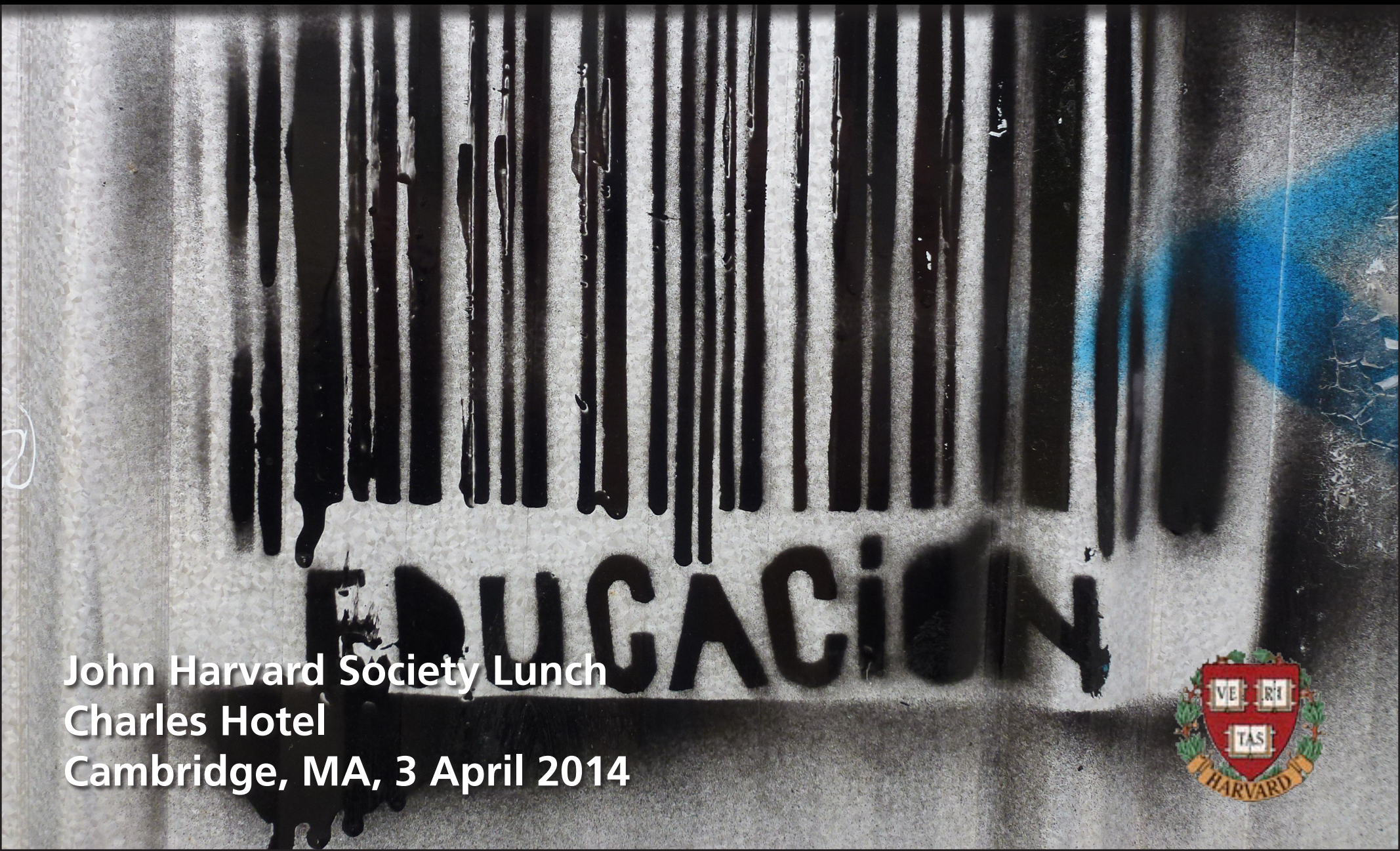


# Educating: one-on-one, all at once



John Harvard Society Lunch  
Charles Hotel  
Cambridge, MA, 3 April 2014



# Educating: one-on-one, all at once



@eric\_mazur

John Harvard Society Lunch  
Charles Hotel  
Cambridge, MA, 3 April 2014





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

...  
...  
...  
...  
...

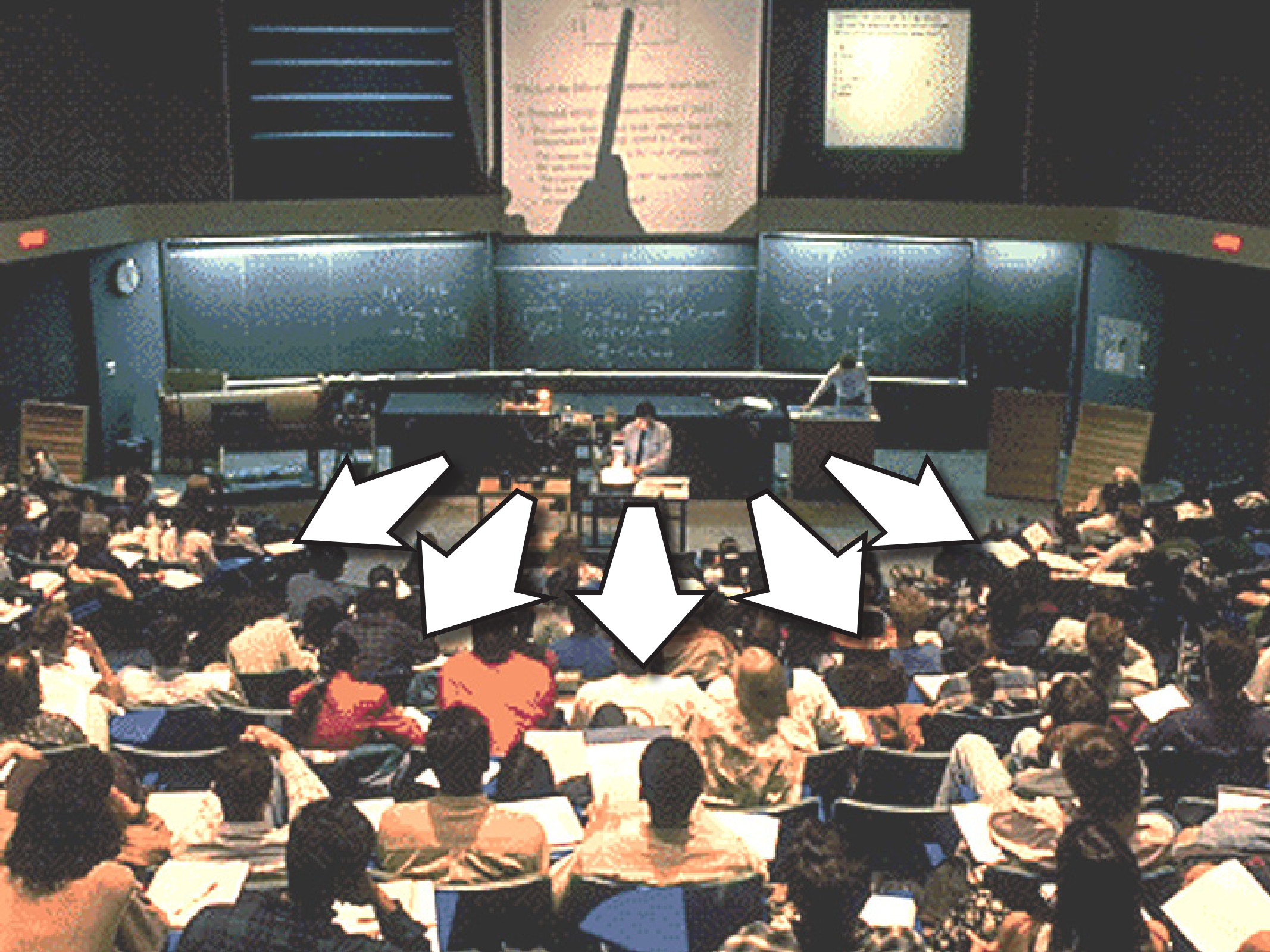
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What are the following...  
A...  
The...  
The...  
The...  
The...

- 1. ...
- 2. ...
- 3. ...
- 4. ...
- 5. ...





The background is a painting of a face, possibly a woman, with large, expressive eyes. The face is rendered in shades of blue, green, and yellow. The eyes are looking through horizontal slats, which are painted in a light yellow color. The overall style is somewhat abstract and expressive. The text "an illusion..." is written in a bold, red, serif font across the center of the image. The text is slightly transparent, allowing the underlying painting to be seen through it.

**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)**

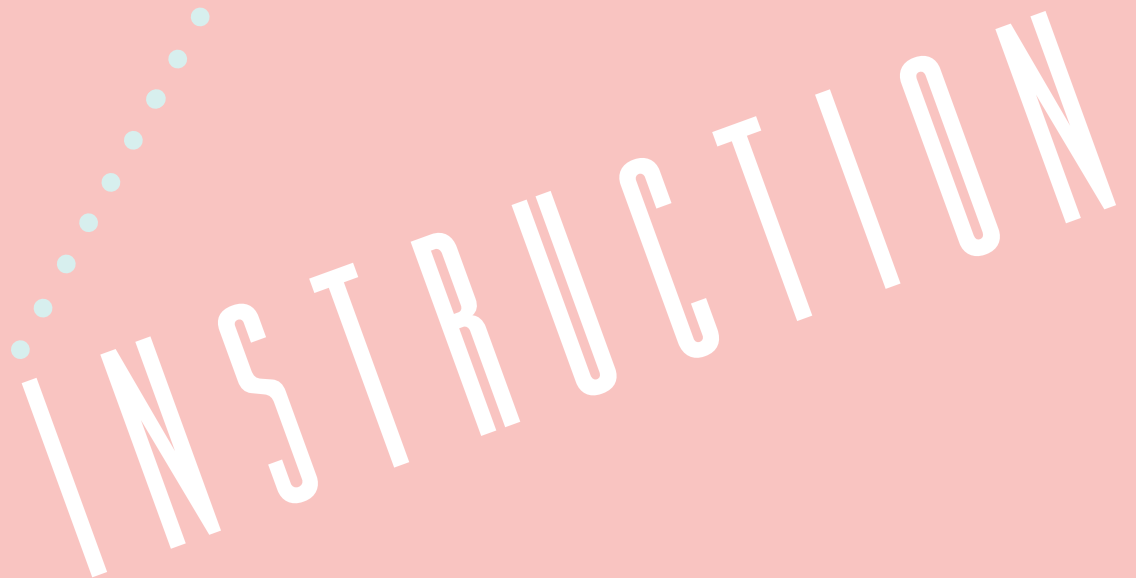
# Peer



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

**2. assimilation of that information (in class)**

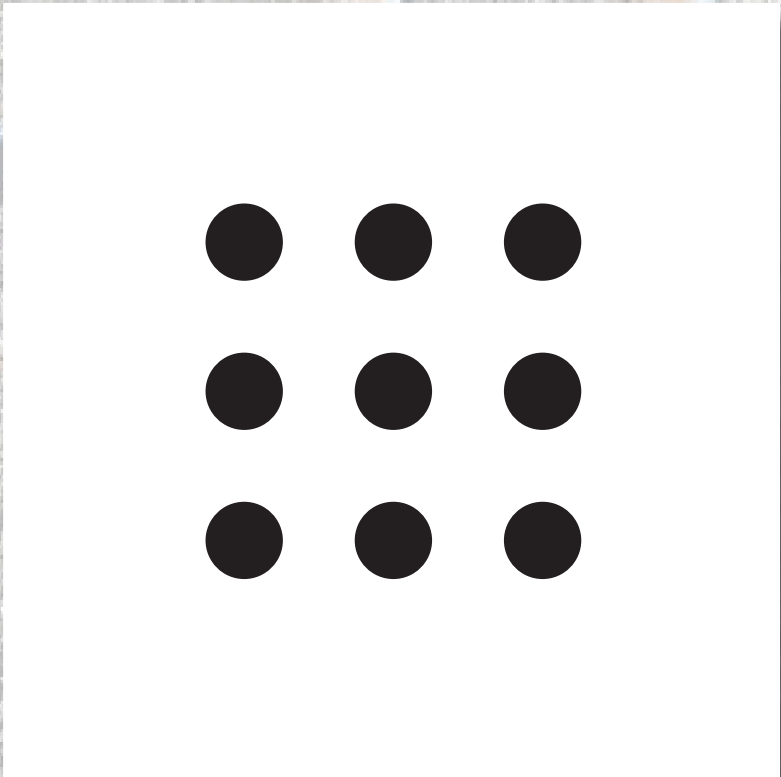
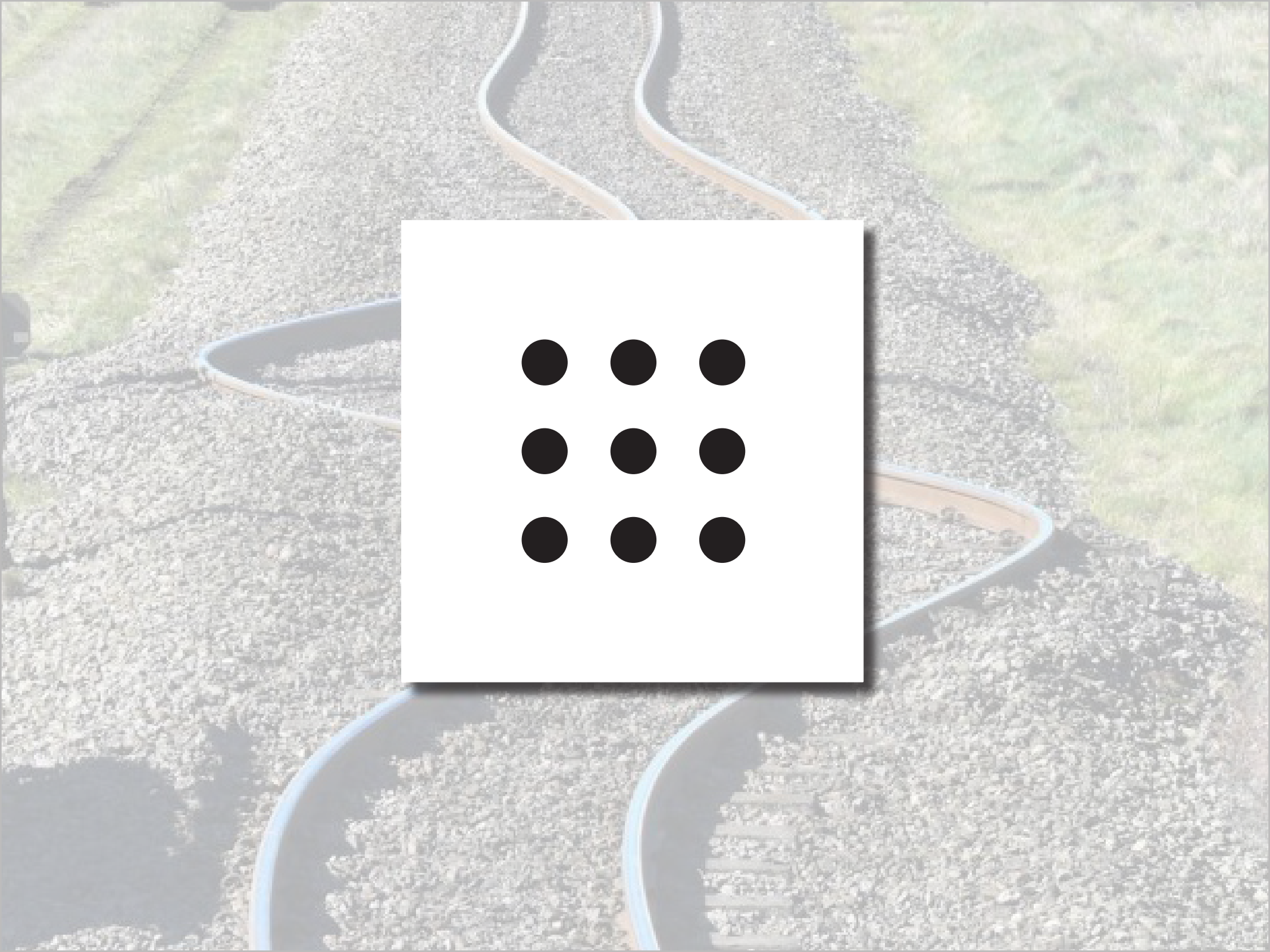
INSTRUCTION

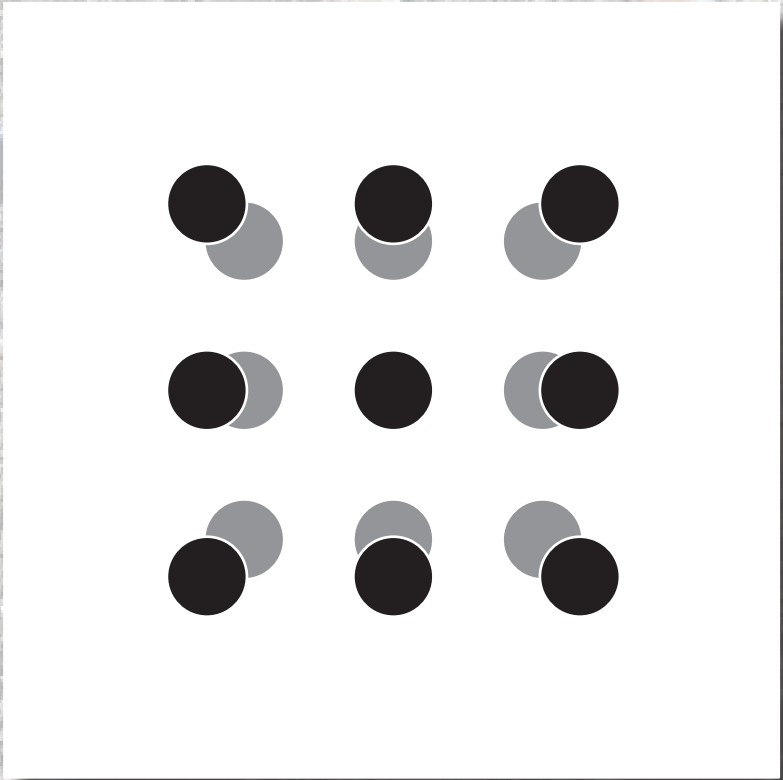


A photograph of a railway track with a wavy, undulating path, illustrating thermal expansion. The track is composed of gravel and wooden sleepers, and the rails are curved in a series of gentle, repeating waves. The surrounding area is grassy. The text "thermal expansion" is overlaid in the center of the image.

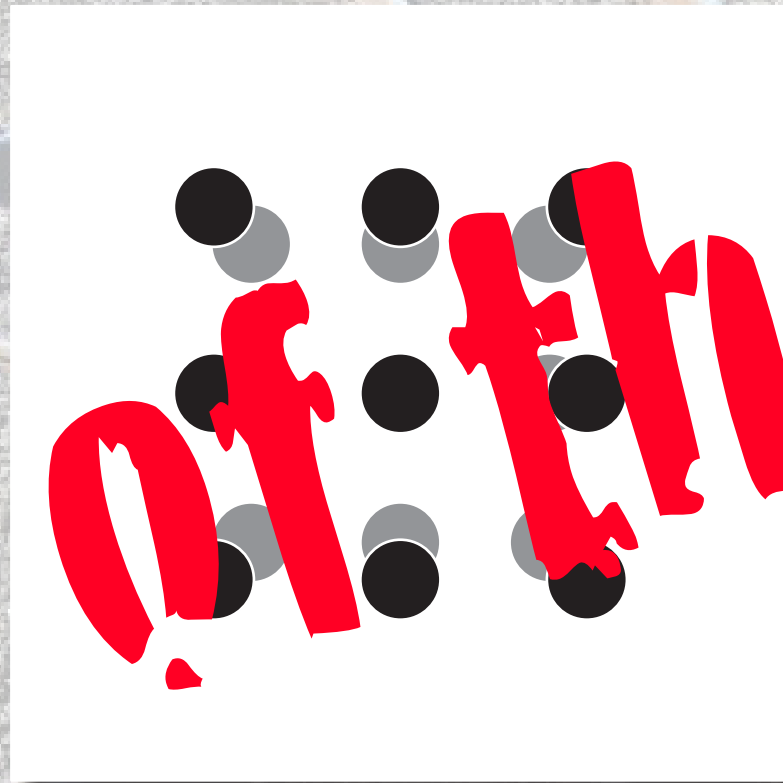
**thermal expansion**



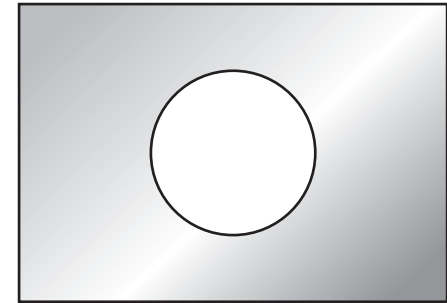




**all of them!**

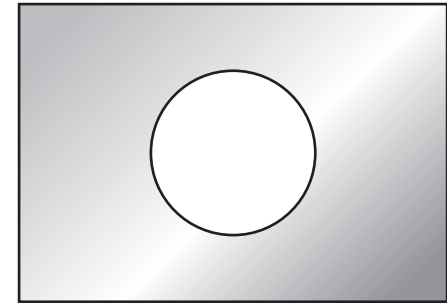


**Consider a rectangular metal plate  
with a circular hole in it.**



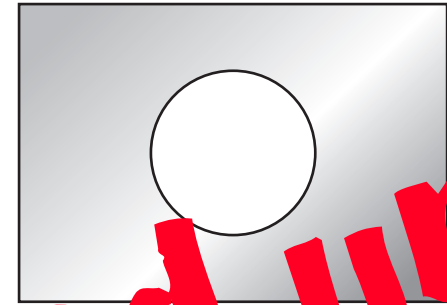
**Consider a rectangular metal plate with a circular hole in it.**

**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.



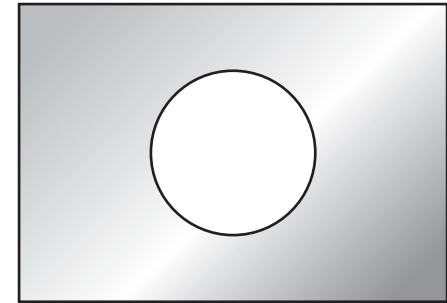
When the plate is uniformly heated, the diameter of the hole

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, 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**

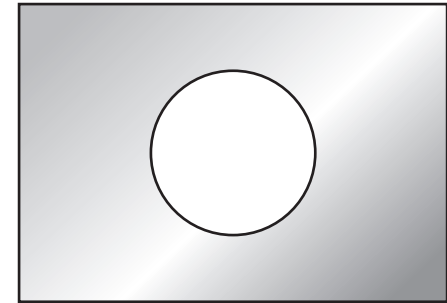
**Before I tell you the answer, let's analyze what happened.**

**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.**

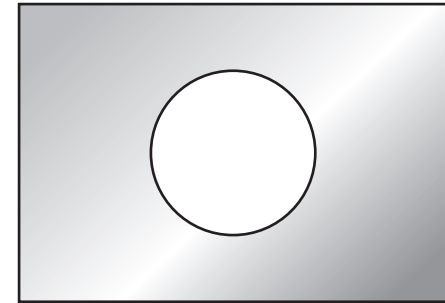
**When the plate is uniformly heated, the diameter of the hole**



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

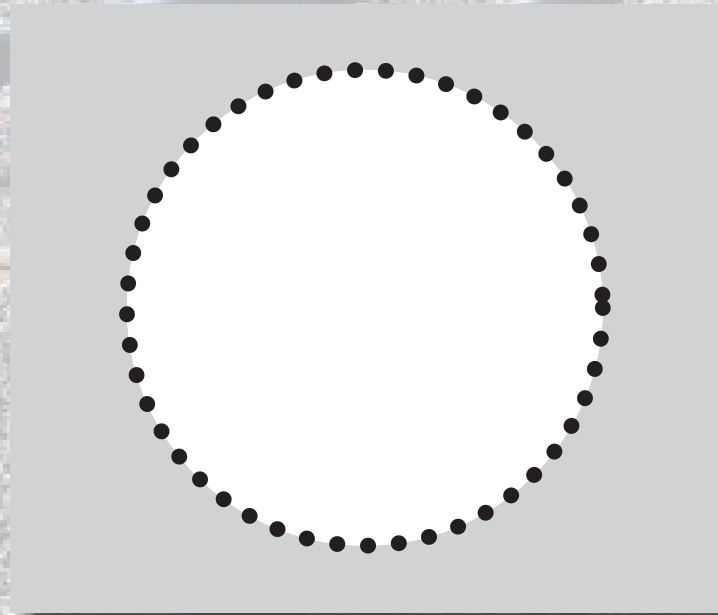
**Consider a rectangular metal plate with a circular hole in it.**

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



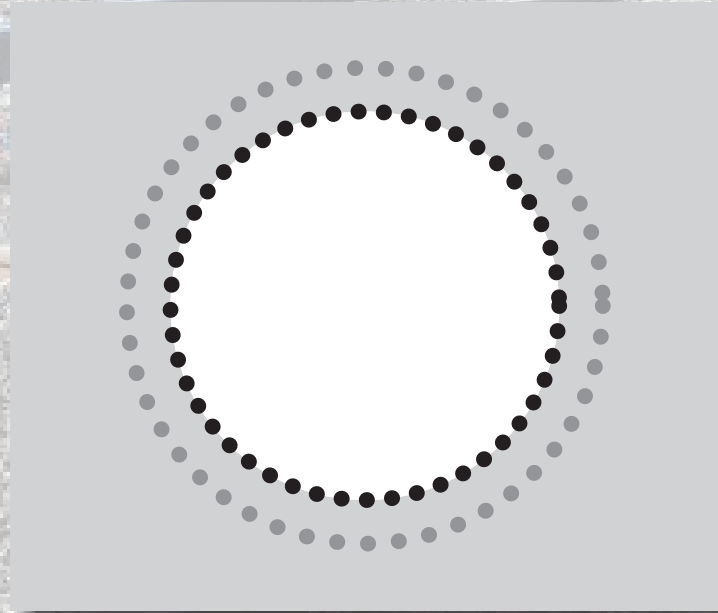
- 1. increases. ✓**
2. stays the same.
3. decreases.

**consider atoms at rim of hole**

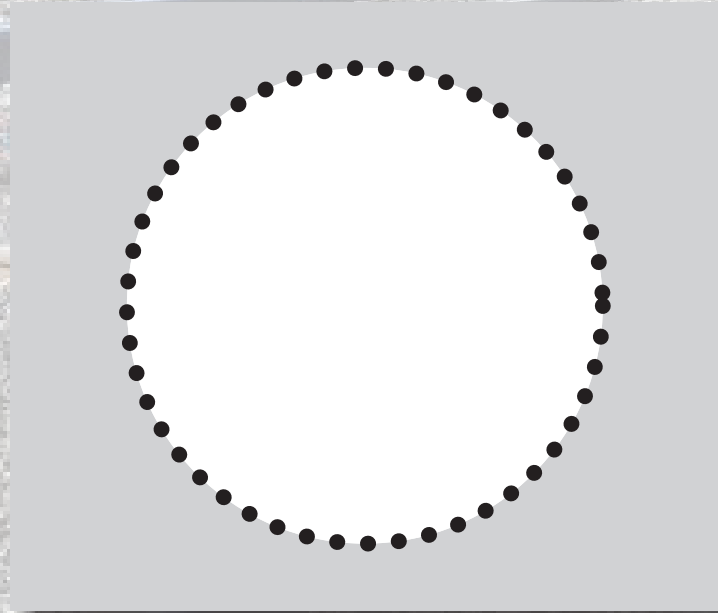




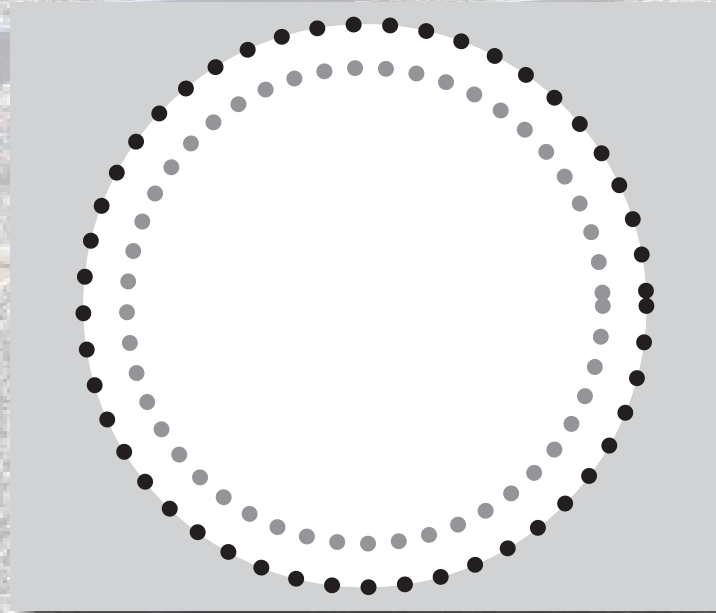
**consider atoms at rim of hole**



**consider atoms at rim of hole**



**consider atoms at rim of hole**



consider atoms at rim of hole

**you won't forget this**



The background of the slide features a close-up of a person's face, specifically their eyes and nose, looking through the horizontal slats of white window blinds. The person's skin is a light, warm tone. The blinds are set against a dark, possibly black, background, which makes the person's face stand out. The lighting is soft, highlighting the texture of the blinds and the contours of the face.

**Education is not just about:**

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

**active participation a must!**



**Education is not just about:**

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

**mazur.harvard.edu**

**Follow me!**



**eric\_mazur**