

# Peer Instruction: Continuous Formative Assessment to Promote Learning



Center for the Promotion of Learning and Teaching  
Technion – Israel Institute of Technology  
Haifa, Israel, 24 June 2015





# Peer Instruction: Continuous Formative Assessment to Promote Learning

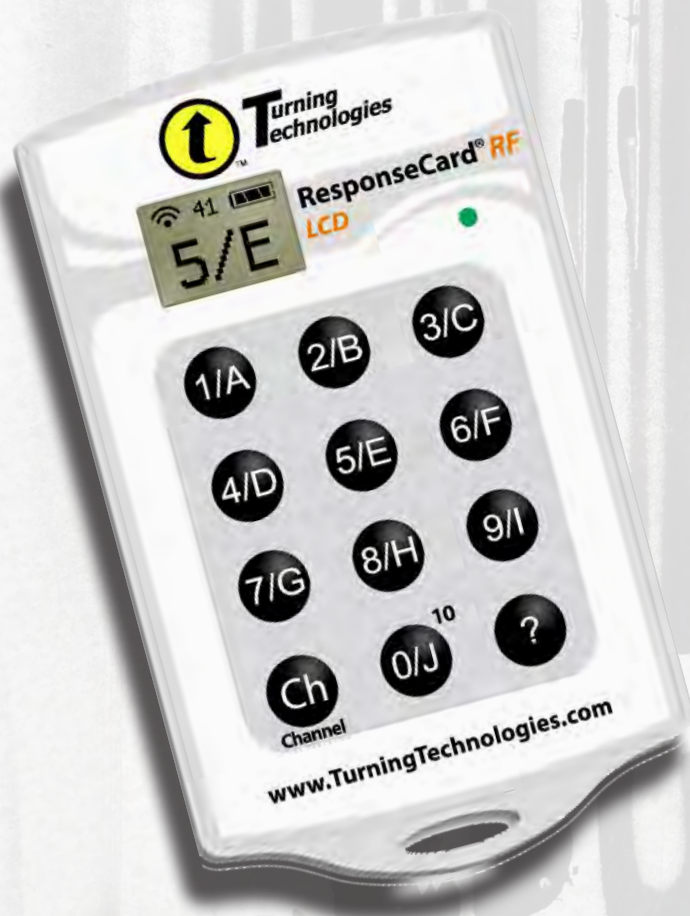


**@eric\_mazur**

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- no ON/OFF button
- only last “click” counts
- display shows recorded answer





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**unique ID on back of clicker**



**Think of something you are good at**

**EDUCACION**



**Think of something you are good at**

***How* did you become good at this?**



**Became good at it by:**

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



















1 education

2 PI

3 test






**better pay  
attention!**

**1** education

**2** PI

**3** test





**What happens  
in a lecture?**



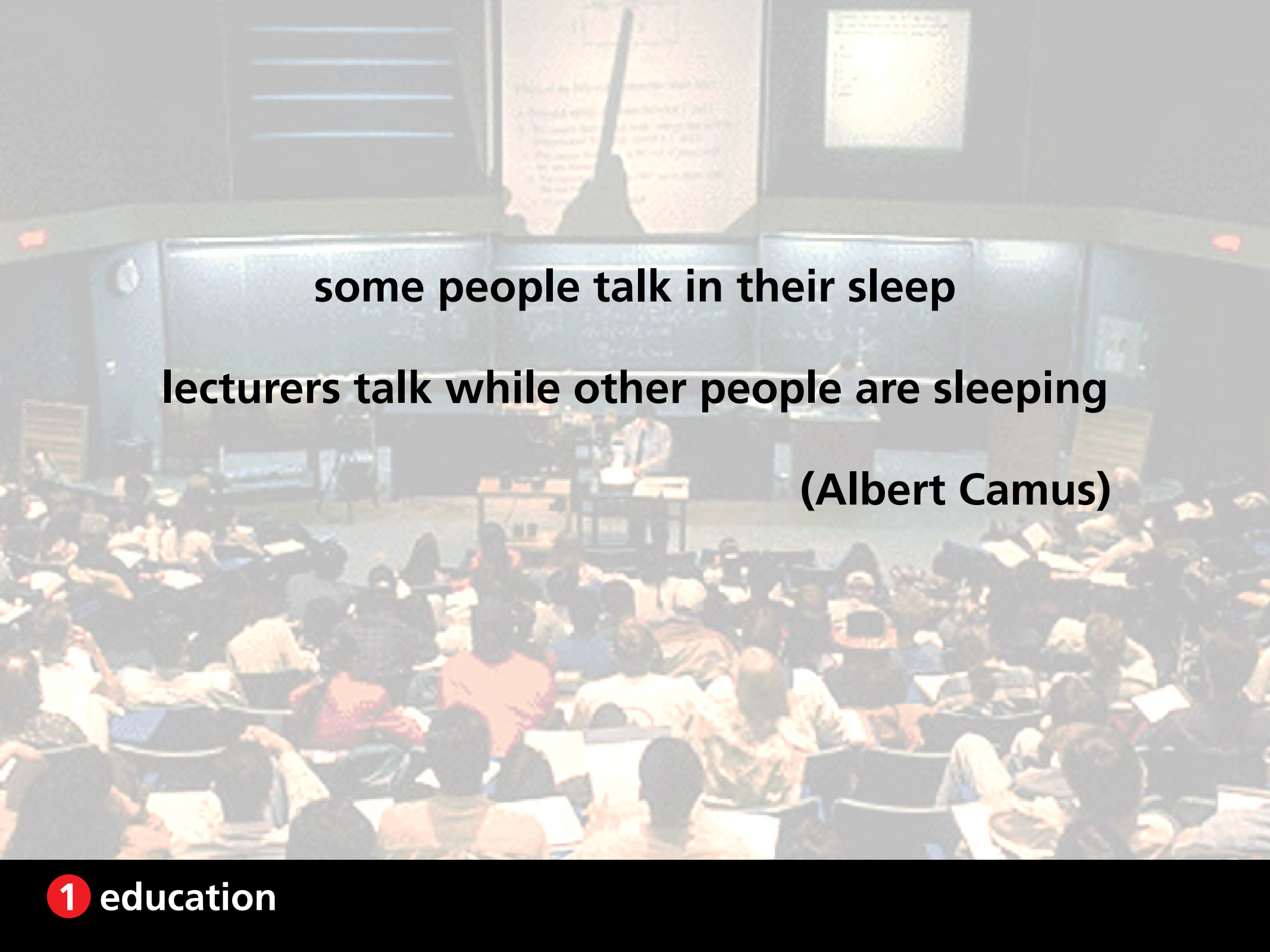




A wide-angle photograph of a large lecture hall. In the foreground, the backs of many students' heads are visible as they sit in rows of chairs, facing the front of the room. Some students have papers or laptops open. At the front of the hall, a lecturer stands behind a podium, addressing the class. Behind the lecturer is a large, curved chalkboard with some faint writing on it. Above the chalkboard, there are several large posters or screens displaying text and diagrams. The room is well-lit, and the overall atmosphere is that of a formal academic setting.

**some people talk in their sleep**

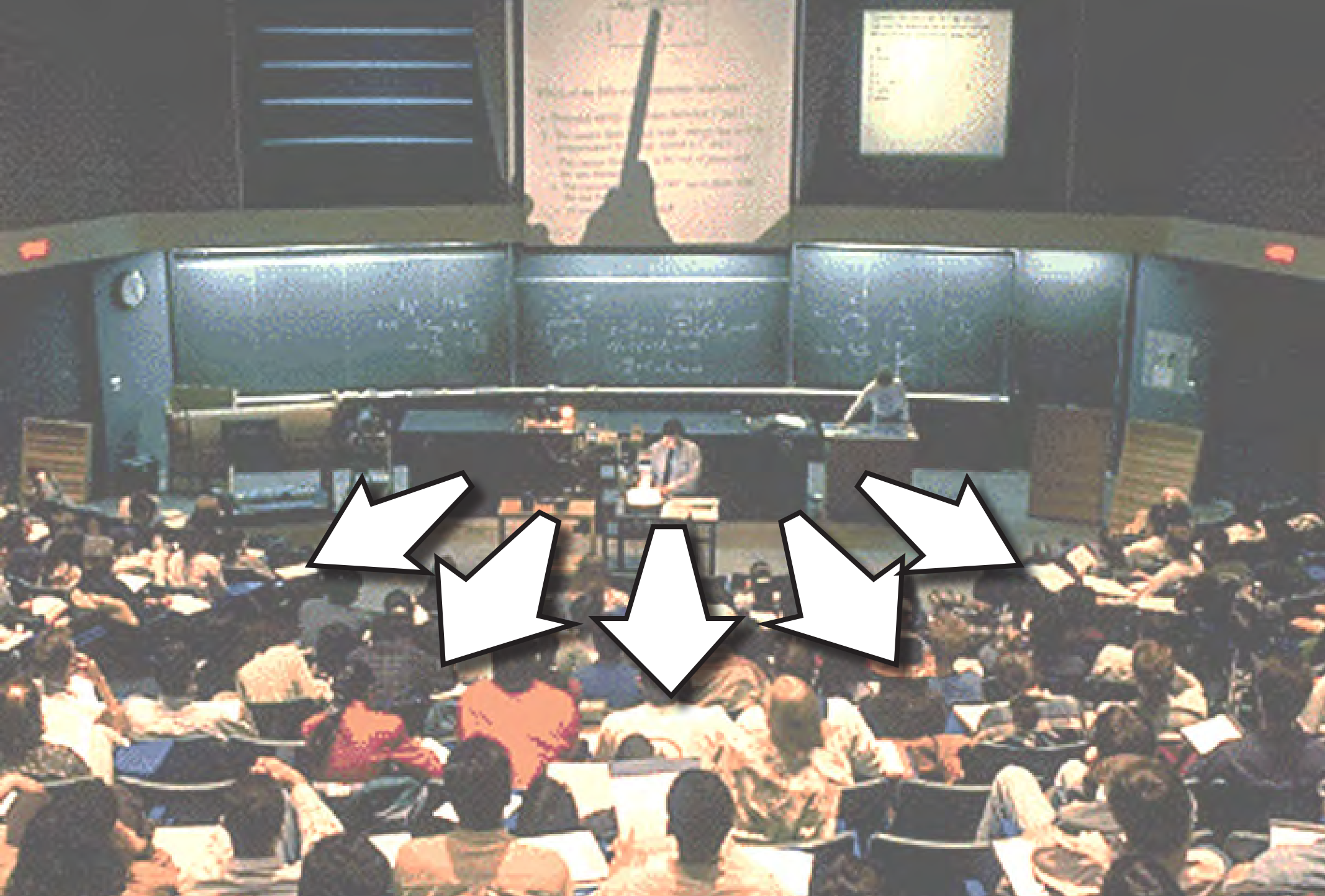


A large lecture hall filled with students. Many students are sleeping in their seats, with their heads resting on their desks or hands. The room has a curved front wall with a large screen displaying text. The lighting is dim, and the overall atmosphere is one of a lecture where many students are not paying attention.

**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**









## 1. transfer of information





**1. transfer of information**

**2. assimilation of that information**



**1. transfer of information (in class)**

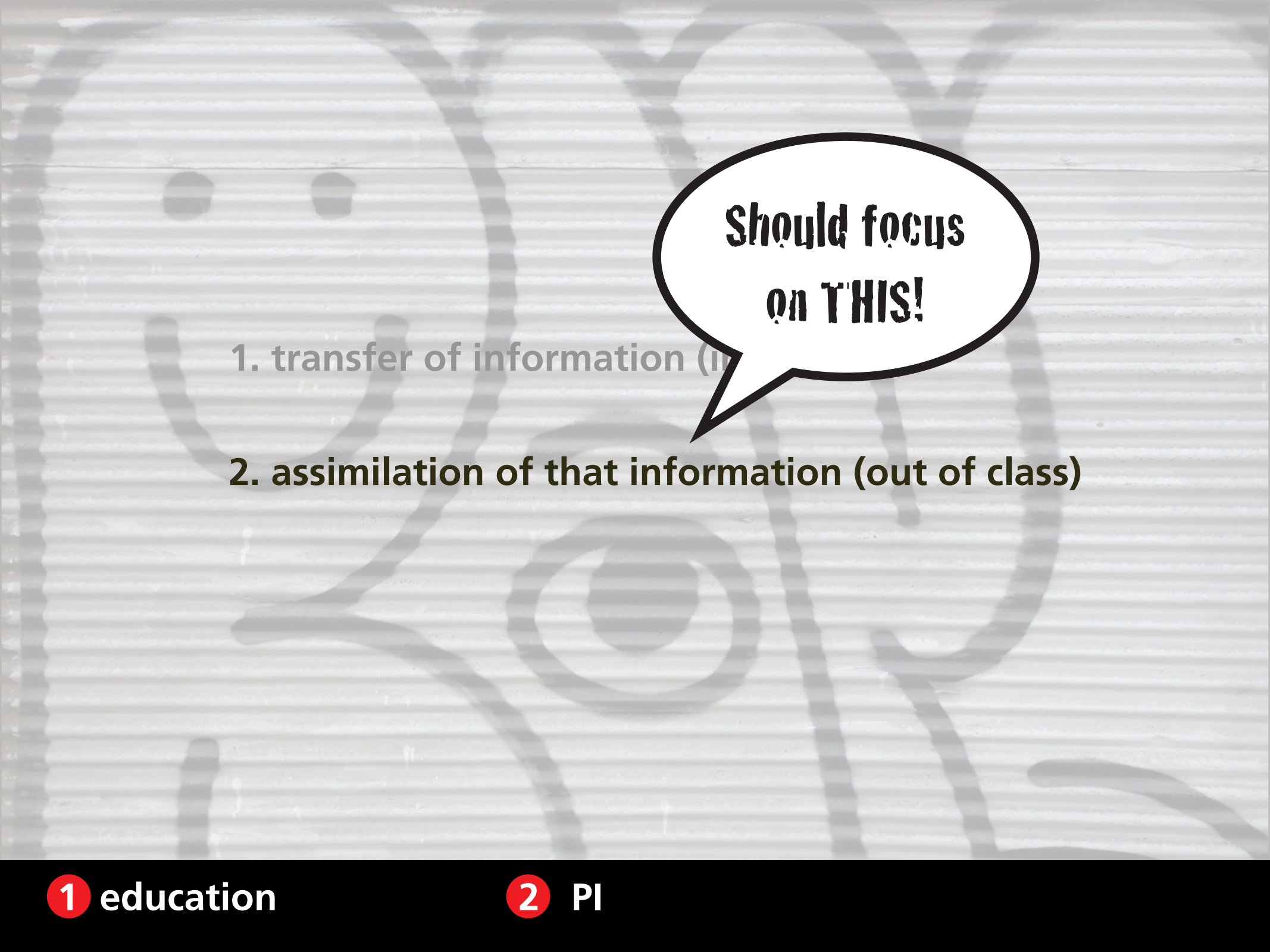
**2. assimilation of that information**





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)

question

1 education

2 PI



**question**



**think**

**question**



**think**



**poll**



**question**



**think**



**poll**



**discuss**

**question**



**think**



**poll**



**discuss**



**repoll**



**question**



**think**



**poll**



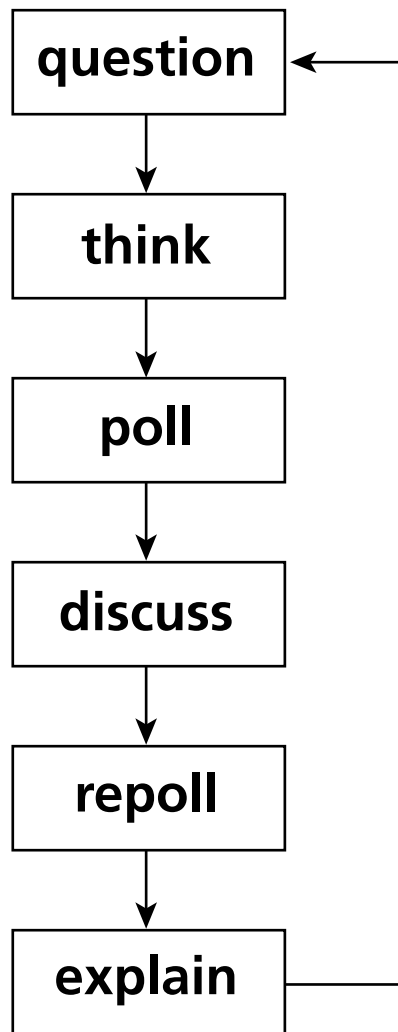
**discuss**



**repoll**



**explain**







**1** education

**2** PI





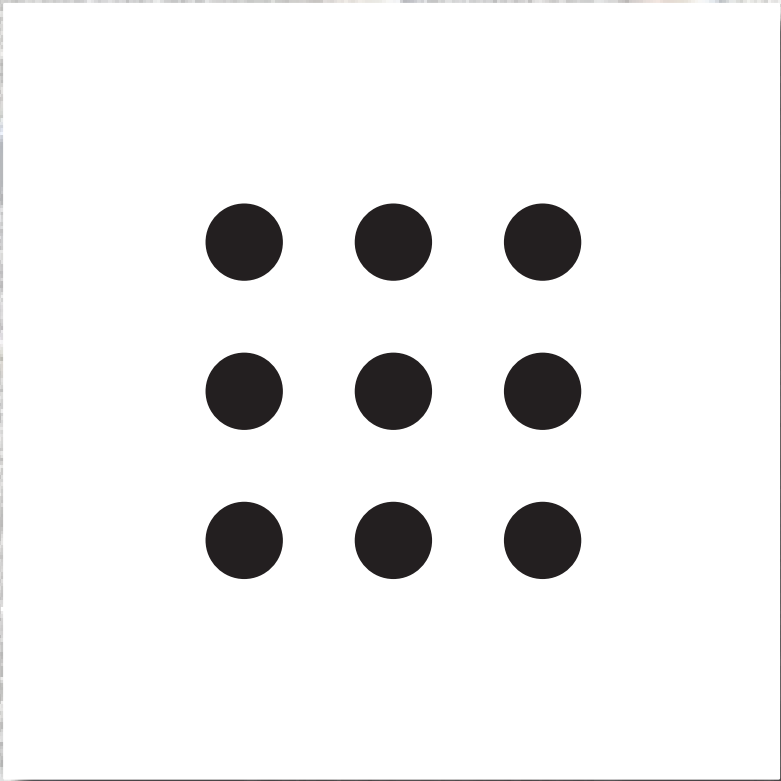
1 education

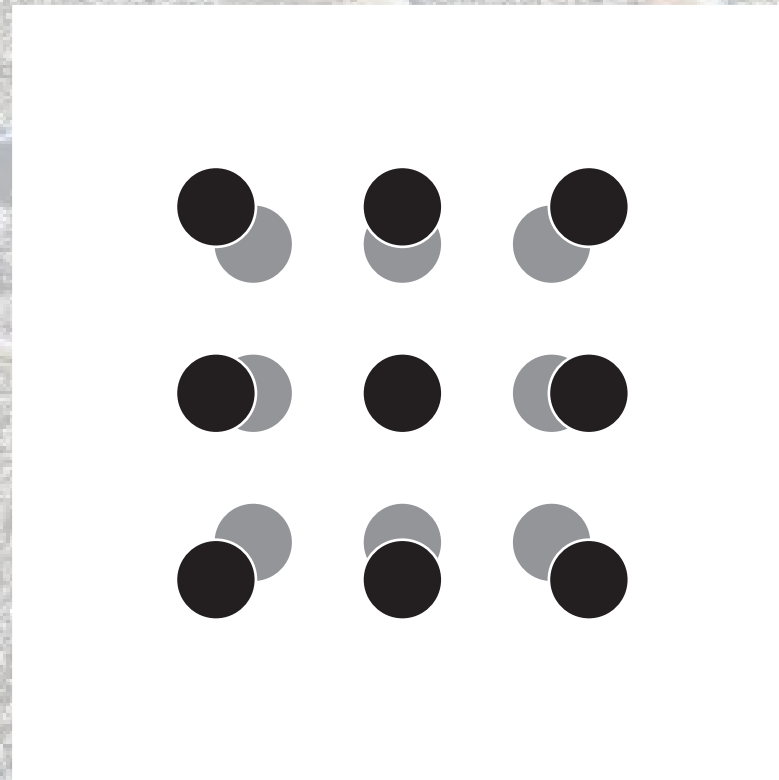
2 PI

A photograph of a wavy metal track, possibly a model for a physics experiment, laid out on a bed of dark gravel. The track is made of a light-colored metal and is bent into a series of connected loops and curves. The background is a blurred green lawn. The text "thermal expansion" is overlaid in the center of the image.

**thermal expansion**

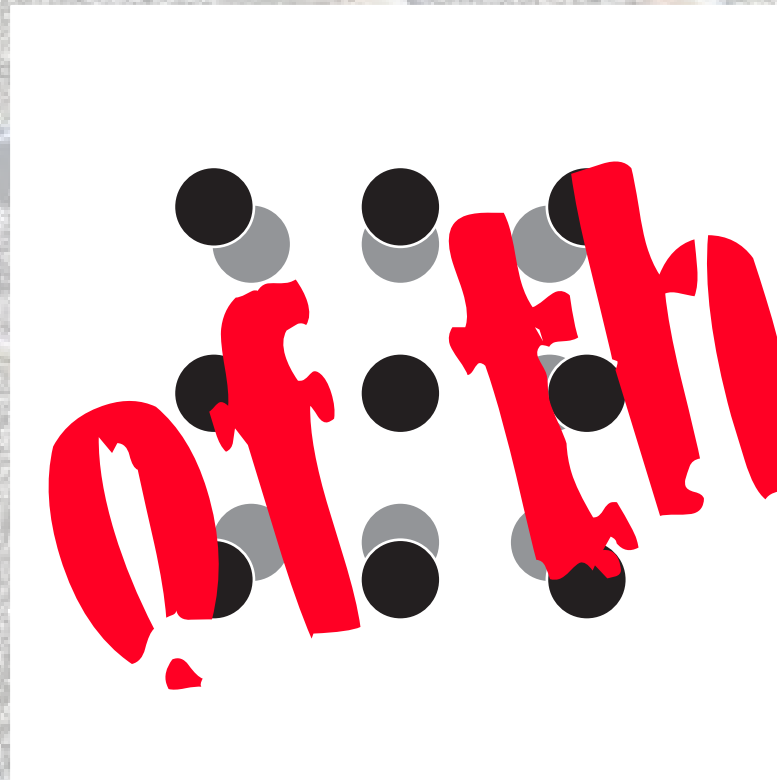








**all of them**



**1** education

**2** PI

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





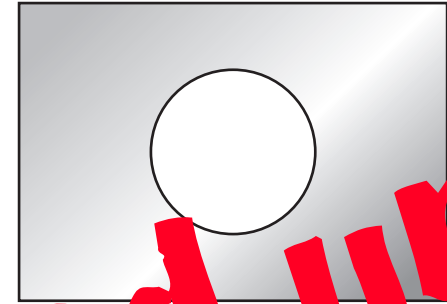
**Consider a rectangular metal plate with a circular hole in it.**



**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.



**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...**

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



**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...**

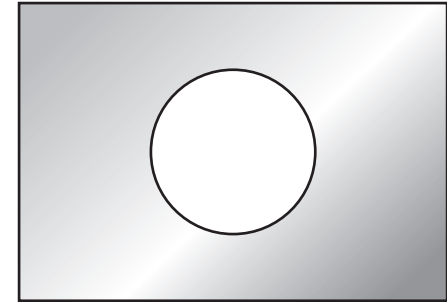
- 1. made a commitment**
- 2. externalized your answer**
- 3. moved from the answer/fact to reasoning**

**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.**

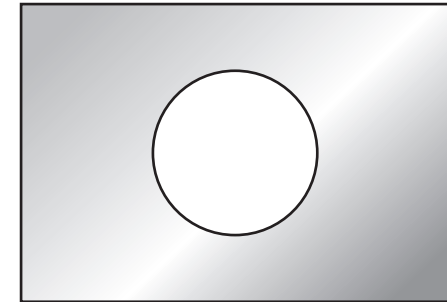


**When the plate is uniformly heated, the diameter of the hole**

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



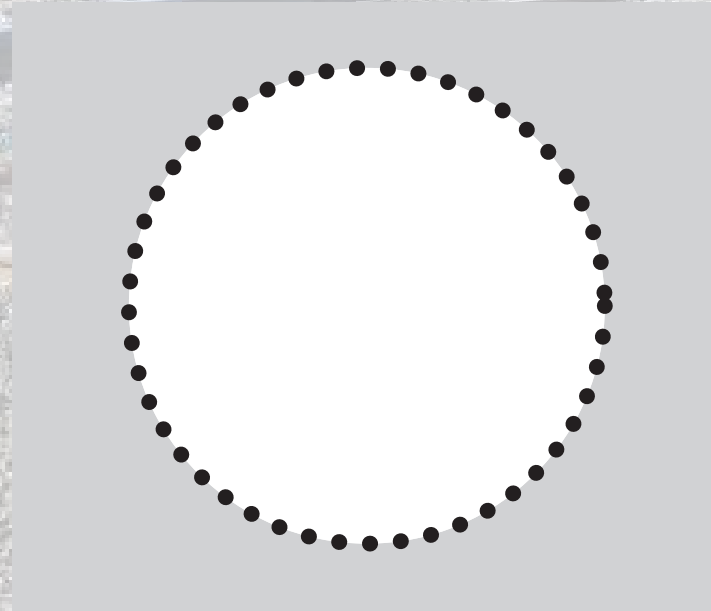
**Consider a rectangular metal plate with a circular hole in it.**



**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

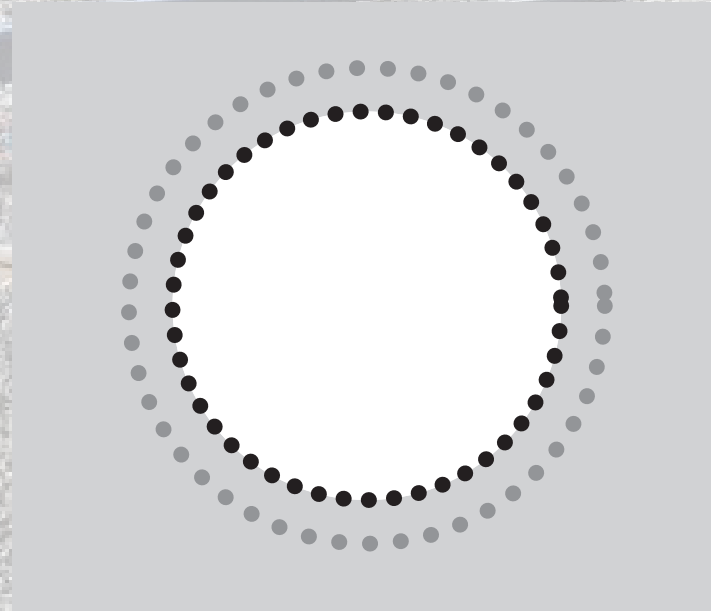


**1** education

**2** PI

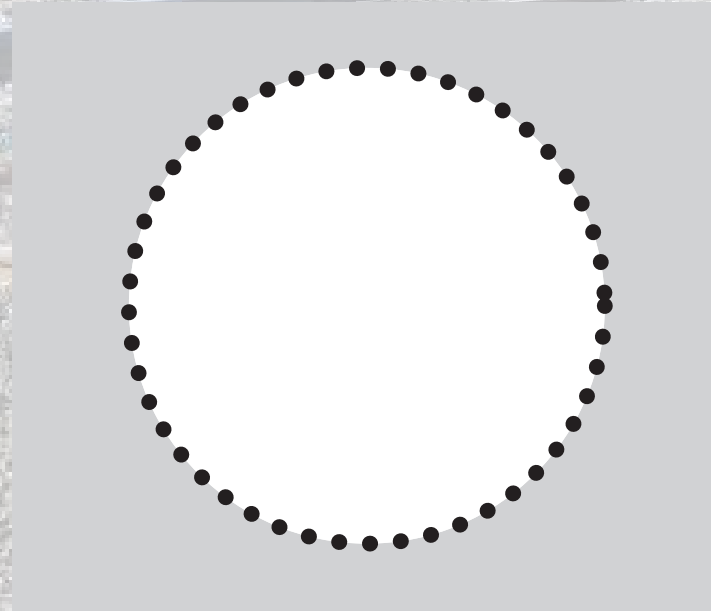
**3** test

consider atoms at rim of hole





consider atoms at rim of hole

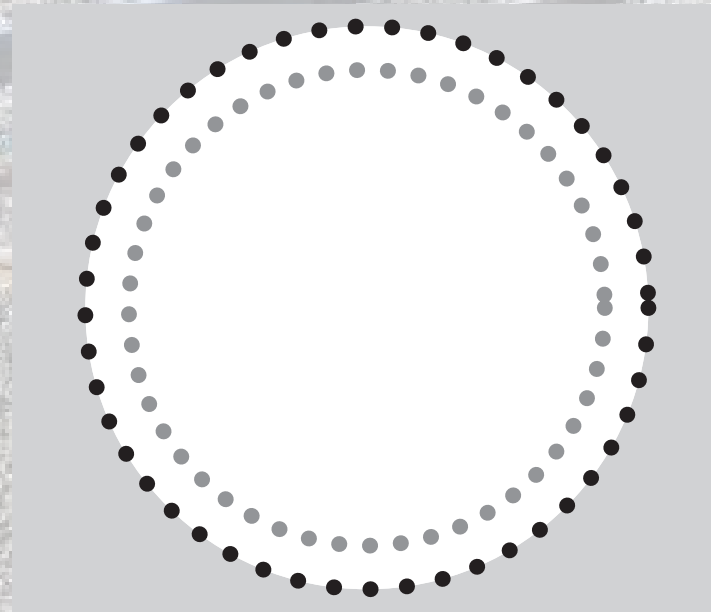


**1** education

**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

1 education

2 PI

3 test



# Peer

**back to PI**

INSTRUCTION

1 education

2 PI

3 test

Peer  
Greater learning gains



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



**in a lecture, students...**

**1. don't pay utmost attention**

**2. think they know it**

**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 is a faded, classical-style painting. It depicts a face, possibly a classical figure, with multiple eyes visible. The eyes are arranged vertically, with one eye at the top, a central eye, and another at the bottom. The face is rendered in a pale, yellowish-tan color, and the eyes are a light blue or grey. The overall style is reminiscent of a classical portrait, but with a surreal or illusionary twist due to the multiple eyes.

**an illusion. . .**

**1** education

**2** PI

**3** test





**Education is not just about:**

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



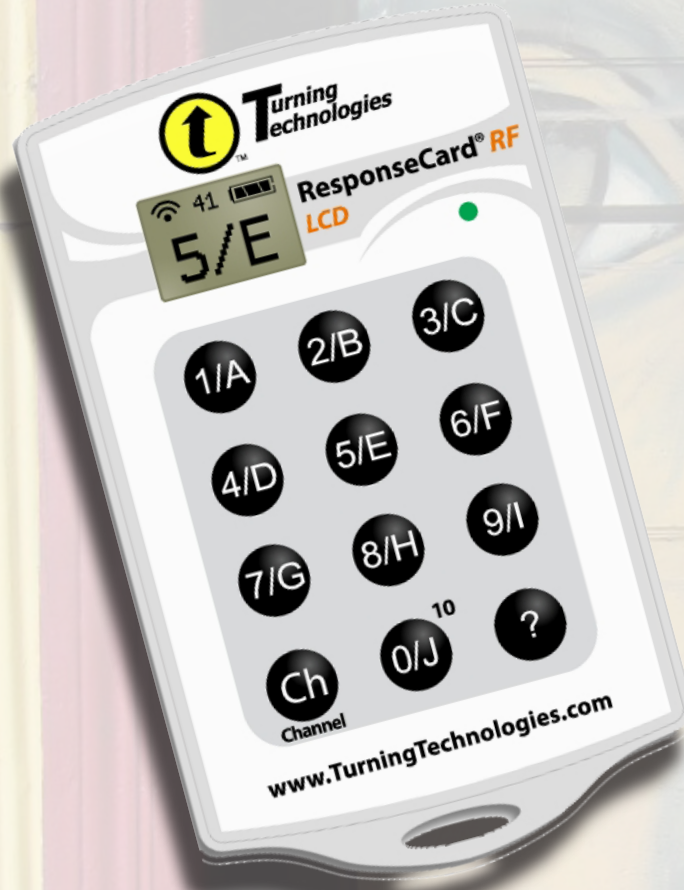


**Education is not just about:**

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

**active participation a must!**

# PLEASE RETURN CLICKER



1 education

2 PI

3 test



**Join now!**

**PeerInstruction.net**



**Funding:**

**National Science Foundation**

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