

# Assessment: The silent killer of learning



1ère journée de l'innovation pédagogique  
Université de Lausanne  
Lausanne, Suisse, 28 novembre 2013



# Assessment: The silent killer of learning



**@eric\_mazur**

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**kosten**

1. die Kosten (*pl.*)
2. kostbar  
lich

**krank**

1. die Krankheit, —, —en

**cow**

**magnificent**  
**glor**

1. magnifice
2. master

**lendid**

**das Kind, —(e)s, —er**

1. kindisch
2. kindlich

**der Kellner, —s, —**

1. der Keller, —s, —

**kennen**

kannte-gekannt  
*irreg.*

1. kennen-lernen
2. erkennen
3. bekannt
4. der Bekannte (*adj.* as *n.*)



# kosten

1. die Kosten (*pl.*)
2. kostbar

# krank

die Krankheit, —, —en

# kennen

1. kannte-gekannt
  2. kennen-lernen
  3. erkennen
  4. bekannt
- der Bekannte (*adj.*, as *n.*)





**35% retained  
after 1 week**



**we only guarantee  
they'll pass the test**







# 5-minute university





1. The first part of the lecture is devoted to the history of the subject.

2. The second part is devoted to the theory of the subject.

3. The third part is devoted to the practice of the subject.

4. The fourth part is devoted to the future of the subject.

5. The fifth part is devoted to the conclusion of the lecture.

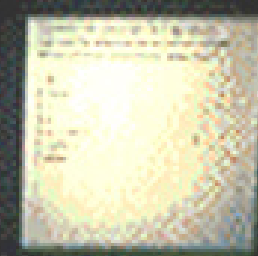
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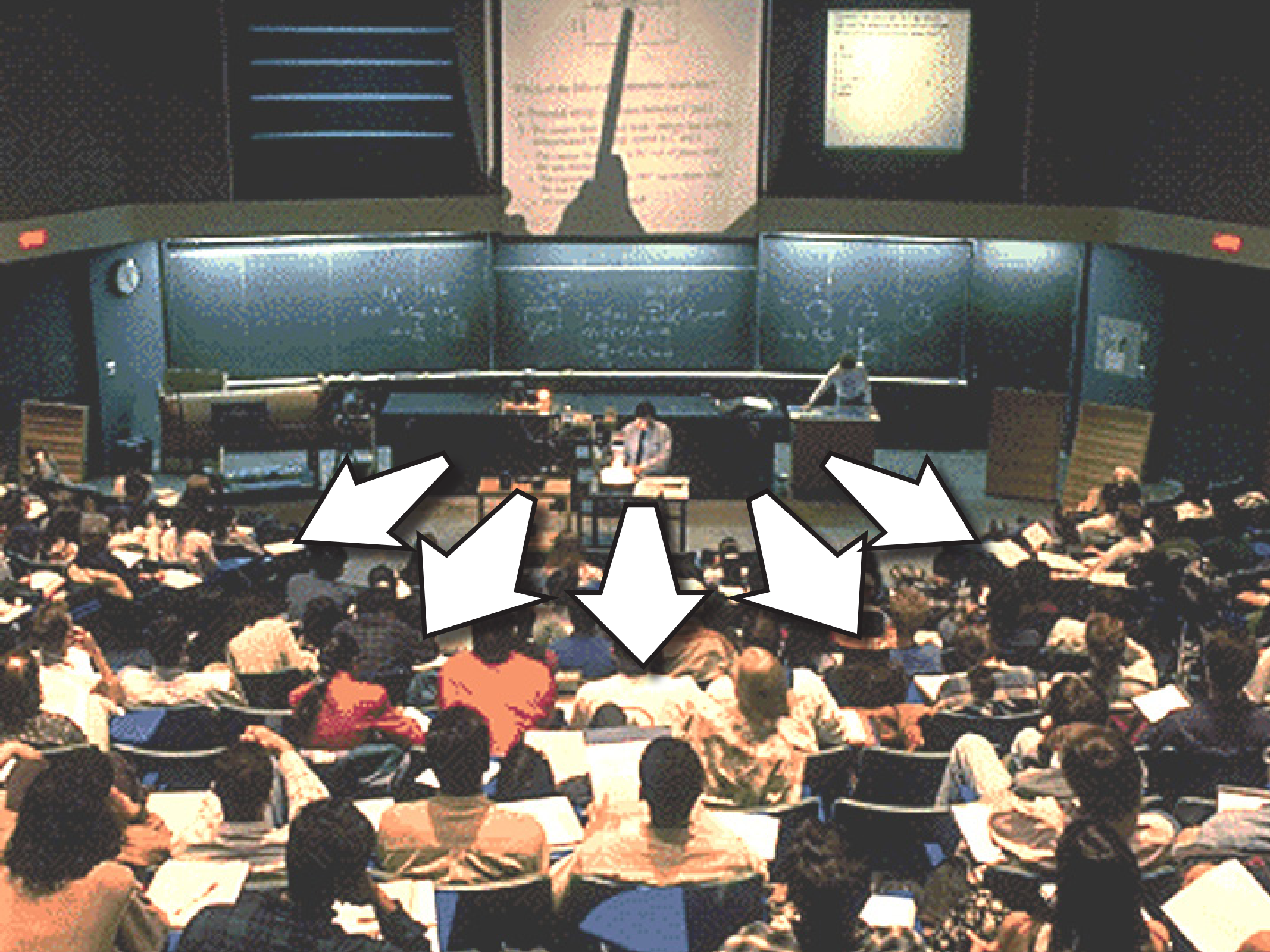
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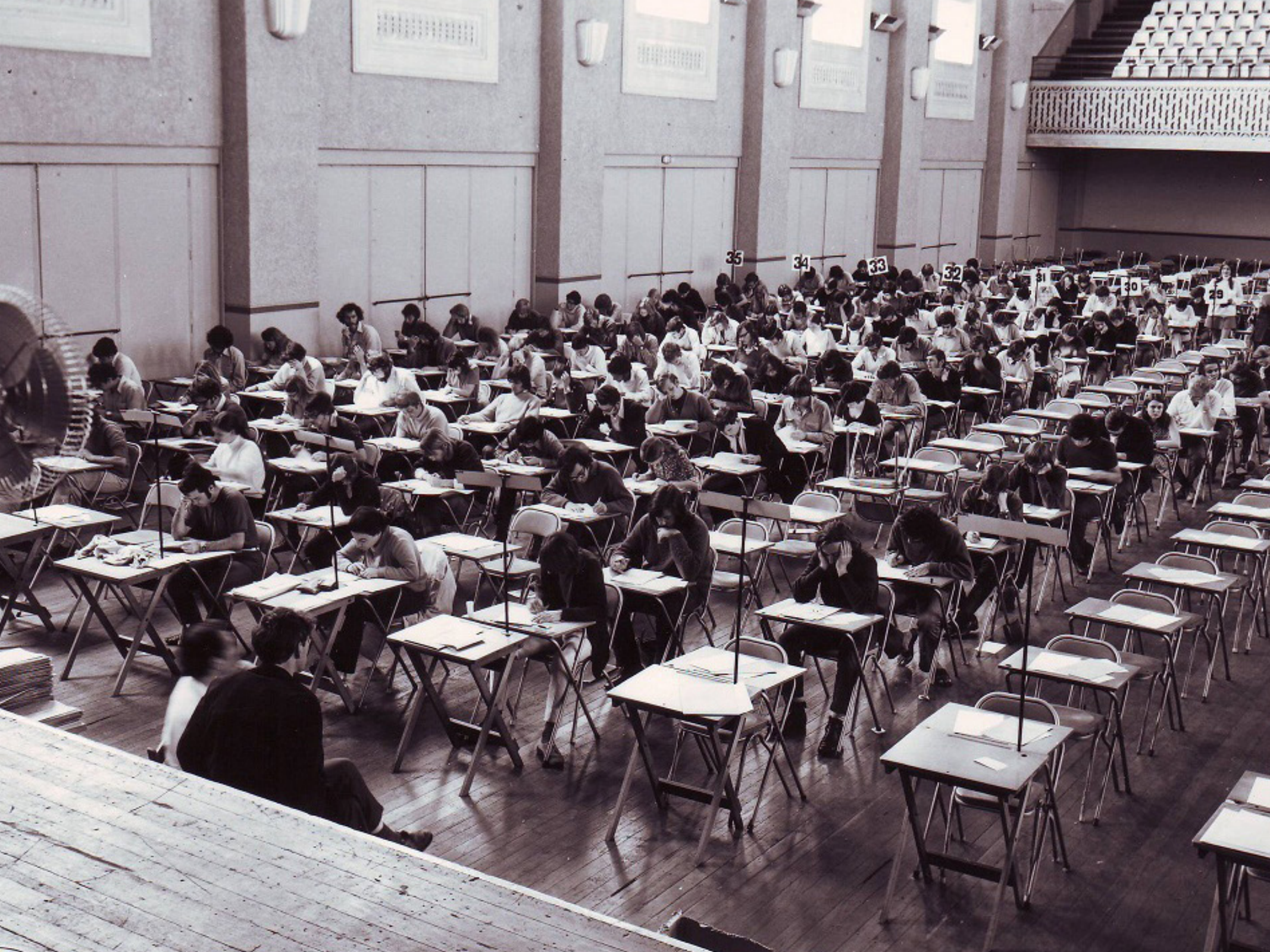











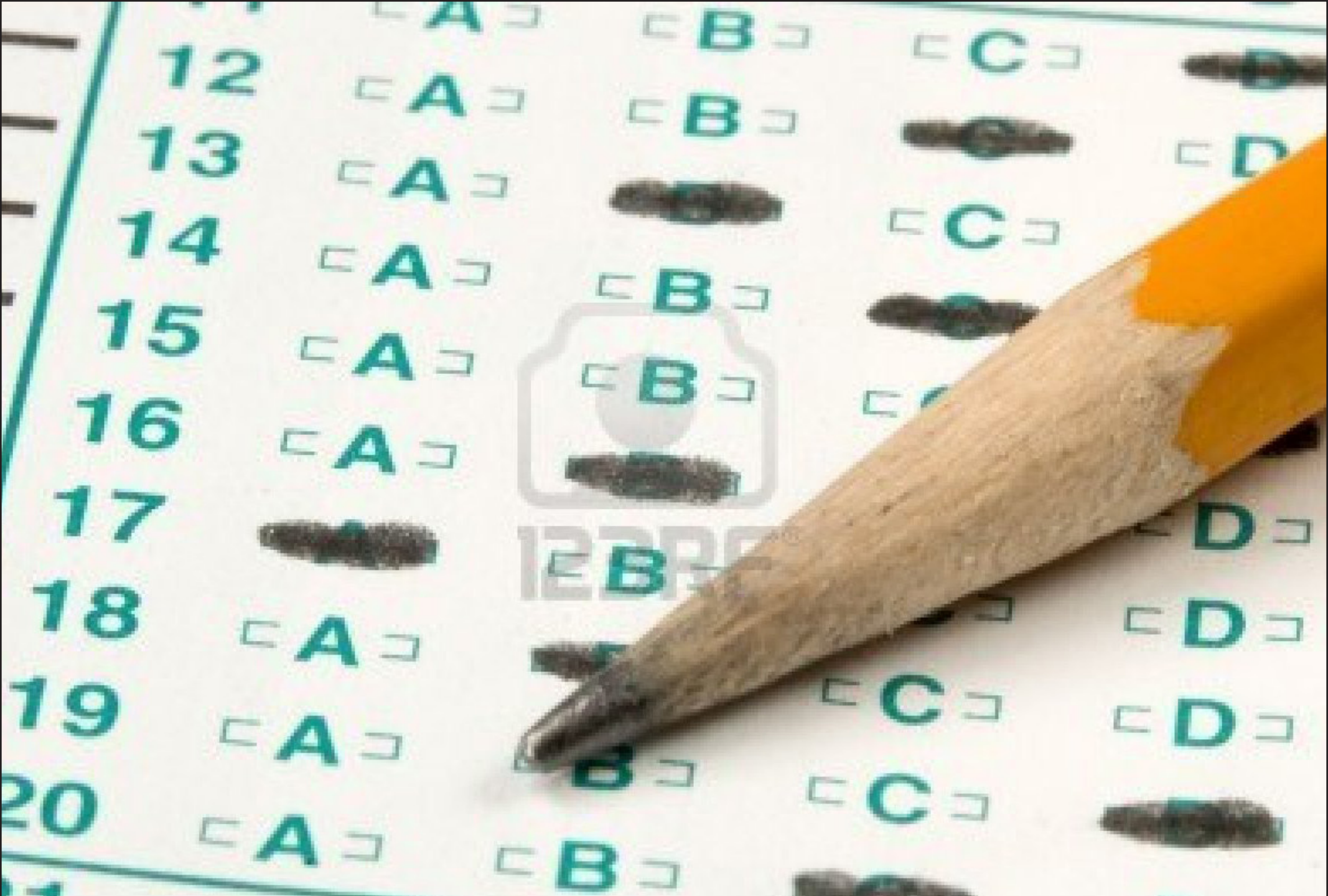




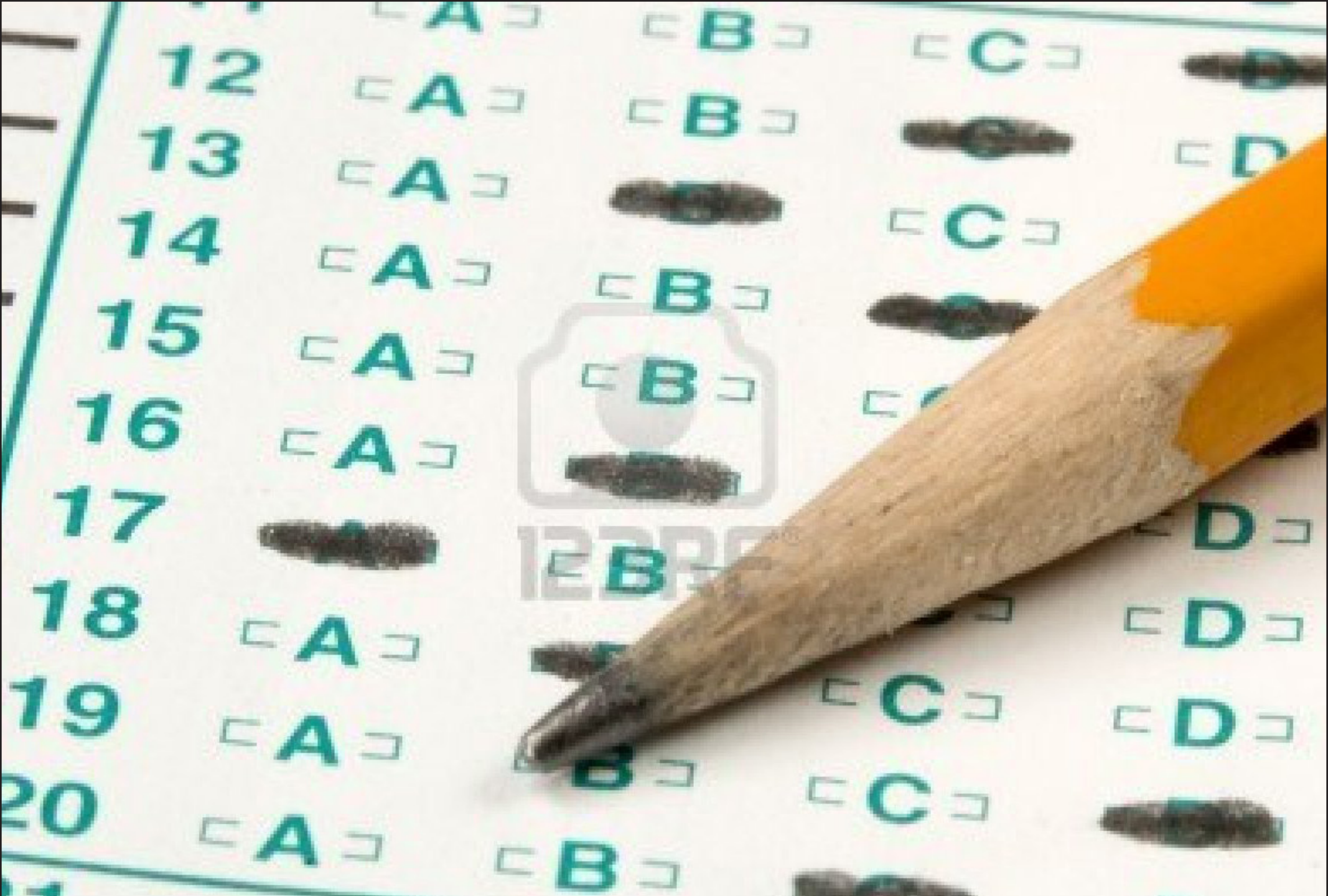


**assessment focussed on ranking and classifying,  
not on developing 21st century skills**





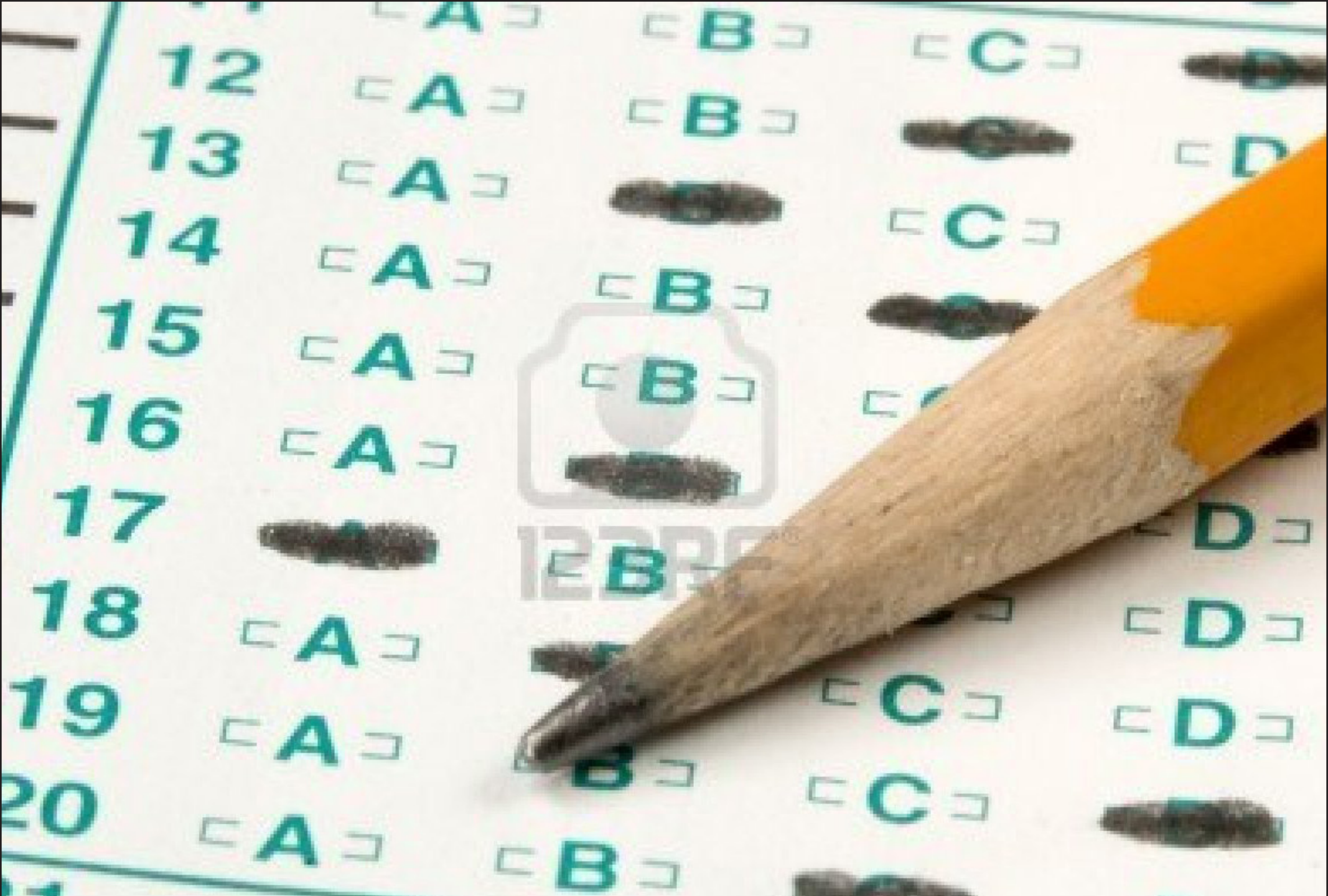
1 purposes



1 purposes

2 problems

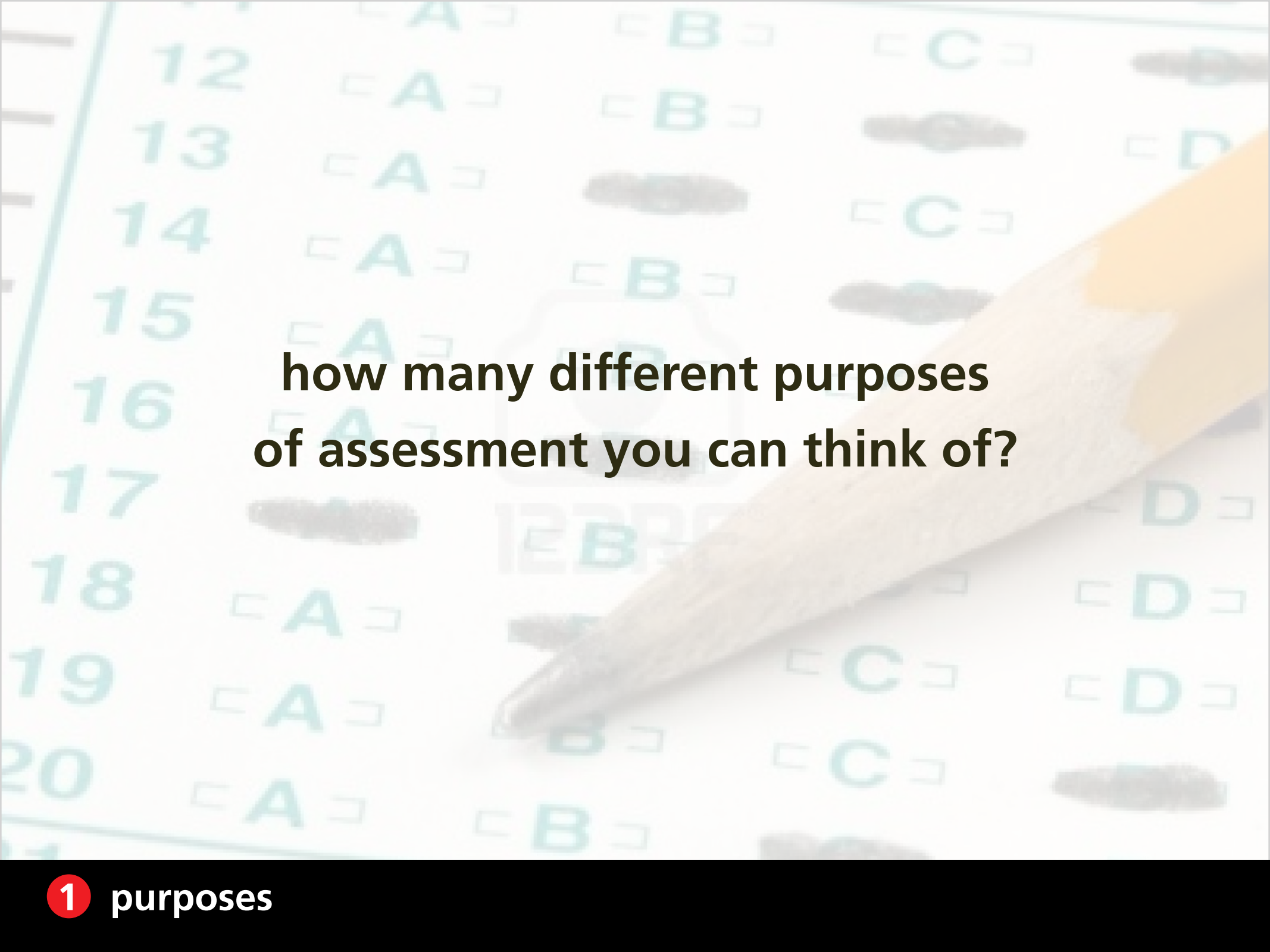




1 purposes

2 problems

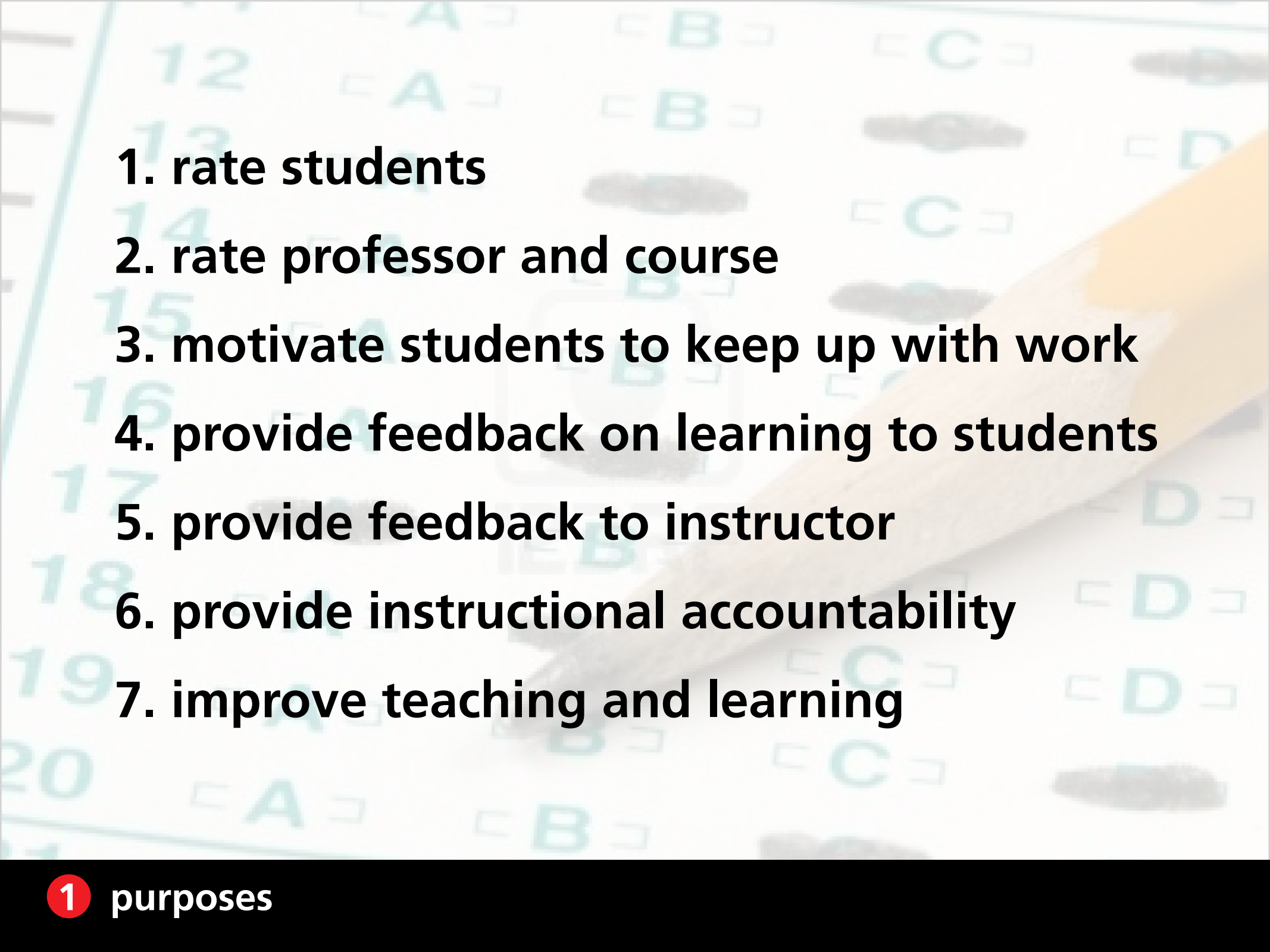
3 improvements

The background of the slide is a blurred image of a test paper. It features a grid of questions with numbers 12 through 20 on the left and multiple-choice options A, B, C, and D. A wooden pencil is positioned diagonally across the lower right portion of the image. The text 'how many different purposes of assessment you can think of?' is centered over the middle of the image.

**how many different purposes  
of assessment you can think of?**

**1** purposes

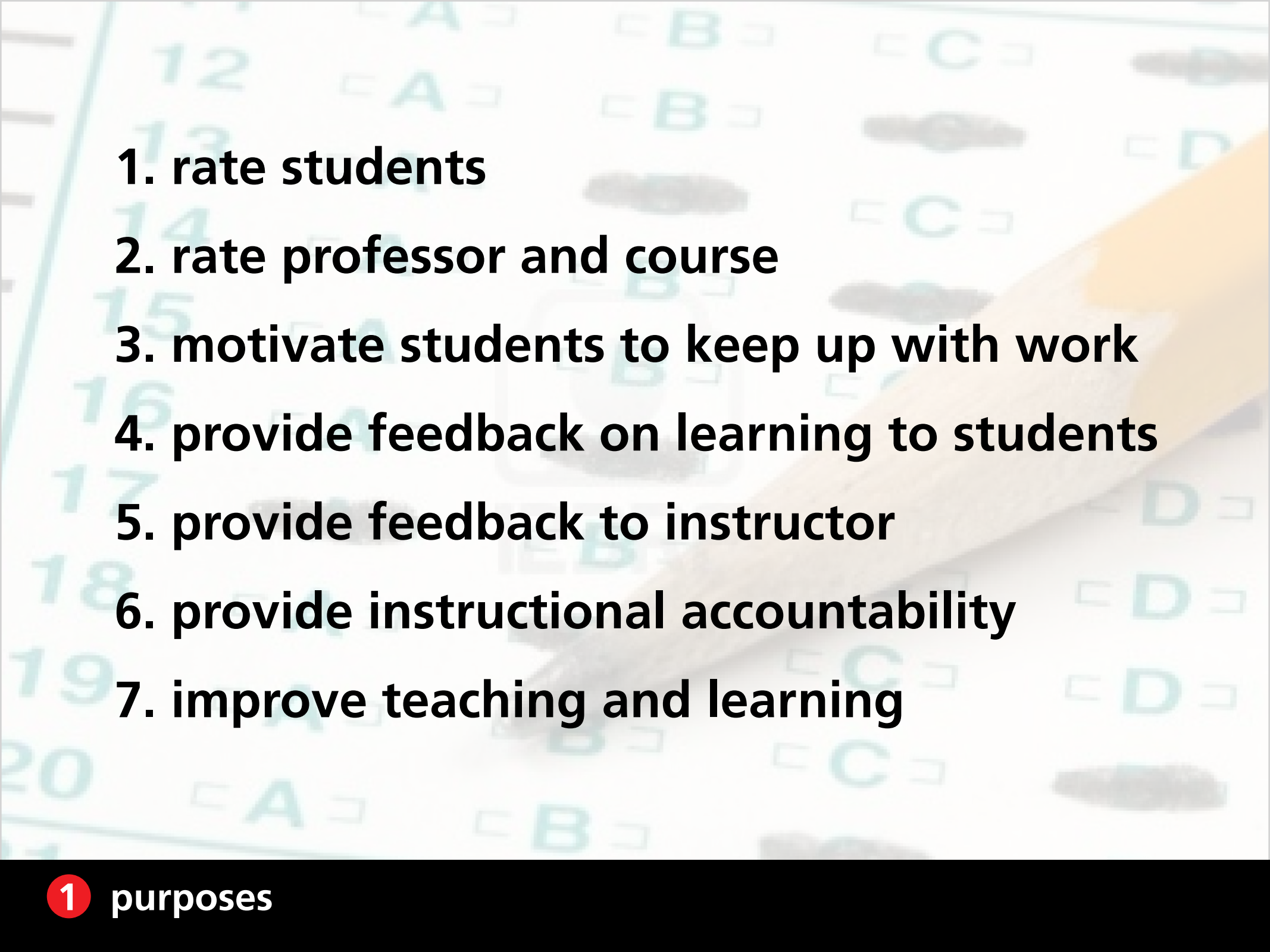


- 
- The background image shows a hand holding a pencil, poised to write on a document. The document contains a table with columns for student names and grades. The visible part of the table includes names like '12', '13', '14', '15', '16', '17', '18', '19', and '20' in the first column, and grades 'A', 'B', 'C', and 'D' in the second column. The text is slightly blurred, suggesting a shallow depth of field.
- 1. rate students**
  - 2. rate professor and course**
  - 3. motivate students to keep up with work**
  - 4. provide feedback on learning to students**
  - 5. provide feedback to instructor**
  - 6. provide instructional accountability**
  - 7. improve teaching and learning**





**1** purposes

- 
- The background image shows a hand holding a pencil, poised to write on a document. The document contains a table with columns for student names and grades. The visible text in the background includes:
- |    | A | B | C | D |
|----|---|---|---|---|
| 12 |   |   |   |   |
| 13 |   |   |   |   |
| 14 |   |   |   |   |
| 15 |   |   |   |   |
| 16 |   |   |   |   |
| 17 |   |   |   |   |
| 18 |   |   |   |   |
| 19 |   |   |   |   |
| 20 |   |   |   |   |
- 1. rate students**
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  - 4. provide feedback on learning to students**
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  - 7. improve teaching and learning**





**1** purposes

**2** problems



# inauthentic tests

1 purposes

2 problems



The background of the slide is a grayscale image of a book cover. At the top, there is a barcode. Below the barcode, the word "EDUCACION" is printed in a large, bold, sans-serif font. The book cover appears to be made of a textured material, possibly paper or cloth, and shows some signs of wear and discoloration.

**what is the meaning/definition of...?**

**1** purposes

**2** problems



# inauthentic problem solving

1 purposes

2 problems



**problem**

**1** purposes

**2** problems





**problem**

**outcome**

**1** purposes

**2** problems



**problem**

**outcome**

**KNOWN**

**1** purposes

**2** problems



problem

solution

outcome

**KNOWN**

1 purposes

2 problems



problem

UNKNOWN

solution

KNOWN

outcome

1 purposes

2 problems



problem

solution

outcome

problem

1 purposes

2 problems



problem

UNKNOWN  
solution

KNOWN  
outcome

problem

KNOWN  
procedure

1 purposes

2 problems



problem

solution

outcome

problem

procedure

answer

UNKNOWN

UNKNOWN

UNKNOWN

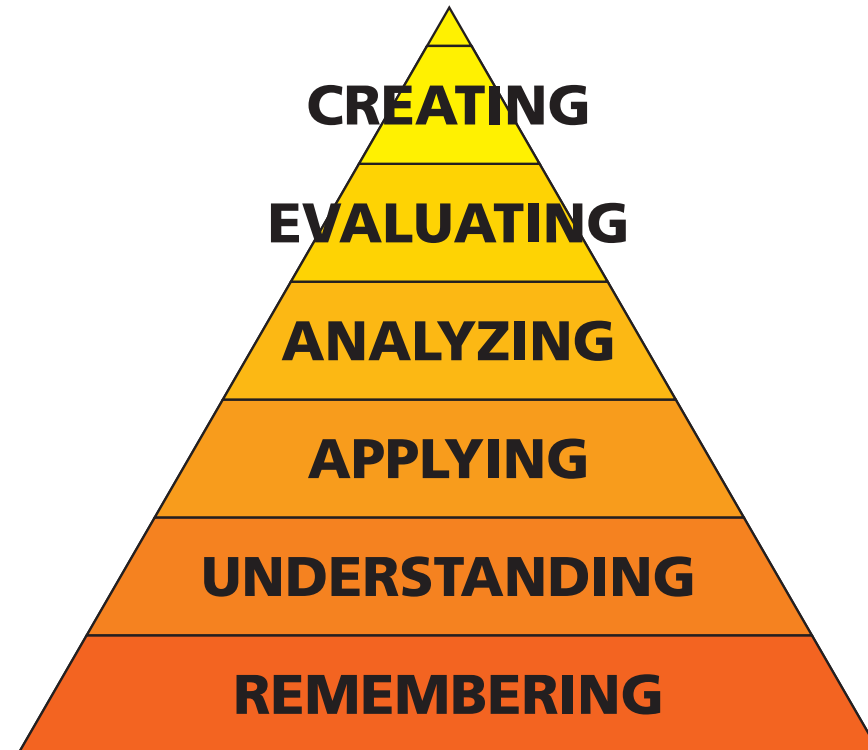
UNKNOWN

1 purposes

2 problems



## Thinking skills



1 purposes

2 problems

On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.



On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.

How long do you have to wait before someone frees up a space?

On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.

How long do you have to wait before someone frees up a space?

Requires:

Assumptions

Developing a model

Applying that model



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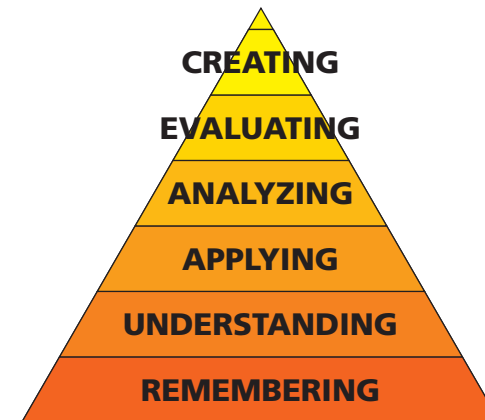
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Requires:

Assumptions

Developing a model

Applying that model



On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces. **On average people shop for 2 hours.**

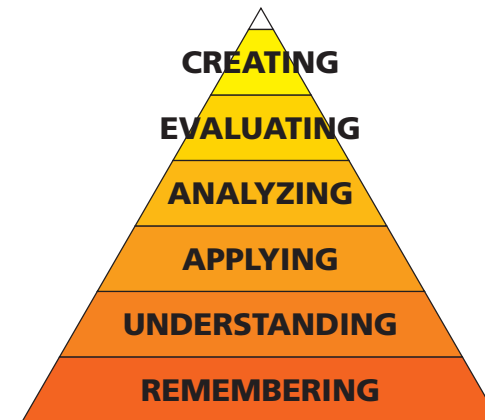
How long do you have to wait before someone frees up a space?

**Requires:**

Assumptions

**Developing a model**

**Applying that model**





On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces. On average people shop for 2 hours.

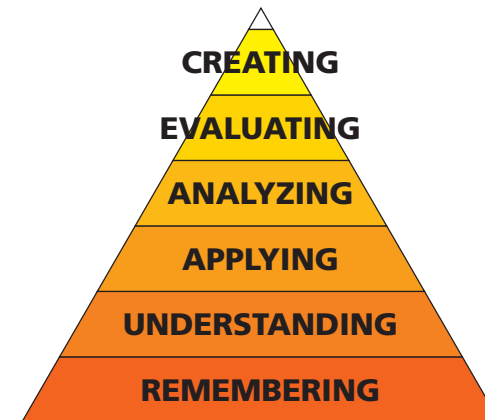
**Assuming people leave at regularly-spaced intervals, how long do you have to wait before someone frees up a space?**

**Requires:**

Assumptions

Developing a model

Applying that model



On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces. On average people shop for 2 hours.

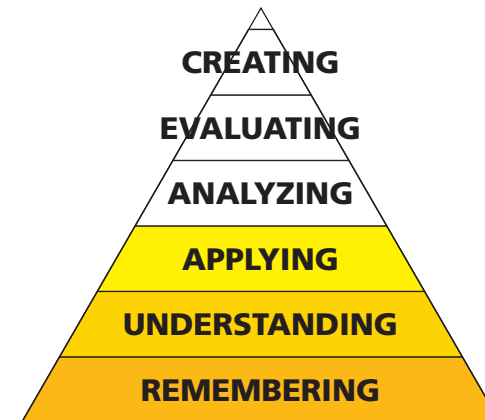
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**Requires:**

Assumptions

Developing a model

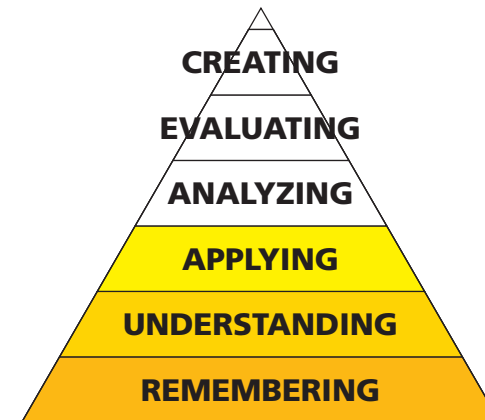
Applying that model





On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area, where people are known to shop, on average, for 2 hours. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.

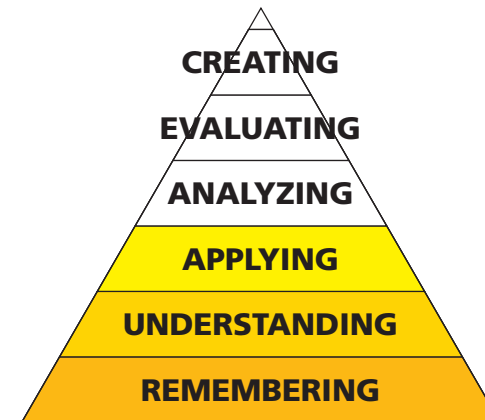
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How long do you have to wait before someone frees up a space?

$$t_{wait} = \frac{T_{shop}}{N_{spaces}}$$

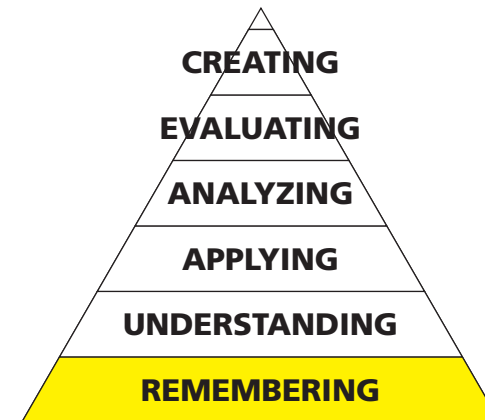


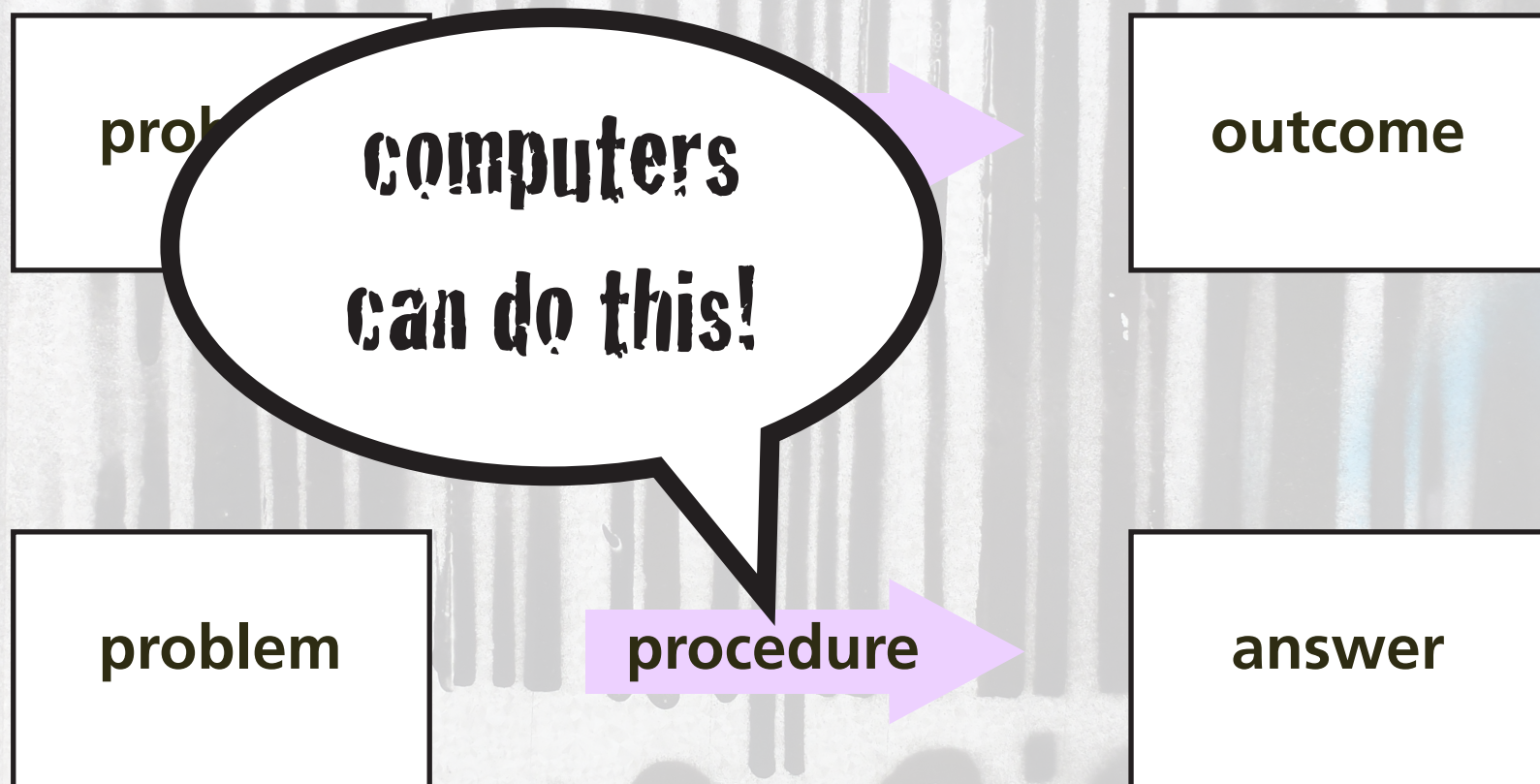


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1 purposes

2 problems





**1** purposes

**2** problems





1 purposes

2 problems



problem

solution

outcome

problem

**REAL**  
**problem solving**

pre

ver

**1** purposes

**2** problems



**problem**

**approach 1**

**approach 3**

**approach 2**

**outcome**

**1** purposes

**2** problems



**problem**

**approach 1**

**approach 3**

**approach 2**

**outcome**

**grading incompatible with real problem solving**

**1 purposes**

**2 problems**





1 purposes

2 problems





# isolation

**1** purposes

**2** problems

④ We will use spherical coordinates:

$0 \leq \rho \leq 4$ ,  $0 \leq \theta \leq 2\pi$ ,  $0 \leq \phi \leq \pi$ . The integral is thus:

$$\int_{\rho=0}^4 \int_{\theta=0}^{2\pi} \int_{\phi=0}^{\pi} (\rho \cos \phi) (\rho^2 \sin \phi) d\phi d\theta d\rho$$

$$= \left\{ \int_{\rho=0}^4 \rho^3 d\rho \right\} \left\{ \int_{\theta=0}^{2\pi} d\theta \right\} \left\{ \int_{\phi=0}^{\pi} \sin(2\phi) d\phi \right\} = \boxed{0}$$

Since the third integral equals 0,

⑤ Direction vectors for the plane are

$$\begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \\ -1 \end{pmatrix}$$



# high-stakes examinations promote cramming



1 purposes

2 problems

A person with dark hair is sleeping at a desk. Their head is resting on their hand, which is holding a pen over an open book. A white mug is on the desk to the left. A pair of red-rimmed glasses is on the desk in front of the book. The background is a plain, light-colored wall.

**information stored in short-term memory**

A close-up of an analog clock face. The numbers 10, 11, and 12 are visible. The hour hand is between 10 and 11, and the minute hand is pointing at 2.

**1 purposes**

**2 problems**



**no retention**

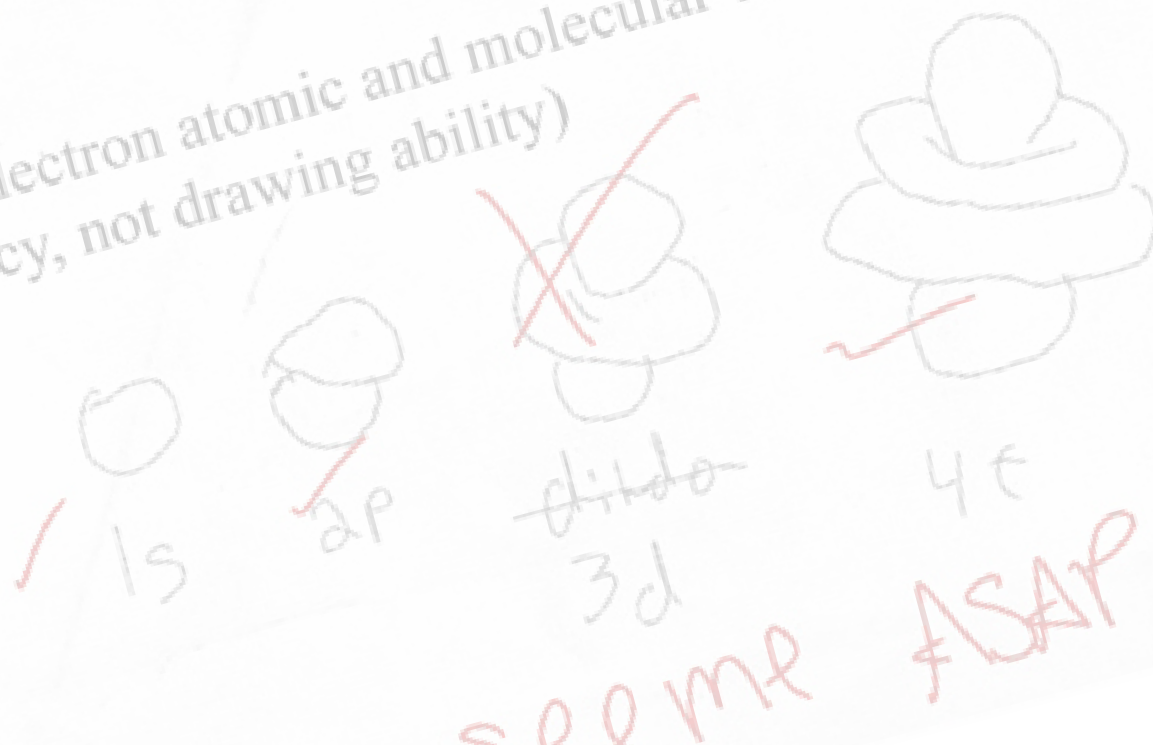
information stored in short-term memory

**no transfer**

**1** purposes

**2** problems

**grades: measure of standing relative to others**

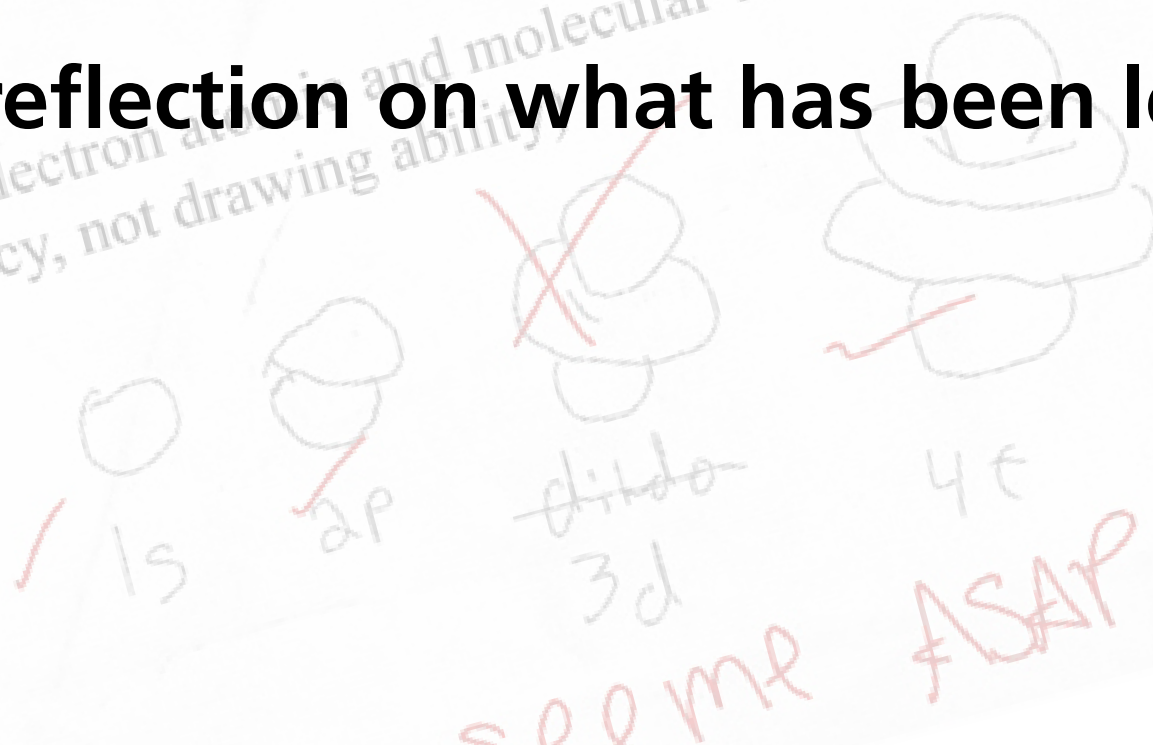


**1 purposes**

**2 problems**



**grades: measure of standing relative to others**  
**feedback: reflection on what has been learnt**



# assessment produces a conflict

1 purposes

2 problems



assessment produces a conflict

coach or judge?

1 purposes

2 problems

**conflict resolved by:**

**objectivity (fairness, reliability)**

**1** purposes

**2** problems



... Makes me  
in humanity

... the three important concepts that the Law of conservation

Equilibrium (boring)  
Thermodynamics (boring)  
Kinetics (bow-chicka-wow-wow)

Describe the Law of definite composition (Dalton's Law):

A chemical compound always contains exactly the  
same proportion of elements by mass.

Unrelated, I saw my T.A., Jimmy, kissing a dude at a party last Friday

5 pts) A chemical reaction does one of two things to involved substances:

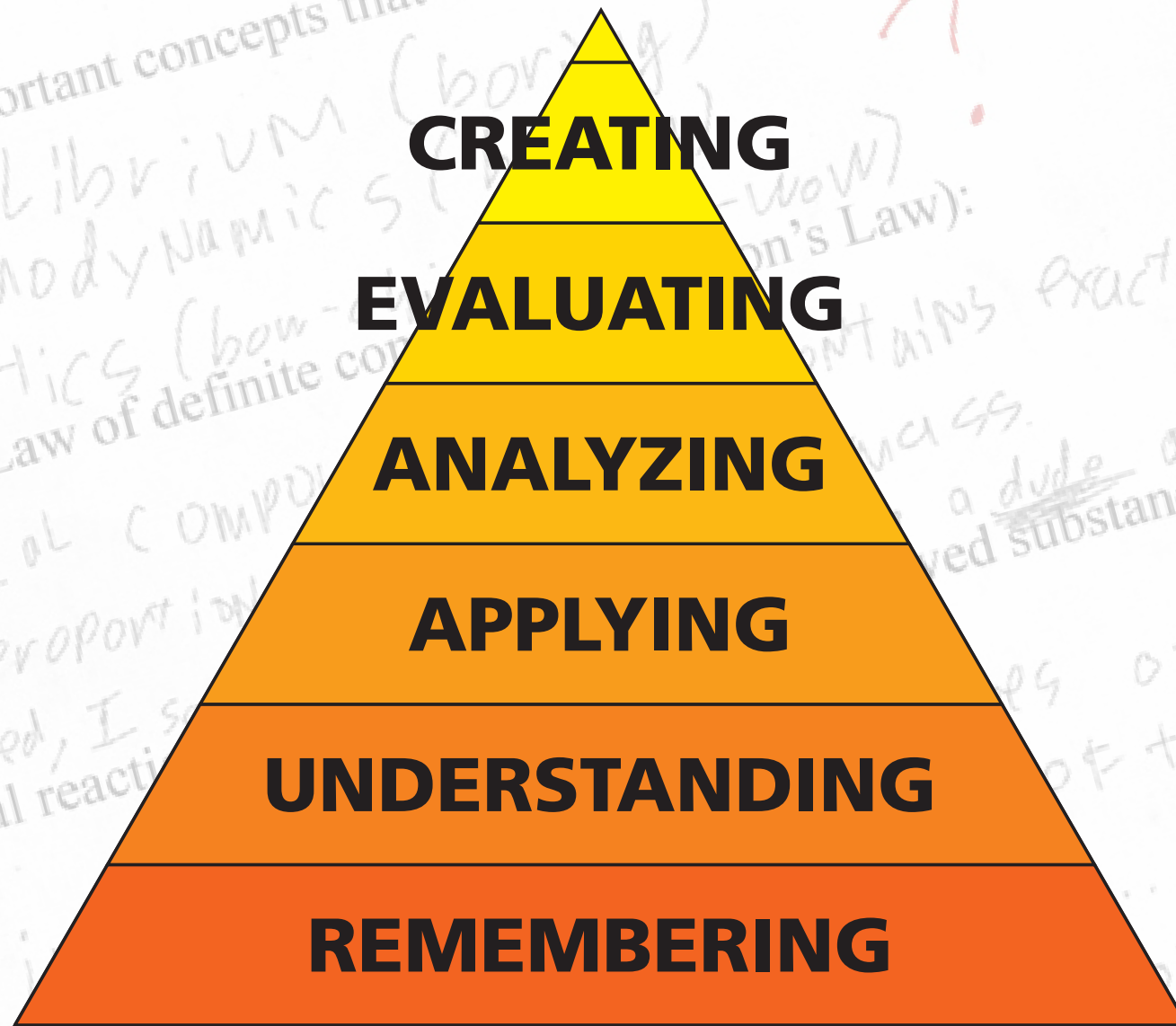
Increases or decreases the  
energy of the substance  
involved ... sometimes in  
the form of heat or light

... orbitals 1s, 2p, 3d and 4f.

... but ...

1 purposes

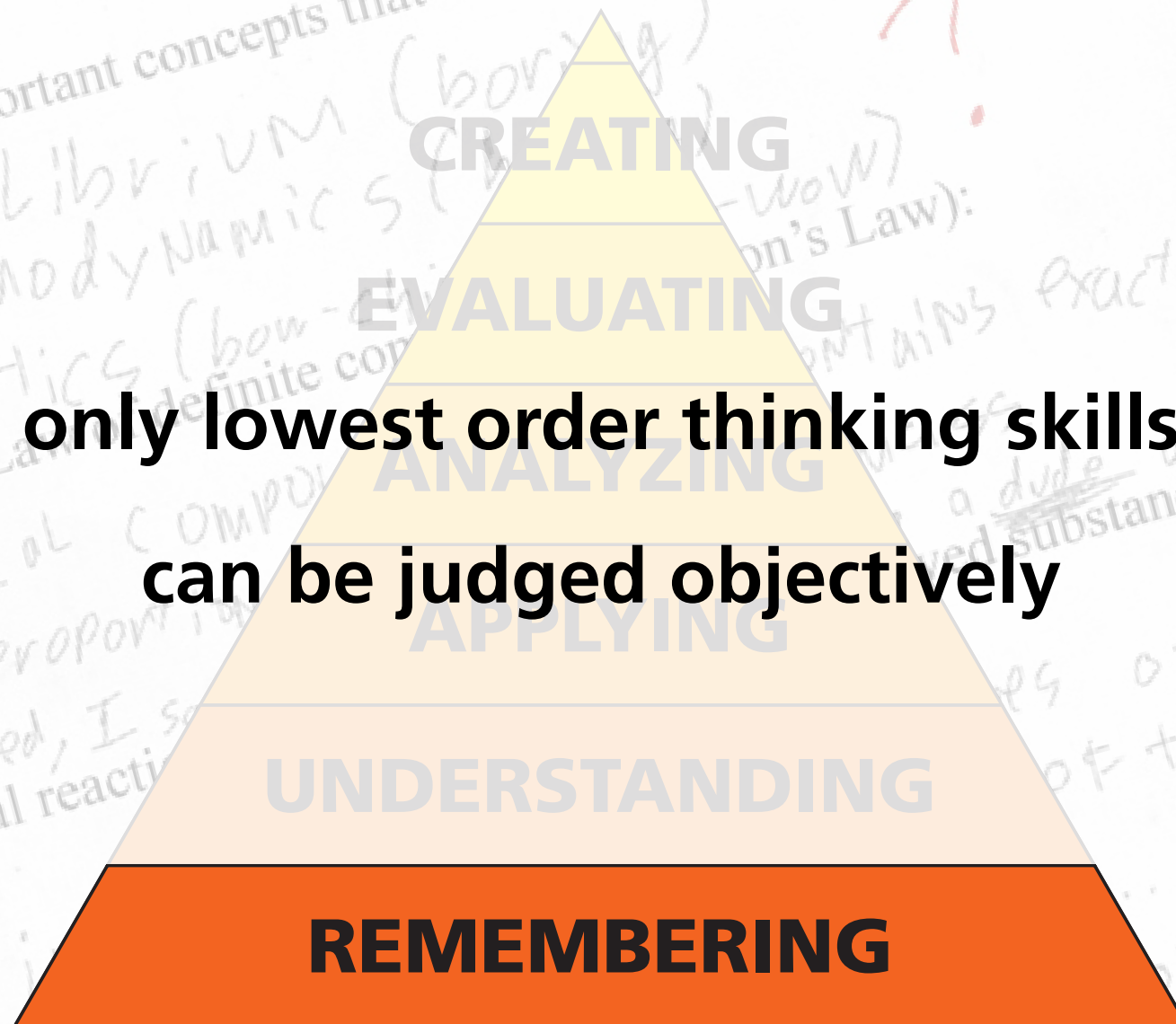
2 problems



**1** purposes

**2** problems





**1** purposes

**2** problems

and then there is...

- grade inflation
- cheating

1 purposes

2 problems





**1** purposes

**2** problems

**3** improvements



**mimic real life**

**1** purposes

**2** problems

**3** improvements



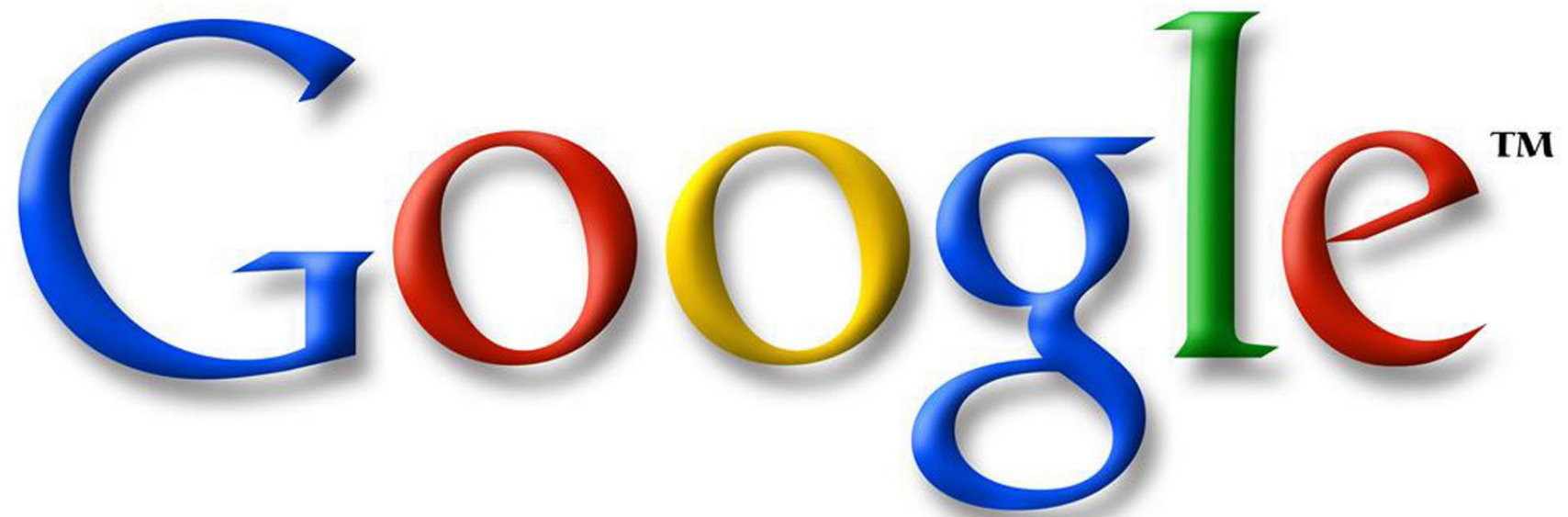


# open-book exam

**1** purposes

**2** problems

**3** improvements

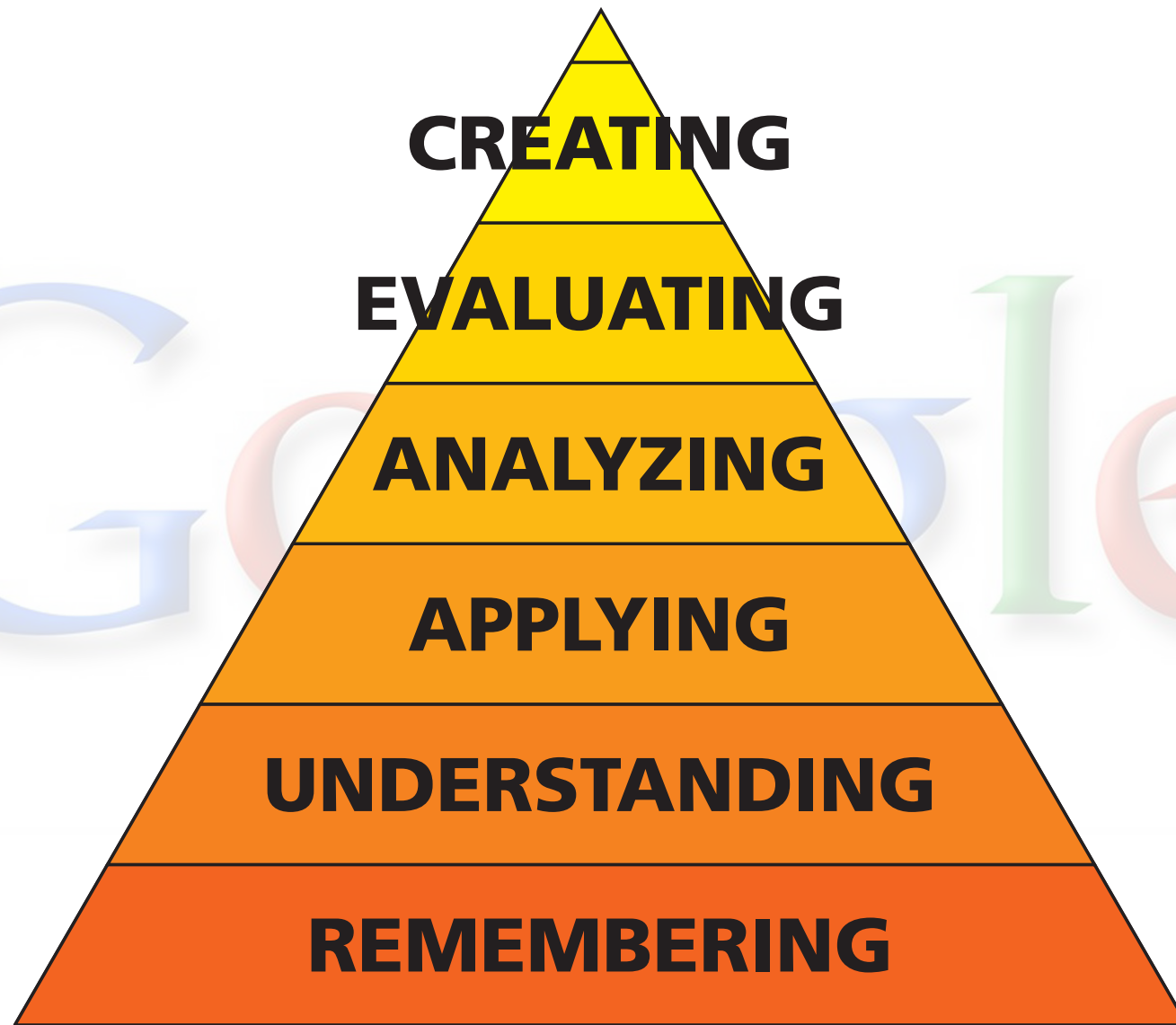


1 purposes

2 problems

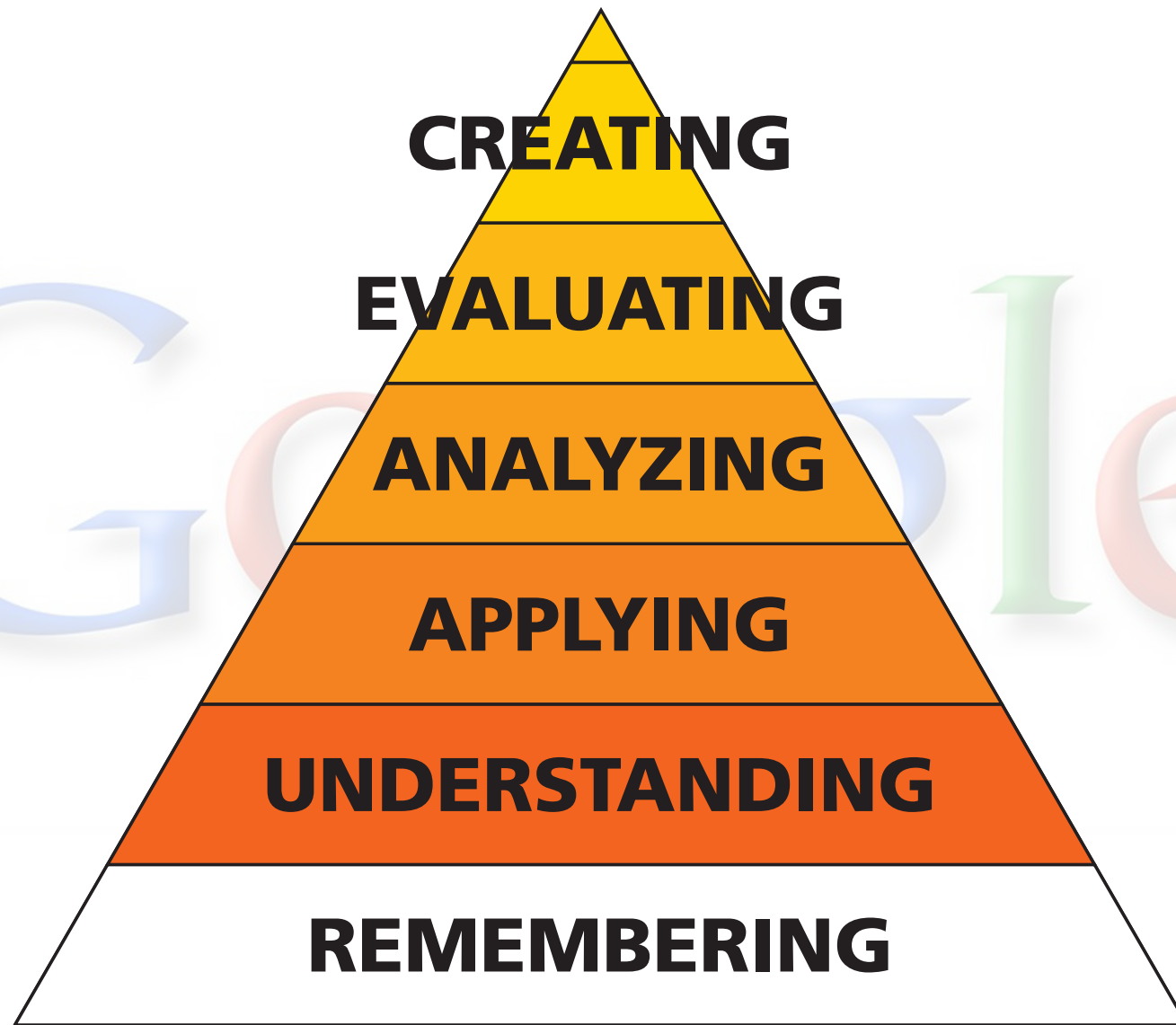
3 improvements





1 purposes

2 problems



1 purposes

2 problems





1 what

2 how

## IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT)

Name Team #3

Test # 1

Subject \_\_\_\_\_

Total 23

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
2.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>2</u>
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>4</u>
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>1</u>
5.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
6.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
7.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>0</u>
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
9.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>  </u>
10.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>  </u>

① purposes

② problems

③ improvements





**1** purposes

**2** problems

**3** improvements

## session 445949

This is the team round. If you respond to a question, it will count for your entire team (you, Brent Jones, Beth Sawyer, and team should respond to each question (otherwise it will count as multiple attempts).



Jump to ▼

1

2

[+ Show my team's responses](#)

6x-6  
Brian Lukoff

6x  
Brent Jones

6x-6  
Beth Sawyer

6x^2-6  
Kip Harmon

### expression question

What is the derivative of  $f(x) = 3x^2 - 6x$ ?

Submit response

For example, enter  $x^2$  for  $x^2$ ,  $\ln(y) - \sin(x)$  for  $\ln y - \sin x$ ,  $x/(y+1)$  for  $\frac{x}{y+1}$ ,  $(1/2)x$  for  $\frac{1}{2}x$ , etc.

0/2 questions attempted, 0/0 possible points so far in team round [Score details](#)

Current team: **Blue team** [Change team](#)

[Change seat](#)

[Send a message to the instructor](#)

[Join](#)

1 purposes

2 problems

3 improvements





**1** what

**2** how



**focus on feedback, not ranking**

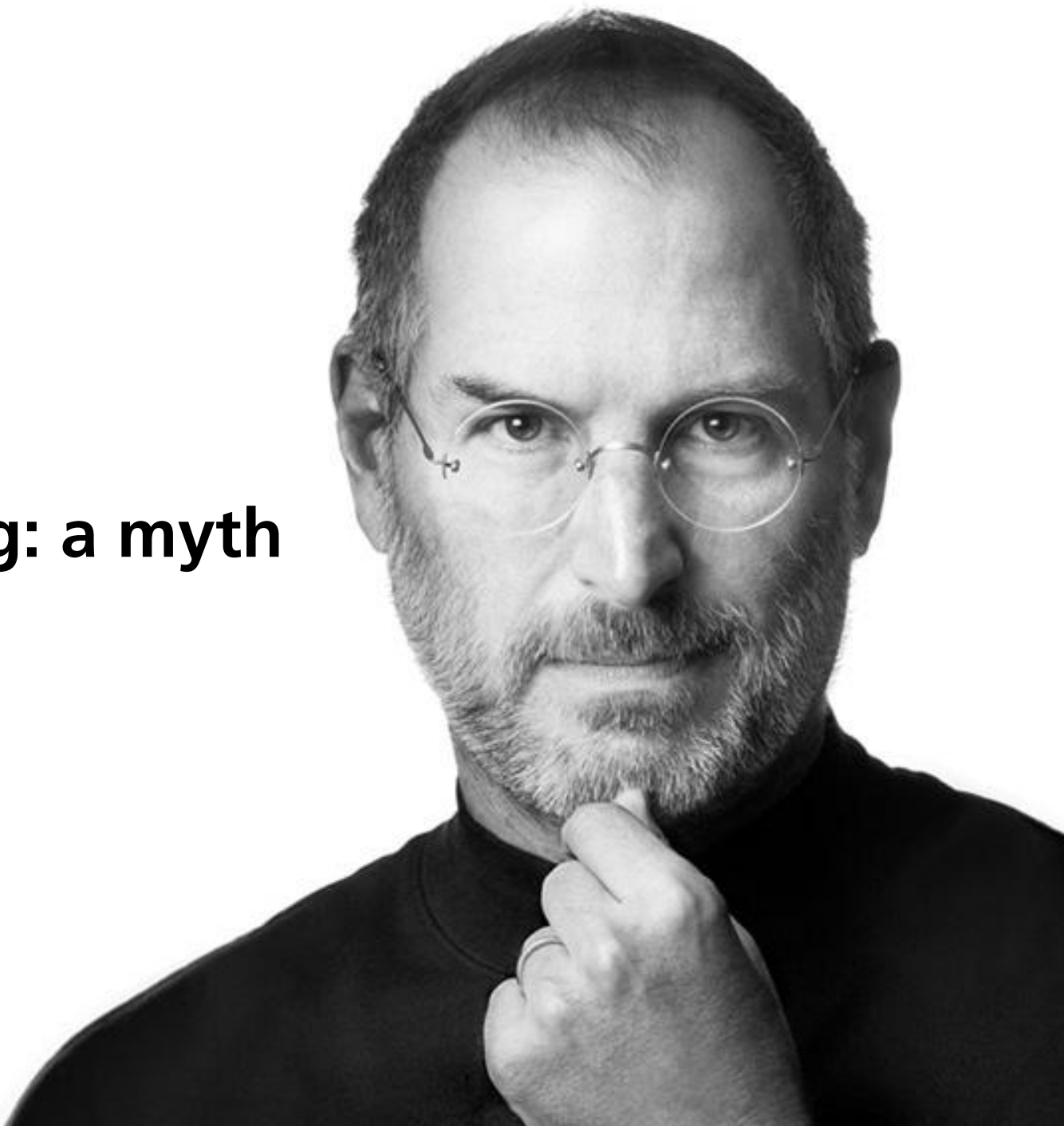
**1** purposes

**2** problems

**3** improvements



# objective ranking: a myth

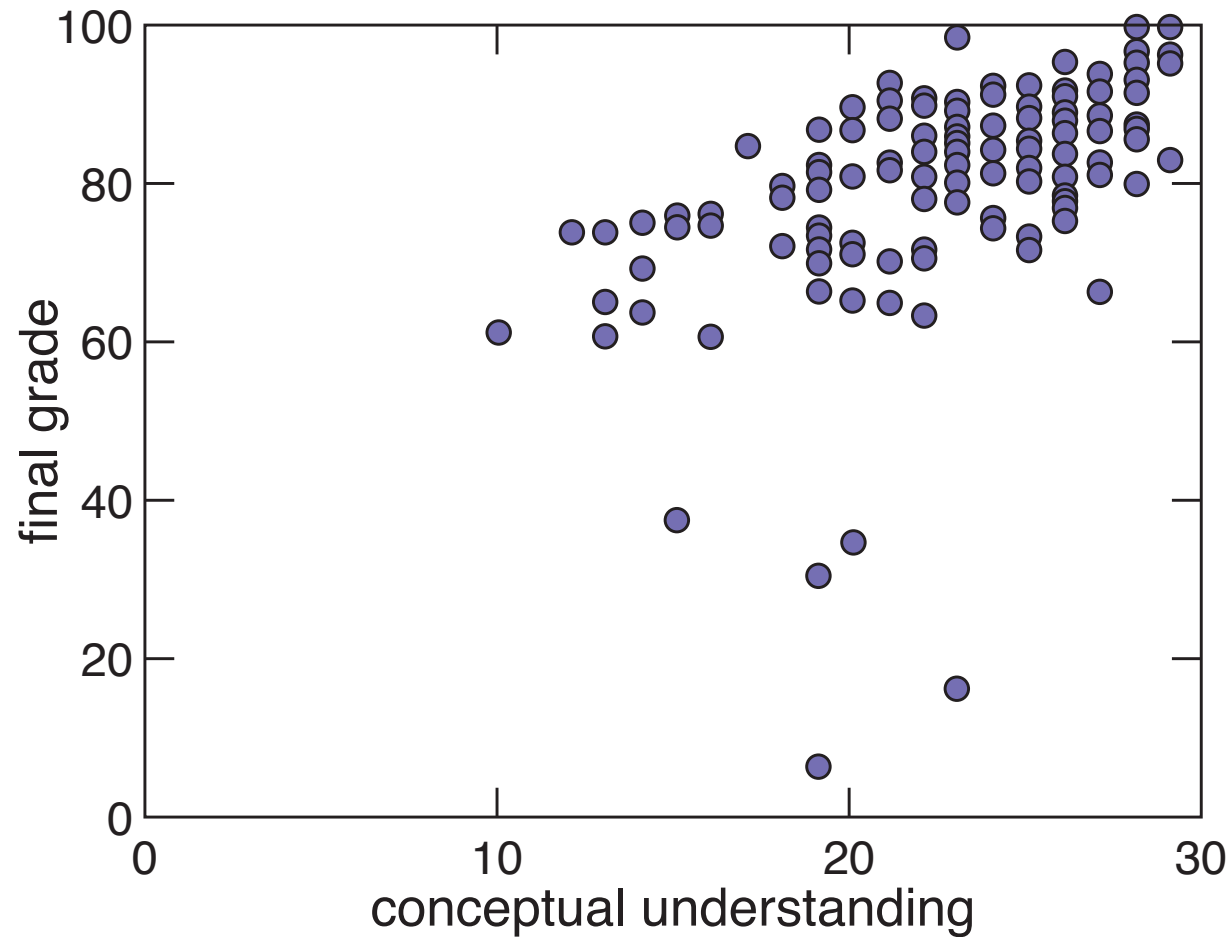


**1** purposes

**2** problems

**3** improvements

## 2 metrics, 2 results



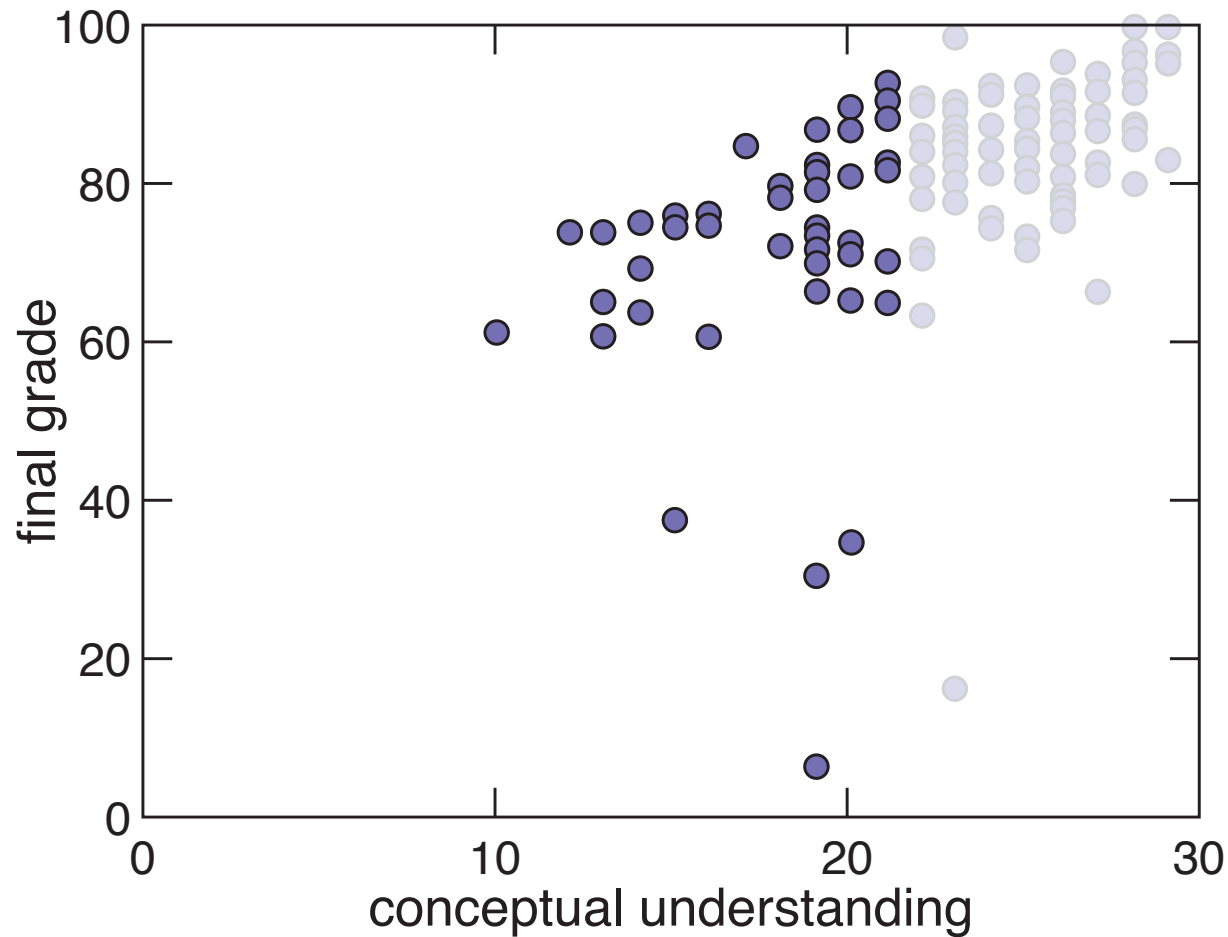
1 purposes

2 problems

3 improvements



# Aristotelian thinkers

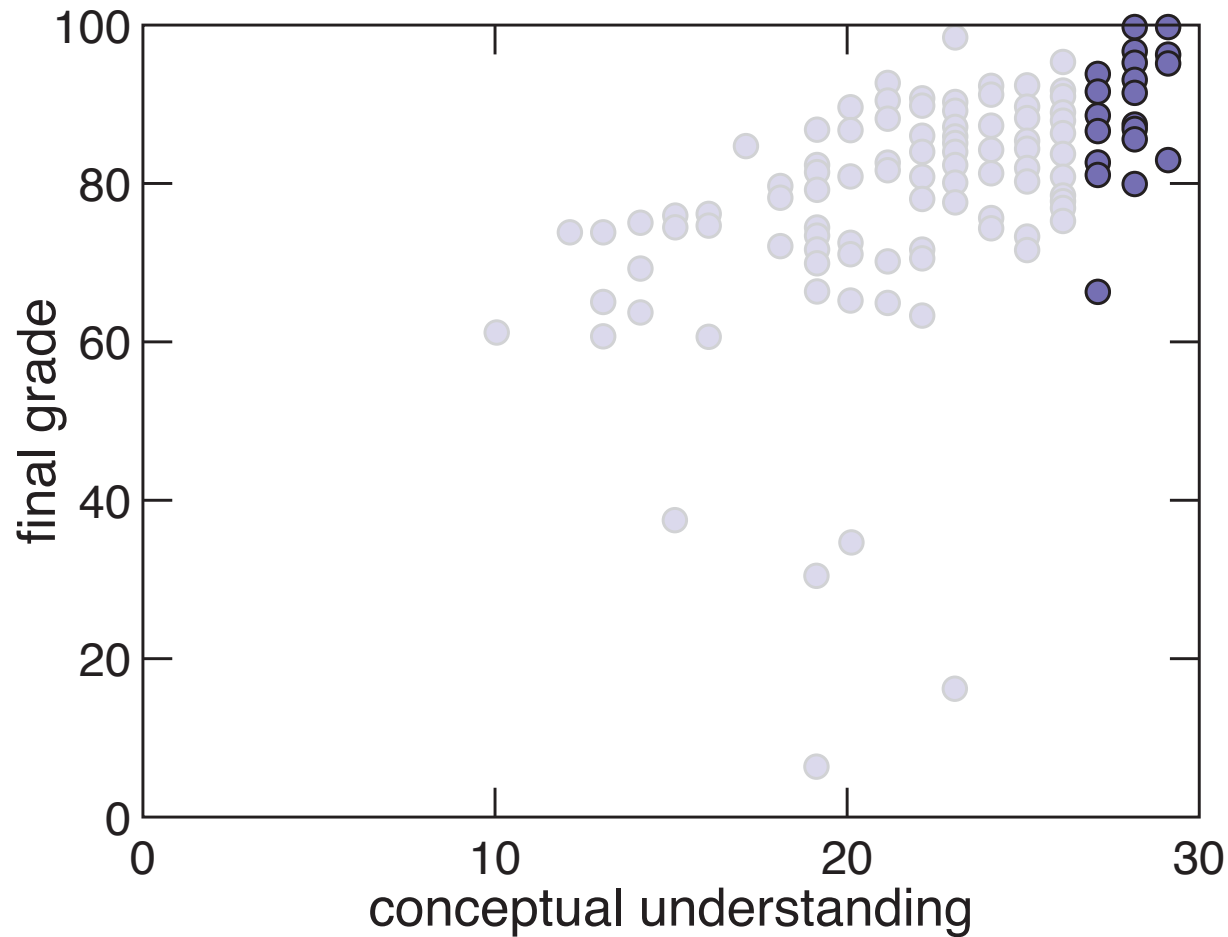


1 purposes

2 problems

3 improvements

# top performers, broad grade distribution



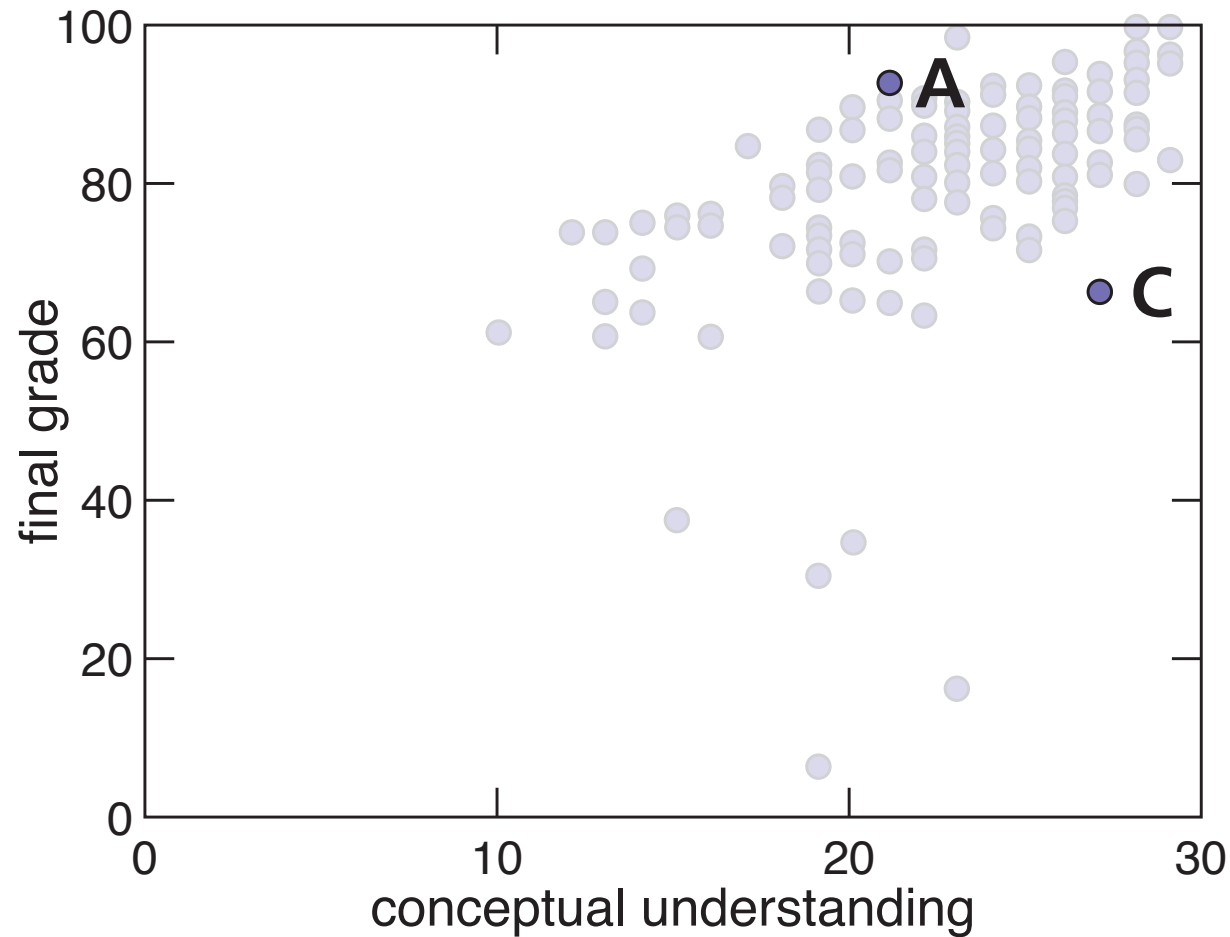
1 purposes

2 problems

3 improvements



# objectivity or injustice?



1 purposes

2 problems

3 improvements



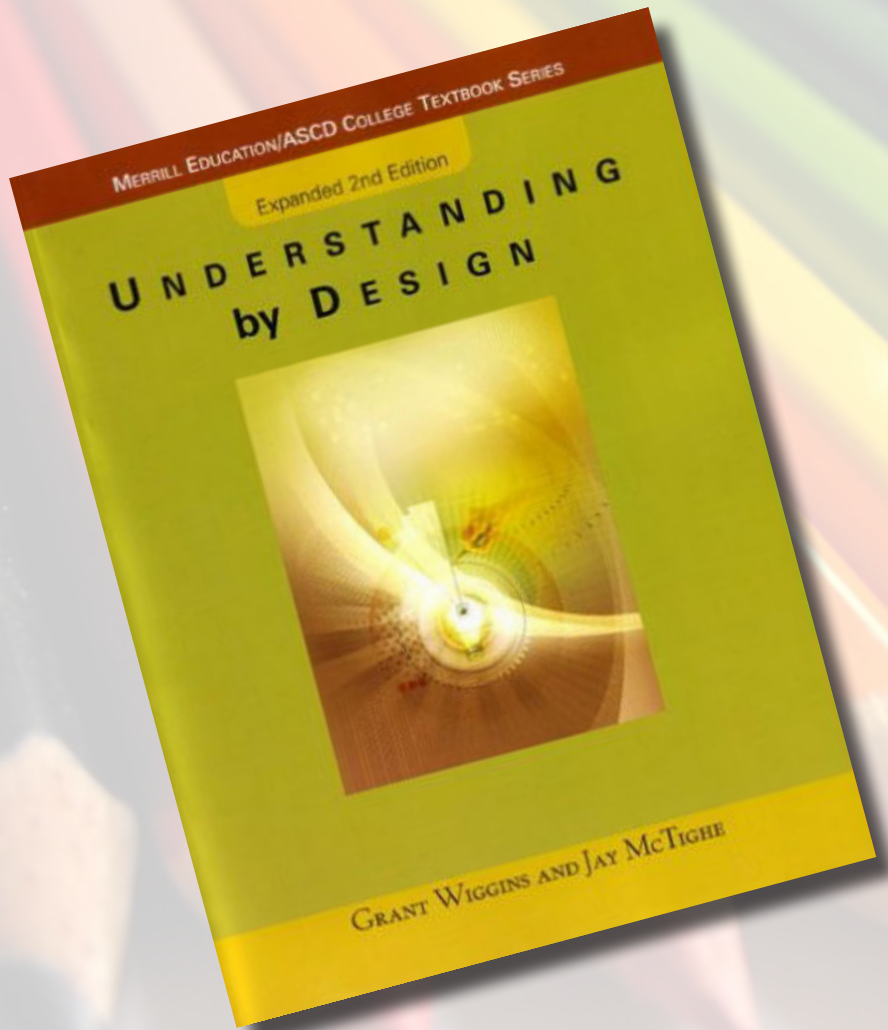
**focus on skills, not content**

**1** purposes

**2** problems

**3** improvements

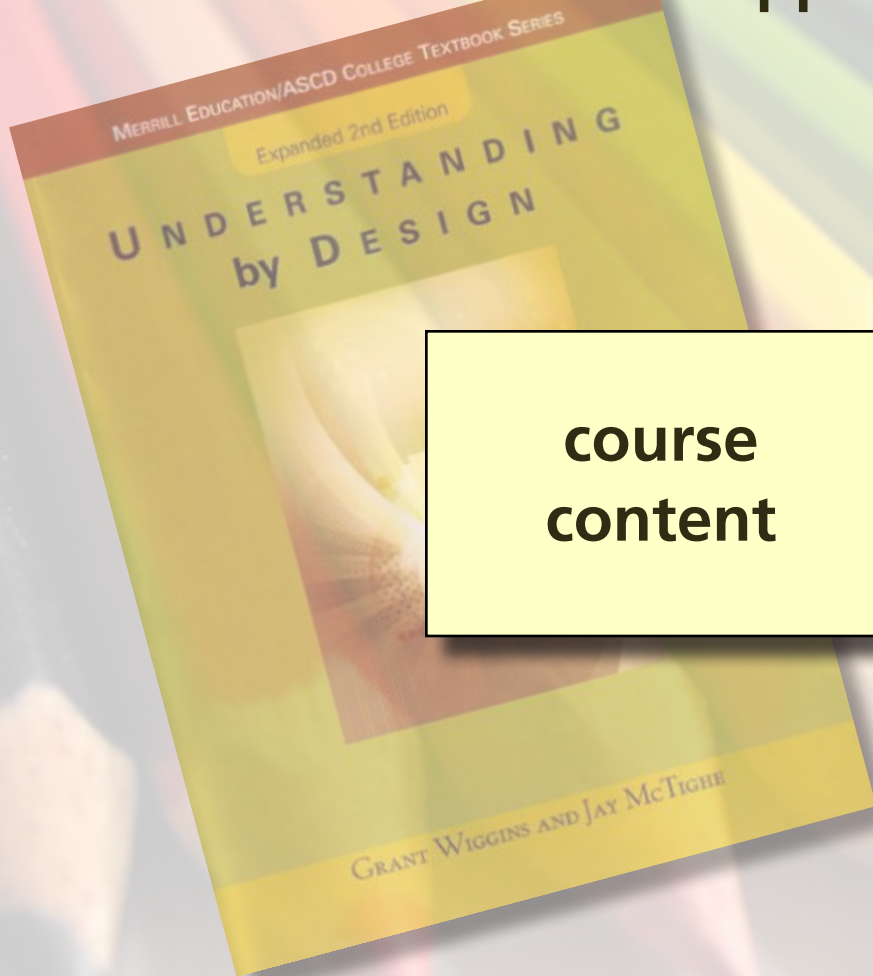




Grant Wiggins and Jay McTighe, *Understanding by Design* (Prentice Hall, 2001)

- 1 purposes
- 2 problems
- 3 improvements

## Traditional approach to course planning



**course  
content**

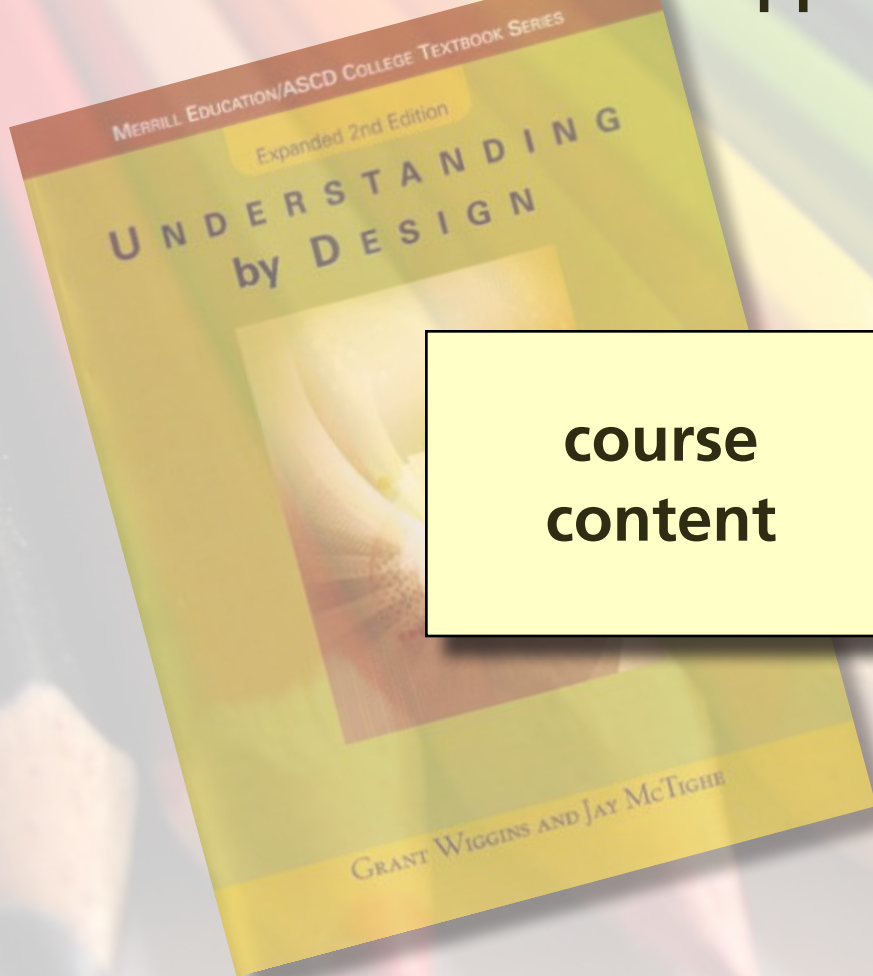
**1** purposes

**2** problems

**3** improvements



## Traditional approach to course planning



**course  
content**



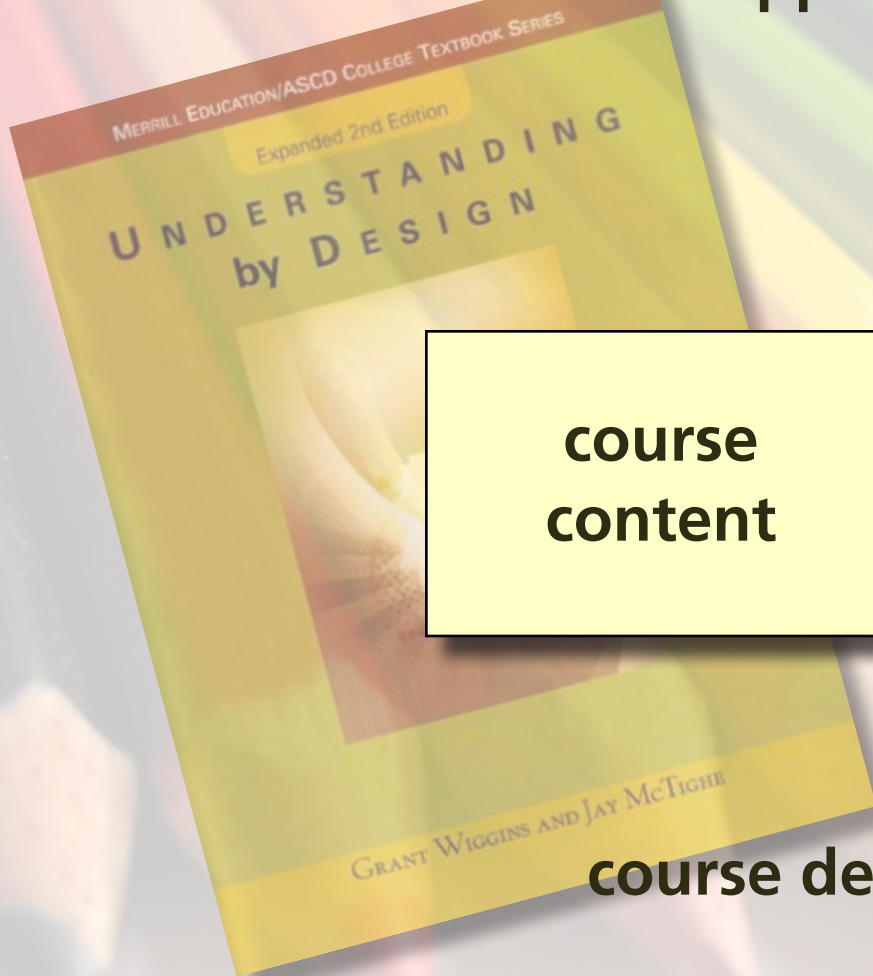
**assessment**

**1 purposes**

**2 problems**

**3 improvements**

## Traditional approach to course planning



**course  
content**



**assessment**

**course defined by content**

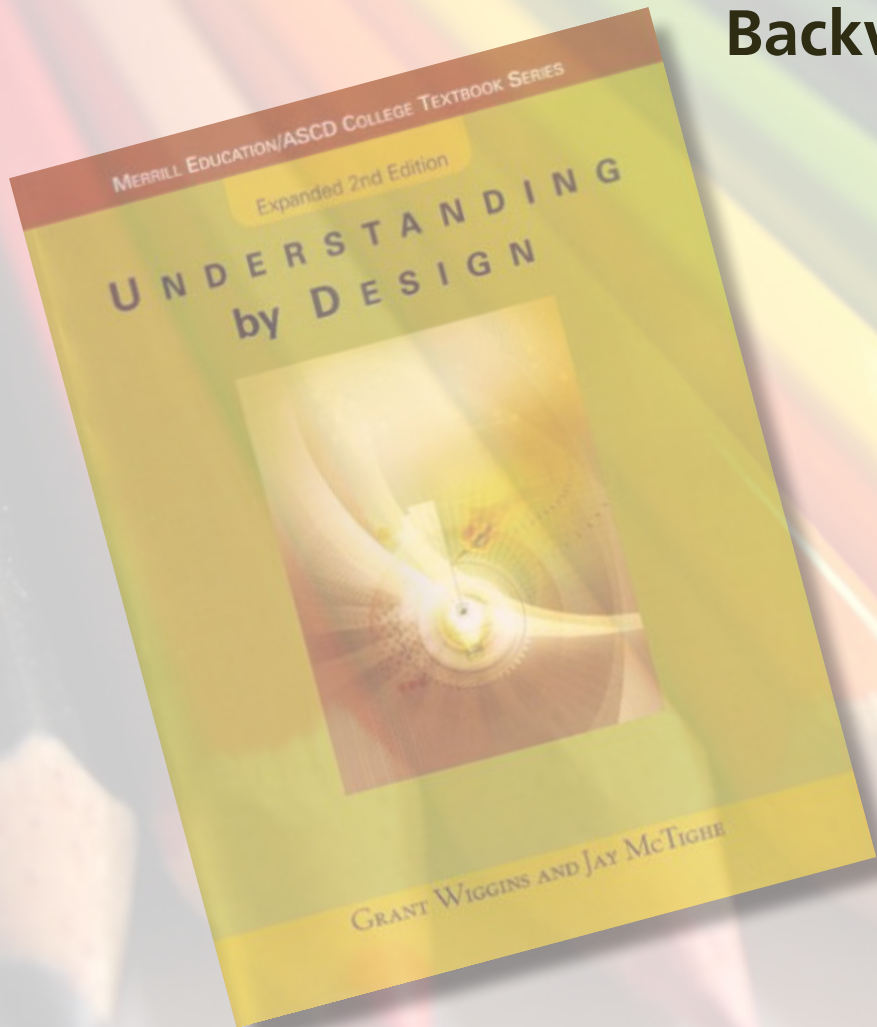
**1 purposes**

**2 problems**

**3 improvements**



## Backward design



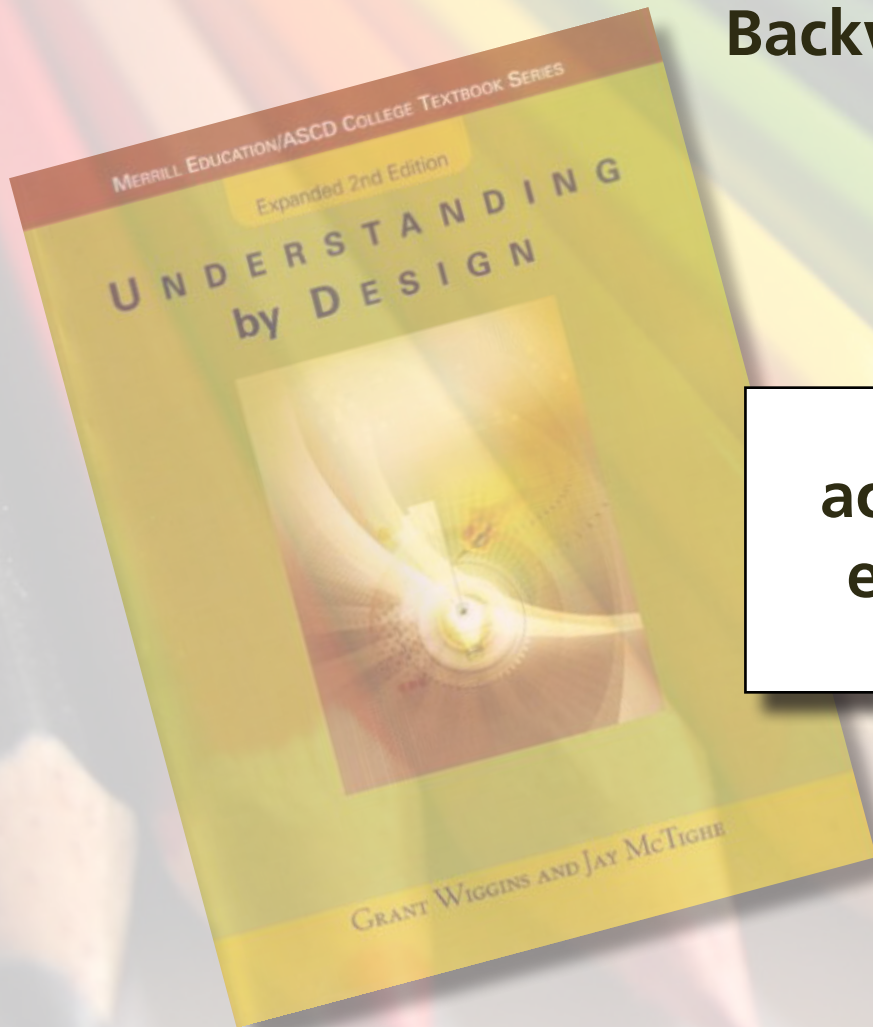
**desired  
outcomes**

**1** purposes

**2** problems

**3** improvements

## Backward design



**acceptable  
evidence**



**desired  
outcomes**

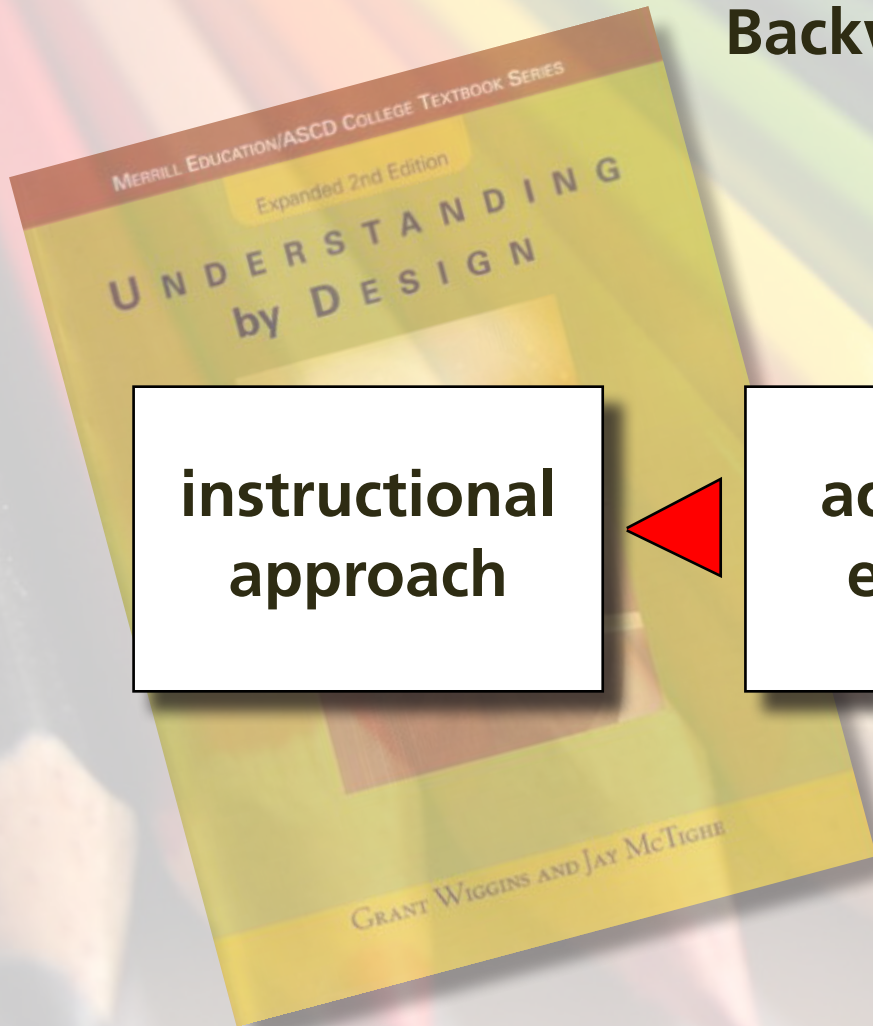
**1** purposes

**2** problems

**3** improvements



## Backward design



**instructional  
approach**

**acceptable  
evidence**

**desired  
outcomes**

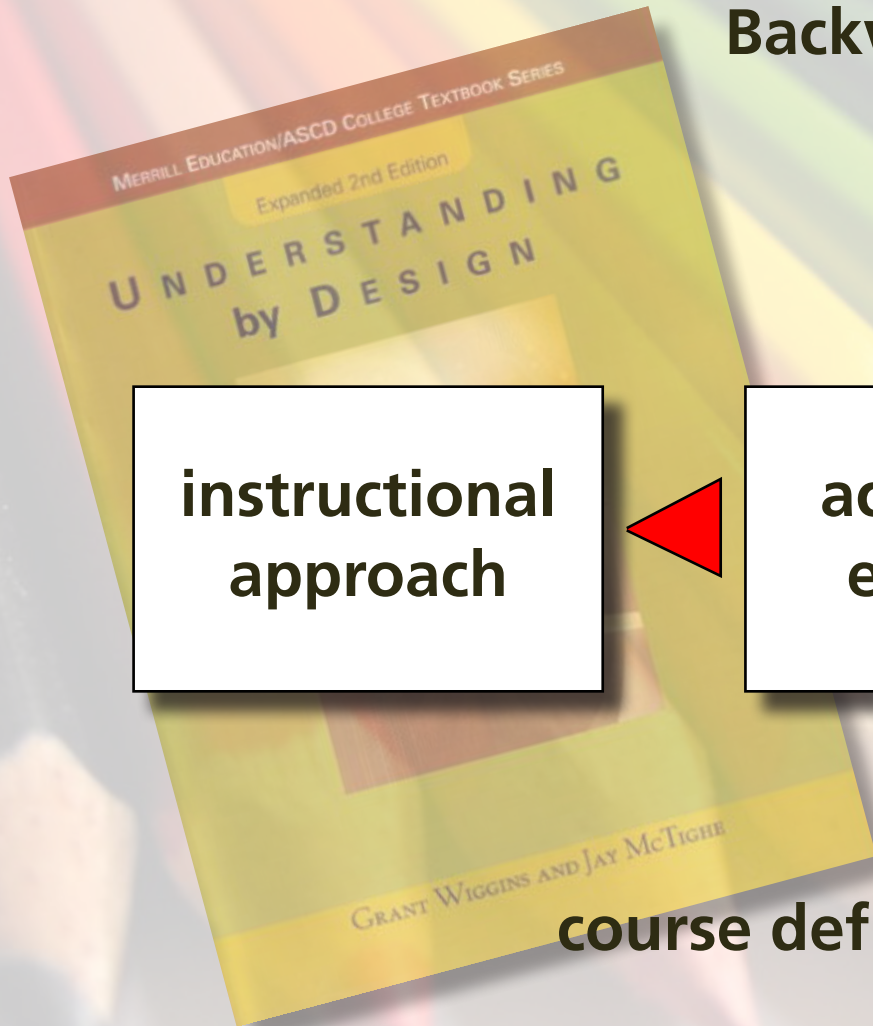


**1 purposes**

**2 problems**

**3 improvements**

## Backward design



**instructional  
approach**

**acceptable  
evidence**

**desired  
outcomes**

**course defined by outcomes**

**1 purposes**

**2 problems**

**3 improvements**





**resolve coach/judge conflict**

**1** purposes

**2** problems

**3** improvements

use external evaluators

1 purposes

2 problems

3 improvements



# peer- and self-assessment

1 purposes

2 problems

3 improvements

# Calibrated Peer Review

## Step 1: assignment & rubric

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1 purposes

2 problems

3 improvements



# Calibrated Peer Review

Rubric for Calibrated Peer Review		WRITING RUBRIC		3 = admirable exceeds expectations (rarely selected)
Structure	Title	1 = needs improvement does not meet expectations entirely	2 = satisfactory meets expectations (what you should aim for)	Catchy title drawing audience into article
	Opening	Wordy, long, unimaginative, or inappropriate title	Basic title	Compelling audience appropriate hook or lead present AND first few paragraphs orient lay reader to subject
	Paragraph length	Missing a "hook" or a lead in the first paragraphs AND does not orient reader to subject	Hook or lead present OR first few paragraphs orient reader to subject	All paragraphs are short (1-5 sentences)
	Organization	Many paragraphs are long (6 or more sentences)	Some paragraphs are long (6 or more sentences), most are short (1-5 sentences)	Headings structure paper in organized, logical way AND paragraphs linked by transitions
	Closing	Lacks organization, no logical headings, no transitions between paragraphs	A few headings OR most paragraphs linked by transitions	Ends compellingly with an important idea or though provoking question AND ties back to title and opening hook
	Content/Ideas	Does not end compellingly or with an important idea AND does not tie back to opening	Summary-like closing, but does not tie back to title or opening hook	
	Scientific facts	Contains incorrect, misstated, irrelevant, or unnecessary facts	All facts are 100% correct, relevant, and necessary	Includes fact-checked expert and/or lay testimony (newspaper article only)
	Sources/evidence	Does not back up facts with proper, convincing, or interesting sources or evidence	Most, but not all, facts backed up with proper, convincing, or interesting sources or evidence	Original presentation of material; uses the unexpected to capture attention
	Creativity	Mostly predictable based on available material	Some originality apparent	Material appropriate and aimed at target audience AND relates to practical/everyday concerns AND uses analogies or other techniques to relate unfamiliar content to familiar concepts; no jargon, colloquialisms, or acronyms
	Audience awareness	Material inappropriate OR not aimed at target audience; Contains unexplained scientific jargon, colloquialisms, or acronyms	Material appropriate AND mostly avoids scientific jargon, contains no colloquialisms or acronyms, and mostly uses clearly defined scientific terms	

1 purposes

2 problems

3 improvements

# Calibrated Peer Review

**Step 2: upload**

**Step 3: review**

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**1** purposes

**2** problems

**3** improvements



# Calibrated Peer Review

UPLOAD

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- 1 purposes
- 2 problems
- 3 improvements

# Calibrated Peer Review

UPLOAD



CALIBRATION

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**1** purposes

**2** problems

**3** improvements



# Calibrated Peer Review

UPLOAD



CALIBRATION

**MEDIUM**

**HIGH**

**LOW**

## The New York Times

January 20, 2009

OBSERVATORY

### Spectacular Supernova Observed

By John Glenn

New York, N.Y. – People around the world witnessed the most brilliant supernova in recorded history this morning. The supernova, named SN 2009B, appeared in the constellation of Cassiopeia, appearing as bright as the full moon. At its peak, it was visible to the naked eye and continued to shine for several hours.

Traffic was interrupted in New York City, as early-rising commuters stopped to look up at the amazing sight. As of press time, the event was being covered by the Associated Press and other major news outlets.

Galileo

20 January 2008

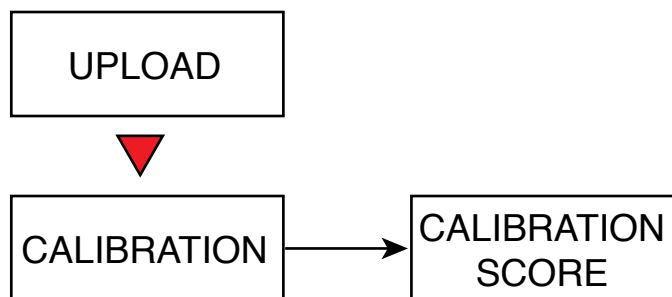
Yesterday at about 4 p.m., I observed a peculiar object appear in the sky. A glowing flash emitted a few seconds, accompanied its appearance. The object was visible even in broad daylight. How did this unprecedented event affect the consequences for Earth? In order to understand the consequences for Earth, we have to look at the galaxy. To fully appreciate it and not be alarmed by its consequences, we must understand the life cycle of stars and how they are classified as consisting of eight planets (Pluto, etc.), various moons, and comets.

**1** purposes

**2** problems

**3** improvements

# Calibrated Peer Review

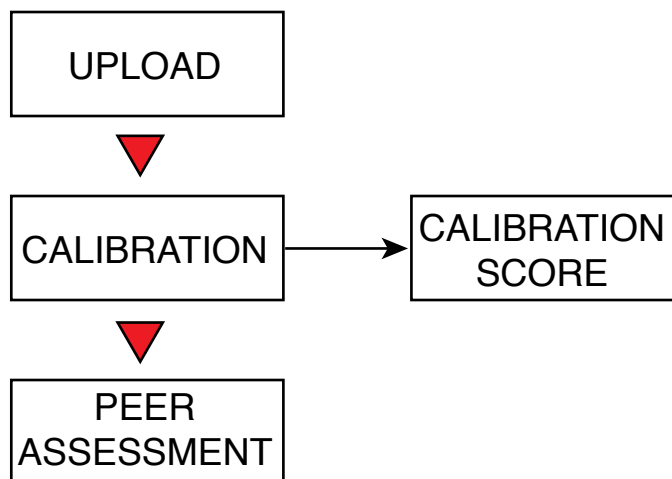


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- 1 purposes
- 2 problems
- 3 improvements



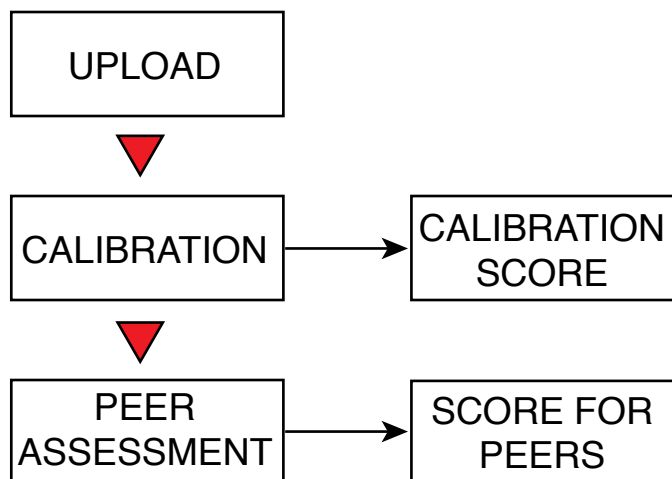
# Calibrated Peer Review



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- 1 purposes
- 2 problems
- 3 improvements

# Calibrated Peer Review



[cpr.molsci.ucla.edu](http://cpr.molsci.ucla.edu)

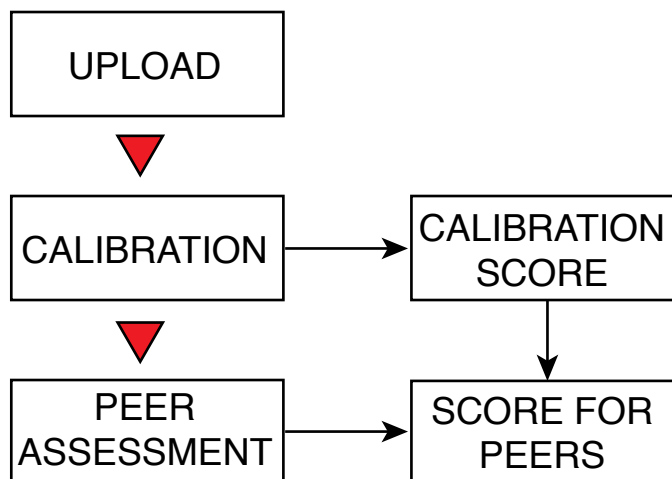
1 purposes

2 problems

3 improvements



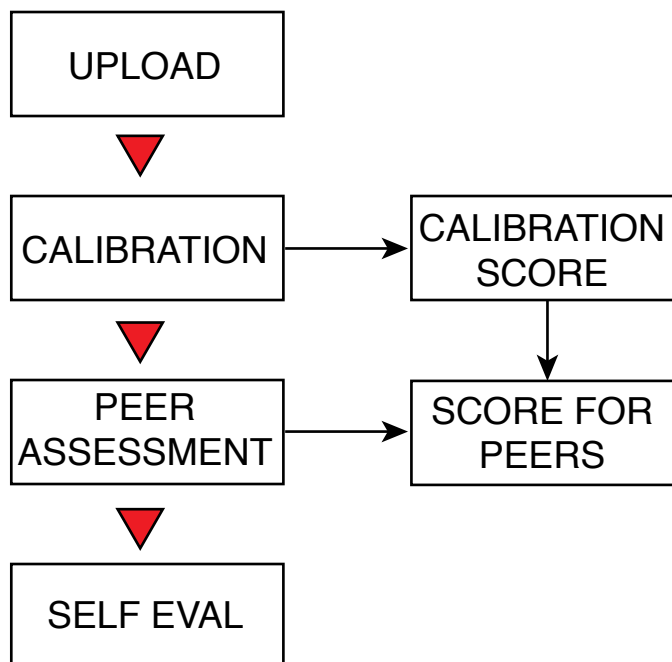
# Calibrated Peer Review



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- 1 purposes
- 2 problems
- 3 improvements

# Calibrated Peer Review



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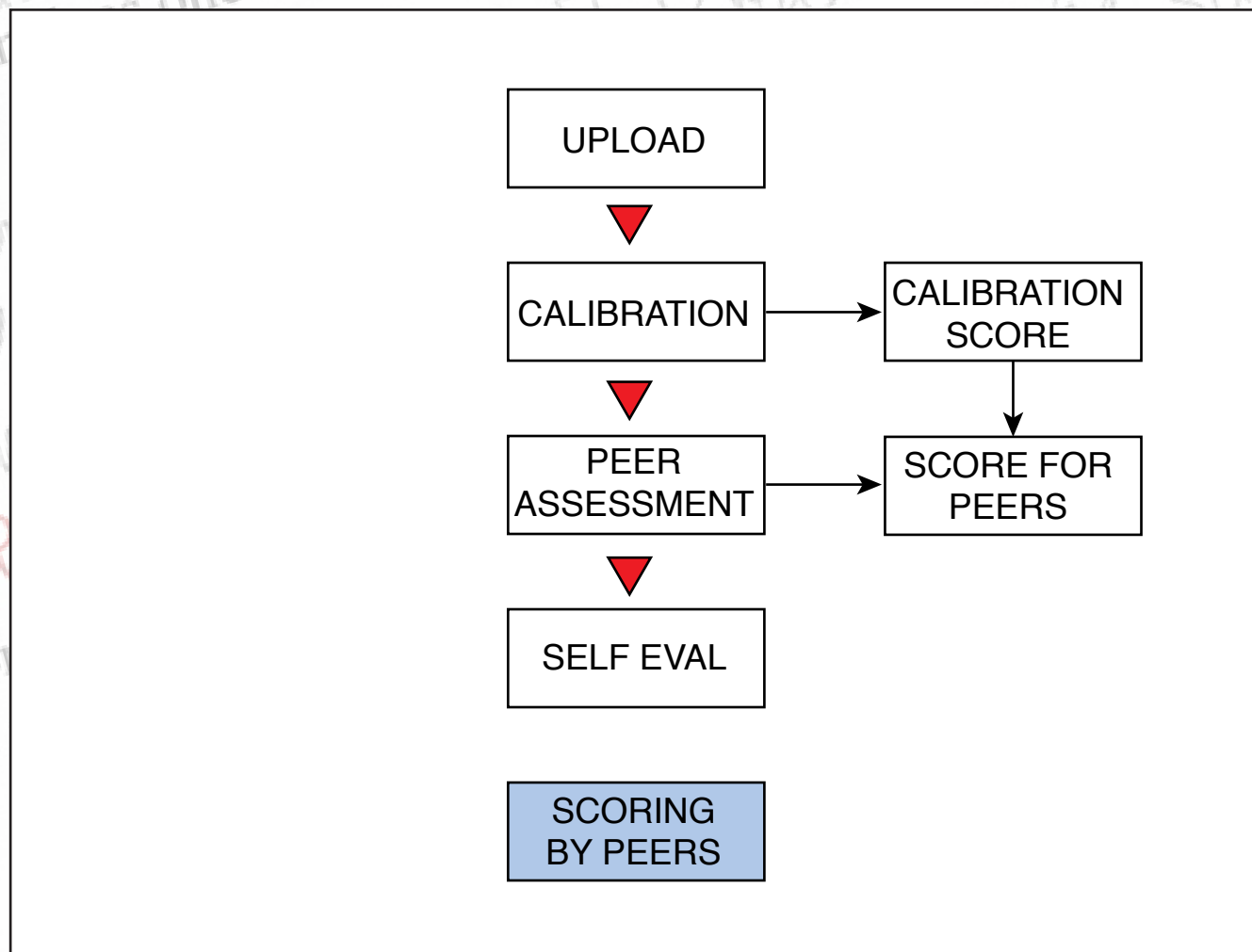
1 purposes

2 problems

3 improvements



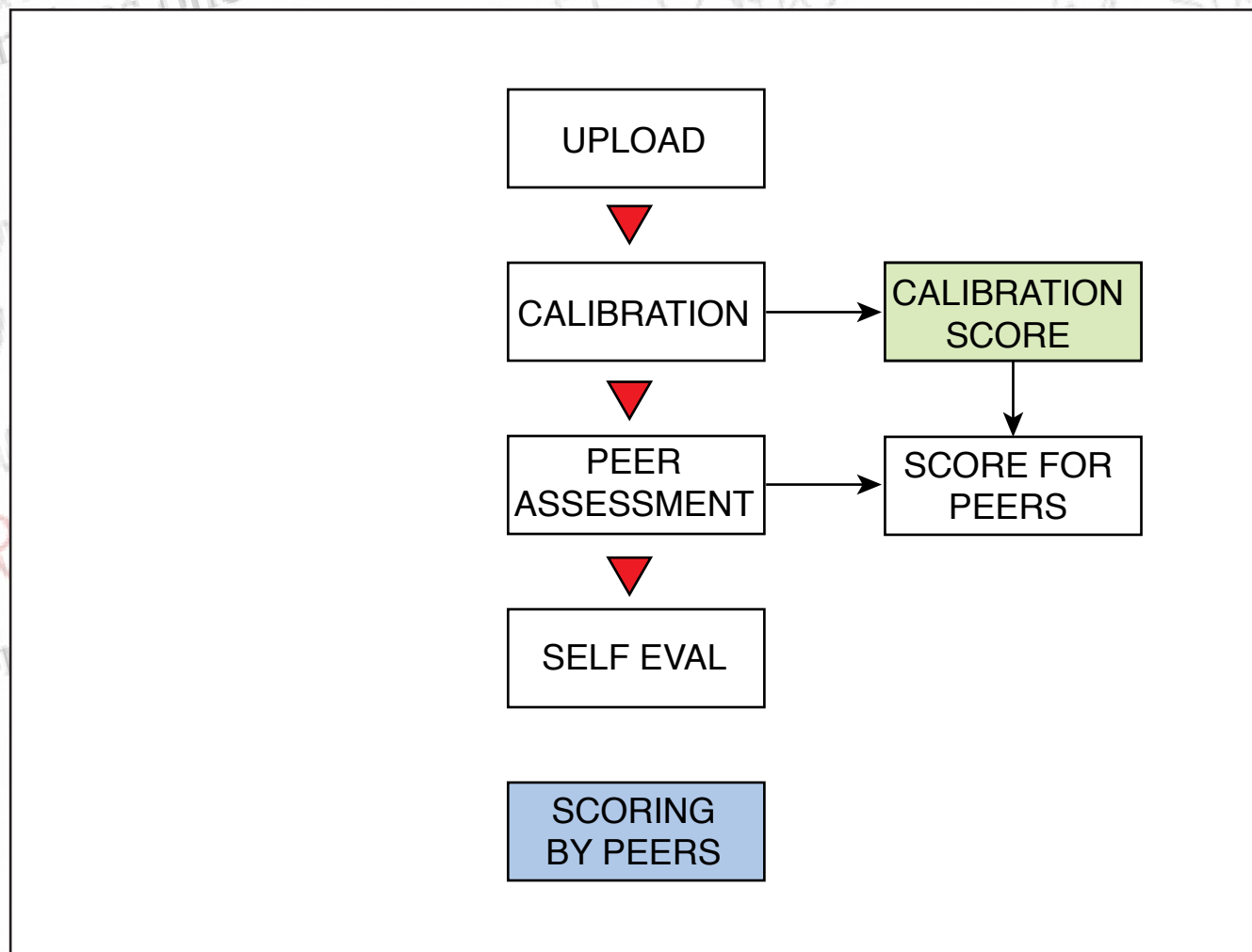
# Calibrated Peer Review



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- 1 purposes
- 2 problems
- 3 improvements

# Calibrated Peer Review

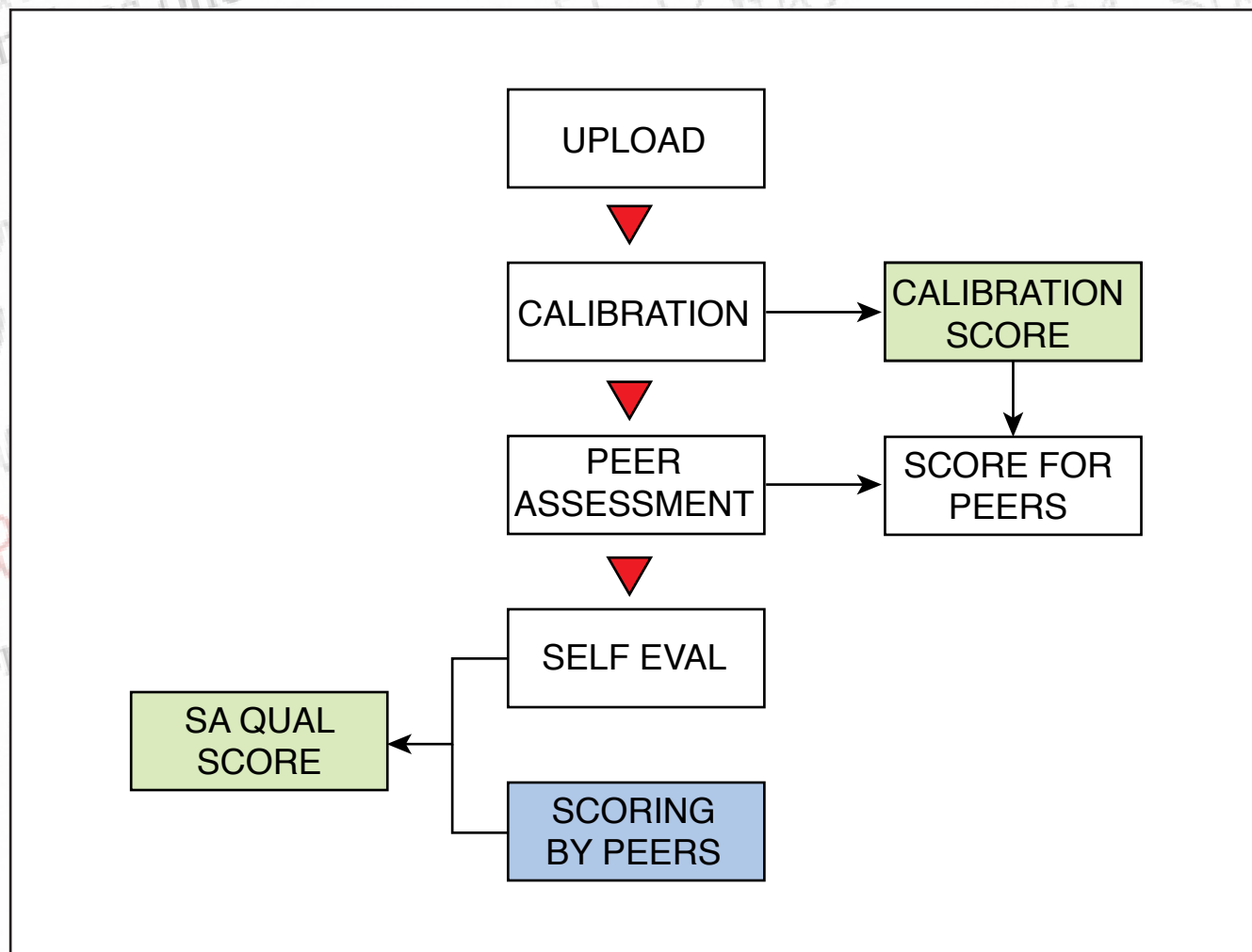


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- 1 purposes
- 2 problems
- 3 improvements



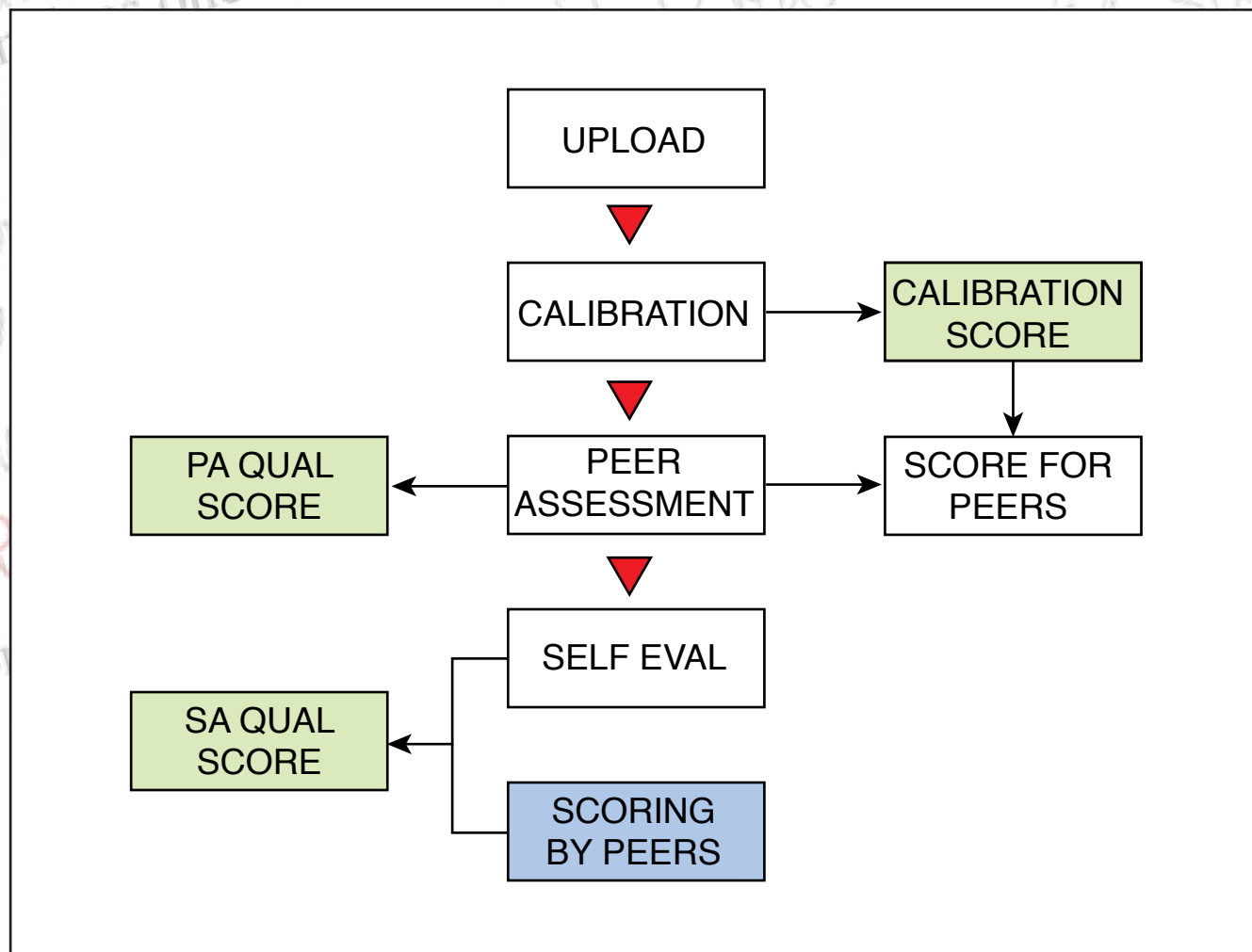
# Calibrated Peer Review



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- 1 purposes
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- 3 improvements

# Calibrated Peer Review



[cpr.molsci.ucla.edu](http://cpr.molsci.ucla.edu)

- 1 purposes
- 2 problems
- 3 improvements







A large, empty classroom with rows of desks and chairs, overlaid with the text "rethink assessment". The room has a light blue floor with yellow and red lines, and a wooden wall in the background. The text is in a large, bold, black font with a blue outline.

**rethink  
assessment**







**mazur.harvard.edu**

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**eric\_mazur**