

Peer instruction and interactive learning in the future classroom



Future Schools
Australian Technology Park
Sydney, Australia, 14 March 2014



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@eric_mazur

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Think of something you are good at

EDUCACION

Think of something you are good at

How did you become good at this?

EDUCACION

Became good at it by:

- 1. trial and error**
- 2. lectures**
- 3. practicing**
- 4. apprenticeship**
- 5. other**





What are the following...
1. Personal...
2. The...
3. The...
4. The...
5. The...

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1 education

2 PI



1 education

2 PI

3 test



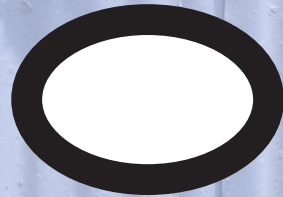
**better pay
attention!**

1 education

2 PI

3 test

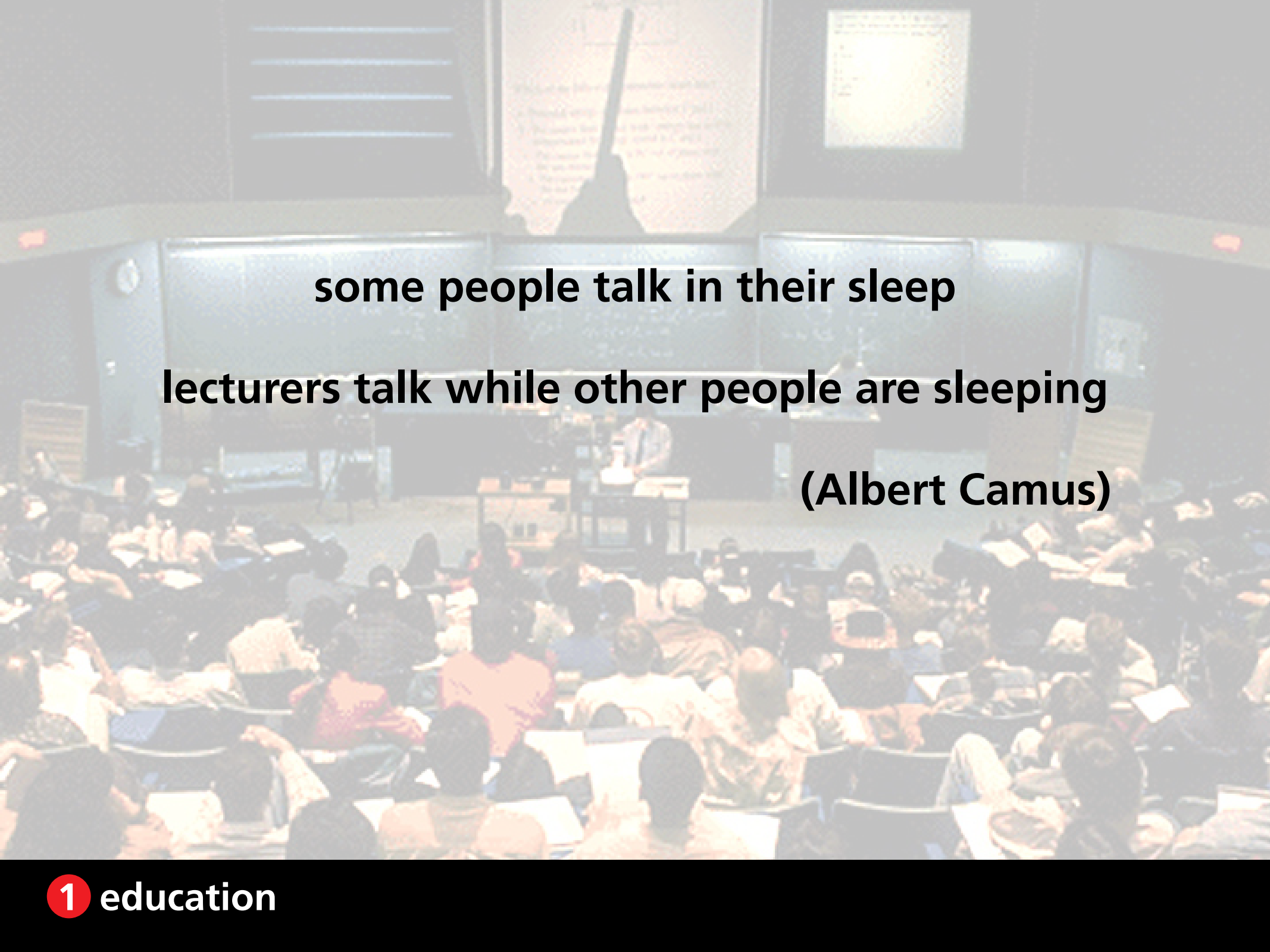
**What happens
in a lecture?**





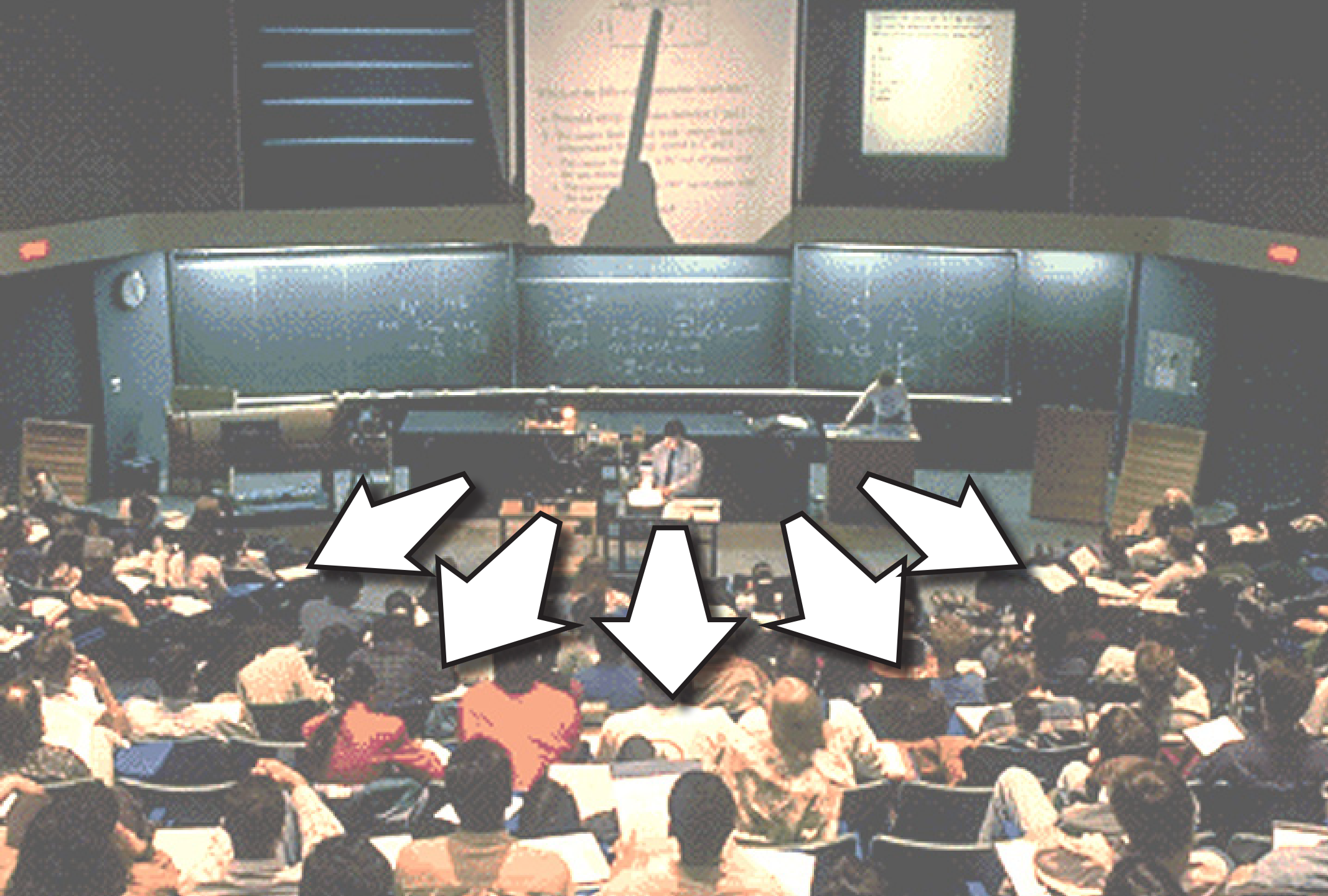
A large lecture hall with a professor at a podium and students in the audience. The professor is standing at a podium on the stage, facing the audience. The audience is seated in rows of chairs, filling the lecture hall. The stage has a large screen behind the professor, and there are several smaller screens or monitors on the walls. The lighting is dim, and the overall atmosphere is that of a formal lecture or presentation.

some people talk in their sleep

A large lecture hall with a lecturer at a podium and an audience of students. The room is filled with people, many of whom appear to be sleeping or resting. The lecturer is standing at a podium in the center, facing the audience. The audience is seated in rows of chairs, and many students have their heads down or are looking away. The room has a curved wall and a large screen at the front. The text is overlaid on the image.

some people talk in their sleep
lecturers talk while other people are sleeping
(Albert Camus)





The result?

EDUCACION

Lack of learning

EDUCACION

Lack of learning

Lack of retention

not transfer but assimilation of information is key

EDUCACION



1 education

2 PI



1. transfer of information



1. transfer of information


2. assimilation of that information

- 
- 1. transfer of information (in class)**
 2. assimilation of that information



1. transfer of information (in class)

2. assimilation of that information (out of class)



**Should focus
on THIS!**

1. transfer of information (in class)

2. assimilation of that information (out of class)



1. transfer of information (in class)

2. assimilation of that information (out of class)

- 
- 1. transfer of information (out of class)**
 - 2. assimilation of that information (in class)**

Peer



1. transfer of information (out of class)

2. assimilation of that information (in class)

INSTRUCTION

question

1 education

2 PI

question



think

question



think



poll

question



think



poll



discuss

question



think



poll



discuss



repoll

question



think



poll



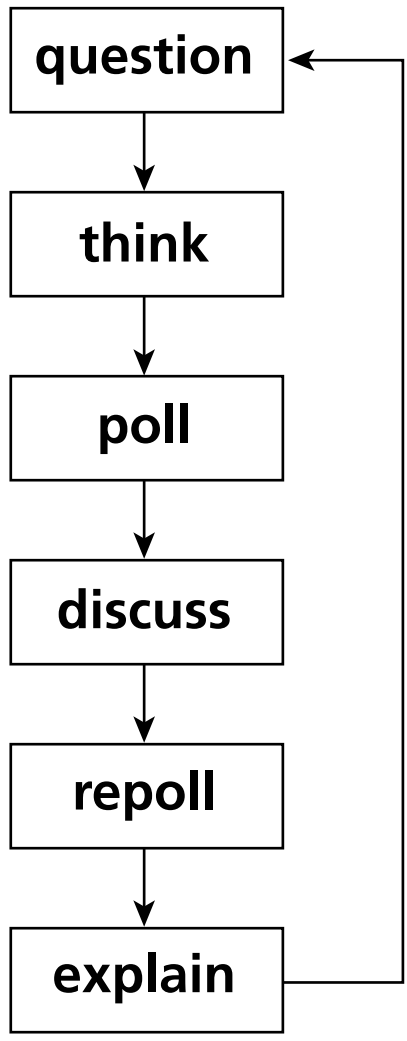
discuss

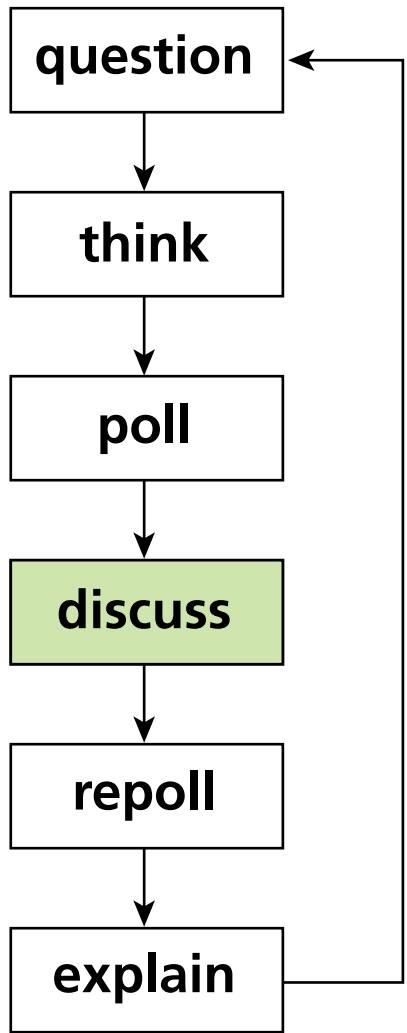


repoll



explain

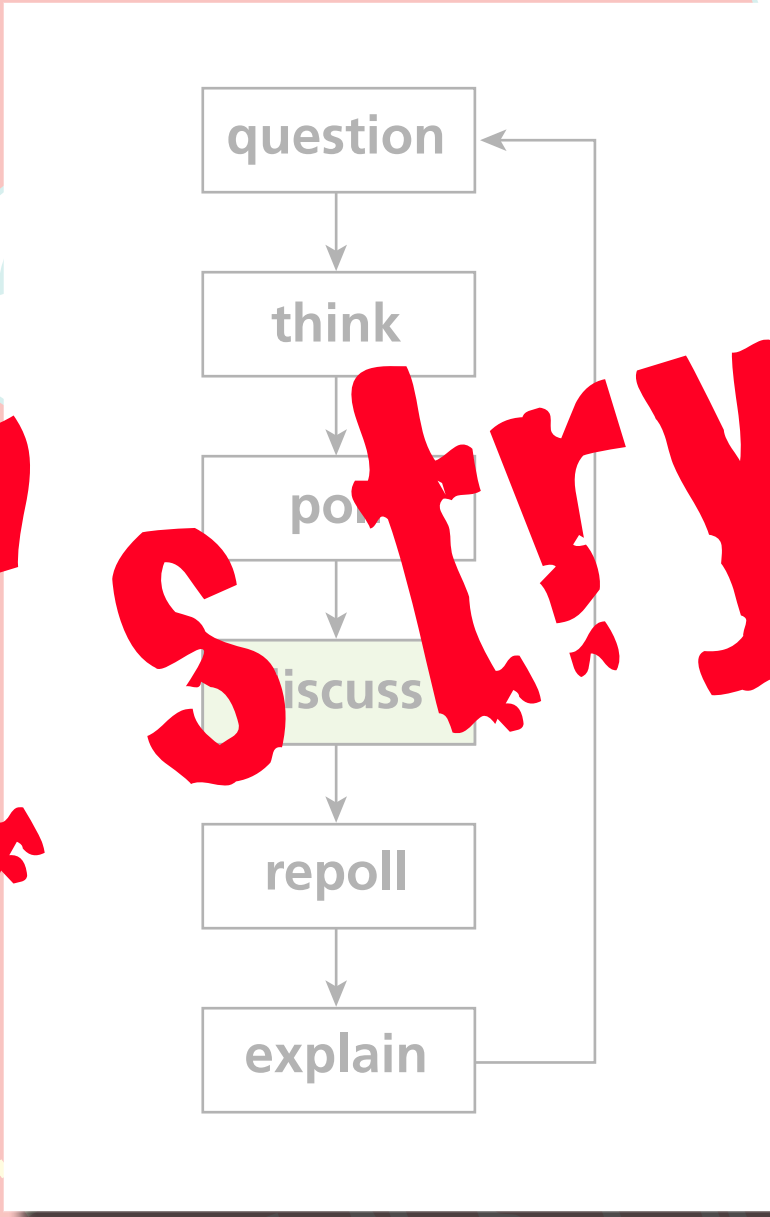




1 education

2 PI

Let's try it!

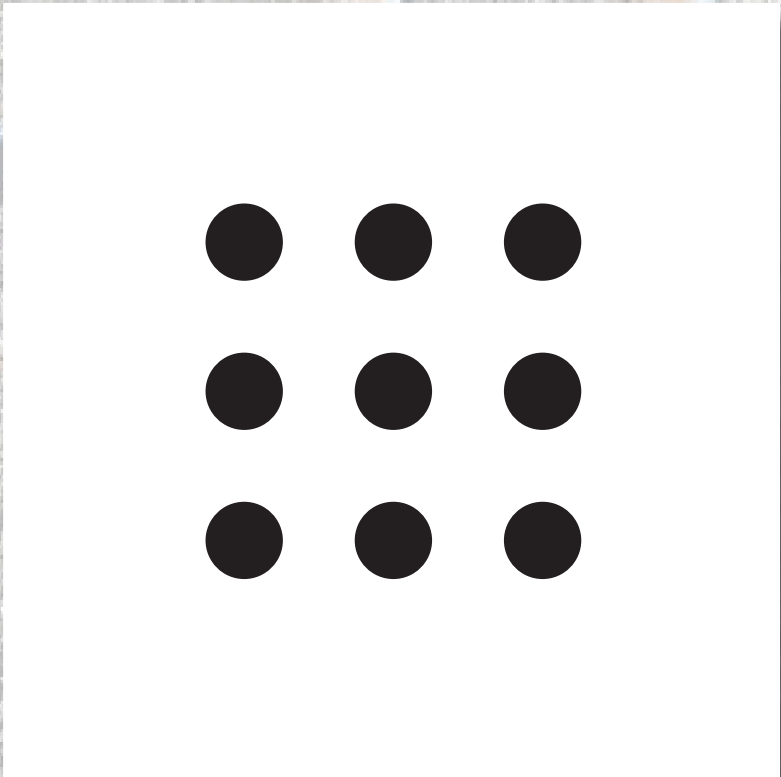


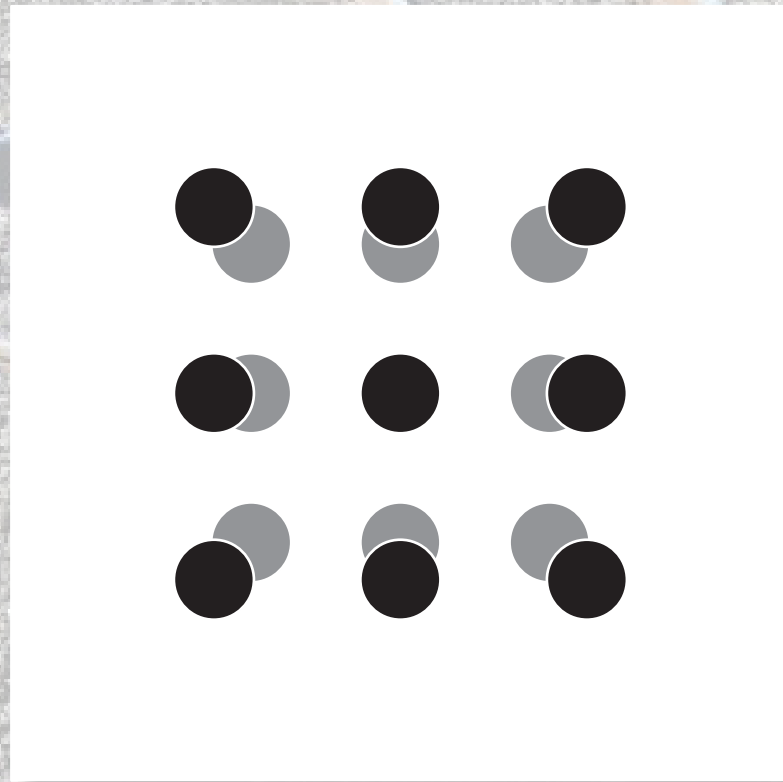
1 education

2 PI

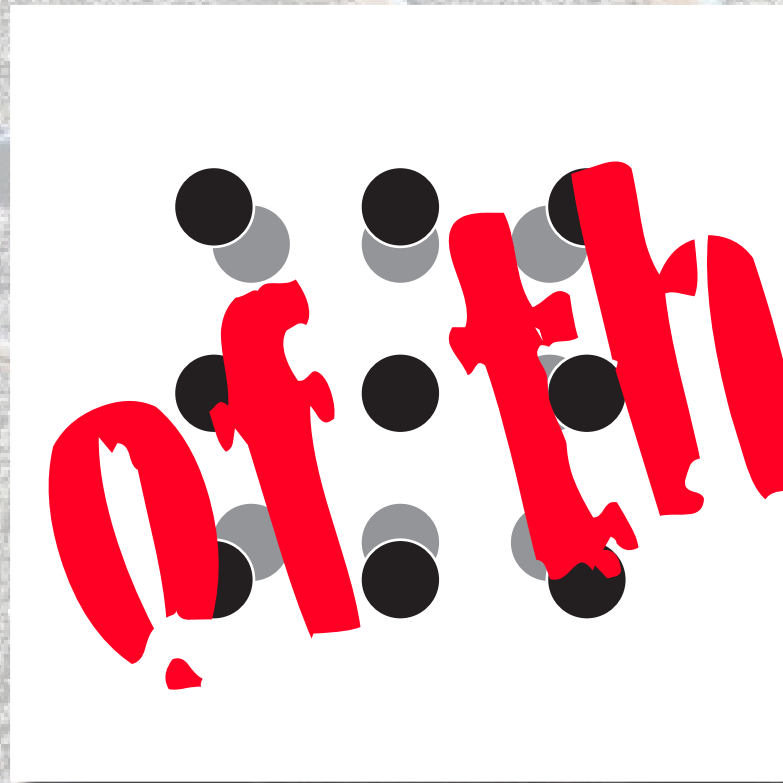
A photograph of a gravel path with a blue wavy line drawn on it, illustrating thermal expansion. The path is made of grey gravel and is bordered by green grass on both sides. The blue line is drawn in a series of connected, rounded curves, resembling a sine wave. The text "thermal expansion" is overlaid in the center of the path.

thermal expansion





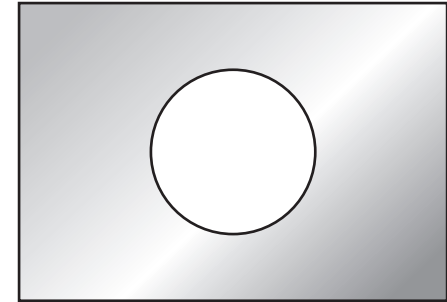
all of them!



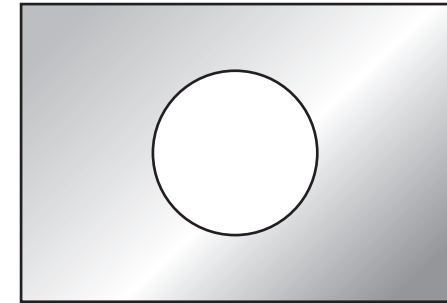
1 education

2 PI

**Consider a rectangular metal plate
with a circular hole in it.**



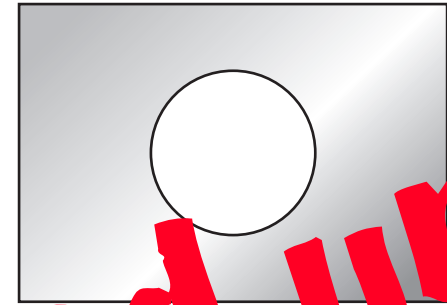
Consider a rectangular metal plate with a circular hole in it.



When the plate is uniformly heated, the diameter of the hole

- 1. increases.**
- 2. stays the same.**
- 3. decreases.**

Consider a rectangular metal plate with a circular hole in it.



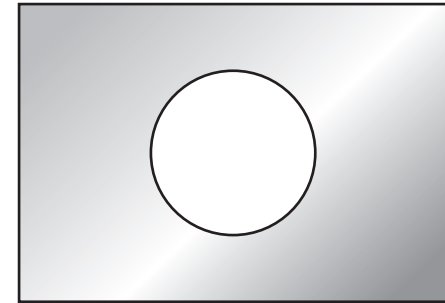
When the plate is uniformly heated, the diameter of the hole

1. increases.
2. stays the same.
3. decreases.

you got all fired up!

Consider a rectangular metal plate with a circular hole in it.

When the plate is uniformly heated, the diameter of the hole



- 1. increases.**
- 2. stays the same.**
- 3. decreases.**

Before I tell you the answer...

1 education

2 PI

3 test

Before I tell you the answer, let's analyze what happened.

1 education

2 PI

3 test

Before I tell you the answer, let's analyze what happened.

You...

Before I tell you the answer, let's analyze what happened.

You...

1. made a commitment

Before I tell you the answer, let's analyze what happened.

You...

- 1. made a commitment**
- 2. externalized your answer**

Before I tell you the answer, let's analyze what happened.

You...

- 1. made a commitment**
- 2. externalized your answer**
- 3. moved from the answer/fact to reasoning**

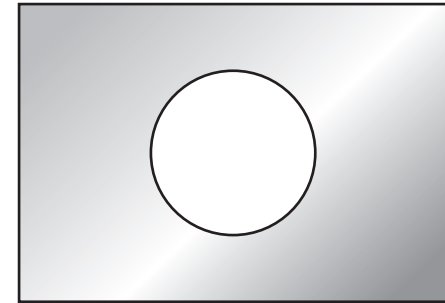
Before I tell you the answer, let's analyze what happened.

You...

- 1. made a commitment**
- 2. externalized your answer**
- 3. moved from the answer/fact to reasoning**
- 4. became emotionally invested in the learning process**

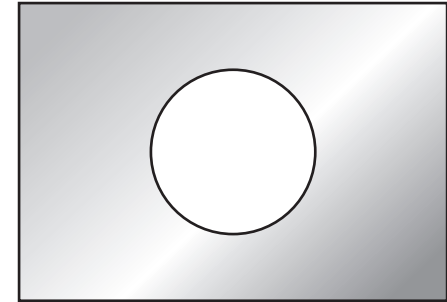
Consider a rectangular metal plate with a circular hole in it.

When the plate is uniformly heated, the diameter of the hole



- 1. increases.**
- 2. stays the same.**
- 3. decreases.**

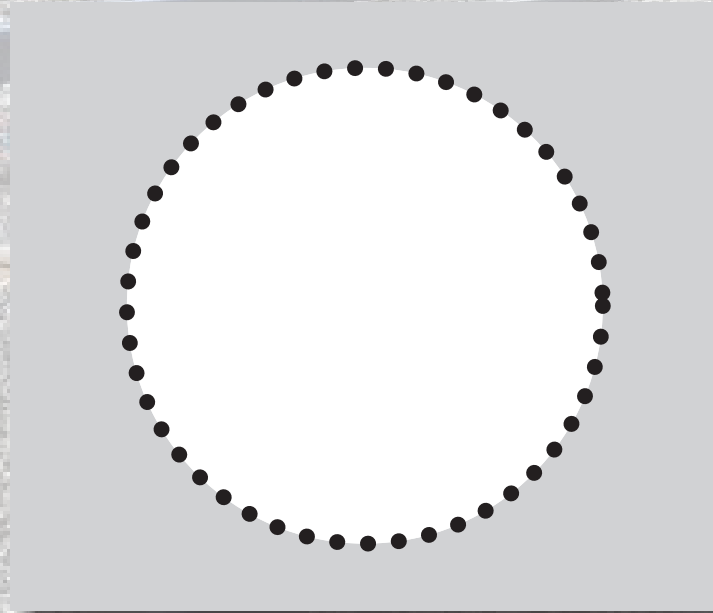
Consider a rectangular metal plate with a circular hole in it.



When the plate is uniformly heated, the diameter of the hole

1. increases. ✓
2. stays the same.
3. decreases.

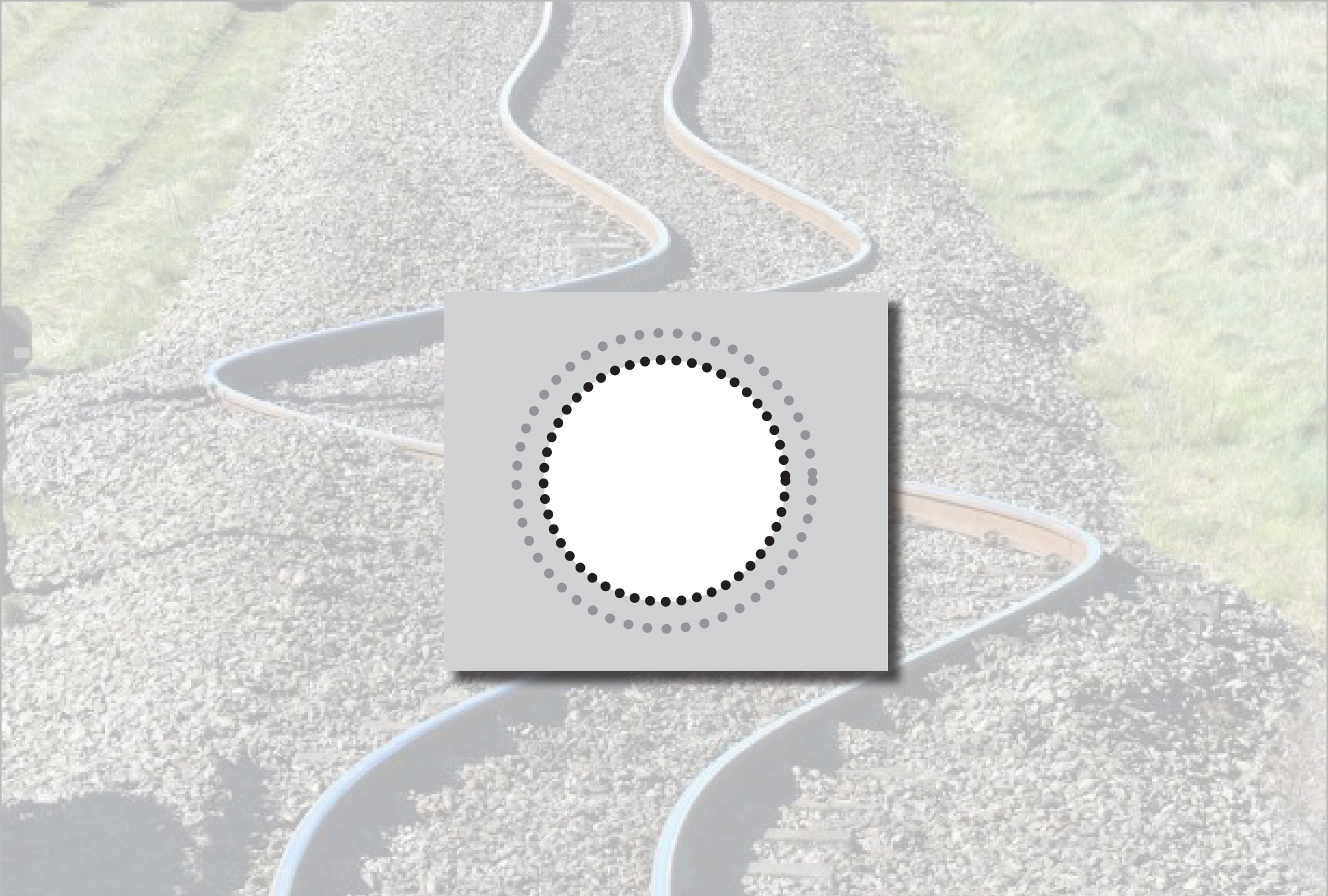
consider atoms at rim of hole



1 education

2 PI

3 test

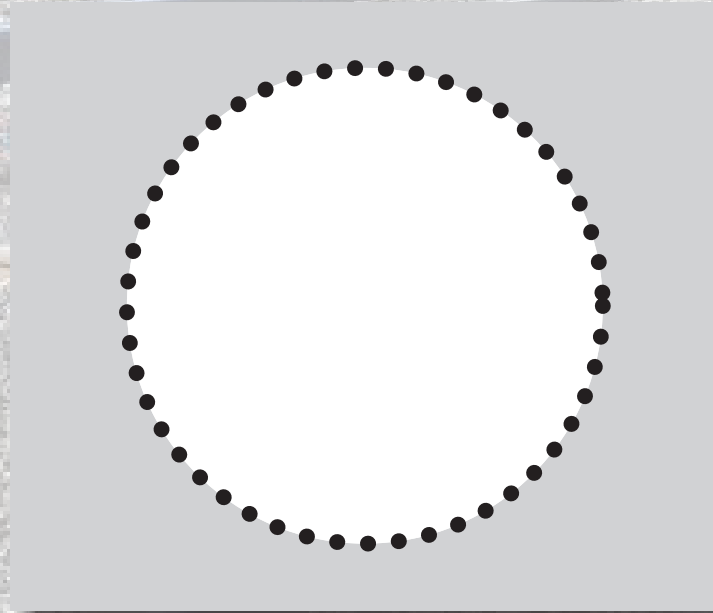


1 education

2 PI

3 test

consider atoms at rim of hole

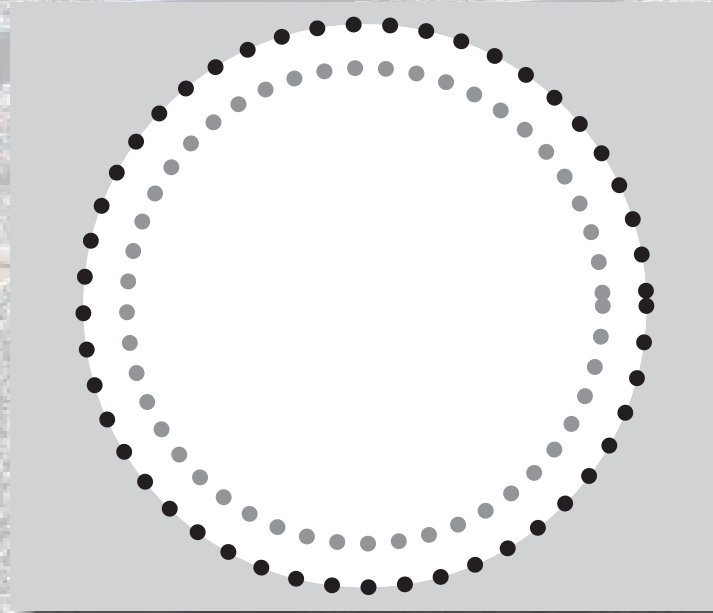


1 education

2 PI

3 test

consider atoms at rim of hole



1 education

2 PI

3 test

consider atoms at rim of hole

you won't forget this

A diagram of a circular hole with a dotted border, representing atoms at the rim. The hole is centered in a grey square, and the dotted border is white. The text "you won't forget this" is written in red, slanted, bold letters across the hole and the surrounding area.

1 education

2 PI

3 test

Peer

back to pi

INSTRUCTION

1 education

2 PI

3 test

Peer
Greater learning gains

INSTRUCTION

1 education

2 PI

3 test

Peer
Greater learning gains

Better retention

INSTRUCTION

1 education

2 PI

3 test



1 education

2 PI

3 test

in a lecture, students...

1 education

2 PI

3 test

in a lecture, students...

1. don't pay utmost attention

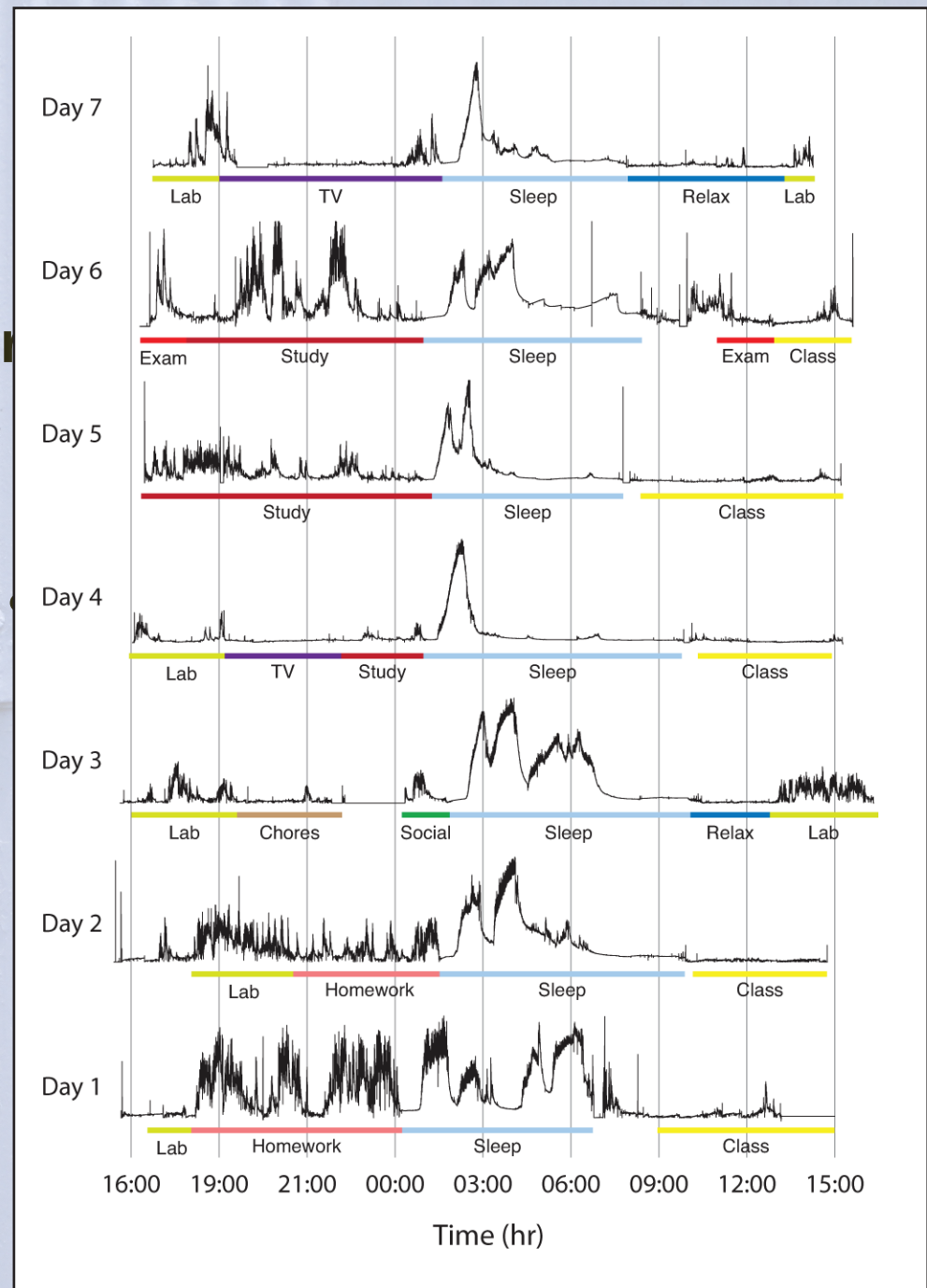
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

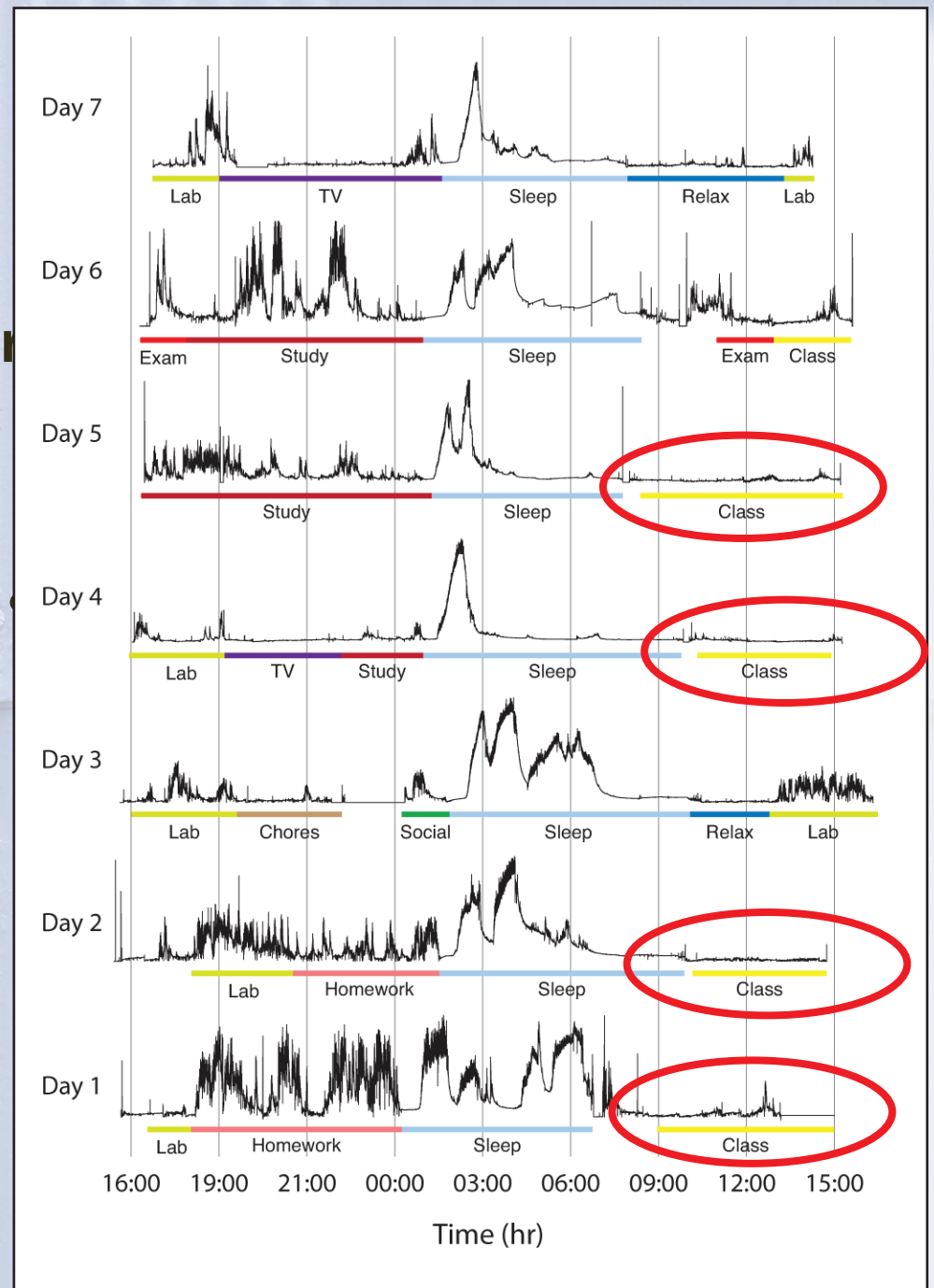
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

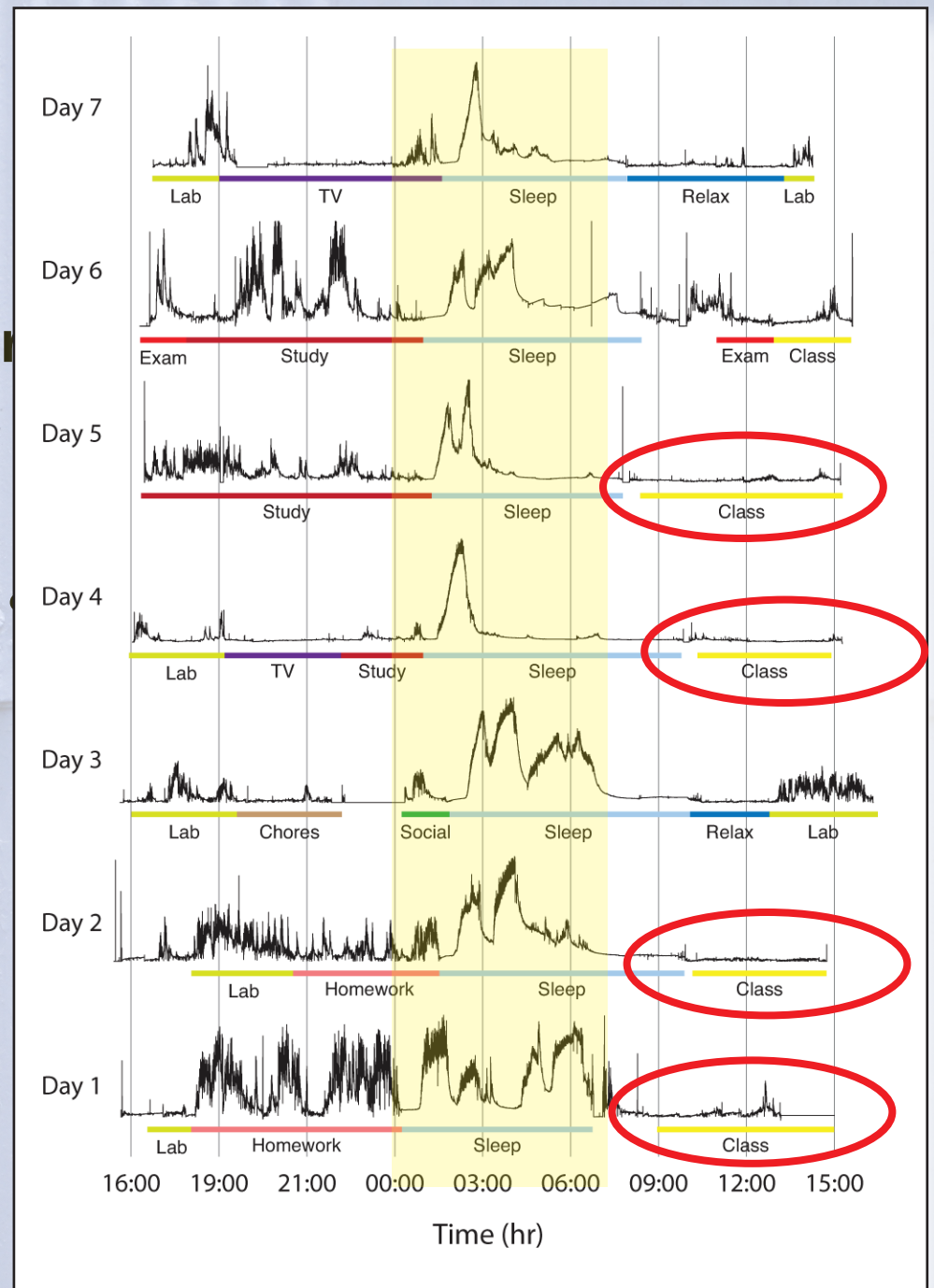
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

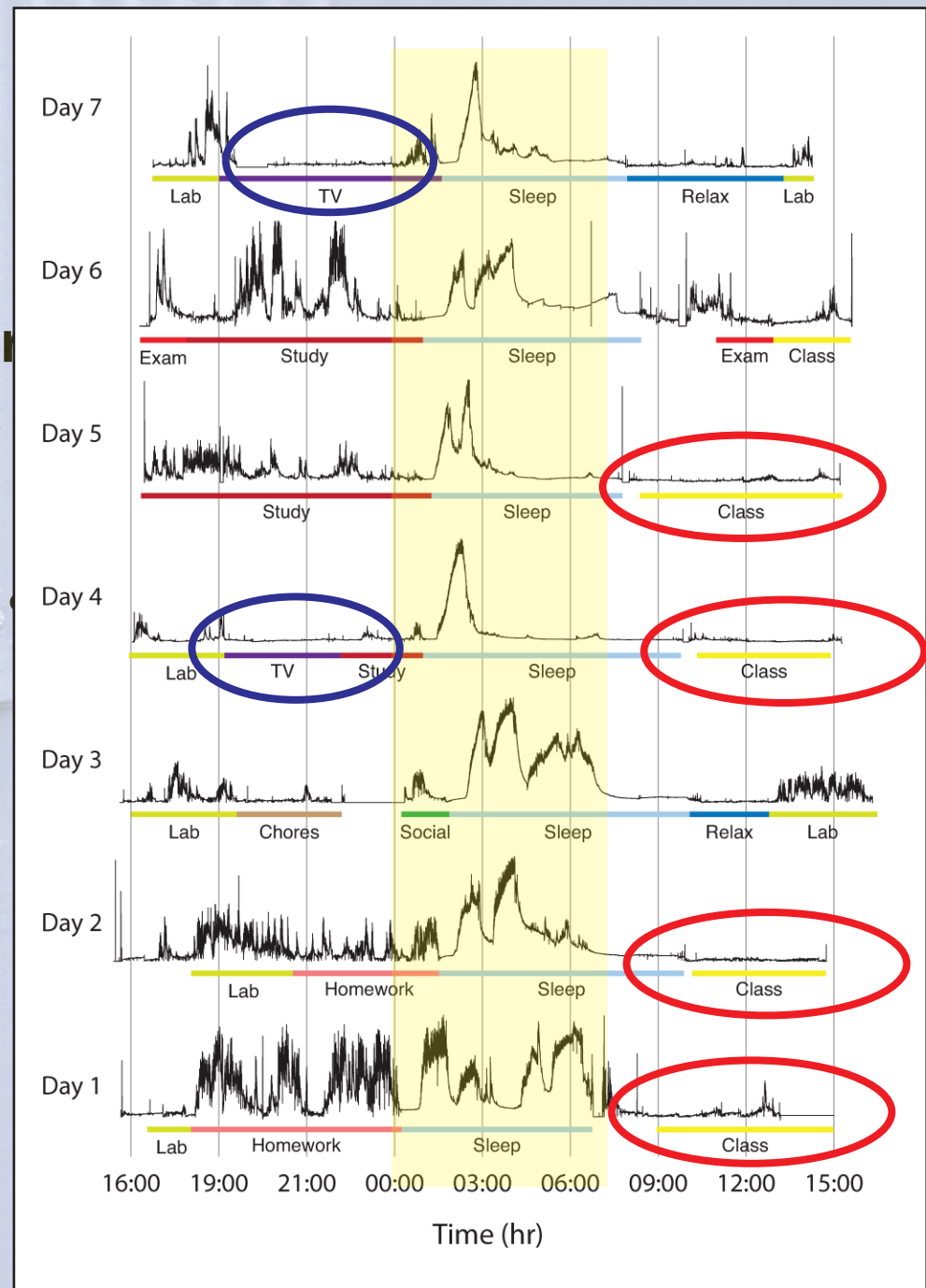
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

1 education

2 PI

3 test

in a lecture, students...

1. don't pay utmost attention

2. think they know it



<http://www.babble.com>

1 education

2 PI

3 test

A close-up photograph of a calico cat's face, showing its green eyes and white fur with orange and black patches. The image is slightly faded to allow text to be overlaid.

2 short video lectures on calico cats, same content

doi: [10.3758/s13423-013-0442-z](https://doi.org/10.3758/s13423-013-0442-z)

1 education

2 PI

3 test

2 short video lectures on calico cats, same content

fluent video



speaks fluidly w/o notes

upright

maintains eye contact

doi: 10.3758/s13423-013-0442-z

1 education

2 PI

3 test

2 short video lectures on calico cats, same content

fluent video



**speaks fluidly w/o notes
upright
maintains eye contact**

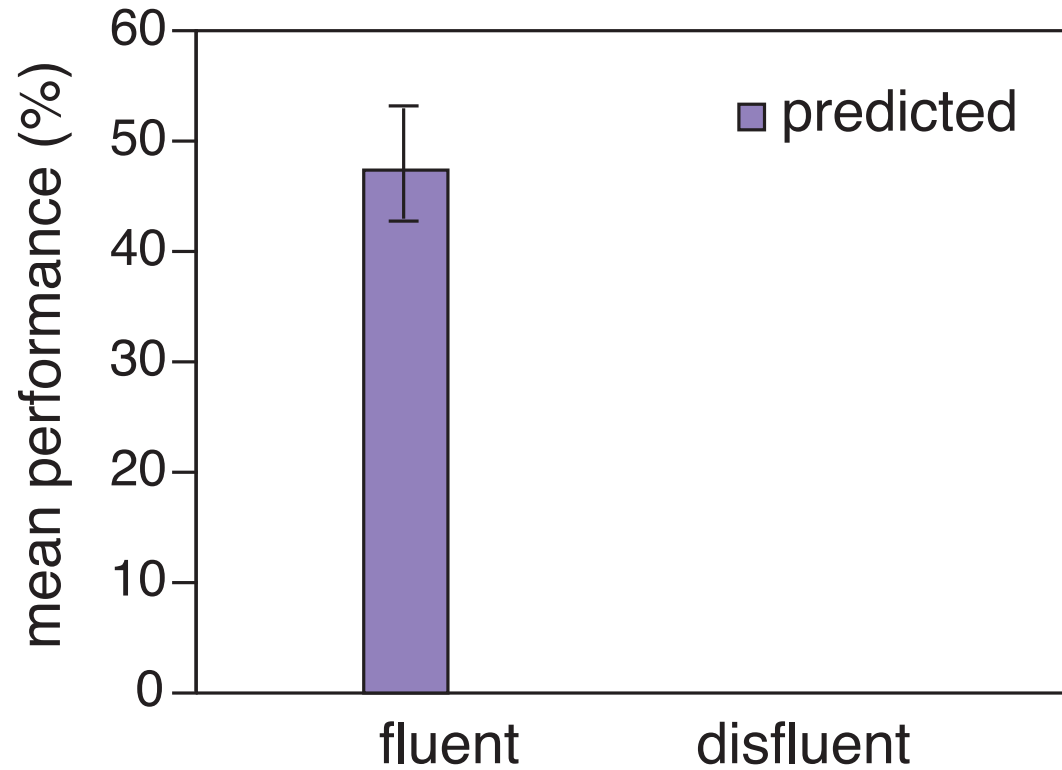
disfluent video



**speaks haltingly from notes
slumped
looks away**

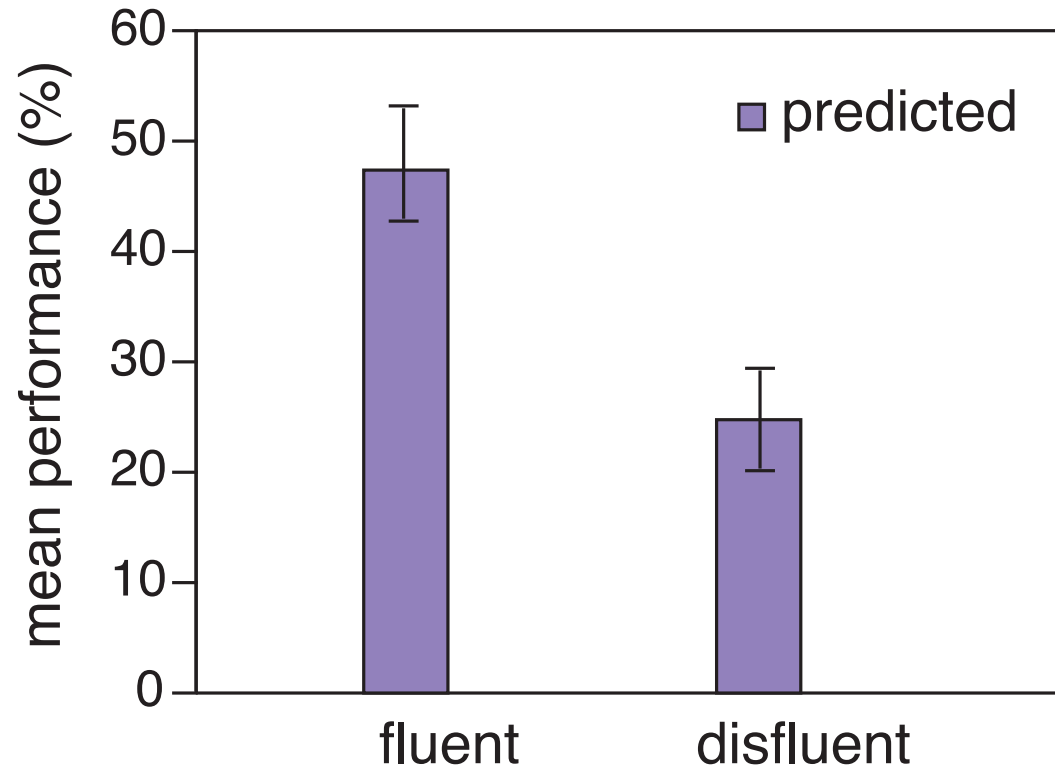
doi: 10.3758/s13423-013-0442-z

judgement of learning



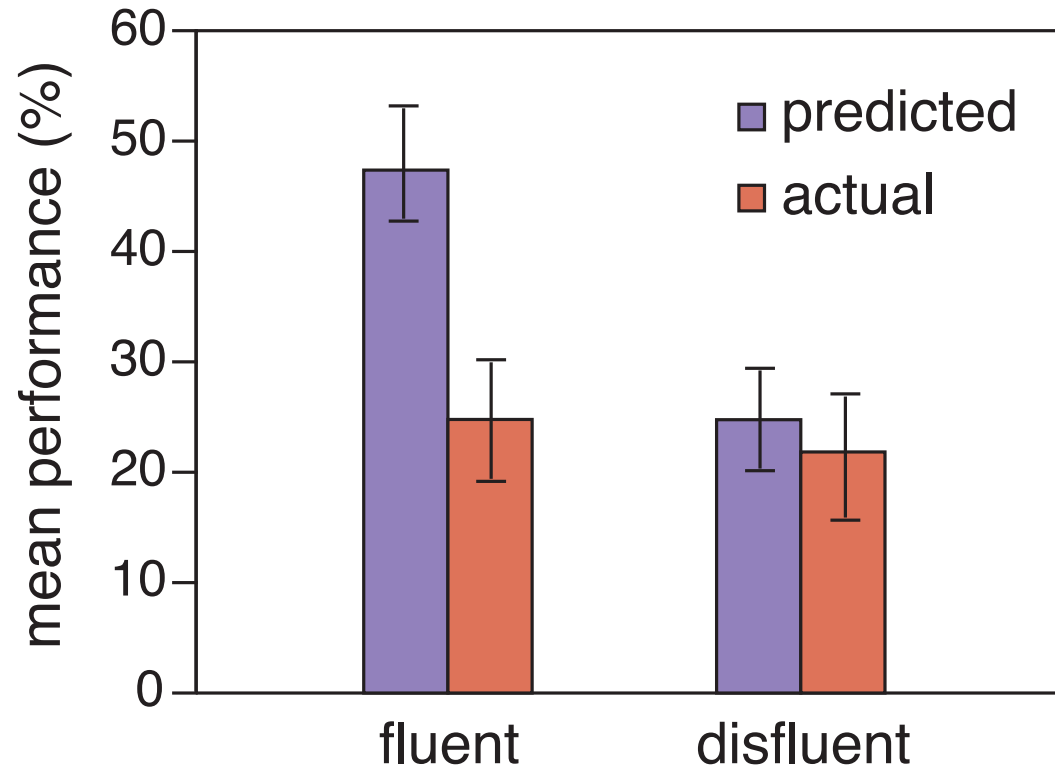
doi: 10.3758/s13423-013-0442-z

judgement of learning



doi: 10.3758/s13423-013-0442-z

judgement of learning



doi: 10.3758/s13423-013-0442-z

in a lecture, students...

- 1. don't pay utmost attention**
- 2. think they know it**
- 3. are not confronted with misconceptions**

in a lecture, students...

1. don't pay utmost attention

2. think they know it

3. are not confronted with misconceptions

false
sense of security



1 education

2 PI

3 test

The background of the slide is a painting of a face with three eyes, set against a background of vertical blinds. The face is rendered in a style that suggests depth and shadow, with the eyes looking forward. The blinds are a light yellow color with dark red or maroon vertical slats. The text 'an illusion...' is written in a bold, red, serif font across the center of the face.

an illusion. . .

1 education

2 PI

3 test



Education is not just about:

- **transferring information**
- **getting students to do what we do**

1 education

2 PI

3 test



Education is not just about:

- **transferring information**
- **getting students to do what we do**

active participation a must!



Join now!

PeerInstruction.net



**PLEASE LEAVE YOUR CLICKER
ON YOUR CHAIR!**

1 education

2 PI

3 test

A background image showing a person's face, including eyes and a hand near the mouth, viewed through horizontal window blinds. The blinds are partially open, creating a grid-like pattern over the face. The colors are muted, with a yellowish-green tint to the face and reddish-brown for the blinds.

PLEASE RETURN YOUR CLICKER!

1 education

2 PI

3 test

Funding:

National Science Foundation

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