

Flipping the Classroom: How to turn your students' worlds right side up



@julieschell

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Setting the stage for flipped learning

- Knowledge transfer: The primary purpose of education
- What is a flipped classroom
- Flipped IOI Model
- Just-in-Time Teaching
- Peer Instruction

To get from his high school to his home in an rural area with no buildings, Martin travels 5.0 miles east and then 4.0 miles north. When Veronica goes to her home from that same high school, she travels 8.0 miles east and 2.0 miles south.

What is the approximate measure of the shortest distance, between Martin's home and Veronica's home?

To get from his high school to his home in an rural area with no buildings, Martin travels 5.0 miles east and then 4.0 miles north. When Veronica goes to her home from that same high school, she travels 8.0 miles east and 2.0 miles south.

What is the approximate measure of the shortest distance, between Martin's home and Veronica's home?

- A. ~3 miles
- B. ~6 miles
- C. ~9 miles
- D. ~17 miles

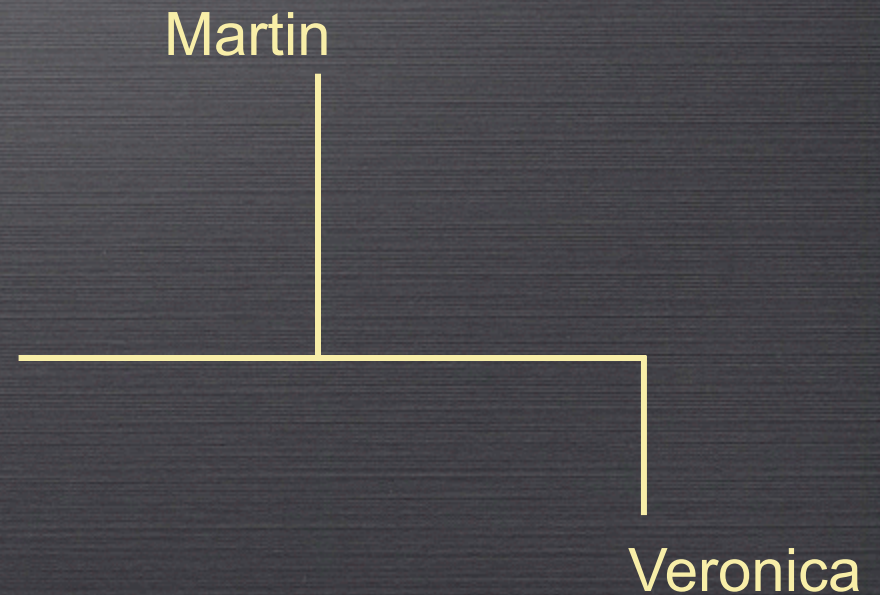
What do you need to know and be able to do to solve this problem?

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$$a^2 + b^2 = c^2$$

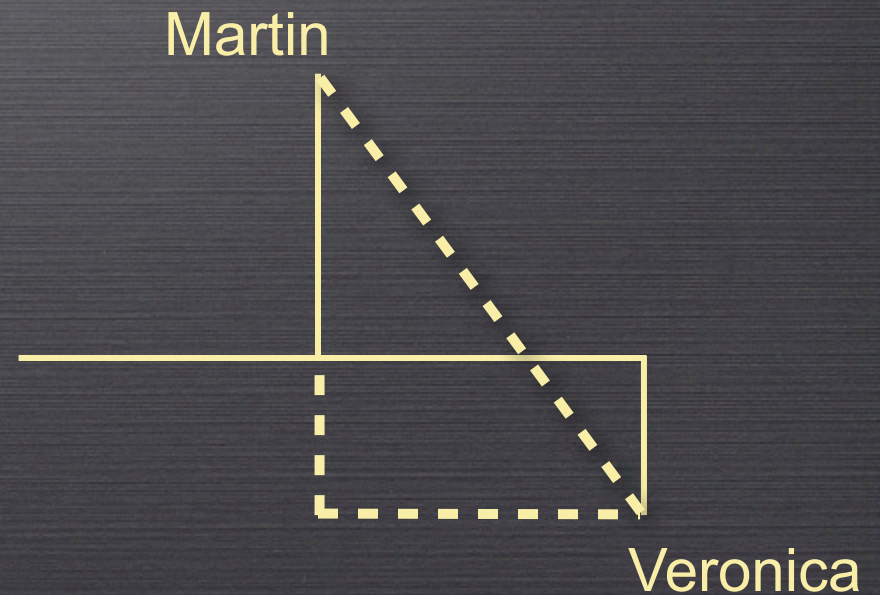
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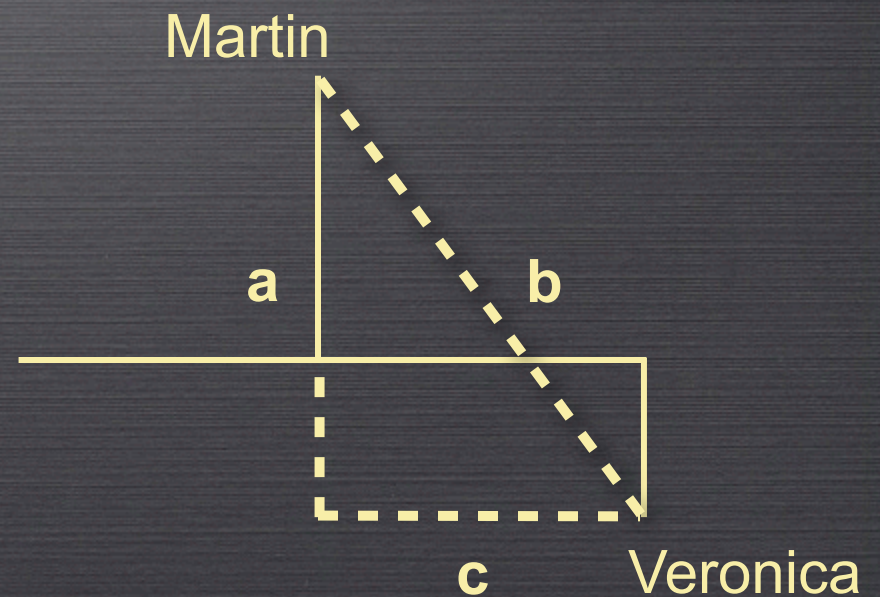
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$$a^2 + b^2 = c^2$$



What do you need to know and be able to do to solve this problem?

$$a^2 + b^2 = c^2$$



What percentage of 10th grade MA students got this problem right?

- A. 13%
- B. 33%
- C. 50% miles
- D. 66%

What percentage of 10th grade MA
students got this problem right?

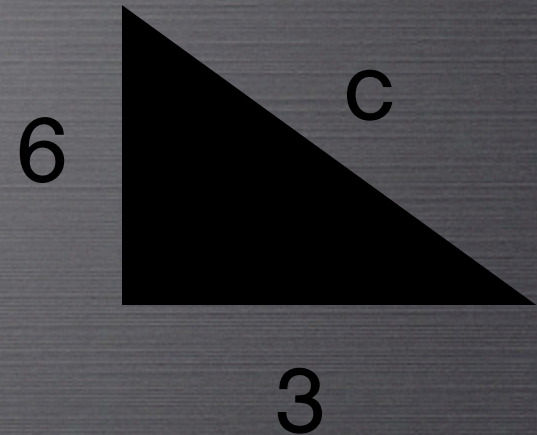
33%

Why is this happening?

We Tell

$$a^2 + b^2 = c^2$$

We Test



$$c = 6.7$$

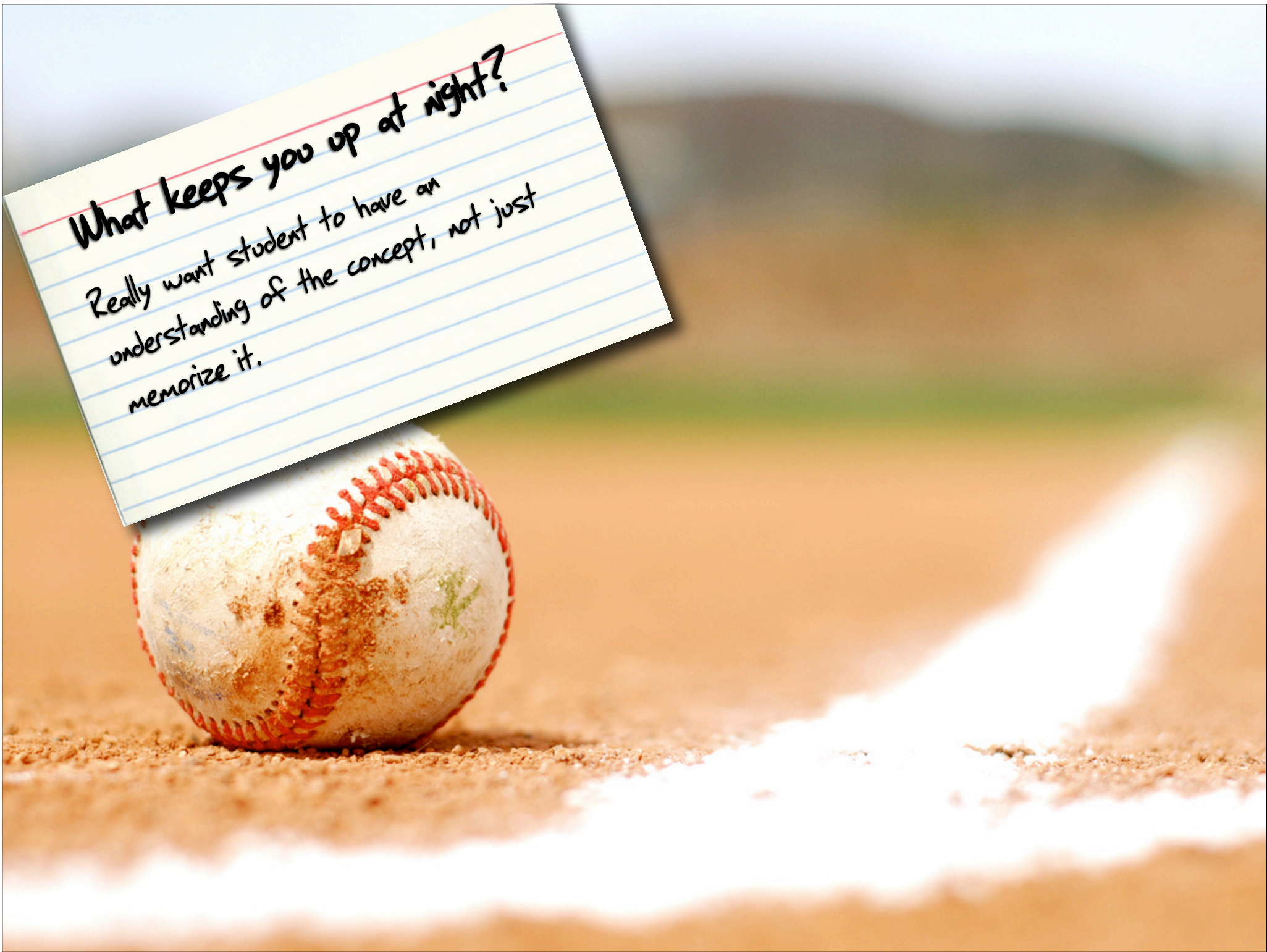


A+

The primary model education is
situated learning...

when the ultimate purpose of
education is knowledge transfer.





What keeps you up at night?

Really want student to have an understanding of the concept, not just memorize it.

Your estimate of students' knowledge transfer ability



The purpose of education is not
being fulfilled.



6 signs you may have a problem with knowledge transfer

1. Students cannot or will not self start
2. Students cannot tolerate not having all the variables
3. Students lack perseverance or "patient problem solving"
4. There is a serious aversion to word problems
5. Students are unwilling or unable to try or risk failure
6. Students don't retain what they learn

How can we teach for knowledge transfer?

6 Strategies for Teaching for Transfer

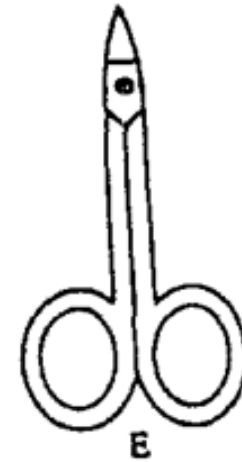
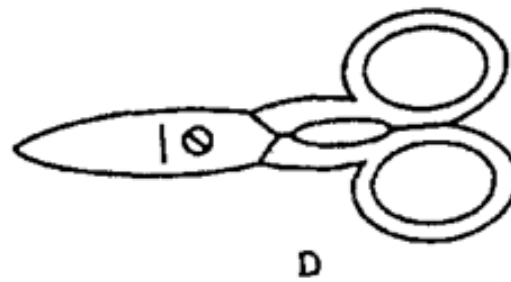
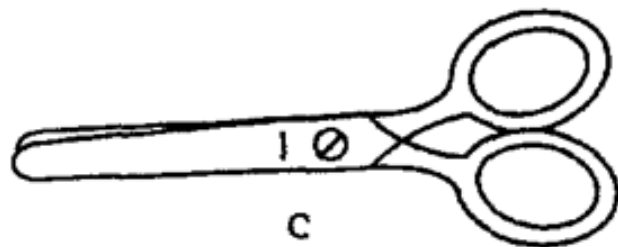
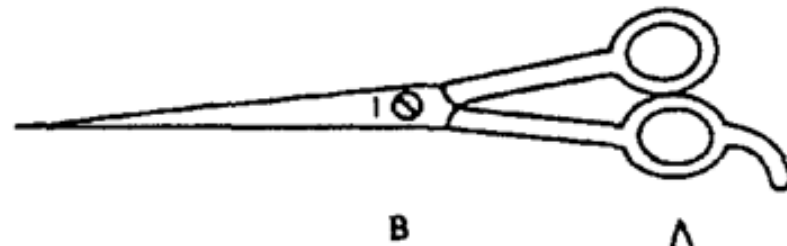
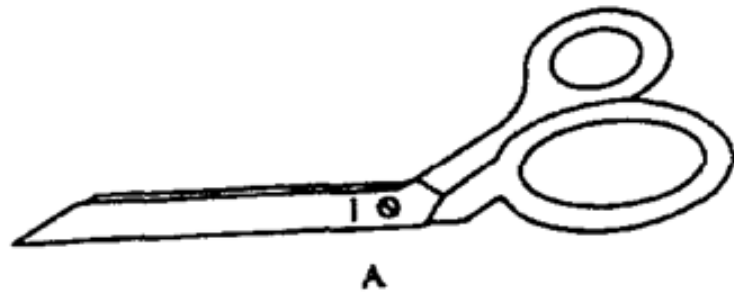
water tank video! [http://](http://threeacts.mrmeyer.com/watertank/)
threeacts.mrmeyer.com/watertank/

STRATEGY 1

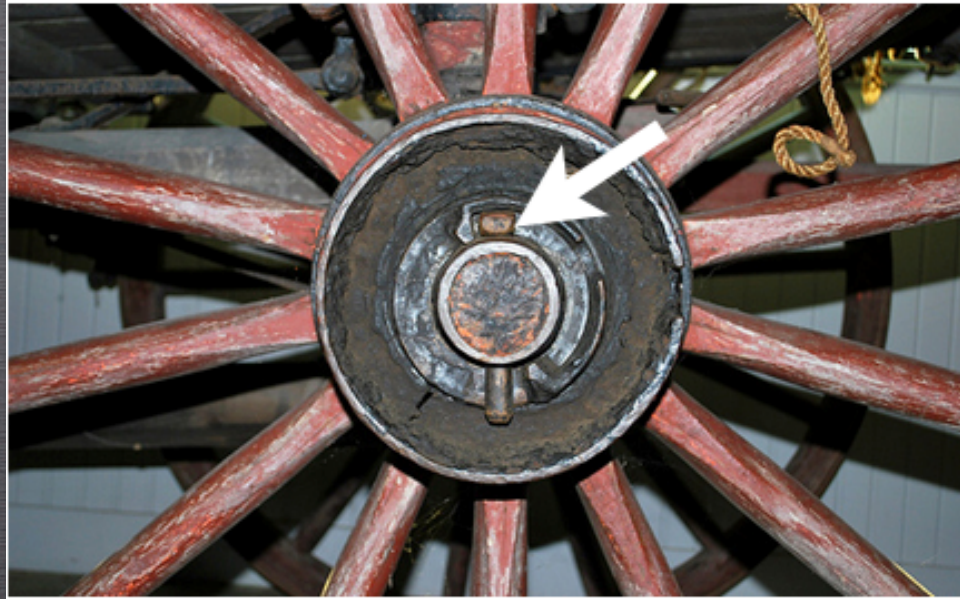
Leverage the notion of a
Time for Telling

No matter how much you want to,
you can't teach them everything.

Imagine you are cutting a section of
cloth, draw the scissors you would
use....



Pick a "linchpin" Concept



"Thus, a linchpin idea is the one that is essential for understanding, without which students cannot go anywhere...the most important enduring ideas" in an area of study.

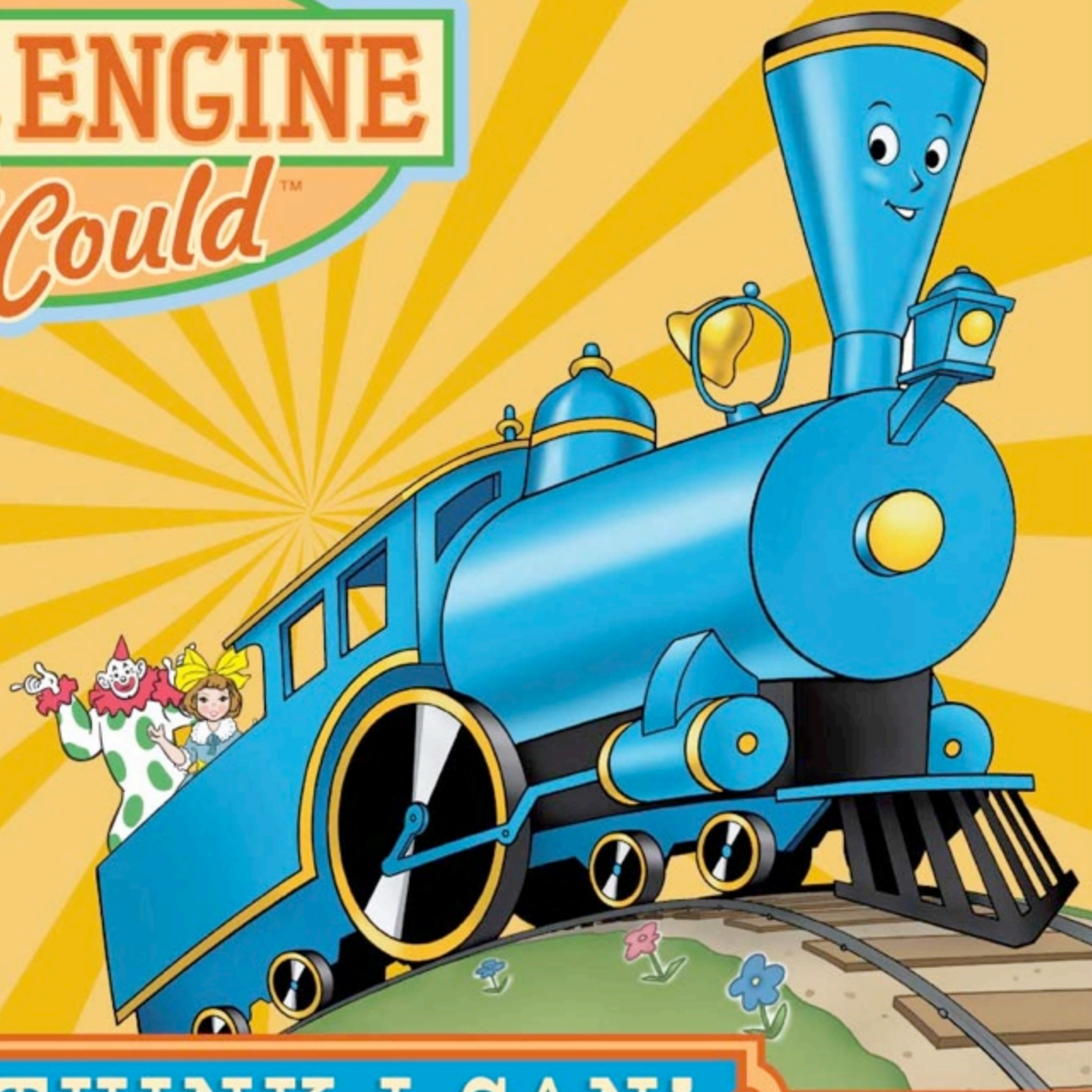
*Understanding by Design

STRATEGY 2

Leverage the power of big ideas

Teach your students the lesson of
the little engine that could...

The
LITTLE ENGINE
That Could™



I THINK I CAN!

STRATEGY 3

Leverage the power of a
growth mindset

Turn your students into...
Karate Masters

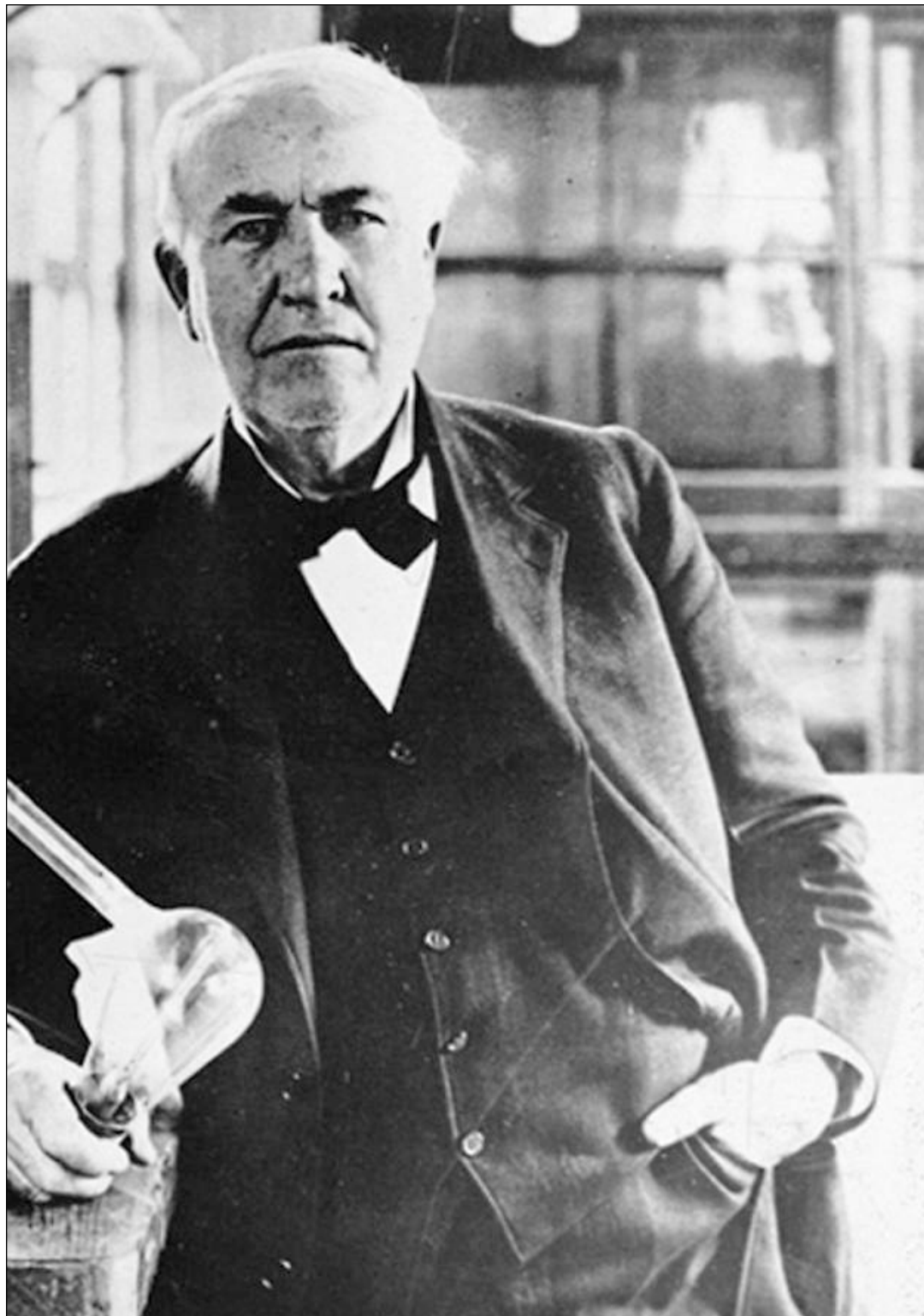


STRATEGY 4

Leverage the power of metacognition

Muddiest Point

What did you find most confusing or difficult about what we have discussed so far?



"I haven't
failed. I've just
found 10,000
ways that
won't work"

STRATEGY 5

Leverage the power of failure

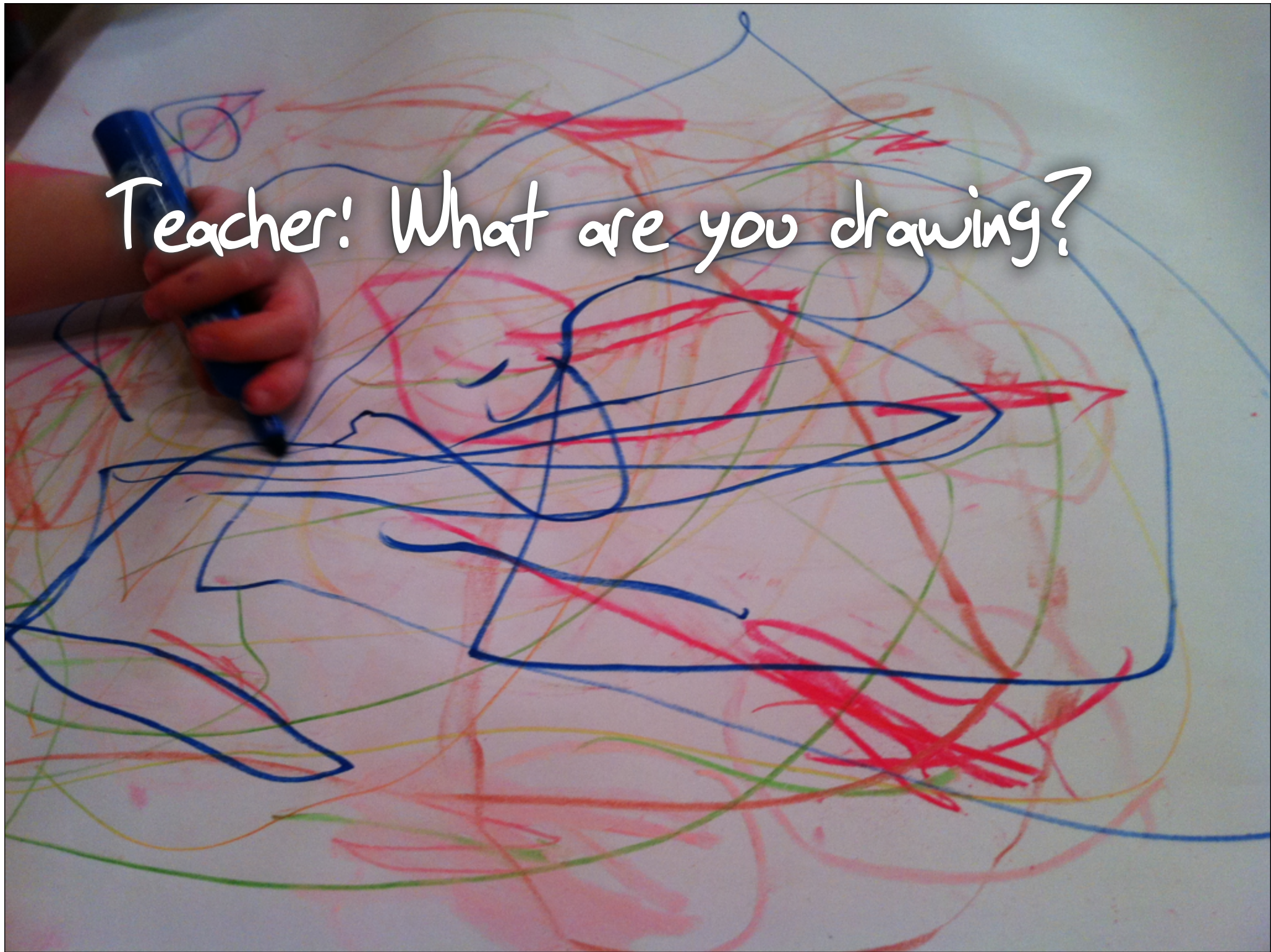
STRATEGY 5

Leverage the power of failure

"Tell me one thing that is wrong w/ your current answer."



Teacher! What are you drawing?





Teacher: What are you drawing?

Jane: A picture of God

A hand holding a blue marker is shown in the upper left corner, actively drawing a chaotic scribble on a white surface. The scribble consists of numerous overlapping, swirling lines in blue, red, and green, creating a complex, abstract pattern that fills most of the frame. The text is overlaid on this background.

Teacher: What are you drawing?

Jane: A picture of God

Teacher: But no one knows what
God looks like.

A hand holding a blue marker is shown in the upper left corner, actively drawing a chaotic scribble on a white surface. The scribble consists of numerous overlapping, swirling lines in blue, red, and green, filling most of the frame. The text is overlaid on this background.

Teacher: What are you drawing?

Jane: A picture of God

Teacher: But no one knows what
God looks like.

Jane: Well, they will in a minute!

*Sir Ken Robinson, Ted Talk on Creativity

STRATEGY 6

Leverage the power of the unknown

Break

Setting the stage for flipped learning

- Knowledge transfer: The primary purpose of education
- What is a flipped classroom
- Flipped IOI Model
- Just-in-Time Teaching
- Peer Instruction

What is a Flipped Classroom?

Think of something you are very good at, something you know you do well and write that down.

How did you get good at that something? Also jot that down.

How did you get good at that something? Also jot that down.

A. listening to someone else talk

B. practice or trial and error

C. taught myself

D. other

What answer matches best what you wrote down?

- A. listening to someone else talk
- B. practice or trial and error
- C. taught myself
- D. other





What is happening in this picture?



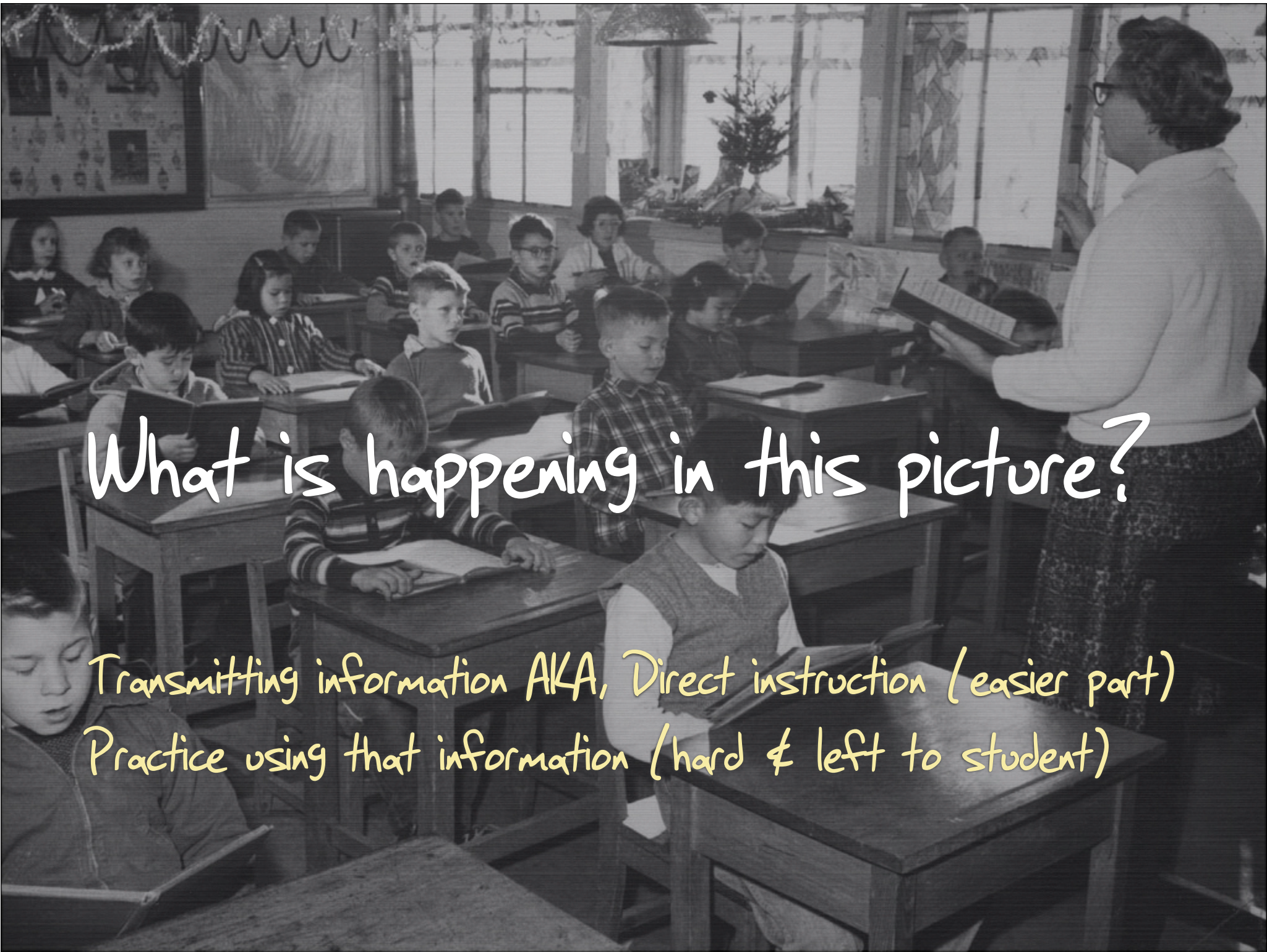
What is happening in this picture?

Transmitting information AKA, Direct instruction (in class)



What is happening in this picture?

Transmitting information AKA, Direct instruction (in class)
Practice using that information (out of class)

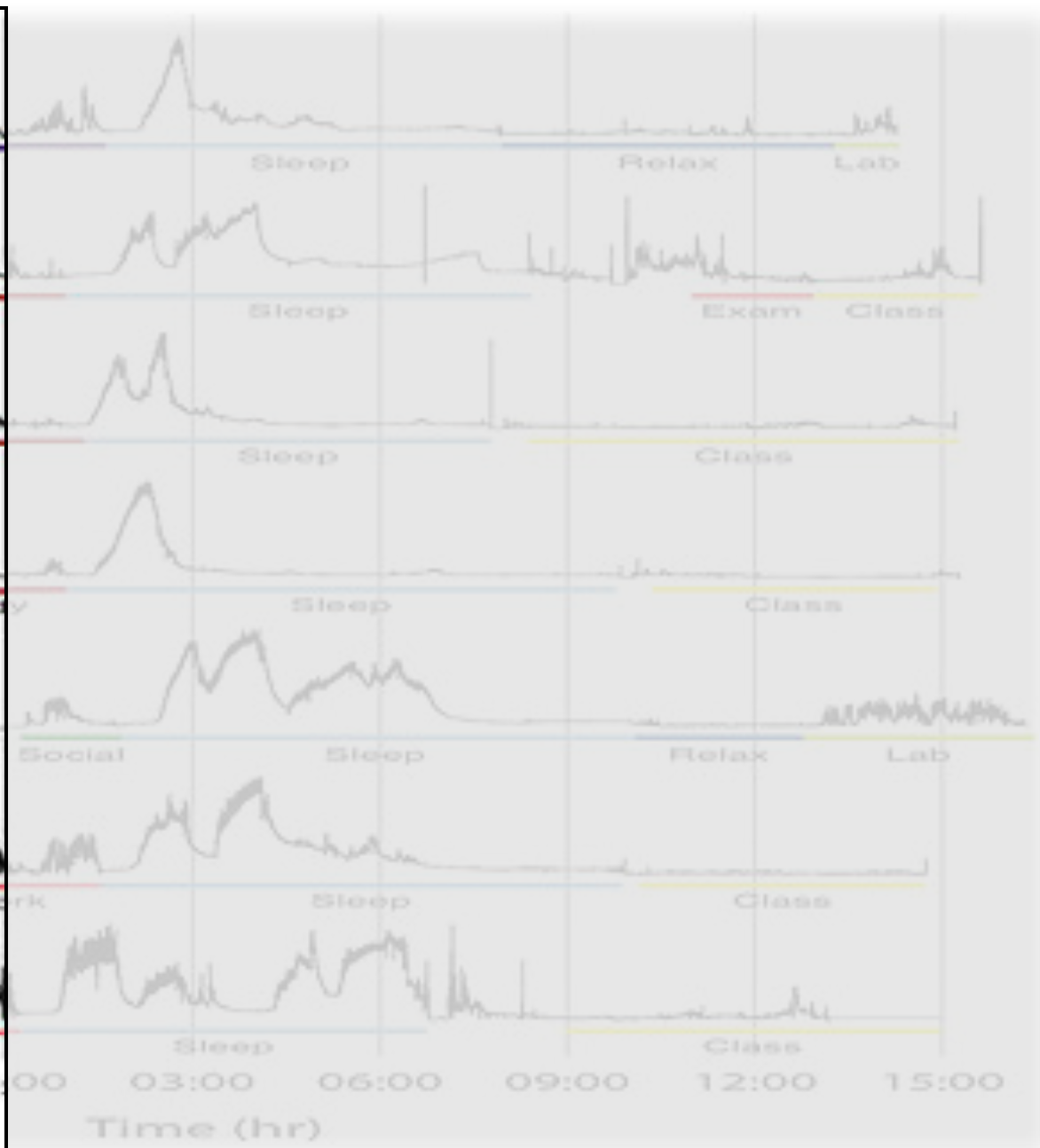
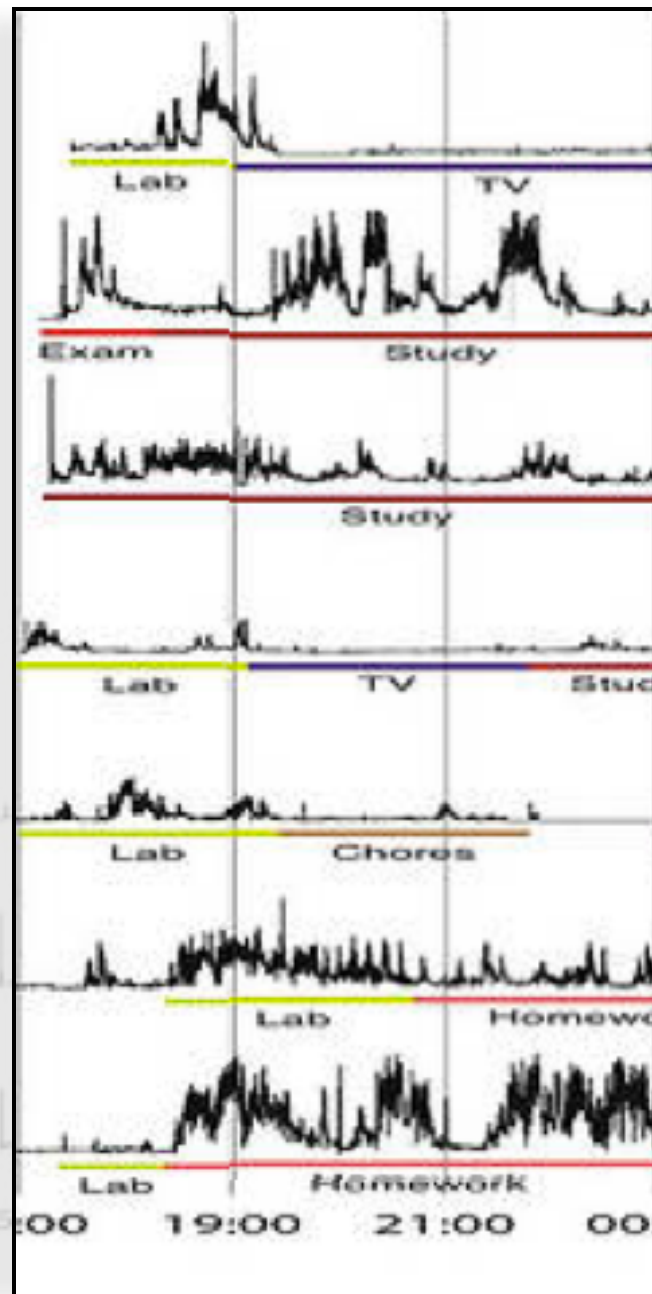


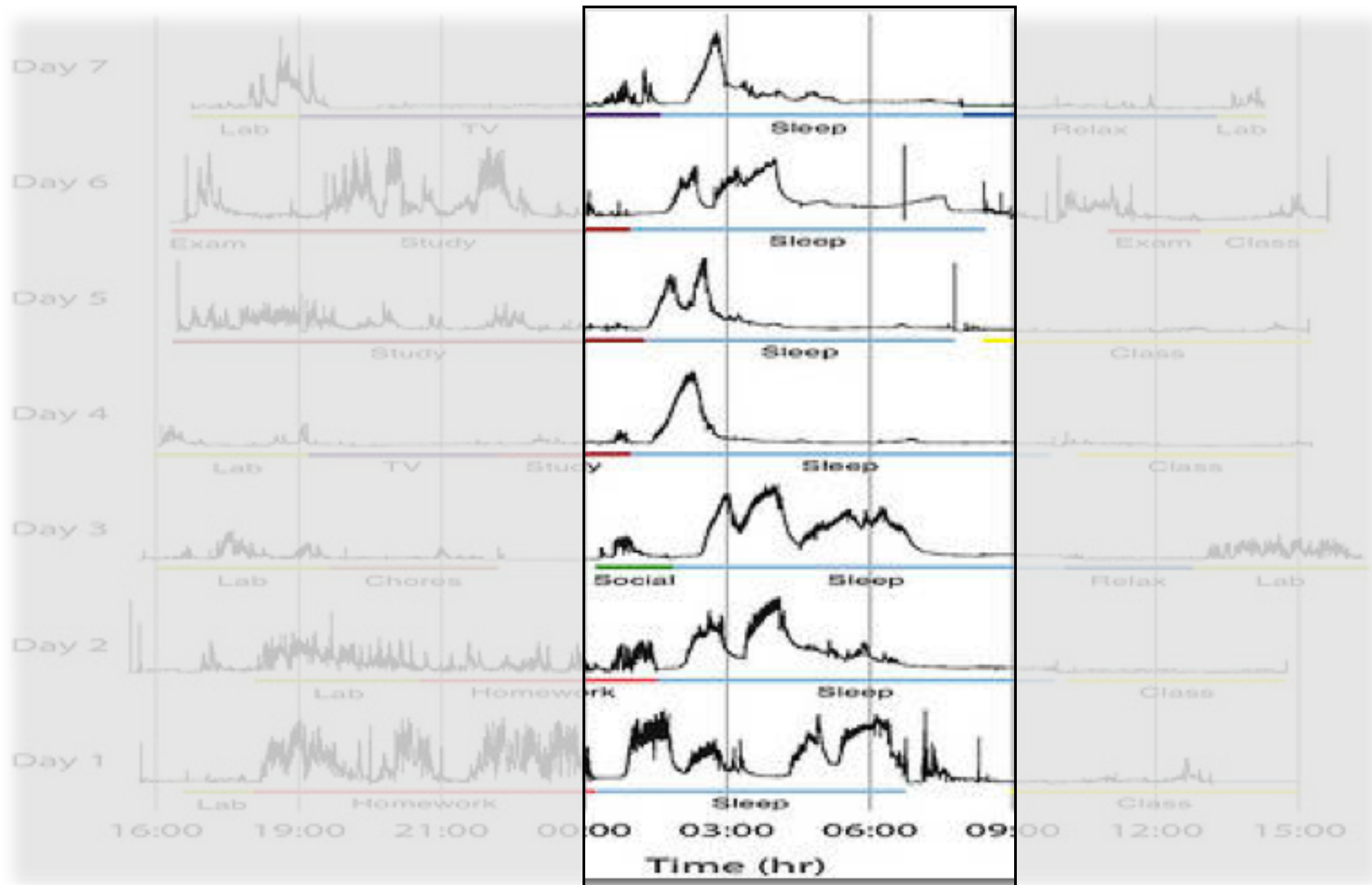
What is happening in this picture?

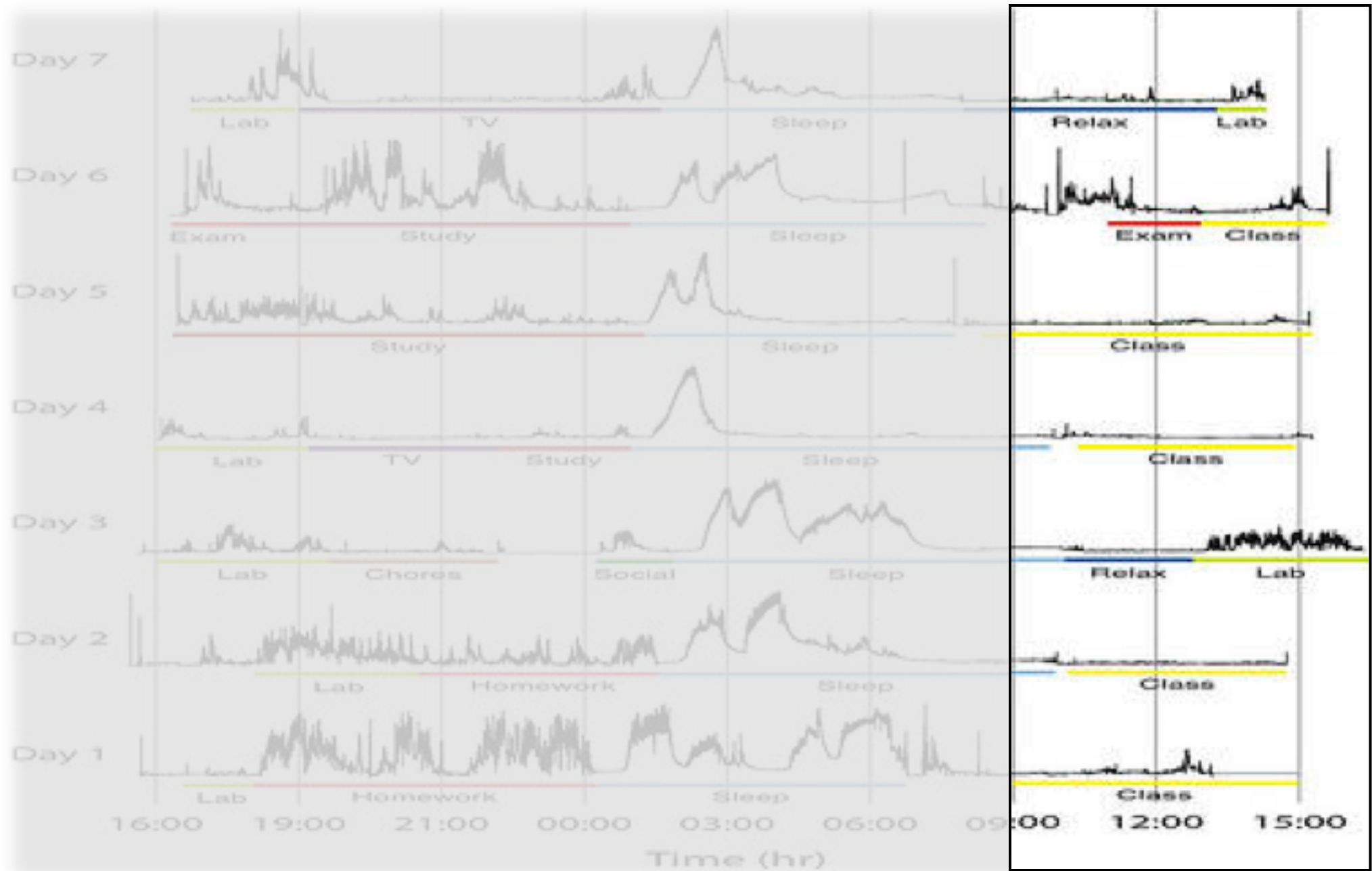
Transmitting information AKA, Direct instruction (easier part)
Practice using that information (hard & left to student)

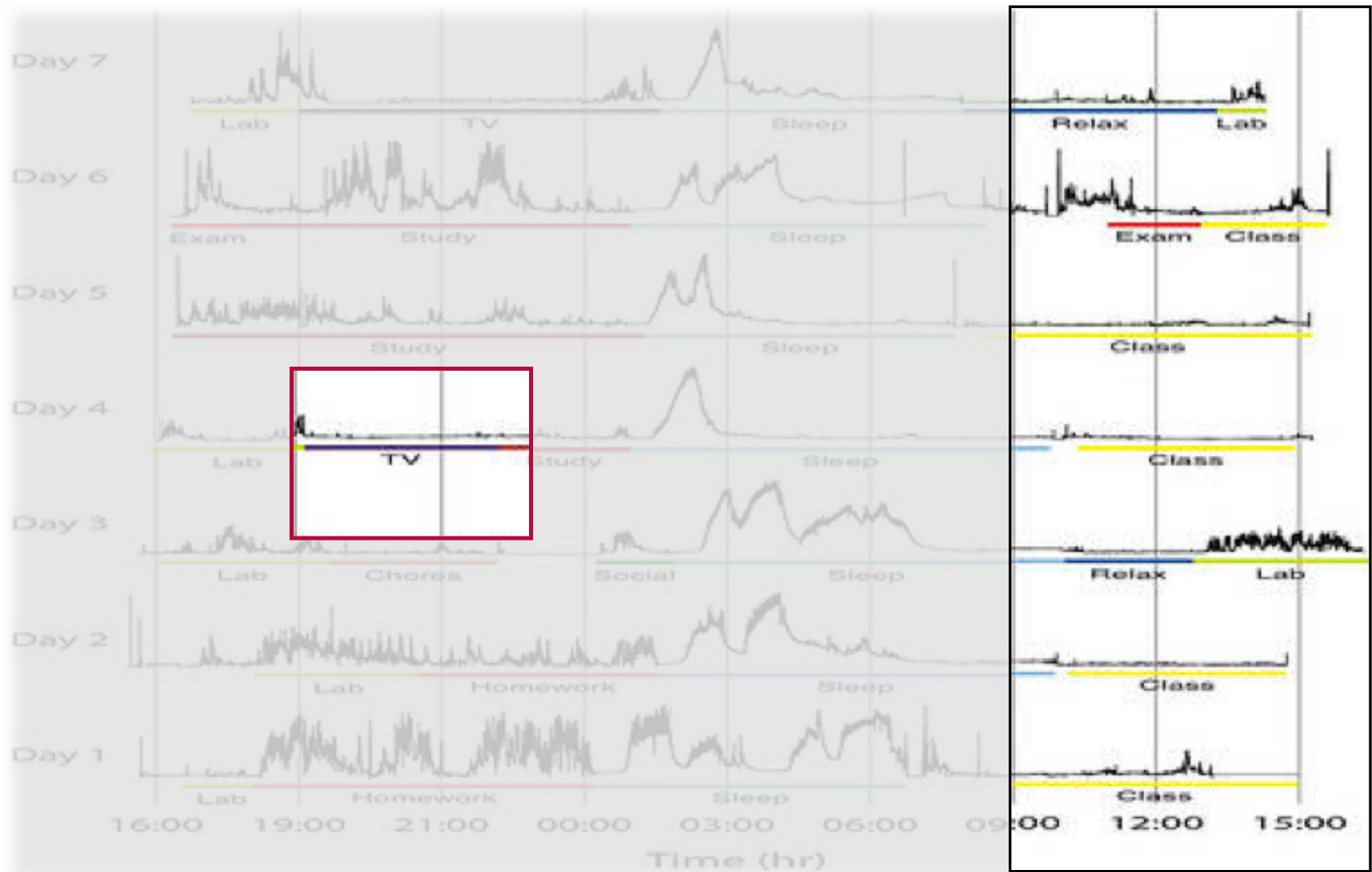




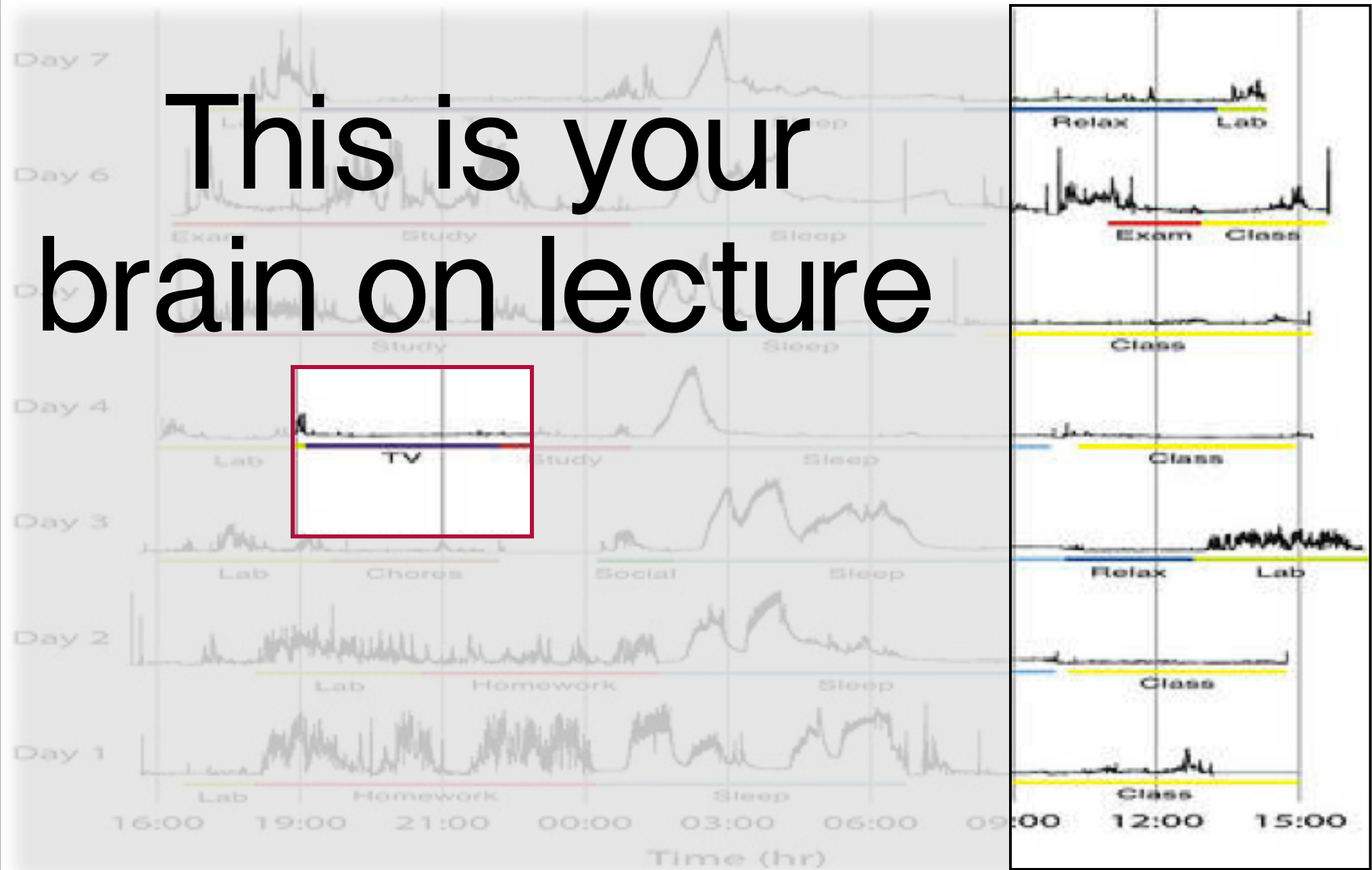






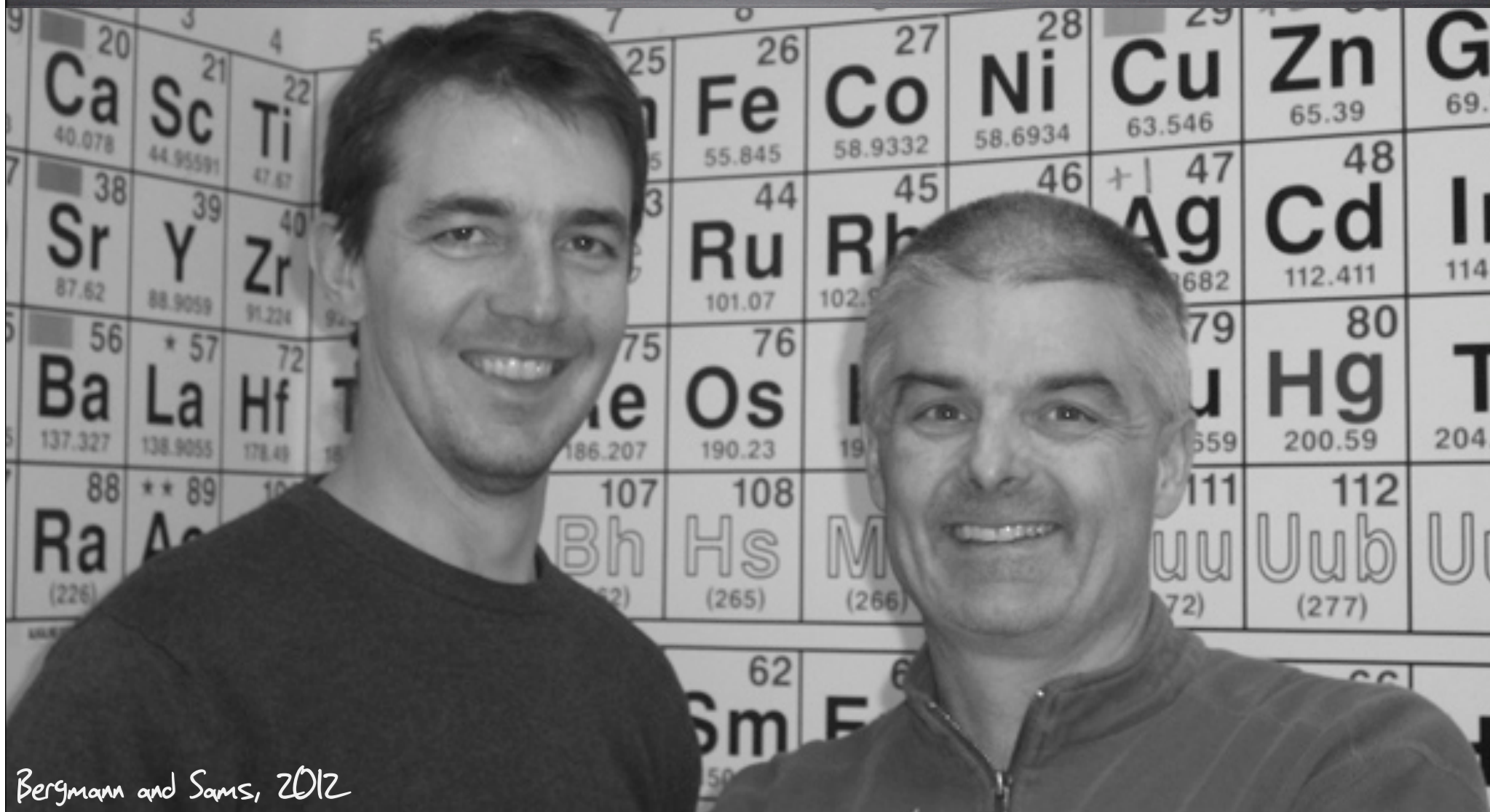


This is your brain on lecture



Education doesn't
have to be this way!

A flipped classroom is a mindset.



Bergmann and Sams, 2012

Direct Instruction in Class



Traditional Learning Model

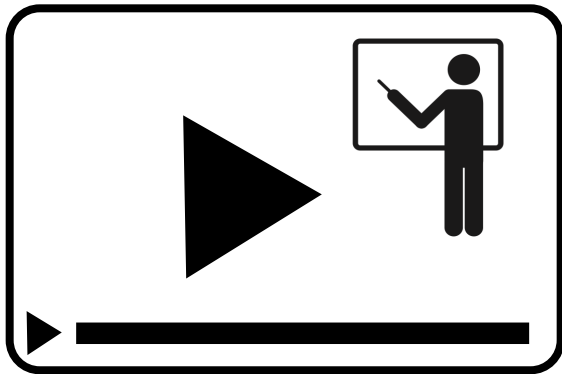
Direct Instruction in Class



Traditional Learning Model



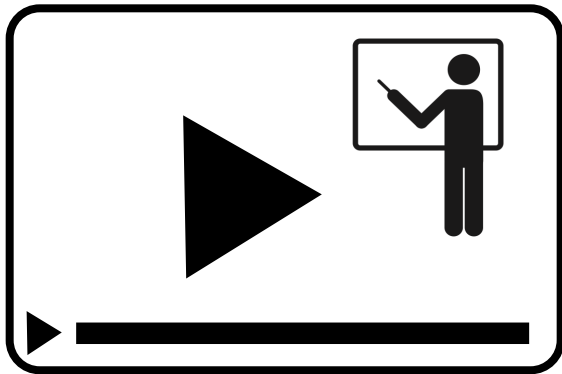
Practice At Home



Direct Instruction at Home

Flipped Learning Model

Practice or assimilation
in class



Direct Instruction at Home

Flipped Learning Model

3 characteristics of a flipped classroom

1. Bulk of direct instruction happens out of class
2. Students are the center of attention in class
3. Guided practice or assimilation happens in class

How to determine what to flip—
ask yourself:

“Which activities that do not require my physical presence can be shifted out of the class in order to give more class time to activities that are enhanced by my presence?”

Bergmann and Sams, 2012

What is a flipped classroom?

- A. simply putting videos online for students
- B. A mindset
- C. A new technology
- D. I am not sure

What do you wonder about flipped classrooms?

Myths about Flipped Classrooms

- There is one right way to flip a class
 - You can't flip just one lesson
- Flipping the classroom is about putting videos online
 - Students will LOVE this

Flipped Classroom Tools

- Out of Class
- In Class

Out of Class Tools

Out of Class Tools

Screencasting

2 types



1. Personal Capture: when you use your own computer to capture your content

Out of Class Tools

Screencasting

2 types



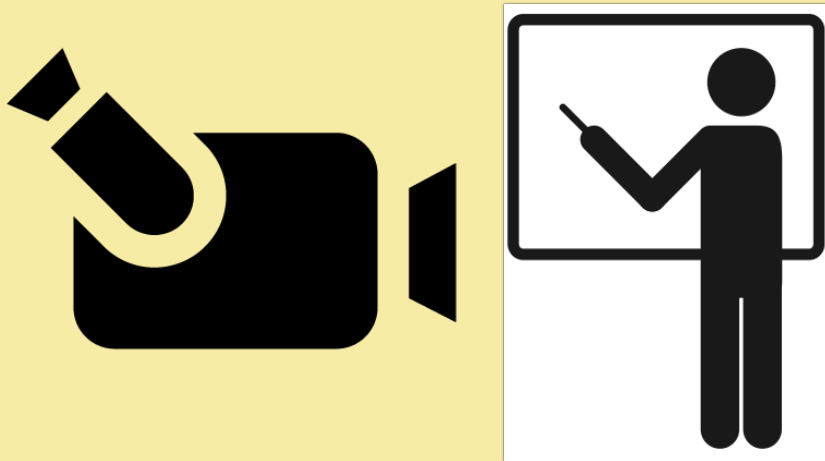
1. Personal Capture! when you use your own computer to capture your content

2. Classroom Capture! when someone records you giving lessons either live or ahead of time

Out of Class Tools

Screencasting

Personal Capture in 2 basic steps

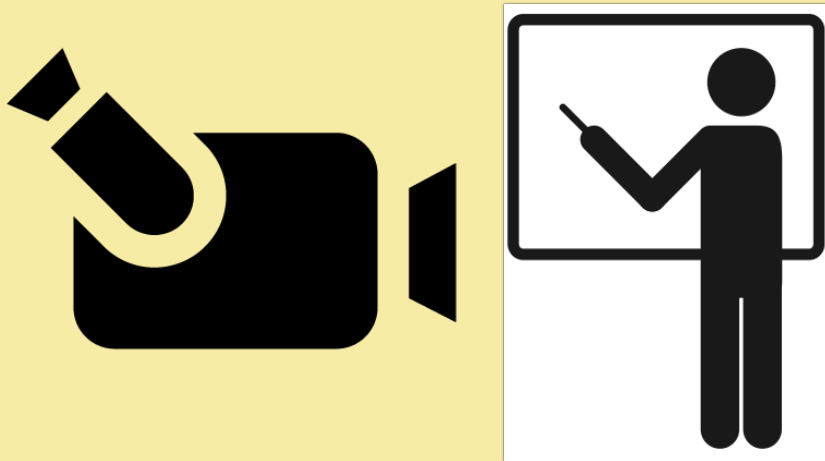


1 Record Lesson

Out of Class Tools

Screencasting

Personal Capture in 2 basic steps



1 Record Lesson



2 Provide Access

Out of Class Tools

Screencasting



Tips for making videos!

1. Keep videos short - 7 min chunks
2. Give students lesson on how to effectively watch
3. Write a script
4. Practice editing
5. Embed or include assessments

Out of Class Tools

Screencasting



- DEMO

Out of Class Tools

Screencasting

My quick start guide for flipping your classroom with screencasting!



blog.peerinstruction.net

Out of Class Tools

Screencasting

What keeps you up at night?

"Innovative ways to present the subject."

Out of Class Tools

Screencasting+Video PDFS

TEXTO DE APOIO (capítulo II)

IFSP (Campus Petrópolis) S. IF - UFRGS

OLIVEIRA, V.; VEIT, E. A.; ARAUJO, L. S.



Figura 2.3: A fotografia mostra a disposição das liminhas de ferro ao redor de um fio retilíneo percorrido por corrente elétrica. Consideramos que a configuração das liminhas forma linhas de campo magnético circulares ao redor do fio.



Vídeo 2.1: Demonstração das linhas de campo magnético ao redor de fio retilíneo.



Figura 2.4: Regra da mão direita: fazendo-se o polegar apontar no sentido da corrente elétrica e os demais dedos envolverem o fio, indicando a orientação das linhas de campo magnético gerado pela corrente.

Fig. 2.4.

Usando a regra da mão direita para um fio retilíneo estendido no plano da página, vamos obter o campo magnético entrando nesse plano de um lado do fio e saindo do outro.

Para simbolizar uma grandeza física que está perpendicular a um plano e entrando nele, utilizamos o símbolo \otimes ; e para representar uma grandeza perpendicular a um plano e saindo dele, utilizamos o símbolo \odot . Veja a Fig. 2.5. Vale destacar que essa simbologia é uma maneira de representar uma flecha (representação de um vetor) que entra ou sai perpendicularmente de um plano. A Fig. 2.6 mostra esquematicamente uma flecha e dois observadores, A e B. O observador A enxerga a parte de trás da flecha (com forma de "x"), e a flecha entrando em um plano. Já o observador B enxerga a parte da frente da flecha (com forma de "•") e saindo do plano.

A determinação da intensidade do campo magnético em um ponto P, afastado por uma distância r do fio condutor, é dada pela Lei de Ampère. A intensidade do campo magnético é proporcional a $(i / 2\pi r)$. A constante de proporcionalidade é a chamada permeabilidade magnética, que depende do meio em que existe o campo magnético. No vácuo, a permeabilidade, μ_0 , tem valor $4\pi \cdot 10^{-7} \text{ T} \cdot \text{m} / \text{A}$.

(Eq. 2.1)

$$B = \frac{\mu_0 i}{2\pi r}$$

A unidade de medida de campo magnético, no Sistema Internacional, é o tesla (T), em homenagem a Nikola Tesla, cientista que contribuiu com estudos na área do Eletromagnetismo.

A Tab. 2.1 mostra valores aproximados de campo magnético gerado em diferentes localizações.

Out of Class Tools

Screencasting+Video PDFS

Three steps to making video pdfs!

<http://blog.peerinstruction.net/2013/01/24/make-readings-come-alive/>

Out of Class Tools

Video Lessons (not your content)

Out of Class Tools

Video Lessons (not your content)

http://www.khanacademy.org/math/geometry/right_triangles_topic/pyth_theor/v/the-pythagorean-theorem

Out of Class Tools

Video Lessons (not your content)

Free!

Khan Academy

Youtube

Sophia.org

Showme

TedEd

Out of Class Tools


Video Lessons (not your content)

Flip your class with proven methods

CREATED BY **JULIE SCHELL** USING **TEDEd** Beta
VIDEO FROM **BokCenter** YOUTUBE CHANNEL

Let's Begin...

What is a **flipped classroom**, anyway? In a traditional flipped class, teachers capture lectures on video and have students watch those videos as "homework." Then, during class time, instructors help students apply what was learned at home and guide more complex work, rather than lecturing. **Peer instruction** is one proven method to boost higher-order thinking during class time, developed at Harvard.



0:00 / 2:21

Watch

Think

Dig Deeper

...And Finally

Flip This Lesson

Create Your Own Lesson | Send Us Feedback | Flag As Inappropriate

TEDEd Beta

ed.ted.com - ed.ted.com/on/g0Sd2mG7

Out of Class Tools

What keeps you up at night?

"How to motivate students who will not work outside of the classroom."

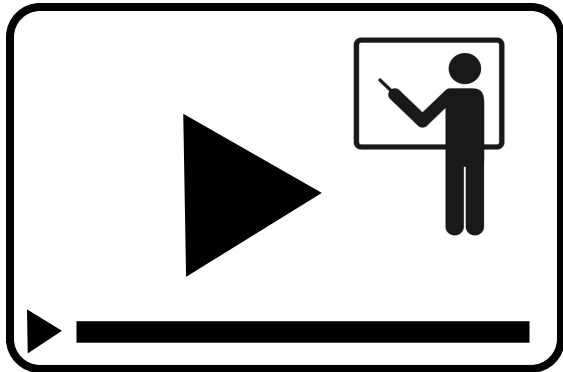
"New ways to engage students."

Out of Class Tools
Just-in-Time Teaching

Practice or assimilation
in class



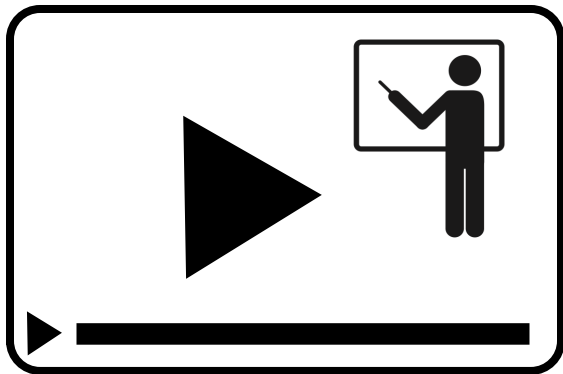
*Have students do
homework in class*



Direct Instruction at Home

Flipped Teaching 101

Practice or assimilation
in class

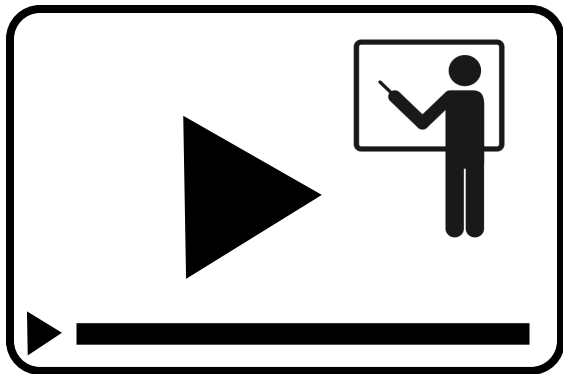


Direct Instruction at Home

Have students do
homework in class

Just-in-Time Teaching

Practice or assimilation
in class

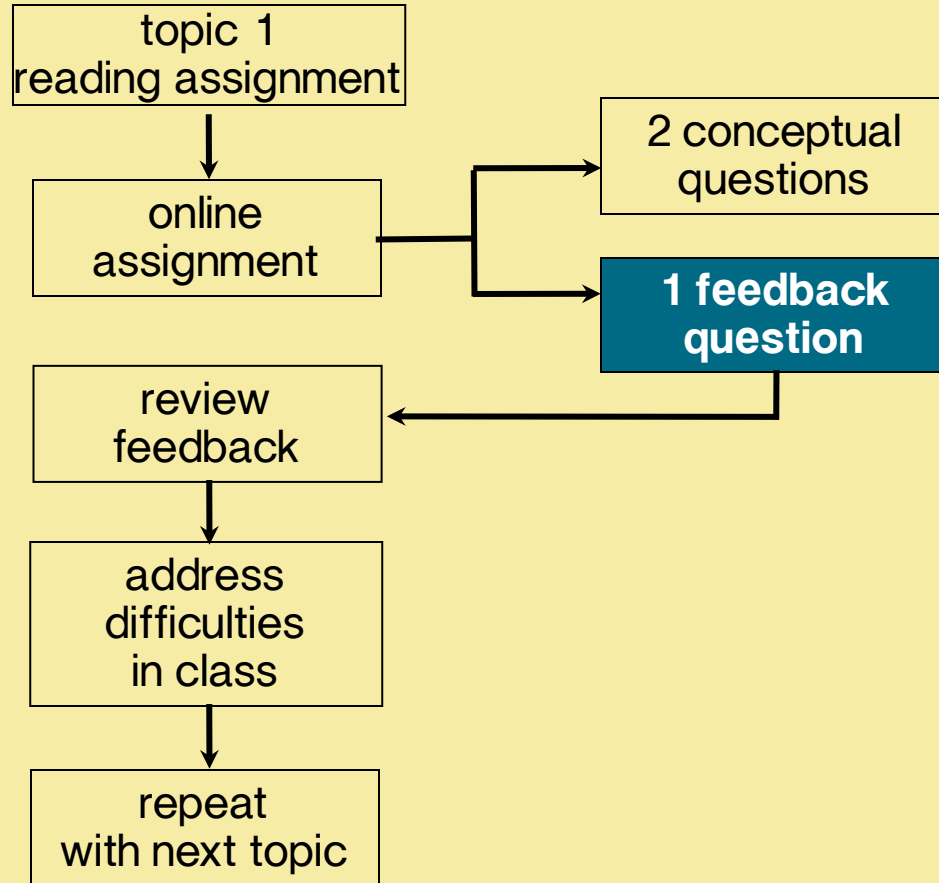


Direct Instruction at Home

One way to do something
innovative with your flip

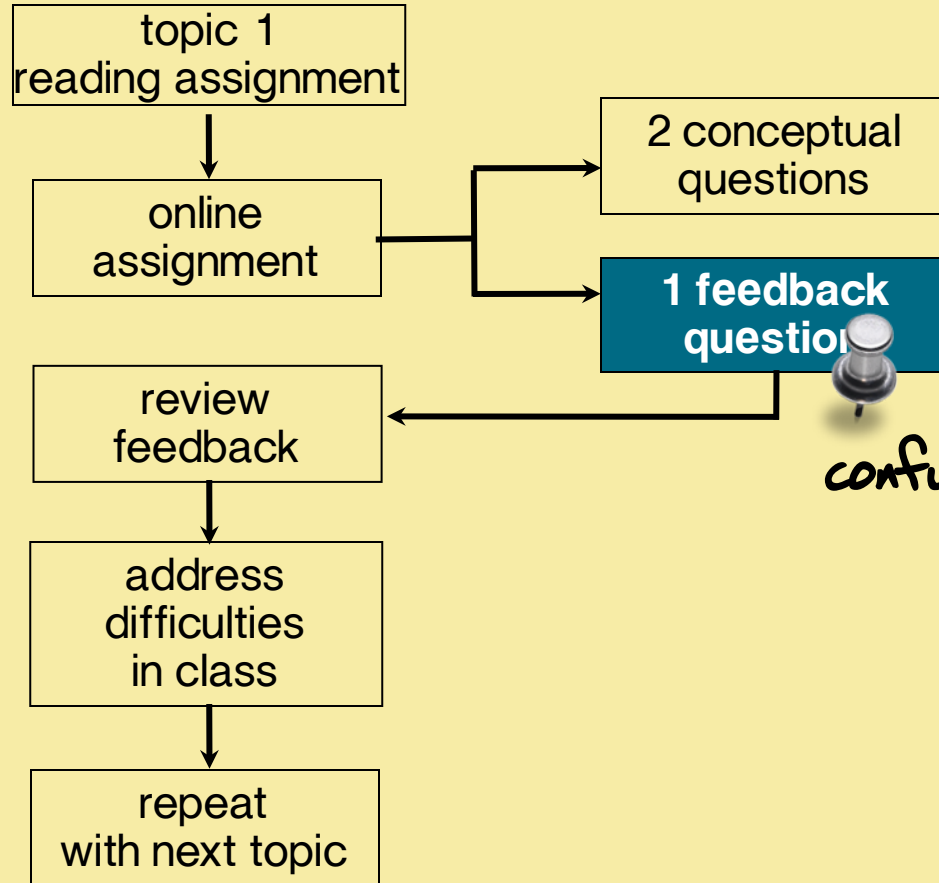
Out of Class Tools

Just-in-Time Teaching



Out of Class Tools

Just-in-Time Teaching

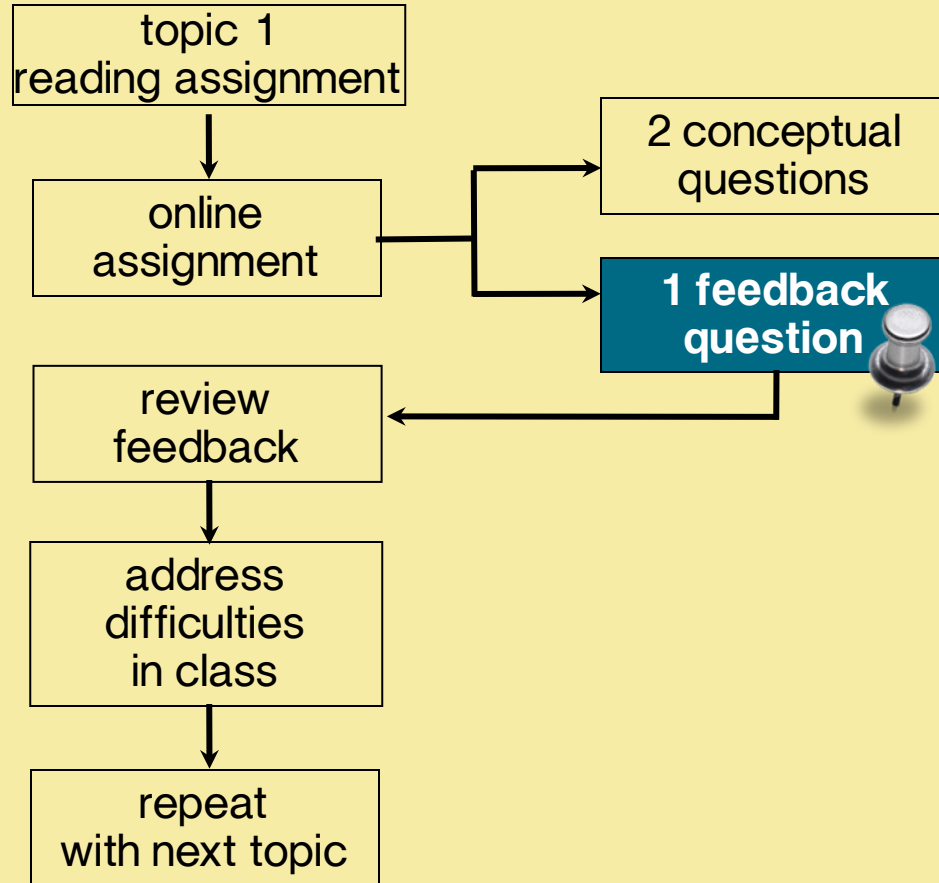


What do you find most
confusing about what you read?

Muddiest Point Technique

Out of Class Tools

Just-in-Time Teaching



What do you wonder about this topic? *Wonder Question*

Out of Class Tools

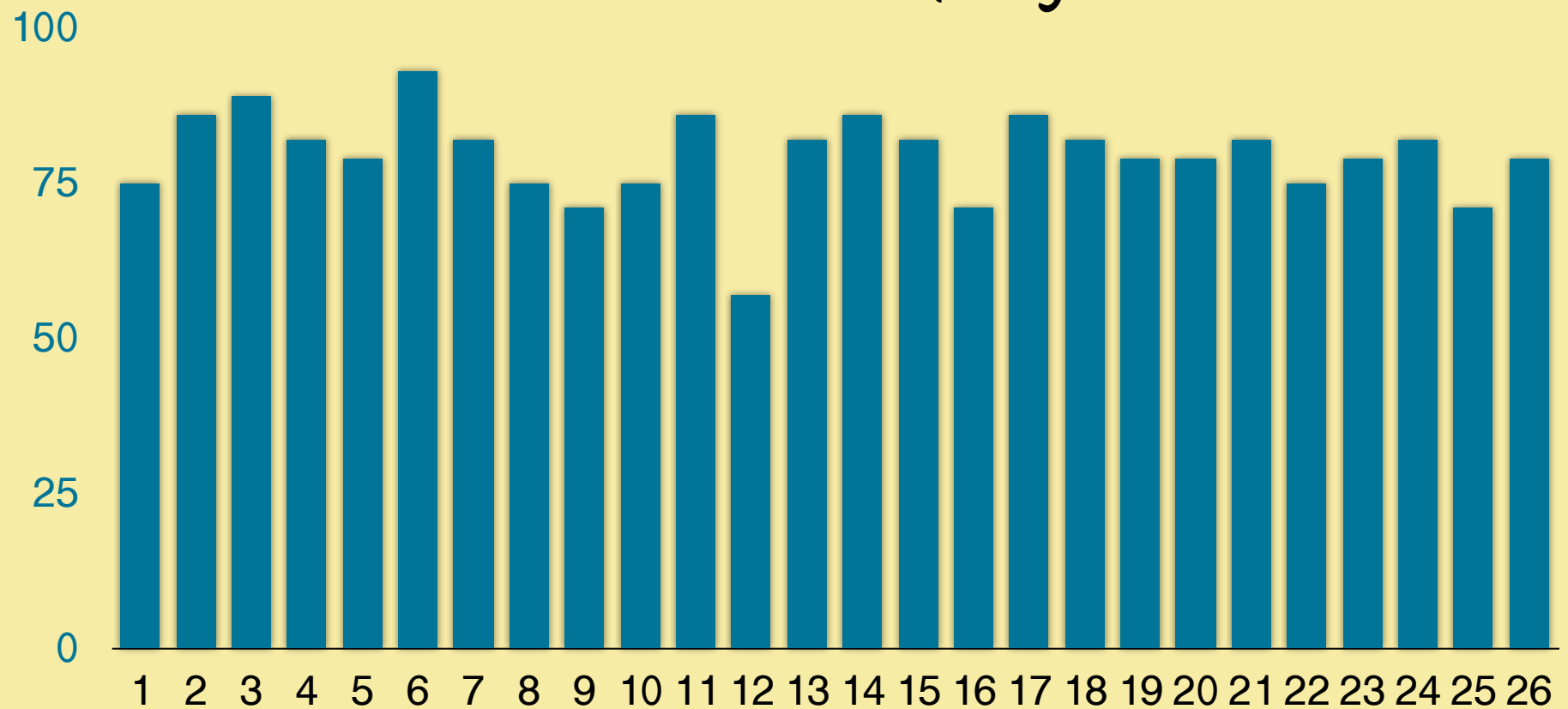
Just-in-Time Teaching

What do you want to learn?

"It is important to cite achievement data & research about student engagement not just perceptions."

Out of Class Tools

Just-in-Time Teaching



% of students (n=28) completing reading assignment (n=26)

Out of Class Tools

Just-in-Time Teaching

- Rewards Process
- Builds Metacognitive Strategies

Out of Class Tools

I think I will try

1. personal capture
2. using other's content for video lessons
3. Just-in-Time Teaching
4. some combo of all of the above

What do you wonder about Screencasting or JiTT?

Tips for JiTT

- give students points for doing reading assignments
- organize class time around results of feedback
- display their comments anonymously

Flipped Classroom Tools

- Out of Class
- In Class

In Class Tools

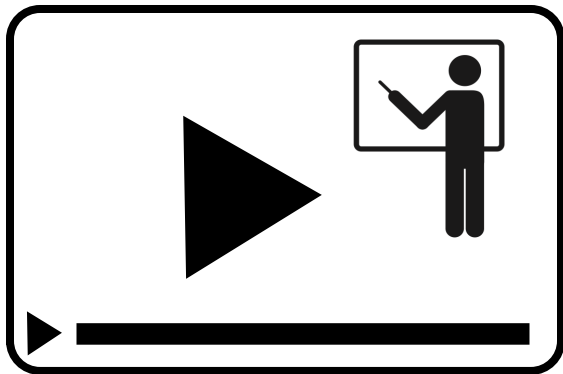
What keeps you up at night?

"How to make learning more interesting and enjoyable."

"Engaging lessons."

Peer Instruction

Practice or assimilation
in class



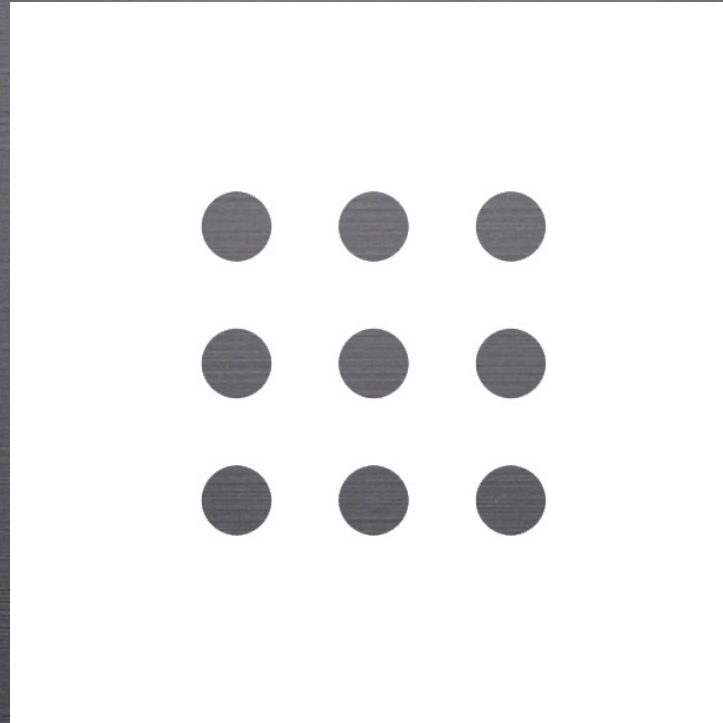
Direct Instruction at Home

One way to do something
innovative with your flip

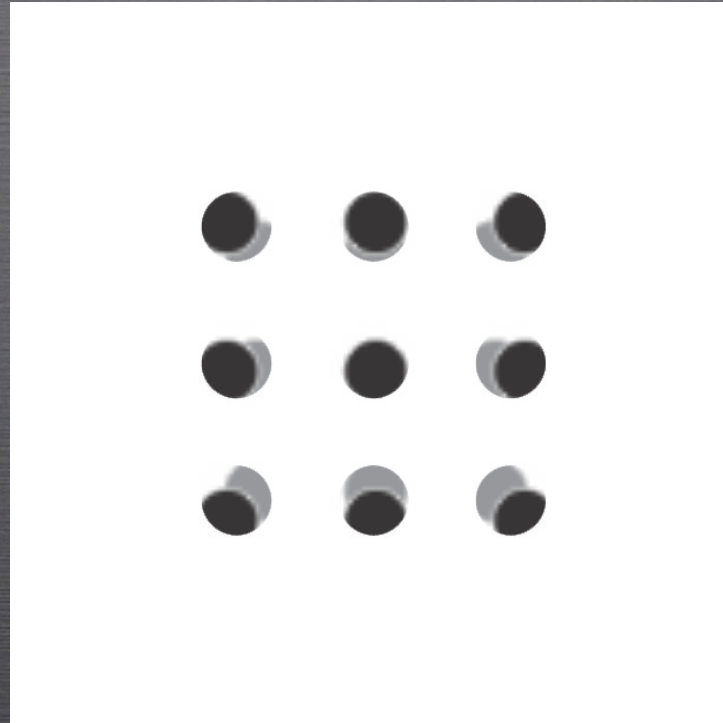
Thermal Expansion



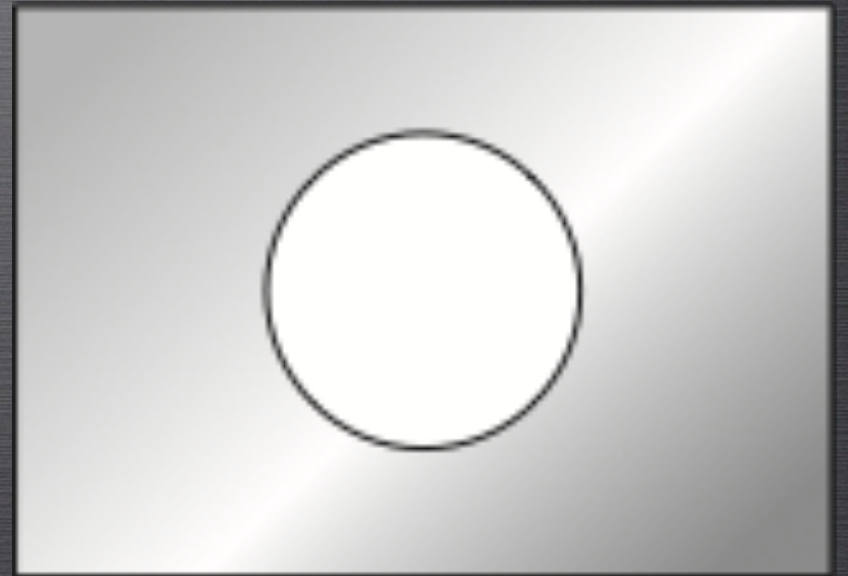
When metals heat up, they expand



When metals heat up, they expand

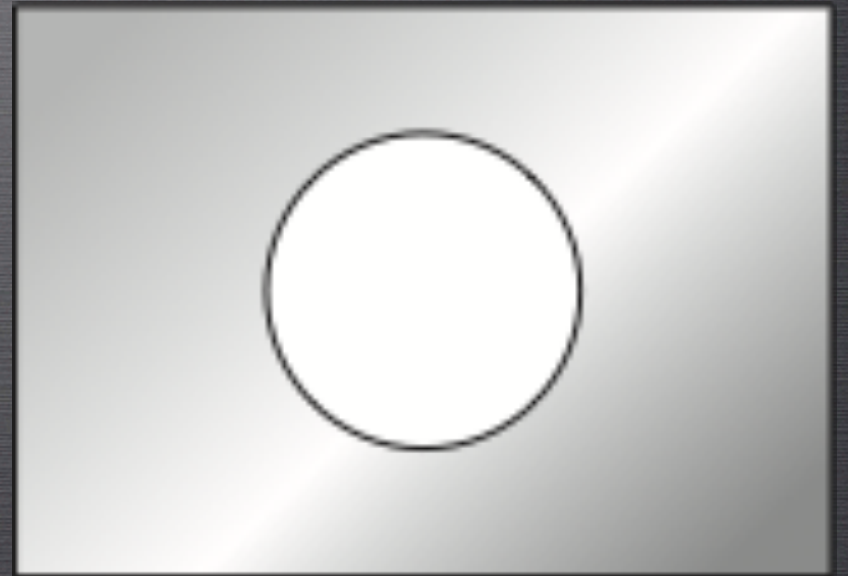


Consider a metal plate with a hole
in it



If you heat it uniformly, what happens to the hole?

- A. increases
- B. stays the same
- C. decreases

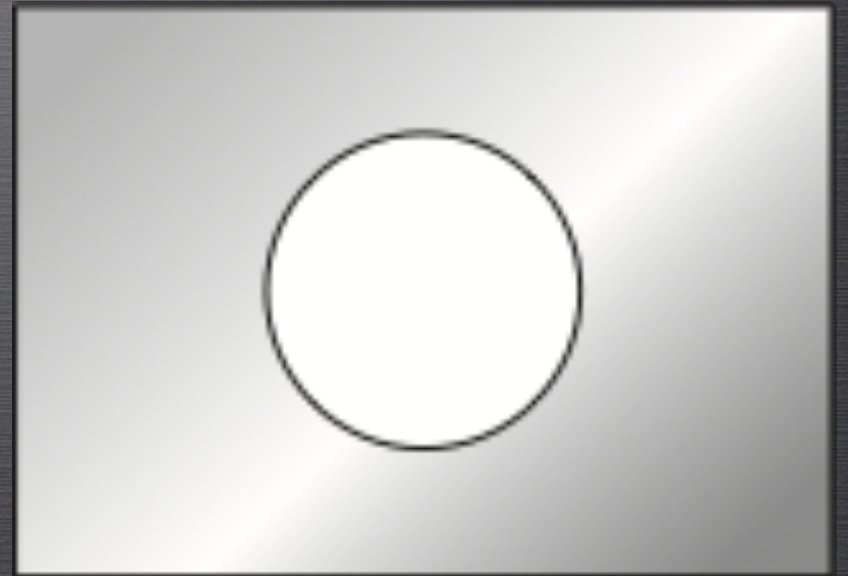


If you heat it uniformly, what happens to the hole?

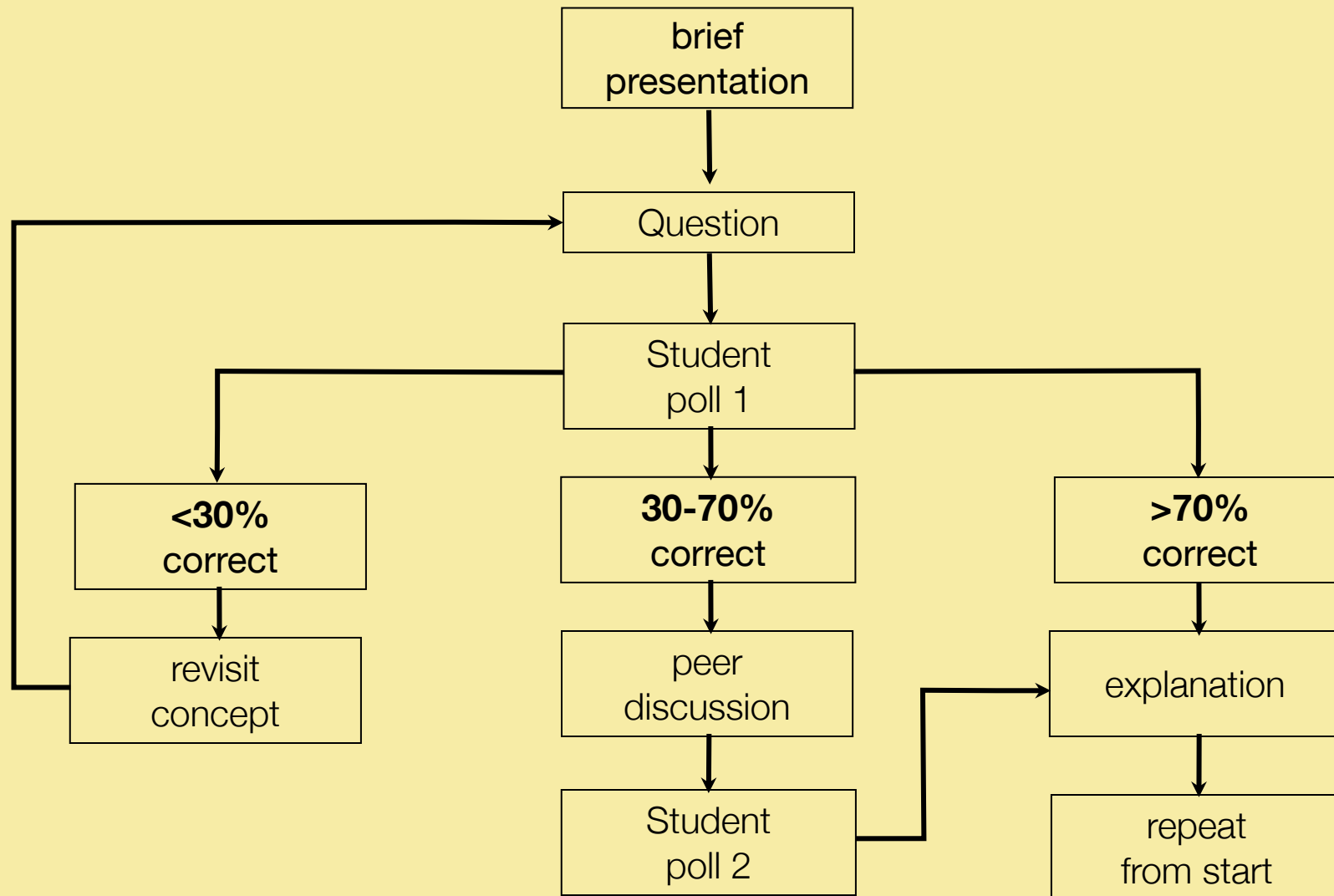
A. increases

B. stays the same

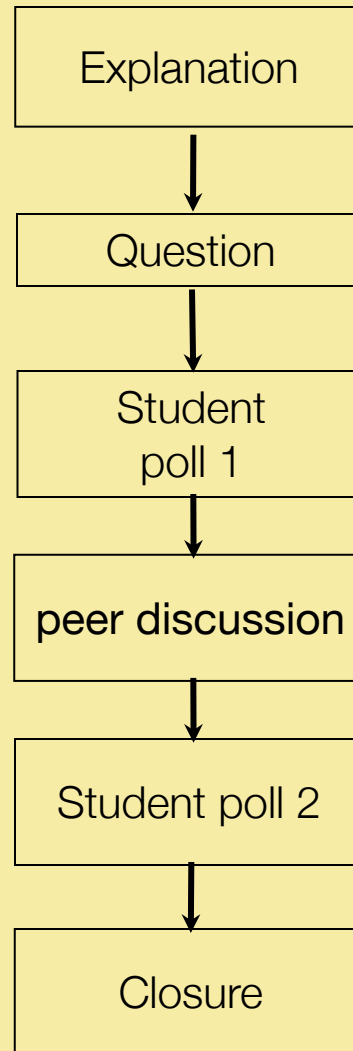
C. decreases



Peer Instruction



Peer Instruction



Out of Class Tools

Peer Instruction

- Knowledge transfer
- Rewards Process
- Builds Metacognitive Strategies





Systematic Moral Analysis



Gert's Moral Rules

1. Do not kill.
2. Do not cause pain.
3. Do not disable.
4. Do not deprive of freedom.
5. Do not deprive of pleasure.
6. Do not deceive.
7. Keep your promises
8. Do not cheat.
9. Obey the law.
10. Do your duty.

Heinz's wife was near death, and her only hope was a drug that had been discovered by a pharmacist who was selling it for an exorbitant price. The drug cost \$20,000 to make, and the pharmacist was selling it for \$200,000. Heinz could only raise \$50,000 and insurance wouldn't make up the difference. He offered what he had to the pharmacist, and when his offer was rejected, Heinz said he would pay the rest later. Still the pharmacist refused. In desperation, Heinz broke into the store and stole the drug.

Should Heinz have broken into the store to steal the drug for his wife?

- A. Yes
- B. No

Projective Trajectories

Motion is decoupled
horizontal motion + vertical motion

You simultaneously throw two coins.

If the coins follow the parabolic trajectories shown below, which coin hits the ground first?



You simultaneously throw two coins.

If the coins follow the parabolic trajectories shown below, which coin hits the ground first?



Imagine a rope fit snugly around the equator...



Suppose the rope is cut and 1m of rope is inserted b/w the cut ends. If the rope were to maintain a circular shape, how far off the surface of the earth would it float?



- A. the width of a few atoms
- B. the width of a few hairs
- C. the height of a curb
- D. exactly 1m

circumference at equator:

$$2\pi R_E$$

new circumference:

$$2\pi R_E + 1 \text{ m}$$

radius of circle with new circumference:

$$2\pi R = 2\pi R_E + 1 \text{ m}, \quad \text{and so} \quad R = R_E + \frac{1 \text{ m}}{2\pi}.$$

What are alternatives to clickers?





A pink square containing the letter 'A' in a white, bold, sans-serif font with a black outline.

A

A green square containing the letter 'B' in a white, bold, sans-serif font with a black outline.

B

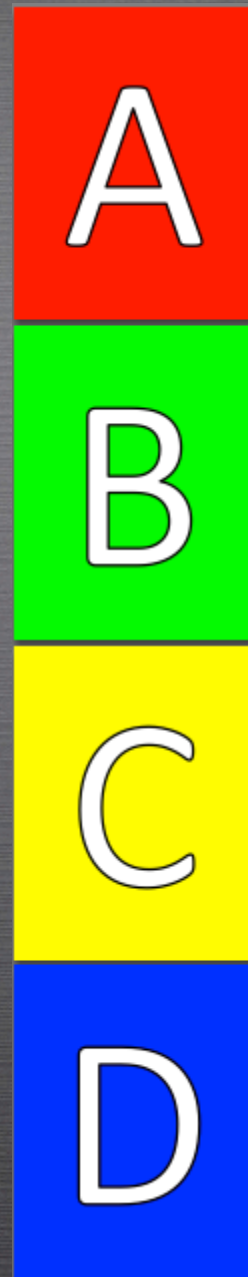
A yellow square containing the letter 'C' in a white, bold, sans-serif font with a black outline.

C

A blue square containing the letter 'D' in a white, bold, sans-serif font with a black outline.

D

<http://bit.ly/TgzIcQ>



<http://bit.ly/VnXtN5>

In Class Tools

Peer Instruction



My *quick start guide* for flipping your classroom with Peer Instruction!

blog.peerinstruction.net

What do you wonder about Peer Instruction?

Tips for PI

- can use with just one concept in a course
- always give students a chance to vote first before discussion
- have students give explanations of different responses as closure activity

5 big ideas about Flipped Classrooms

1. It's mindset, not a prescriptive technique
2. Don't have to flip an entire course
3. Students can and do resist
4. Much more than putting videos up online
5. Many ways to flip a class, no one right way

#1 Tip for Getting Started

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Find a mentor

Peer Instruction Network

Connect.Share.Learn.

www.peerinstruction.net

Turn to Your Neighbor

blog.peerinstruction.net

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BOOKS

Flip Your Classroom

Peer Instruction a User's Manual

Just-in-Time Teaching

Slide:Dology



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