

Innovating education to educate innovators



ETOP 2017
Zhejiang University
Hangzhou, China, 29 May 2017



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@eric_mazur

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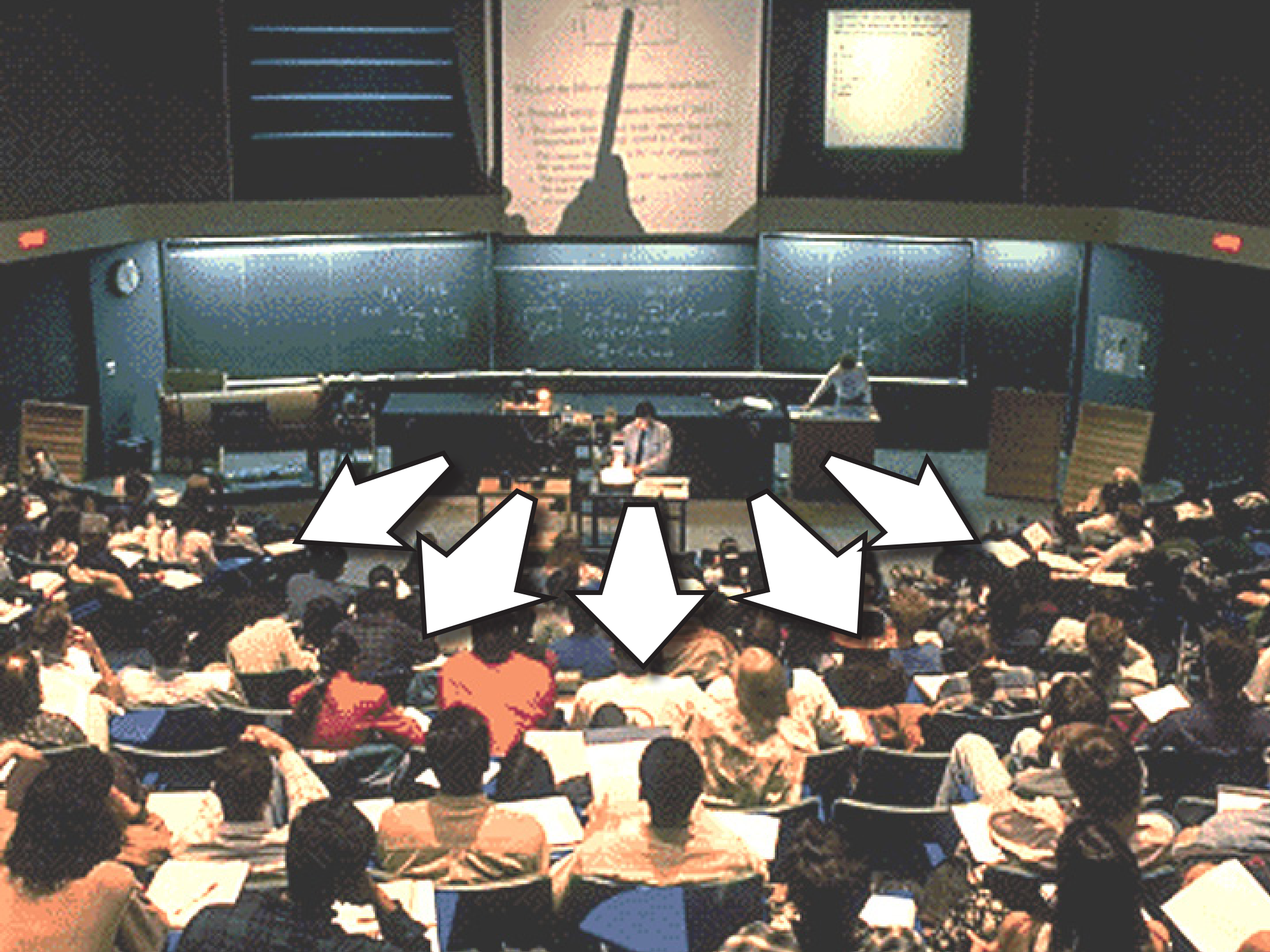
















an illusion. . .





1. transfer of information



1. transfer of information

2. assimilation of that information



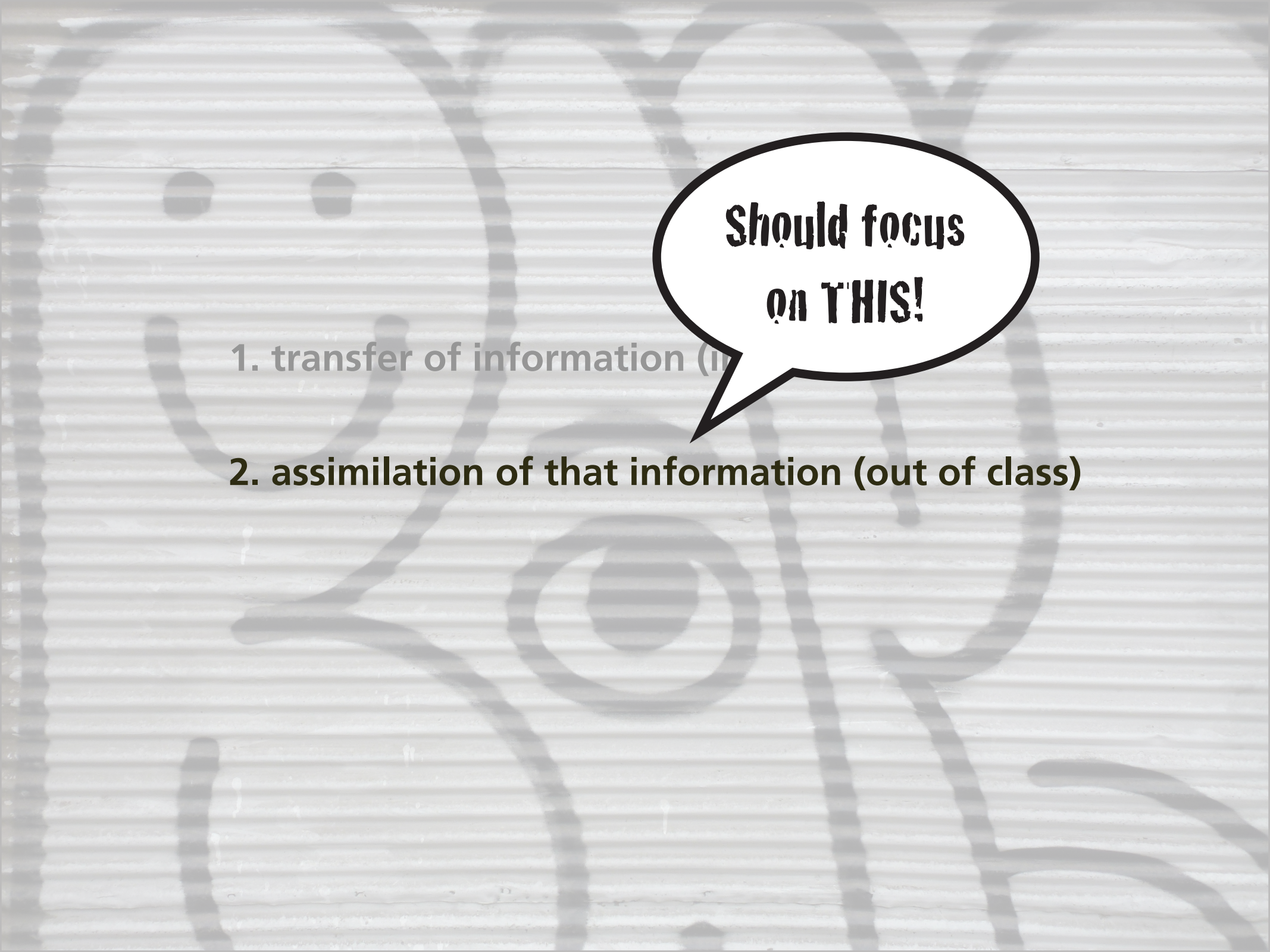
1. transfer of information (in class)

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)

The word "Peer" is written in a large, white, sans-serif font with a light blue outline. A dashed yellow line with an arrow at the end forms a circle around the two 'e's. A dotted blue line with an arrow at the end starts from the right side of the word and points towards the bottom right.

Peer

1. transfer of information (out of class)

2. assimilation of that information (in class)

The word "INSTRUCTION" is written in a white, sans-serif font, tilted at an angle. A dotted blue line with an arrow at the end starts from the bottom left and points towards the word.

INSTRUCTION

question

question



think

question



think



poll

question



think



poll



discuss

question



think



poll



discuss



repoll

question



think



poll



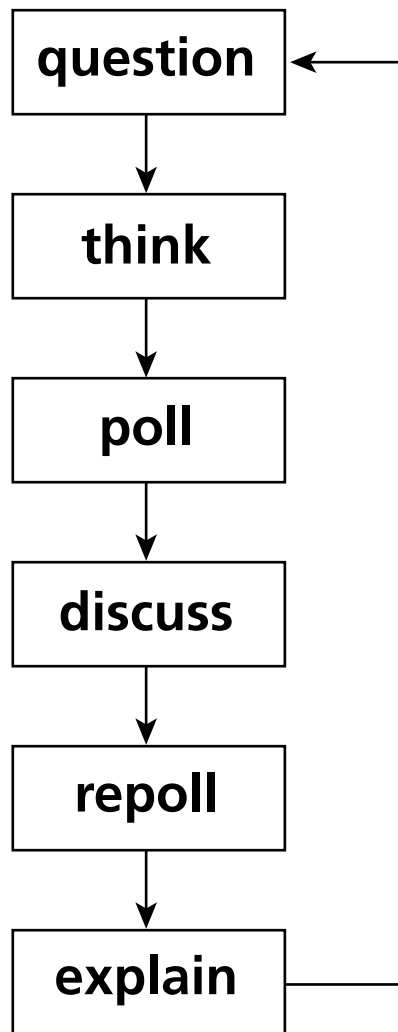
discuss

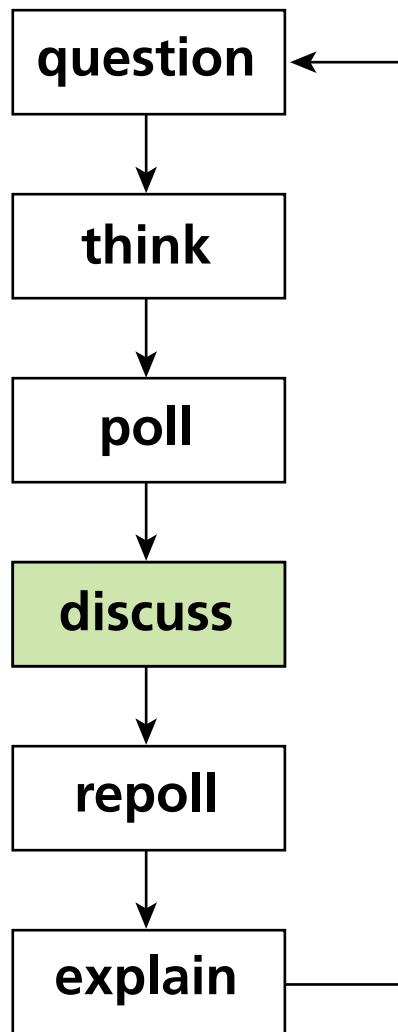


repoll



explain



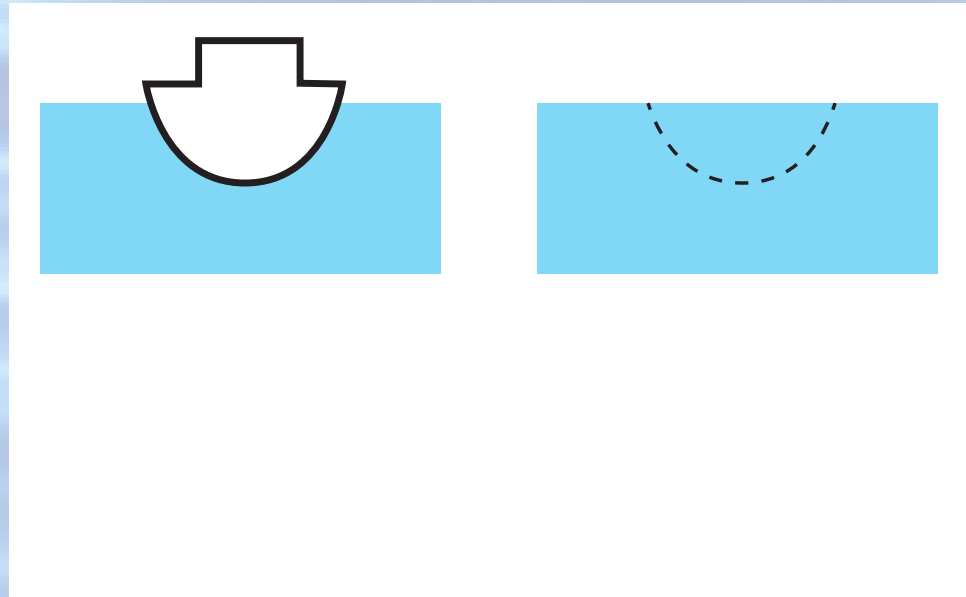




Archimedes Principle

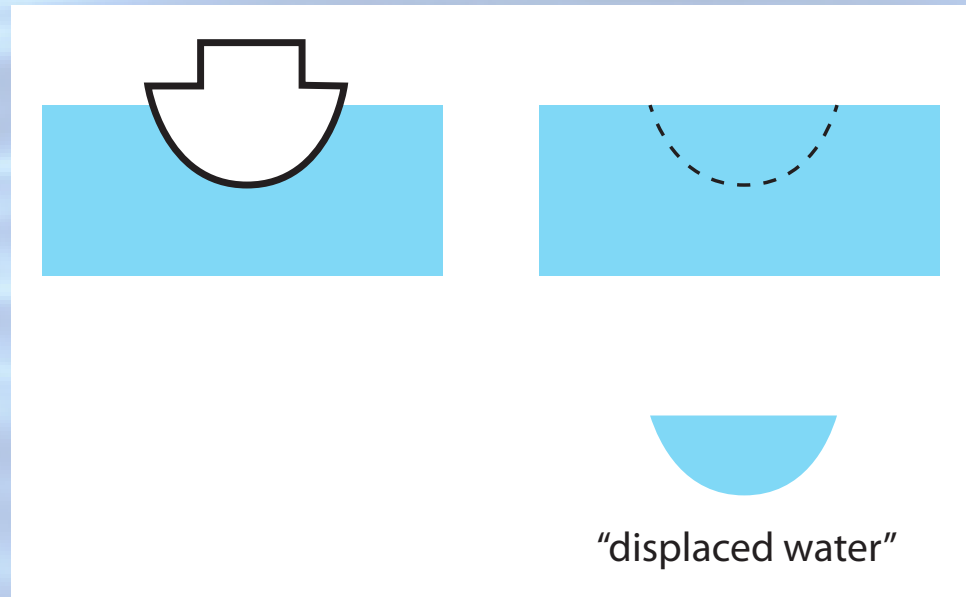
An object submerged either fully or partially in a fluid experiences an upward buoyant force the magnitude of which is equal to the magnitude of the force of gravity exerted on the fluid displaced by the object.

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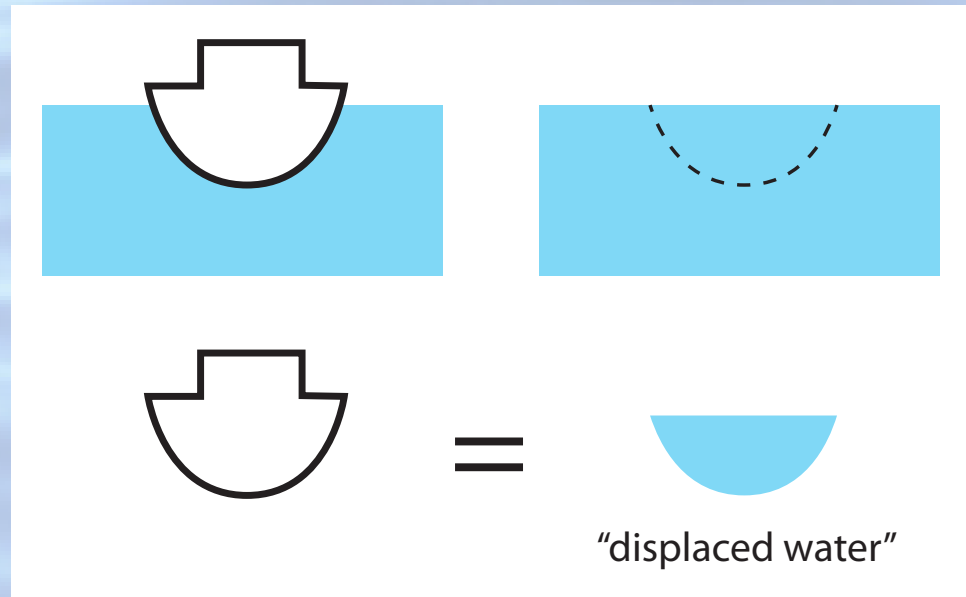
The volume of displaced fluid is equal to the volume of the submerged portion of the object.

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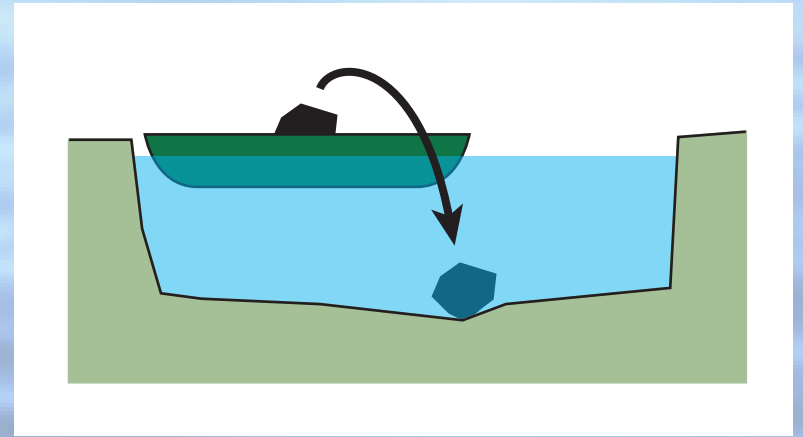
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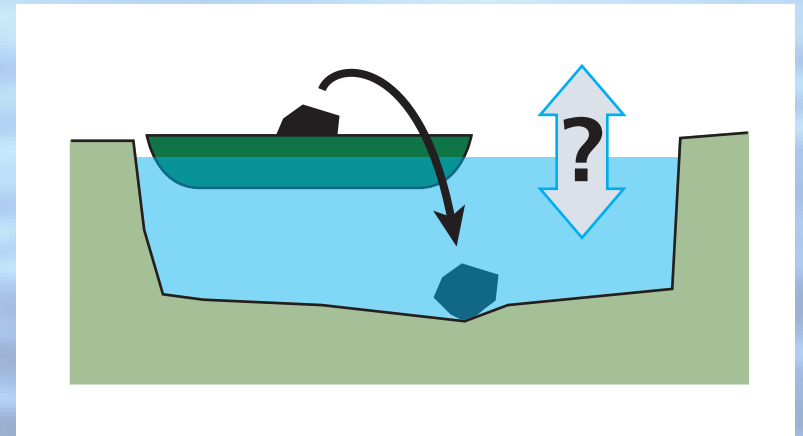


The volume of displaced fluid is equal to the volume of the submerged portion of the object.

A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.



A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.



After the boulder sinks to the bottom of the pond, the level of the water in the pond is

1. higher than
2. the same as
3. lower than

it was when the boulder was in the boat.

A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.



After the boulder sinks to the bottom of the pond, the level of the water in the pond is

1. higher than
2. the same as
3. lower than

it was when the boulder was in the boat.

A boat carrying a large boulder is

flo

de

to

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

A

th

1.

2.

3.

it was when the boulder was in the boat.

A boat carrying a large boulder is

flo

de

to

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

A

th

1.

2.

3.

it was when the boulder was in the boat.

A boat carrying a large boulder is

flo

de

to

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

A

th

1. made a commitment

1.

2.

3.

it was when the boulder was in the boat.

A boat carrying a large boulder is

flo

de

to

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

A

th

1. made a commitment

2. externalized your answer

1.

2.

3.

it was when the boulder was in the boat.

A boat carrying a large boulder is

flo

de

to

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

A

th

1. made a commitment

2. externalized your answer

3. moved from the answer/fact to reasoning

1.

2.

3.

it was when the boulder was in the boat.

A boat carrying a large boulder is

flo

de

to

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

A

th

1.

2.

3.

1. made a commitment

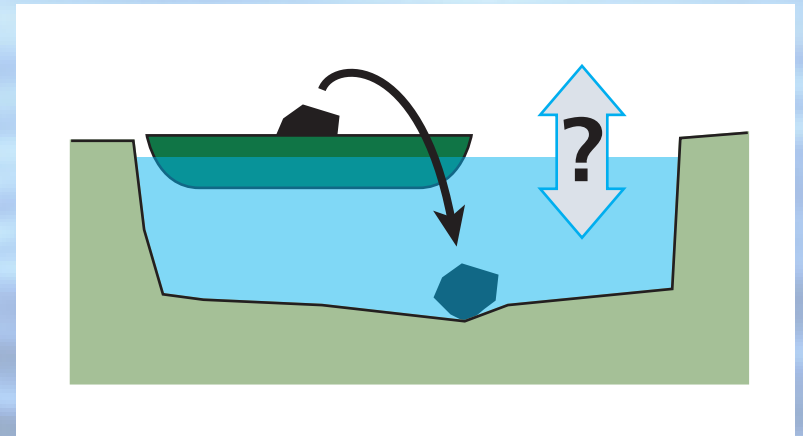
2. externalized your answer

3. moved from the answer/fact to reasoning

4. became emotionally invested in the learning process

it was when the boulder was in the boat.

A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.

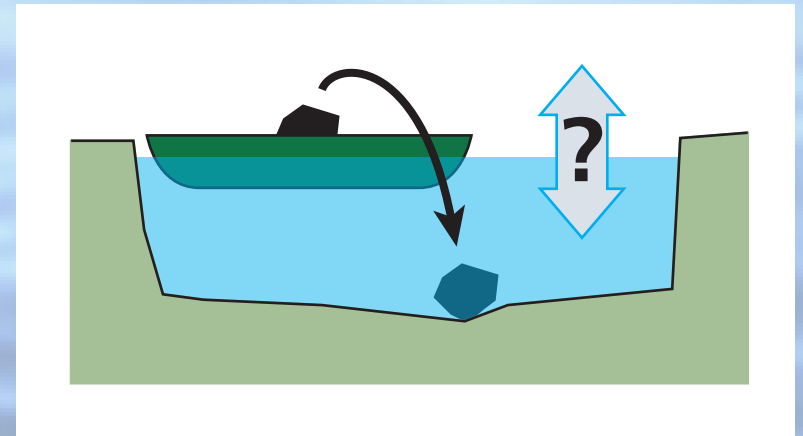


After the boulder sinks to the bottom of the pond, the level of the water in the pond is

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2. the same as
3. lower than

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A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.

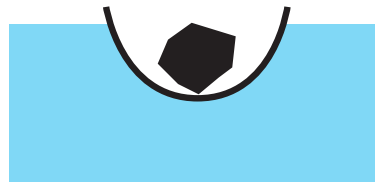


After the boulder sinks to the bottom of the pond, the level of the water in the pond is

- 1. higher than
- 2. the same as
- 3. lower than ✓

it was when the boulder was in the boat.

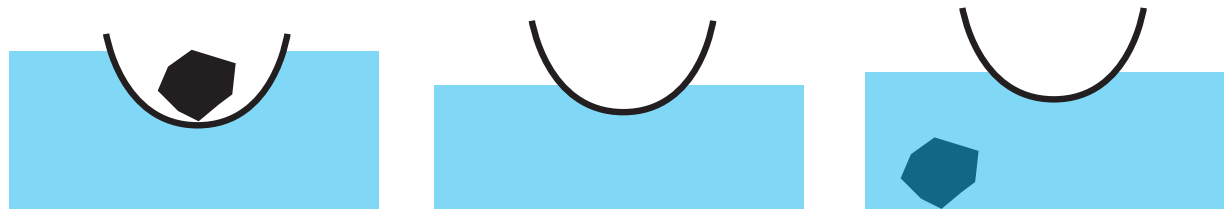
remember: amount of displaced water



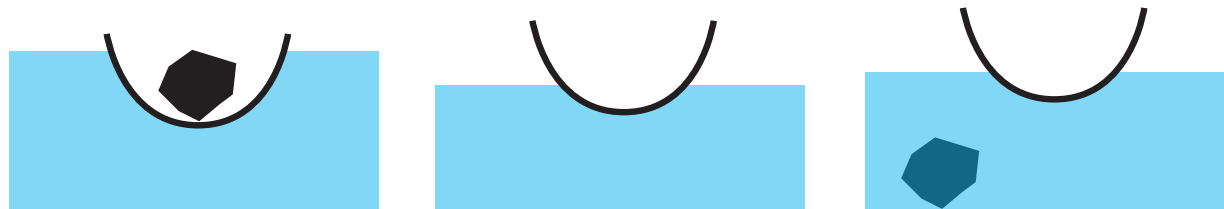
remember: amount of displaced water



remember: amount of displaced water

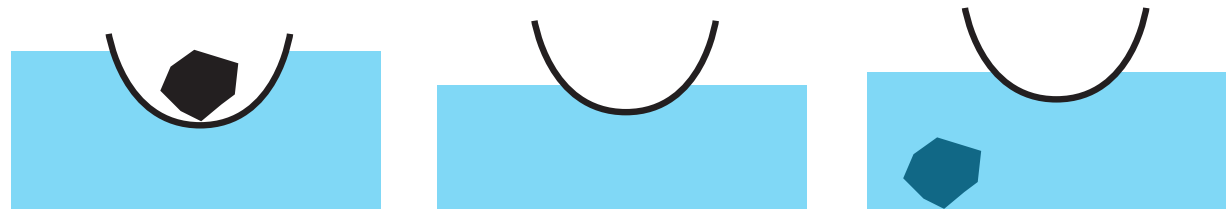


remember: amount of displaced water



displaced
water

remember: amount of displaced water

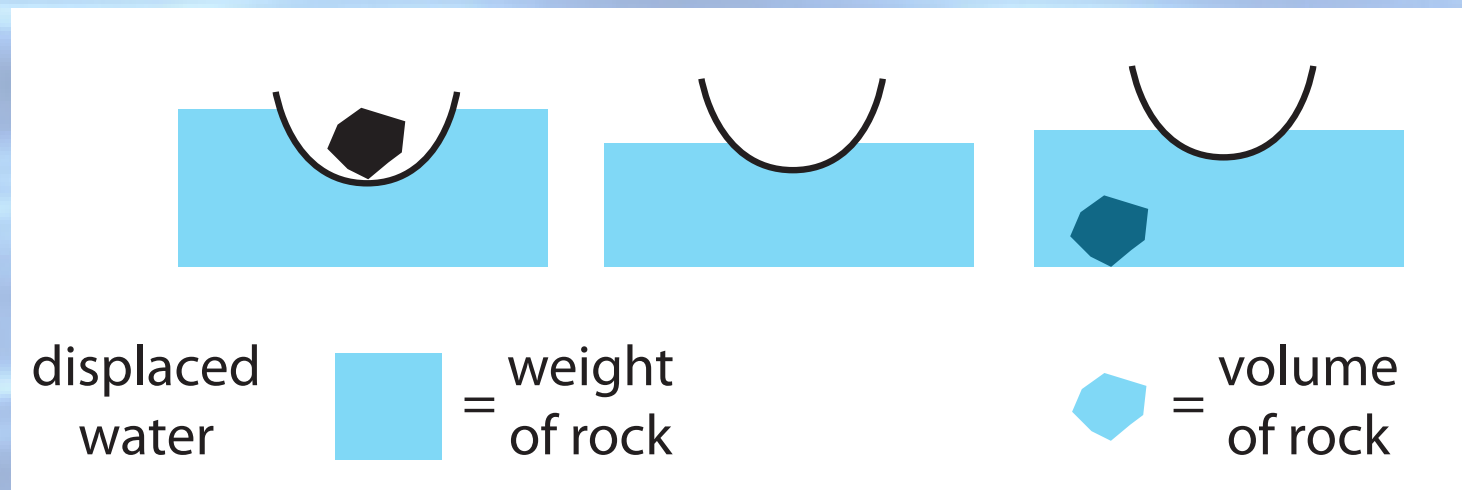


displaced
water



= weight
of rock

remember: amount of displaced water



remember: amount of displaced water



Peer

back to pl

INSTRUCTION

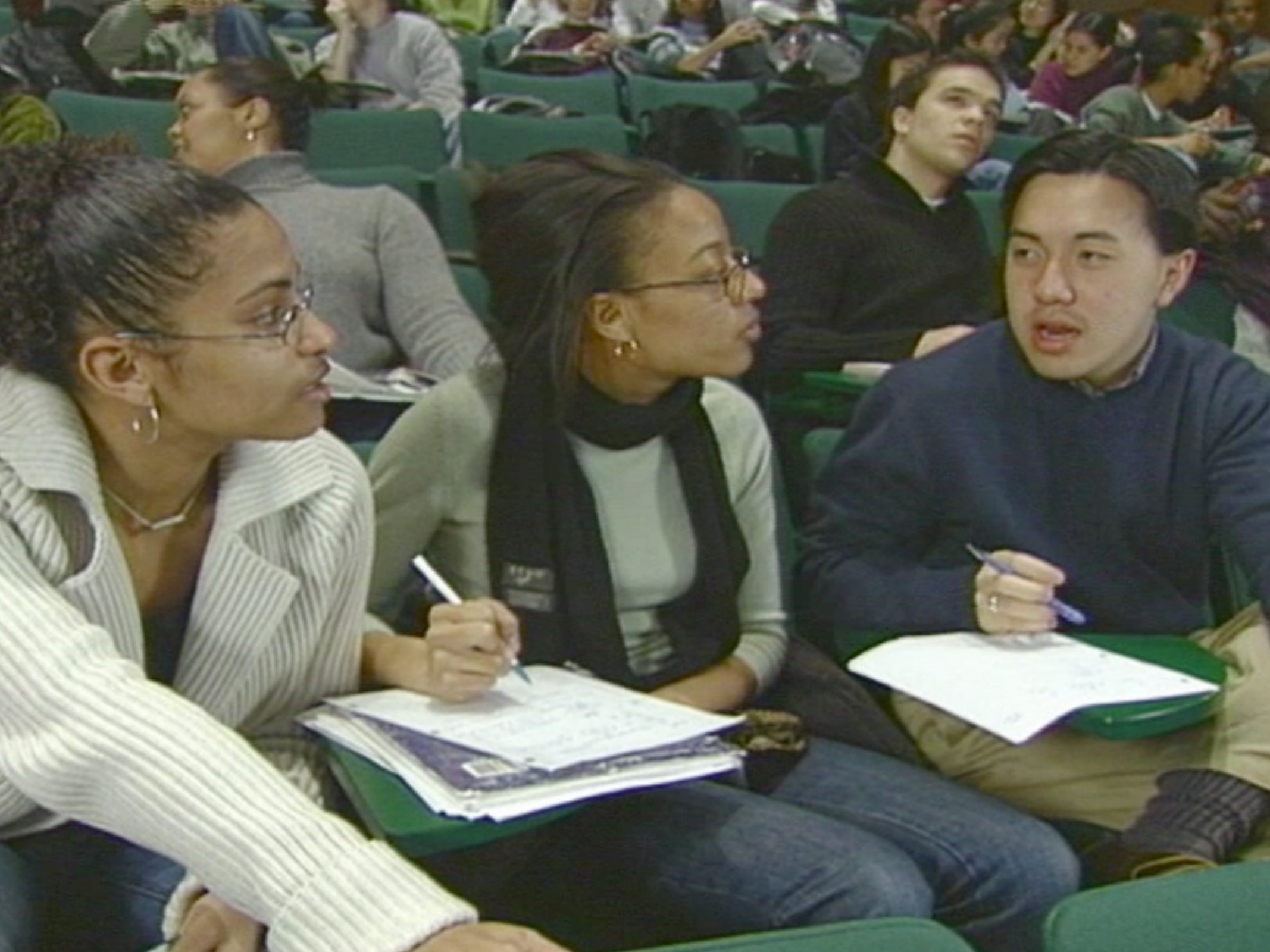
Higher learning gains

INSTRUCTION

Higher learning gains

Better retention

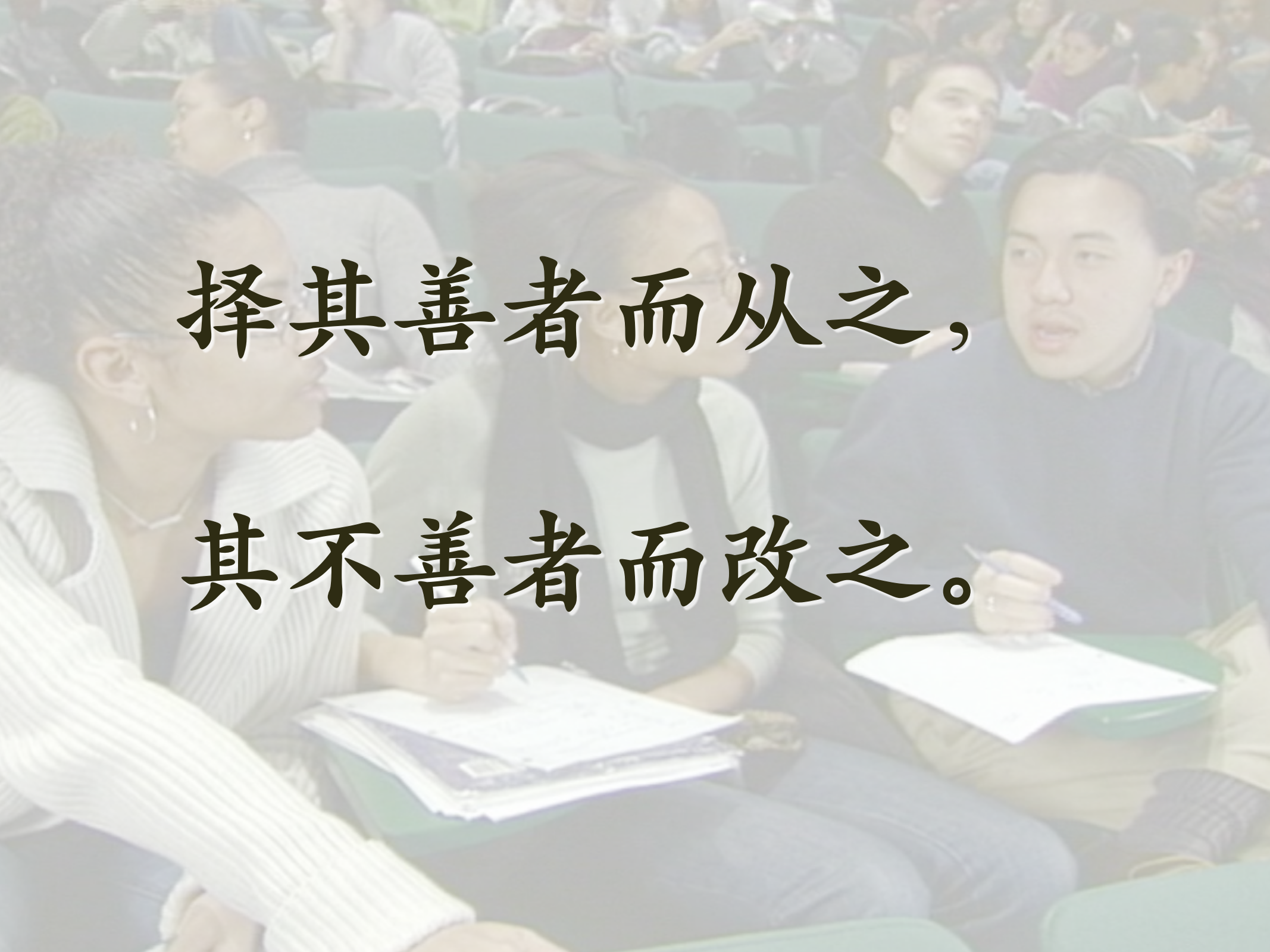
INSTRUCTION





三人行，必有我师焉。

——孔子

A background image of a classroom with students sitting at desks, some writing in notebooks. The image is faded to serve as a backdrop for the text.

择其善者而从之，
其不善者而改之。



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 engagement/social interaction a must!

ericmazur.com

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