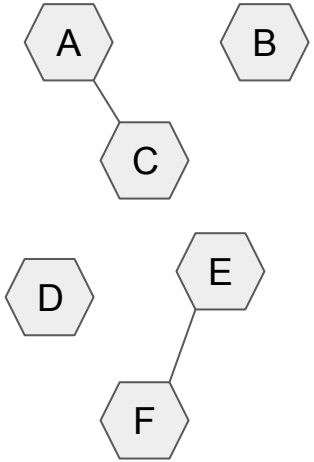
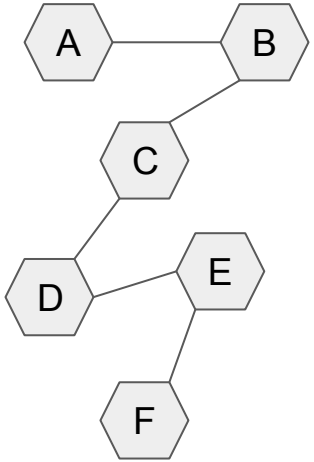
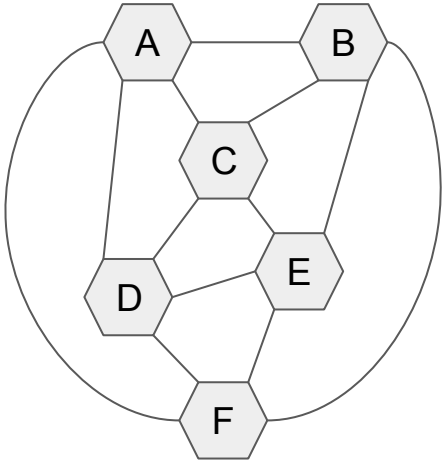


Novice



Competent



Expert

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Symptoms

- Do things by rote
- Ask nonsensical questions
- Use the wrong terms
- Can’t tell what’s relevant
- Lack of confidence

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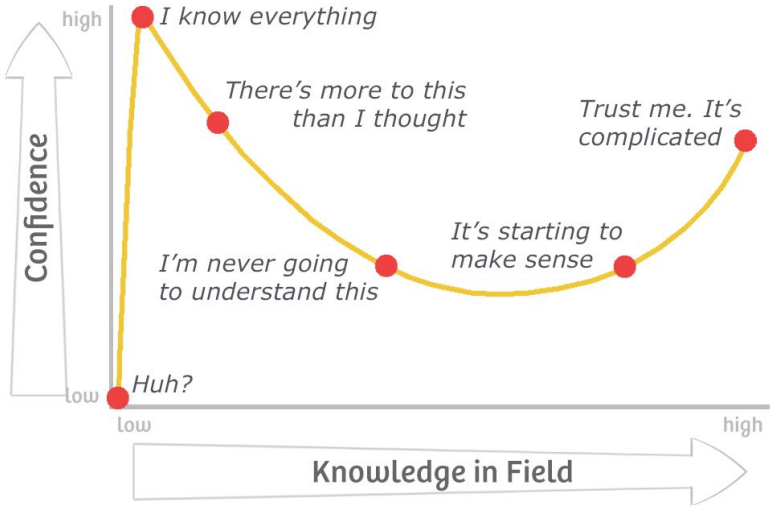
Symptoms

- Do things by rote
- Ask nonsensical questions
- Use the wrong terms
- Can't tell what's relevant
- ~~Lack of confidence~~



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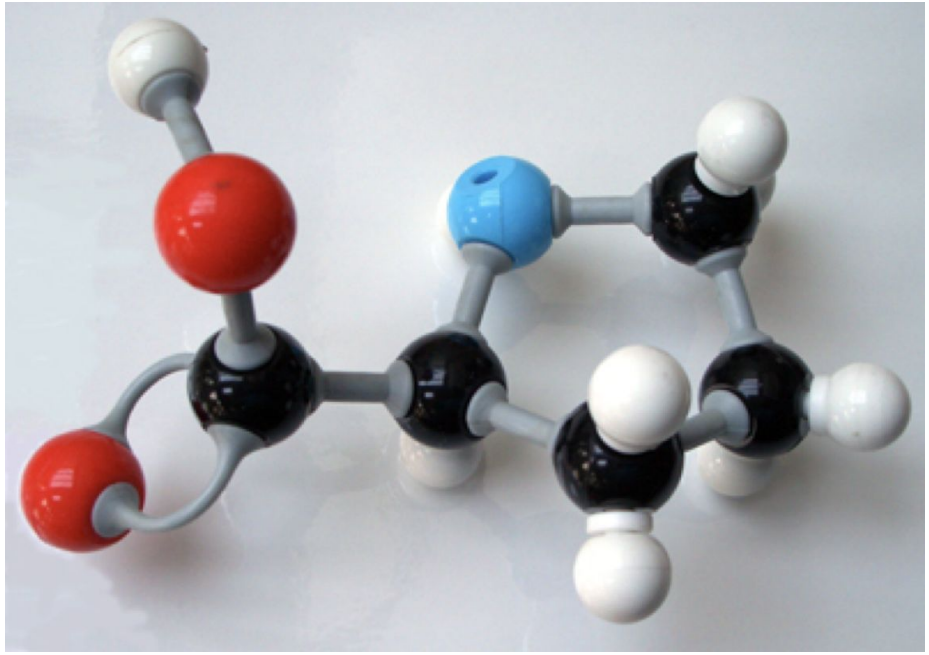
A Mental Model



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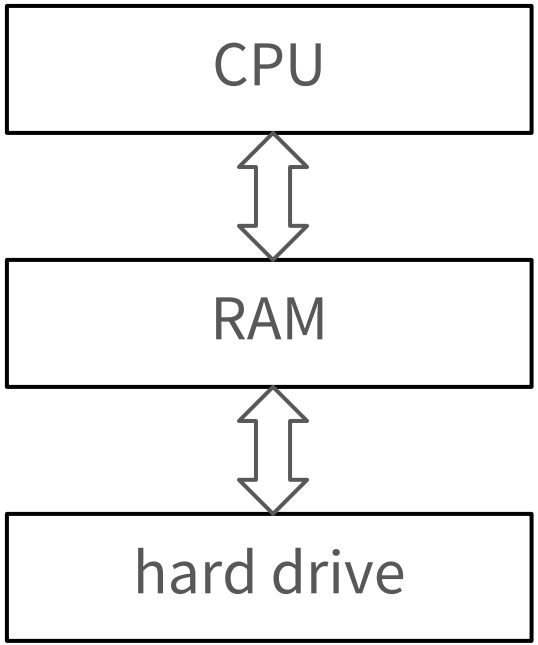
Another Mental Model



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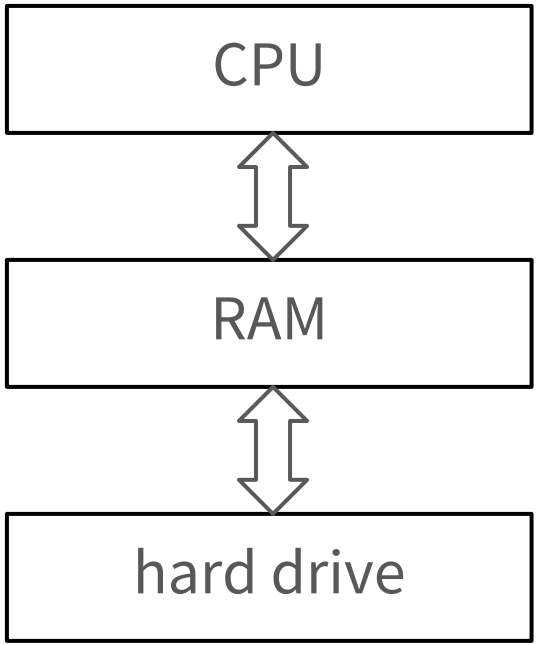
Another Mental Model



nope

nope

nope

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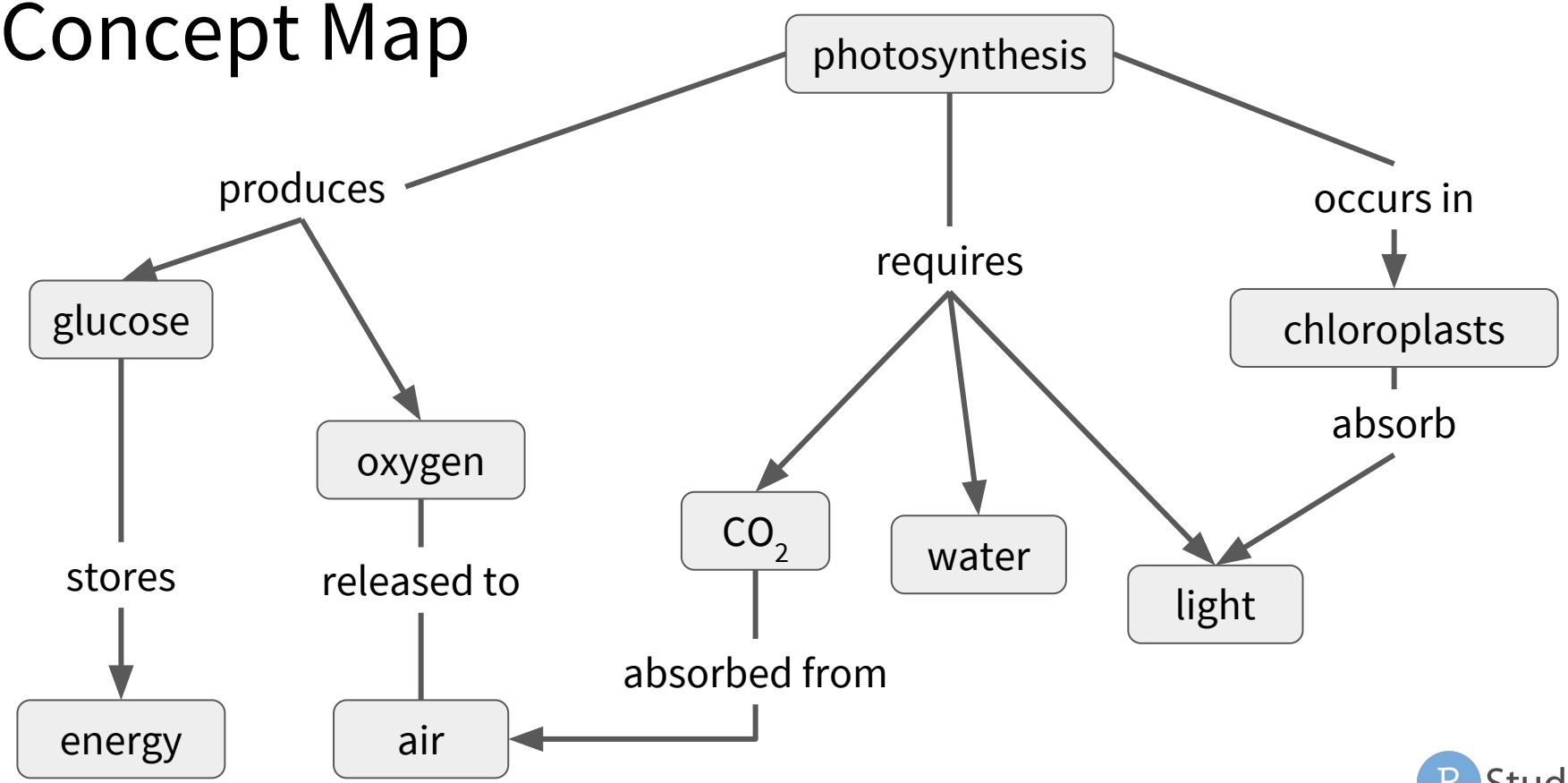
Concept Map



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Step 4: Formative Assessment

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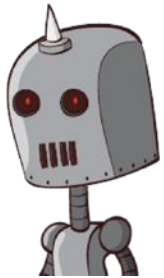
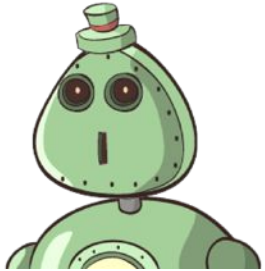
What Is 37 + 15 ?



a) 52



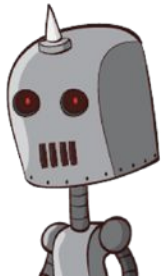
c) 412

b) 42

d) 43

RStudio

What Is 37 + 15 ?



a) 52

Correct

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What Is 37 + 15 ?

b) 42

Didn’t carry

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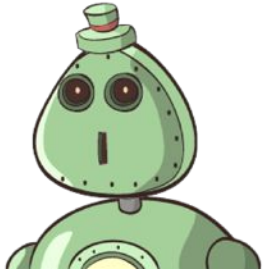
What Is 37 + 15 ?

Added columns separately



c) 412

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What Is 37 + 15 ?

Carried into the same column

d) 43

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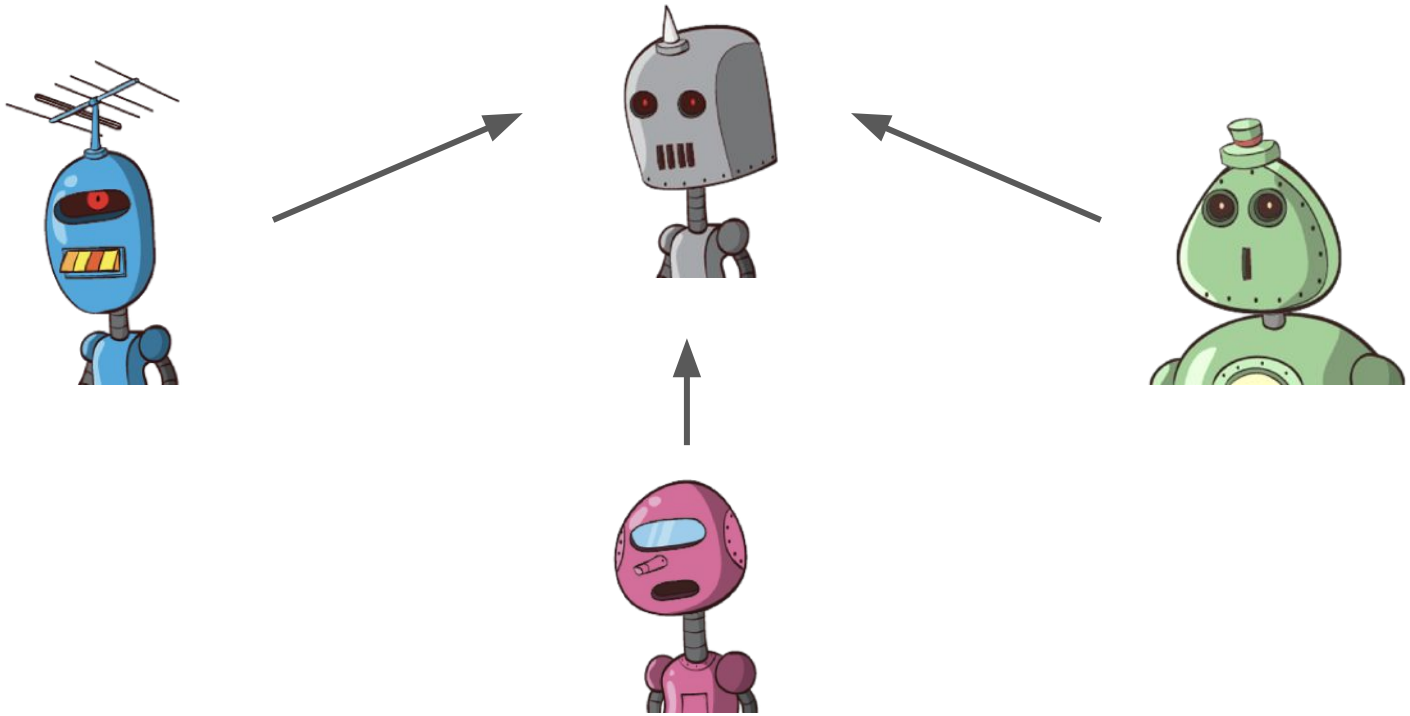
Diagnosing Misconceptions



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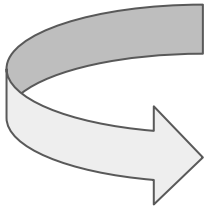
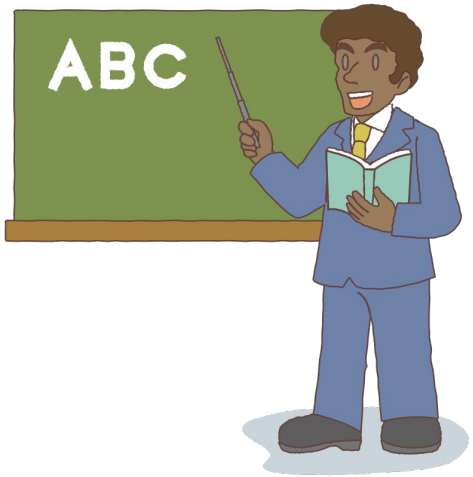
Formative Assessment

- Quick (1-2 minutes)
- Unambiguous (scalable)
- Diagnostic power



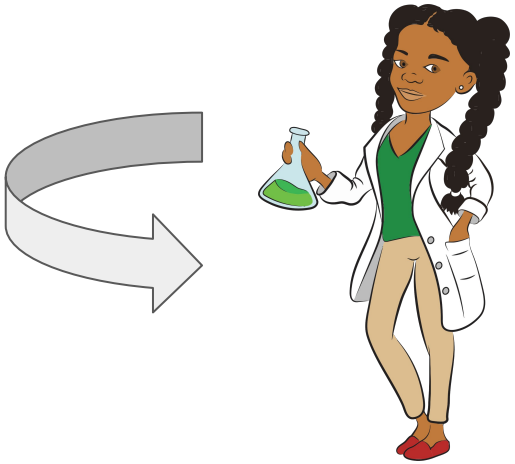


“Can I move on?”

RStudio®

Formative Assessment

- Quick (1-2 minutes)
- Unambiguous (scalable)
- Diagnostic power



“Do I understand this?”

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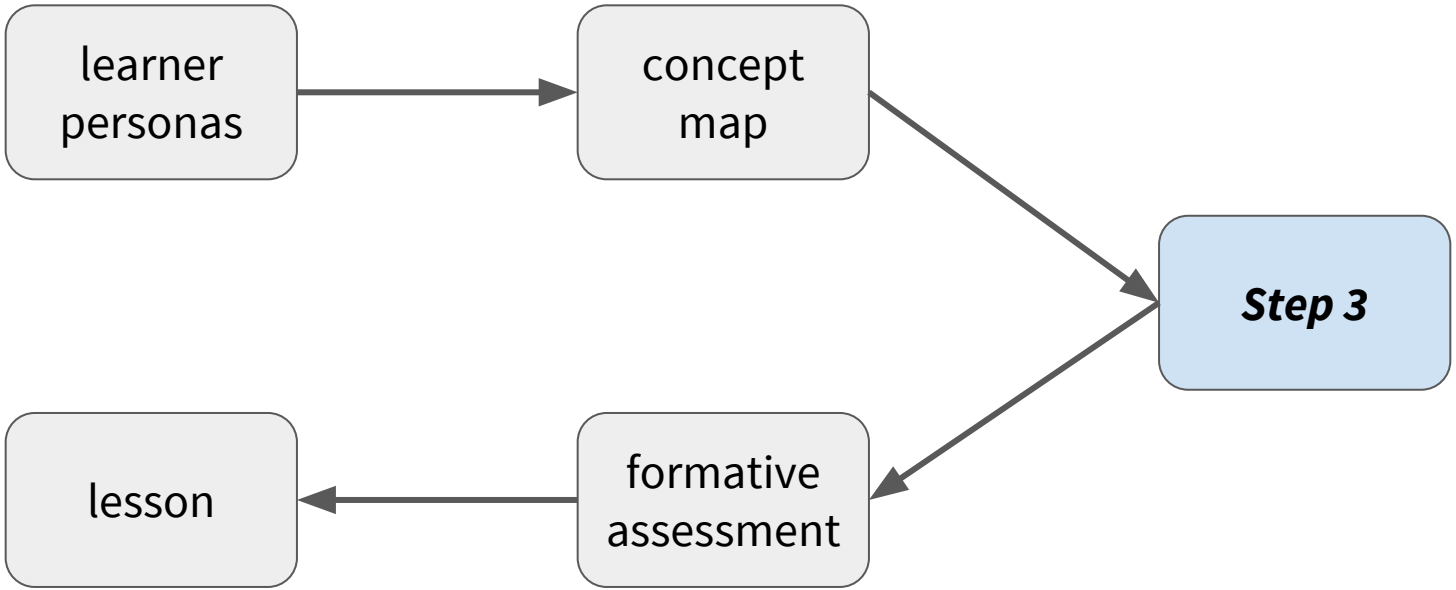
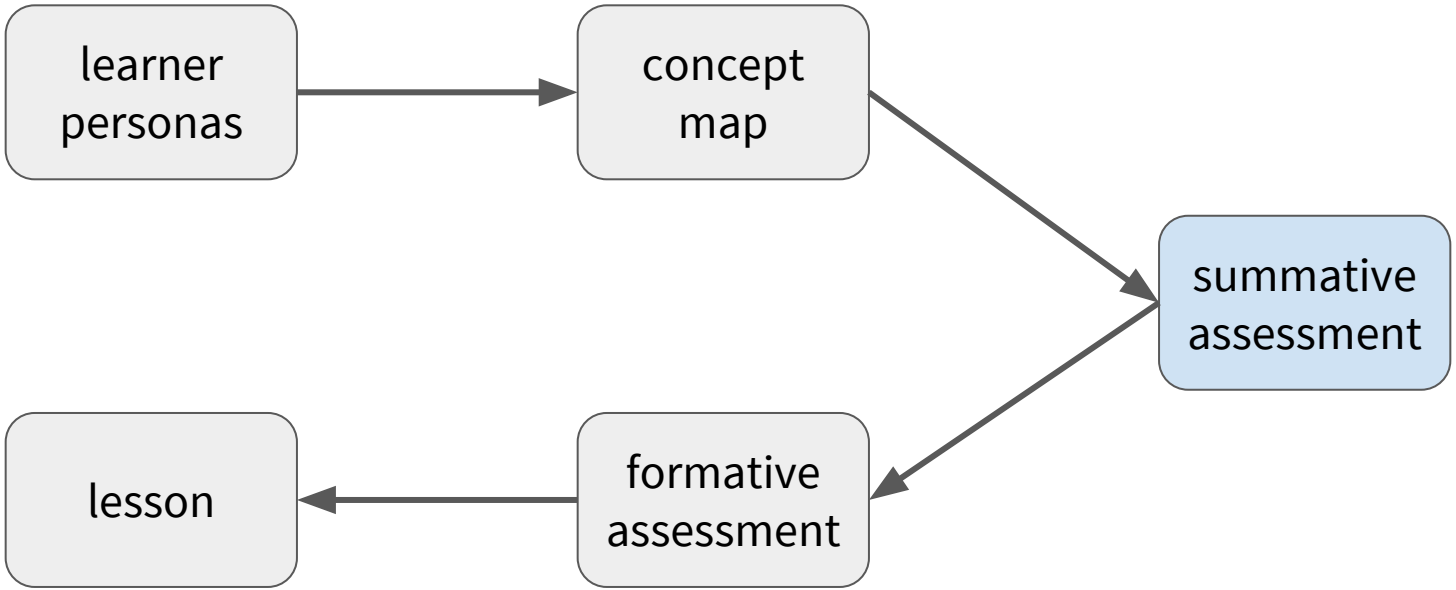
Reverse Instructional Design



RStudio

Summative Assessment



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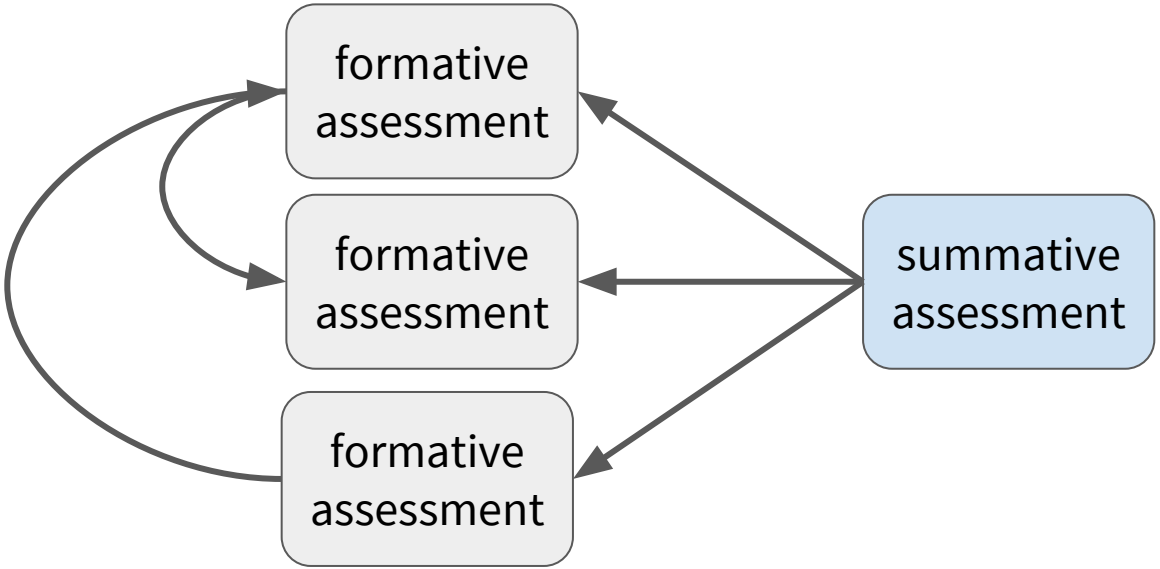
Summative Assessment



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What's Going On In There?

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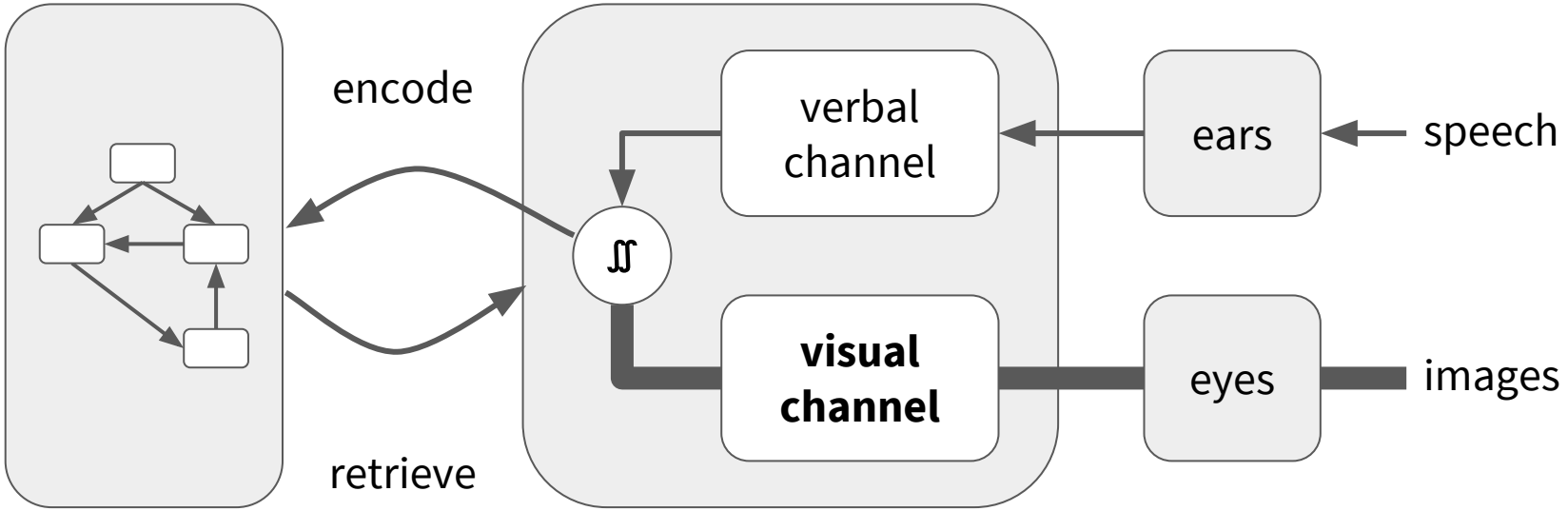
Unequal Weights



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Unequal Weights

	Information	Neurons
Vision	83%	30%
Hearing	11%	2%
Smell	3.5%	8%
Touch	1.5%	
Taste	1%	

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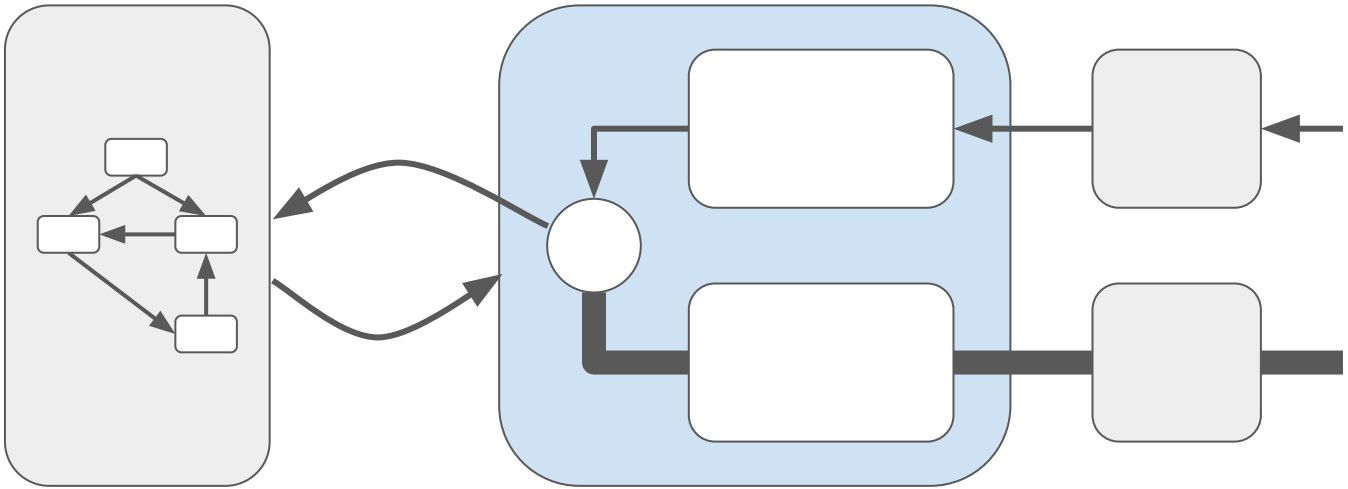
Bottleneck

7 ± 2



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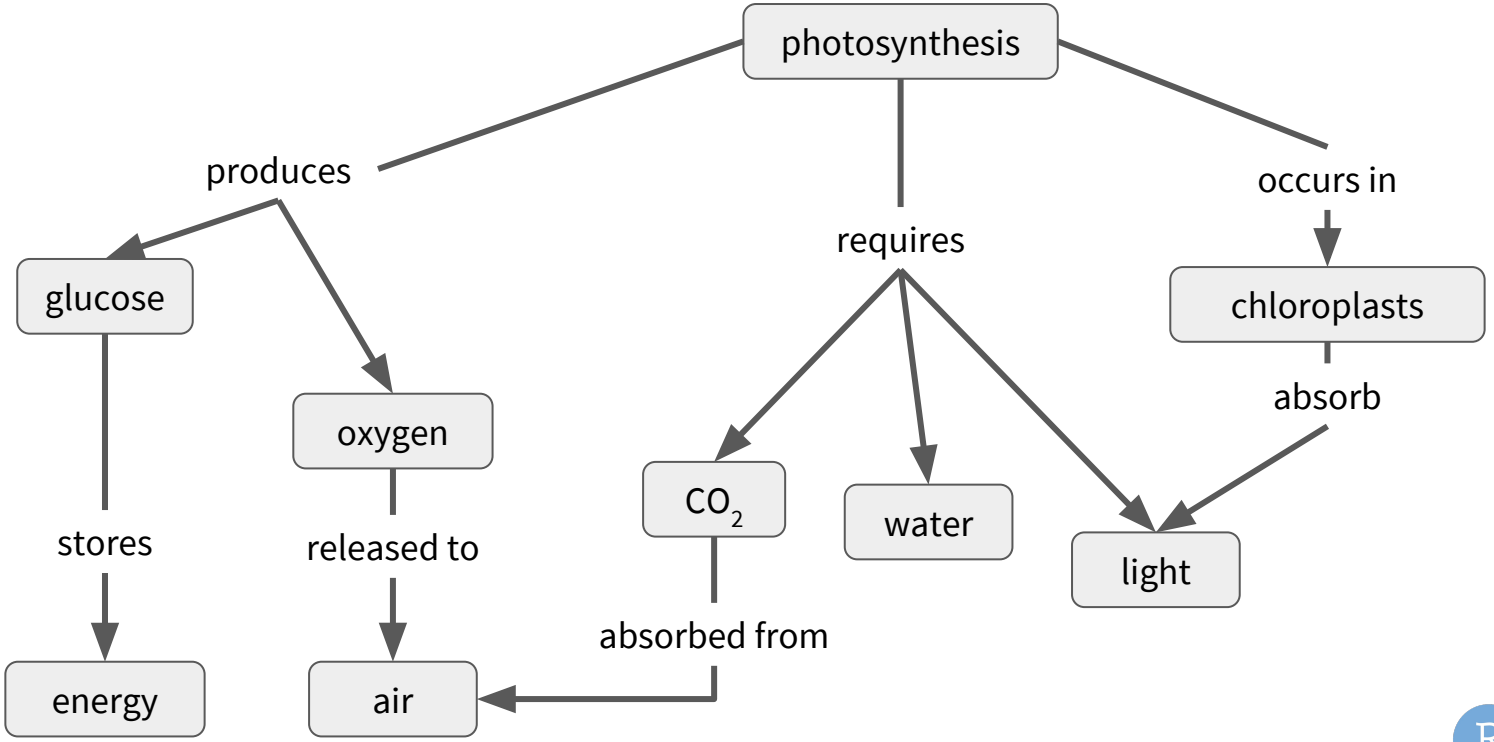
Count Them All



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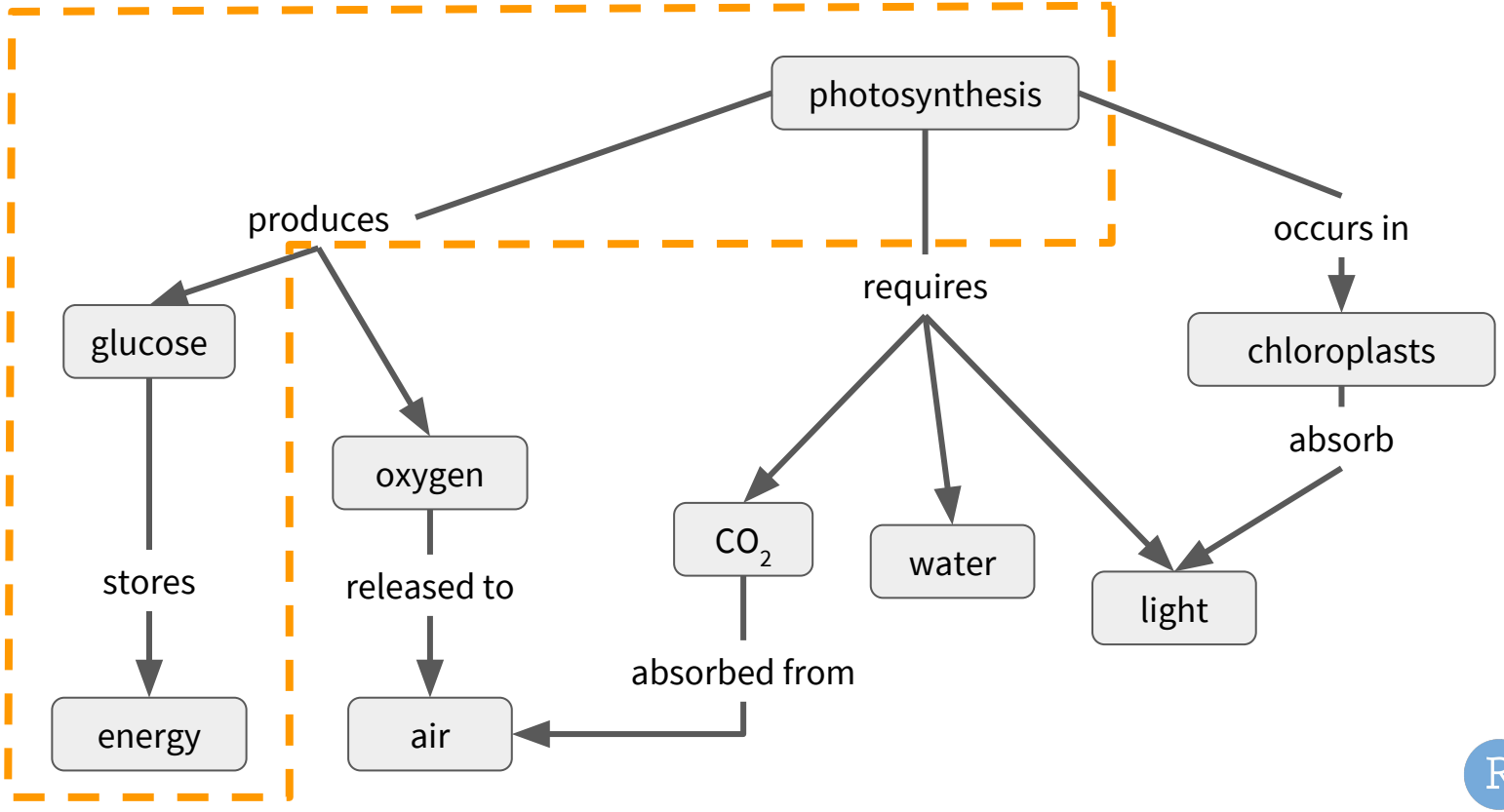
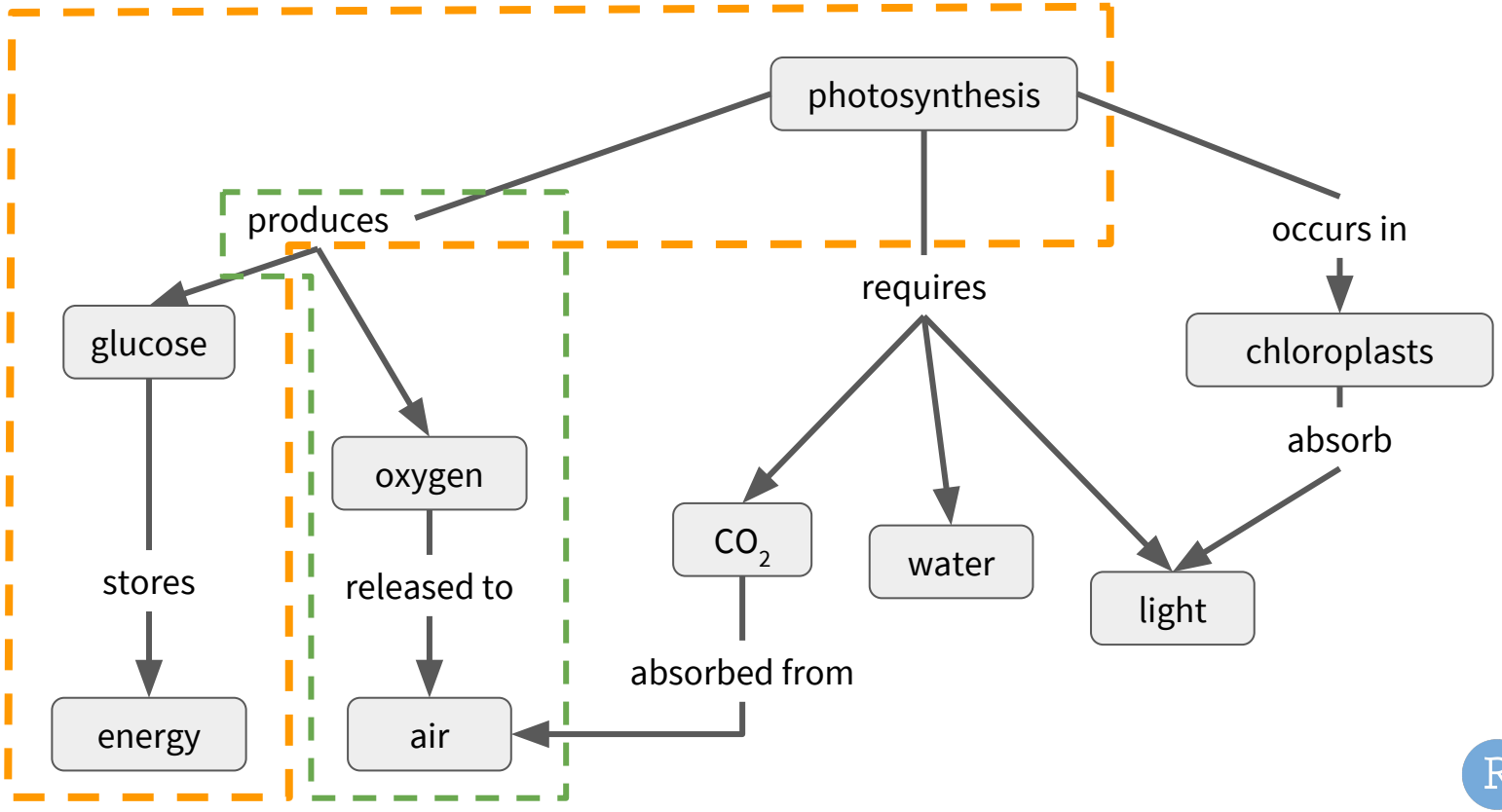
Count Them All



RStudio

Count Them All



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It's Not Just About Brains

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Motivation

Intrinsic	Doing this for my own reasons
Extrinsic	Doing this because I have to

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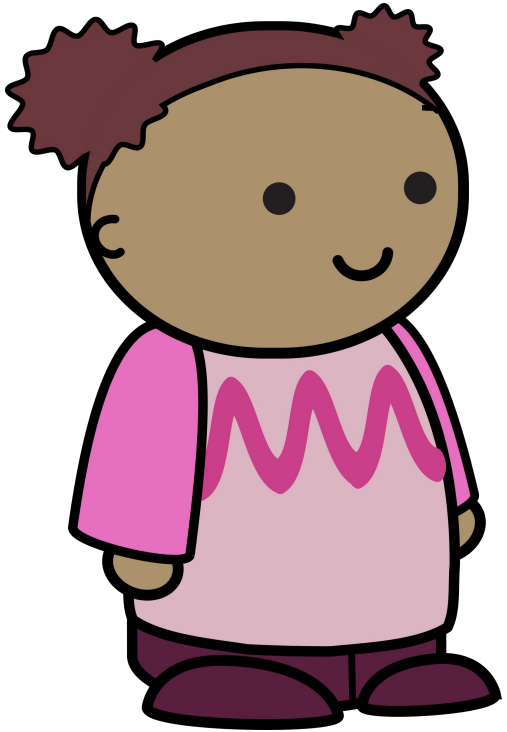
Positive: Self-Efficacy



I am in control of my own life.

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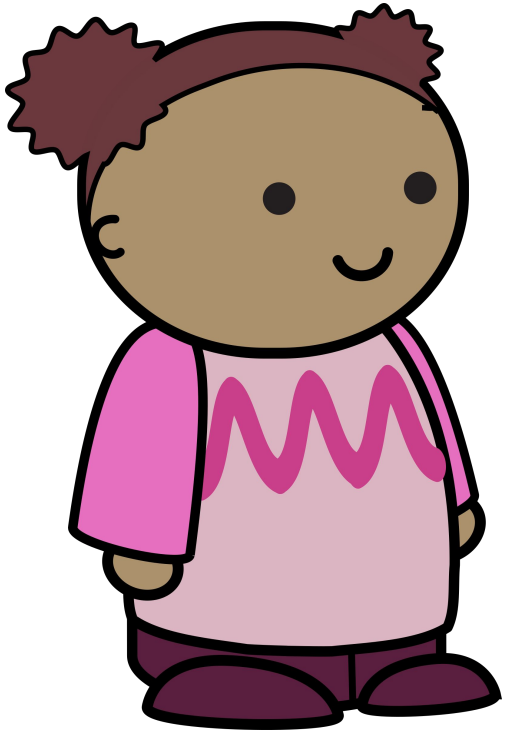
Positive: Utility



This will help me meet my goals.

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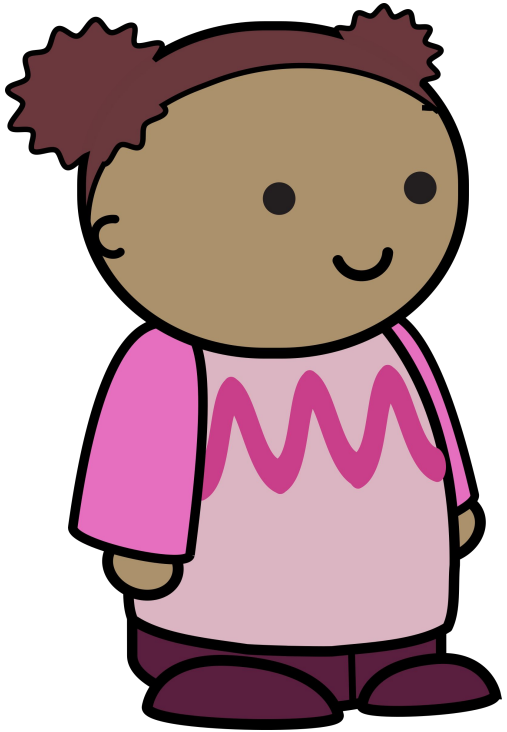
Positive: Community



People I know are learning this with me.

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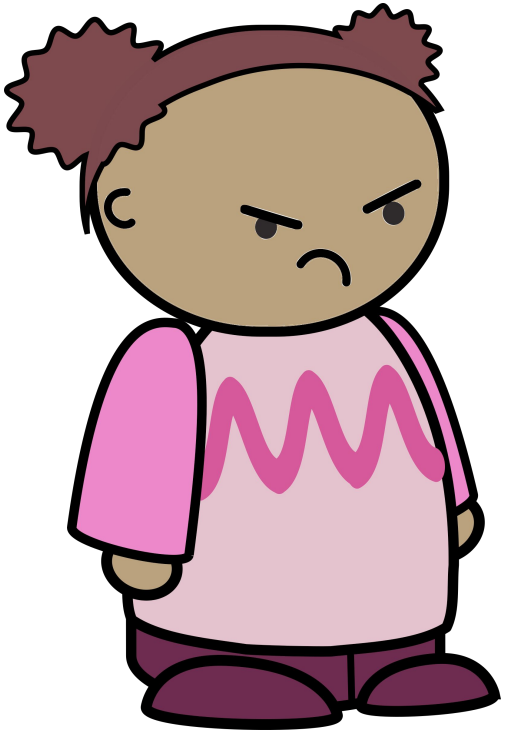
Negative: Unpredictability

What I do doesn't seem to affect the outcome.



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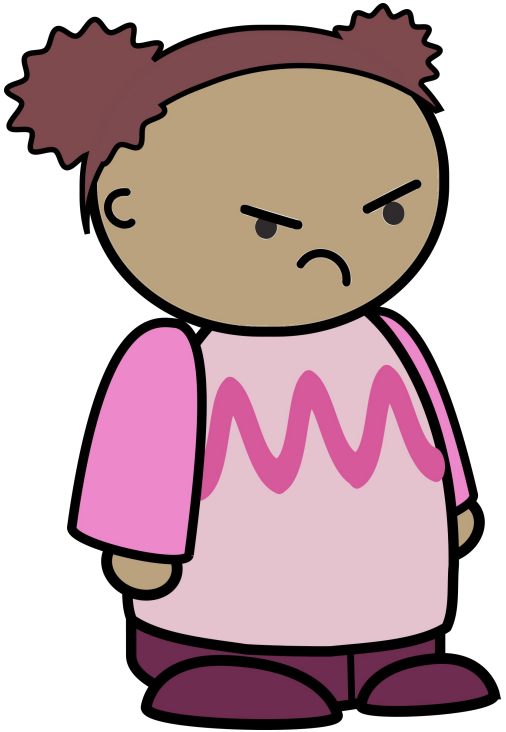
Negative: Unfairness

The teacher plays favorites.



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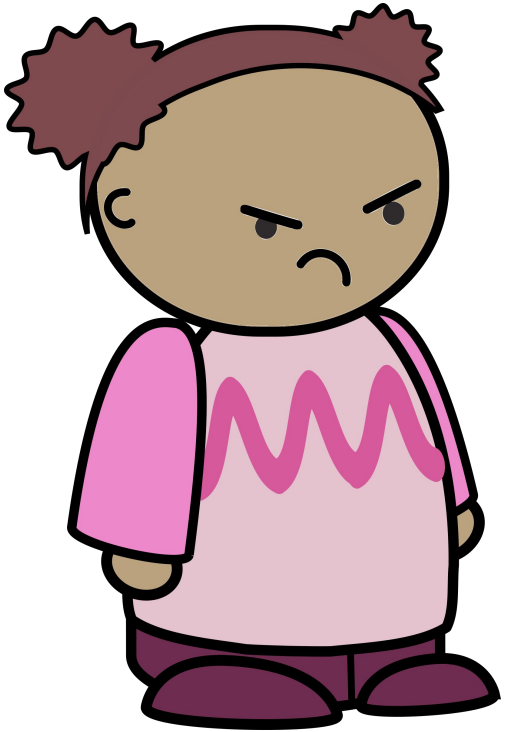
Negative: Indifference

Nobody cares.



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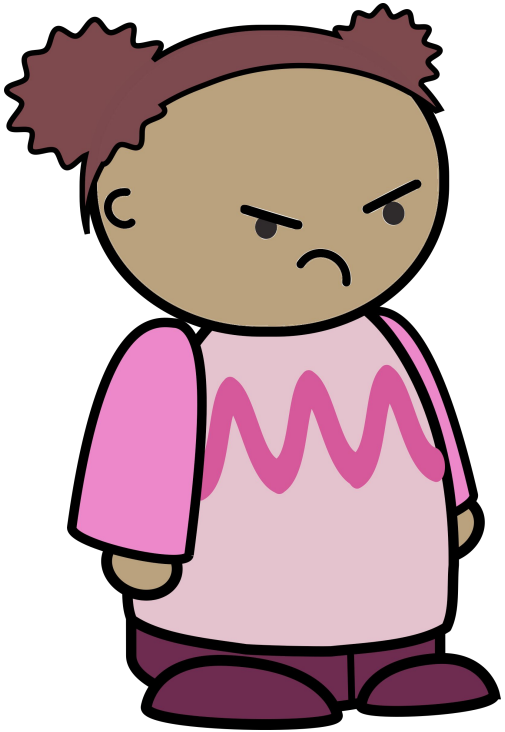
Not Just in Class

If poor inner-city children consistently outscored children from wealthy suburban homes on standardized tests, is anyone naive enough to believe that we would still insist on using these tests as indicators of success?

– Kenneth Wesson



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The Most Important Thing

Don’t use a deficit model

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The Most Important Thing

Don’t use a deficit model

https://frameshiftconsulting.com/ally-skills-workshop/

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What Next?

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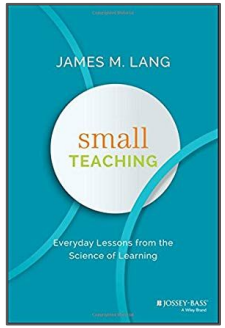
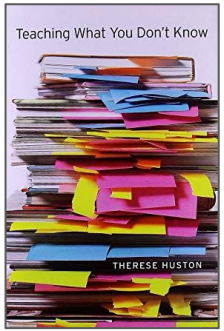
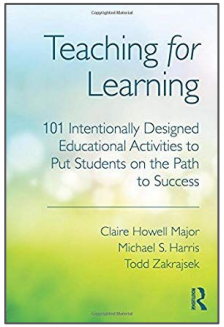
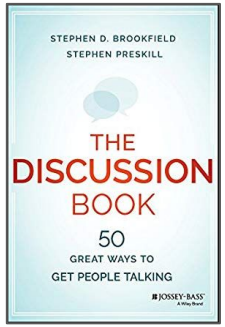
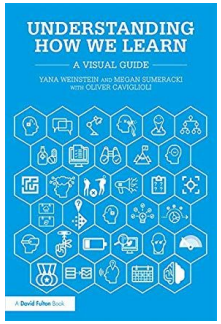
Where Next?











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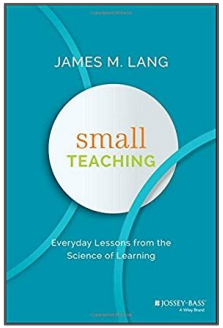
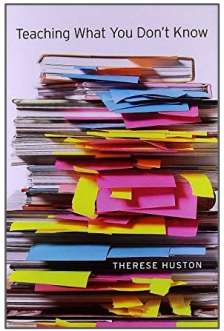
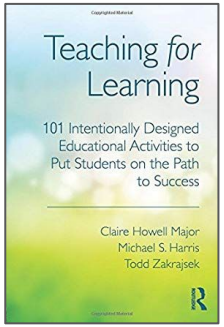
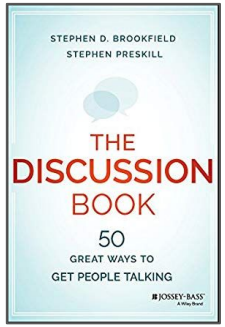
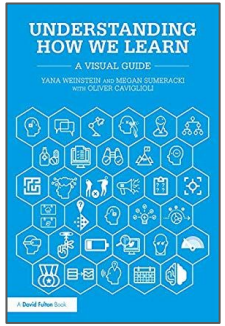
Where Next?











http://teachtogether.tech

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Thank You

1. Be kind: all else is details.
2. Remember that you are not your learners…
3. …that most people would rather fail than change…
4. …and that ninety percent of magic consists of knowing one extra thing.
5. Never teach alone.
6. Never hesitate to sacrifice truth for clarity.
7. Make every mistake a lesson.
8. Remember that no lesson survives first contact with learners…
9. …that every lesson is too short for the teacher and too long for the learner…
10. …and that nobody will be more excited about the lesson than you are.

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