

Assessment: The silent killer of learning



Interactive Teaching and Learning
Taibah University
Medinah, Saudi Arabia, 9 December 2013



Assessment: The silent killer of learning



@eric_mazur

Interactive Teaching and Learning
Taibah University
Medinah, Saudi Arabia, 9 December 2013



kosten

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

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**



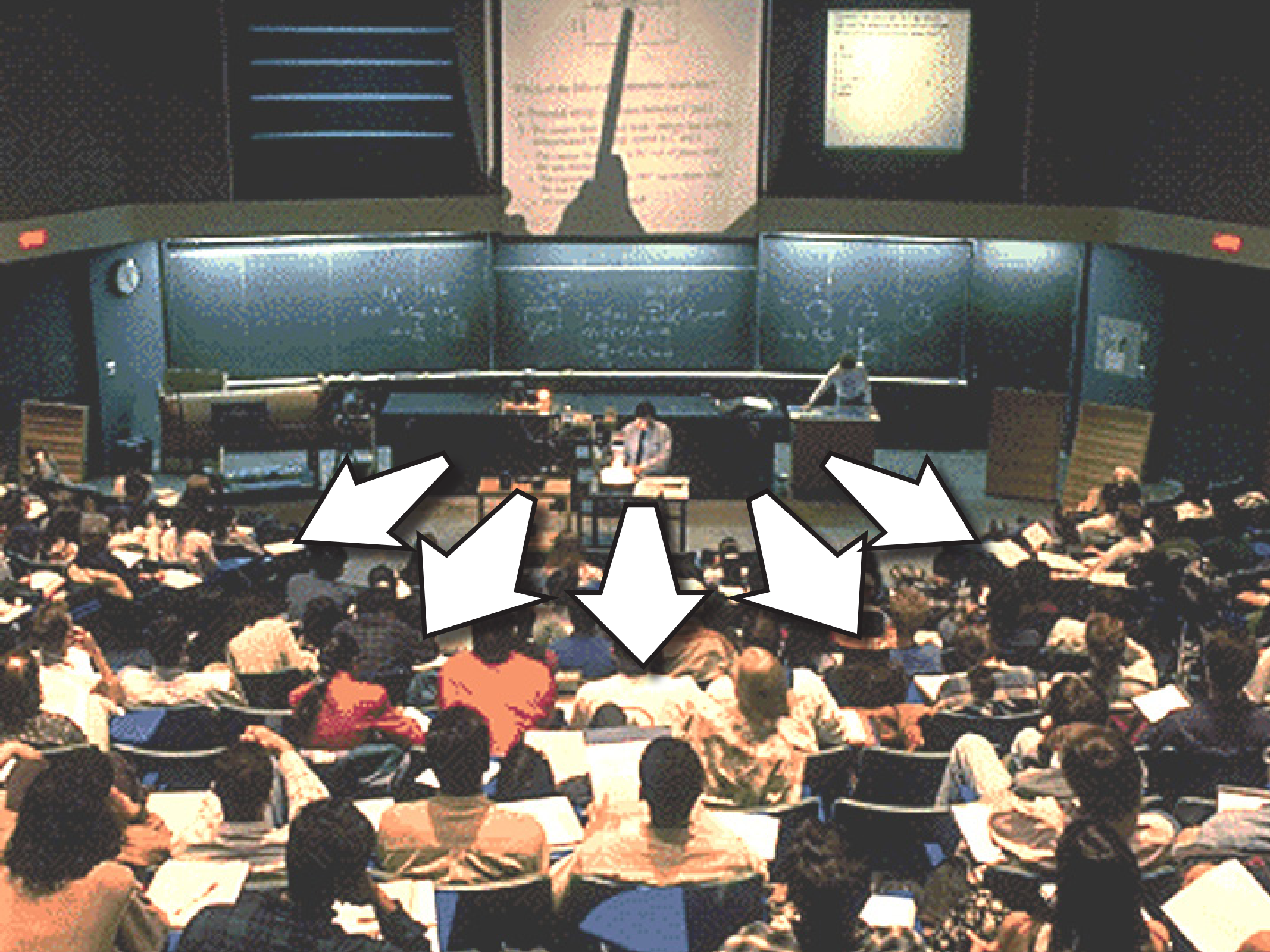
**we only guarantee
they'll pass the test**





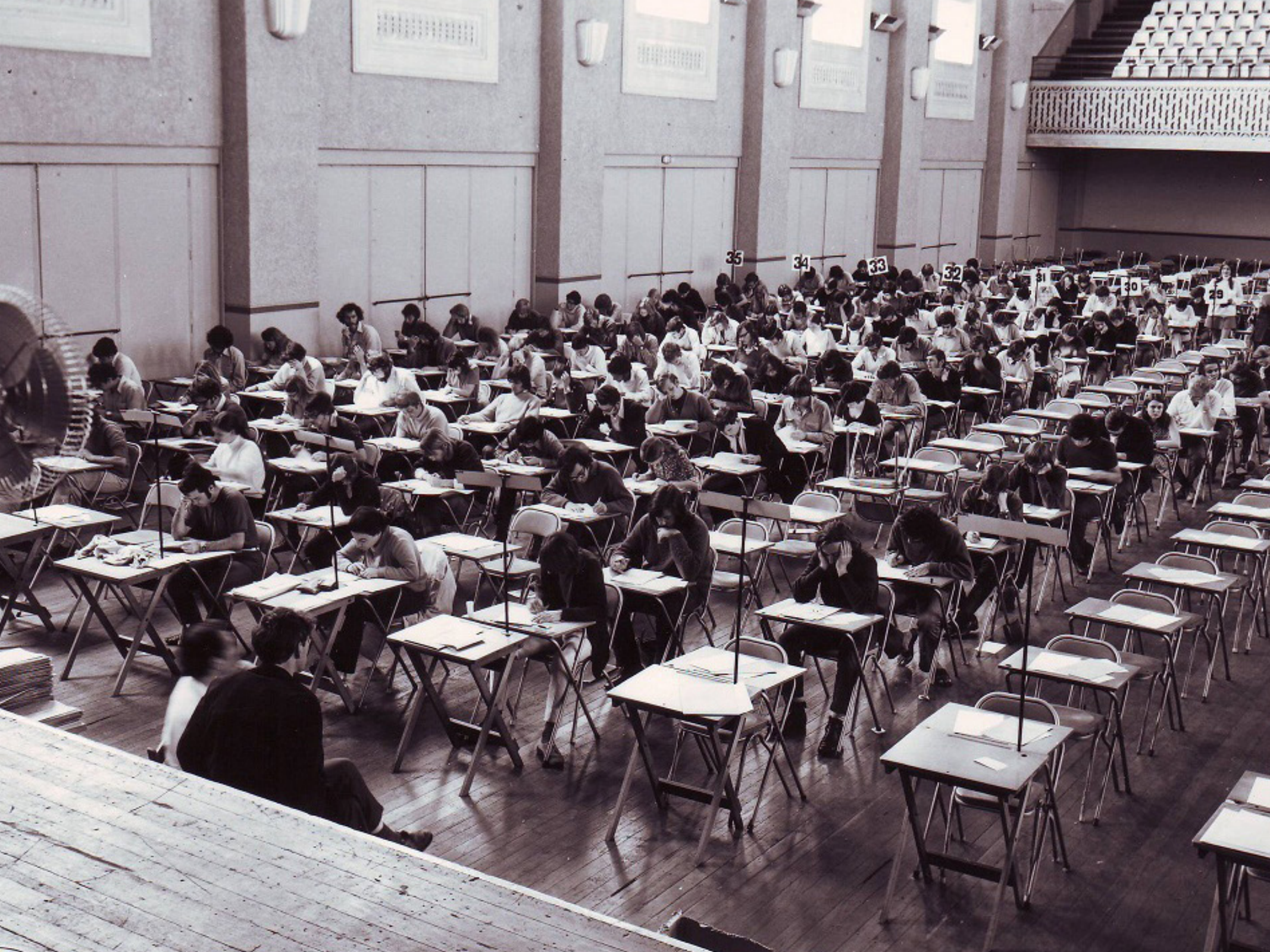
5-minute university






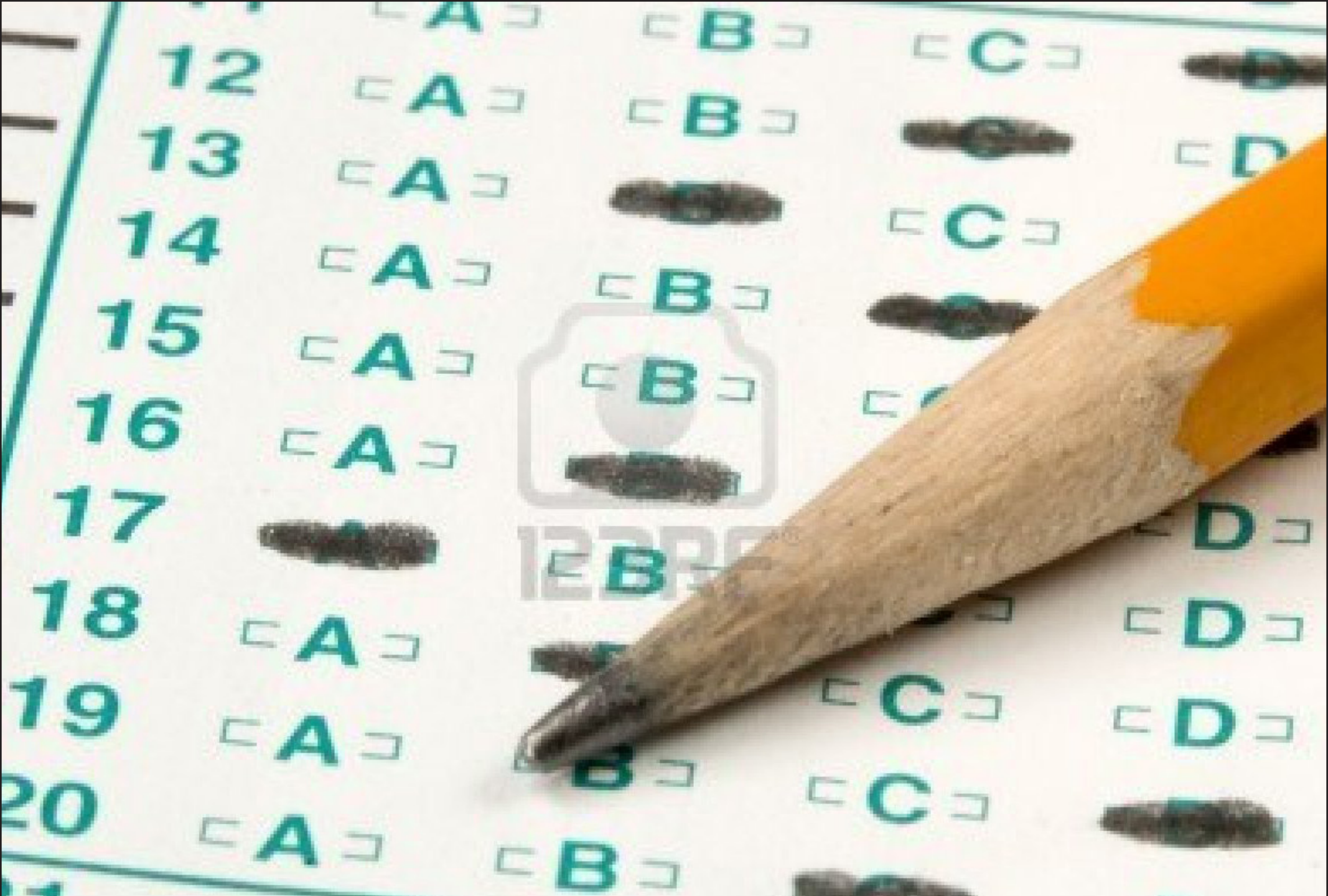




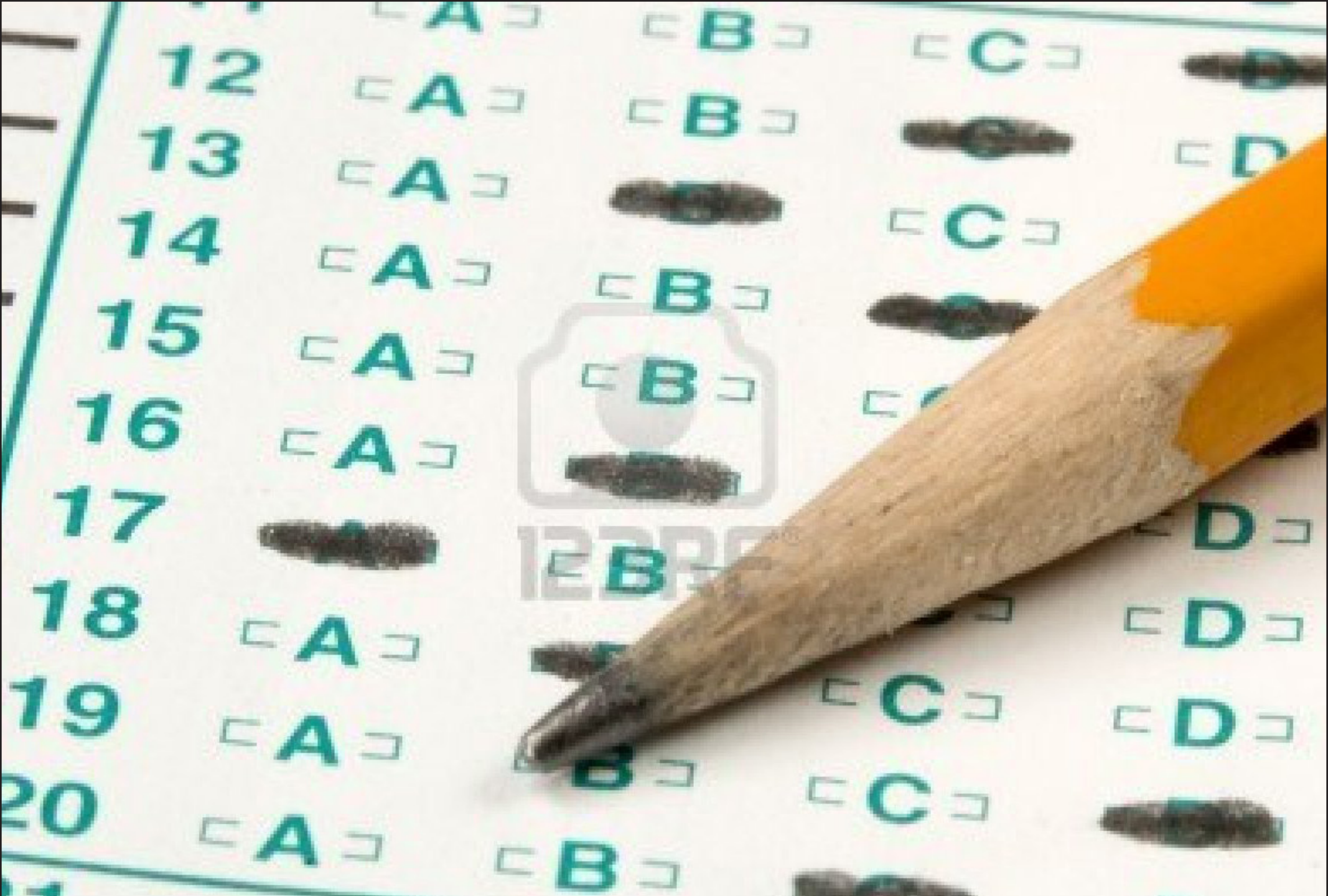




**assessment focussed on ranking and classifying,
not on developing 21st century skills**

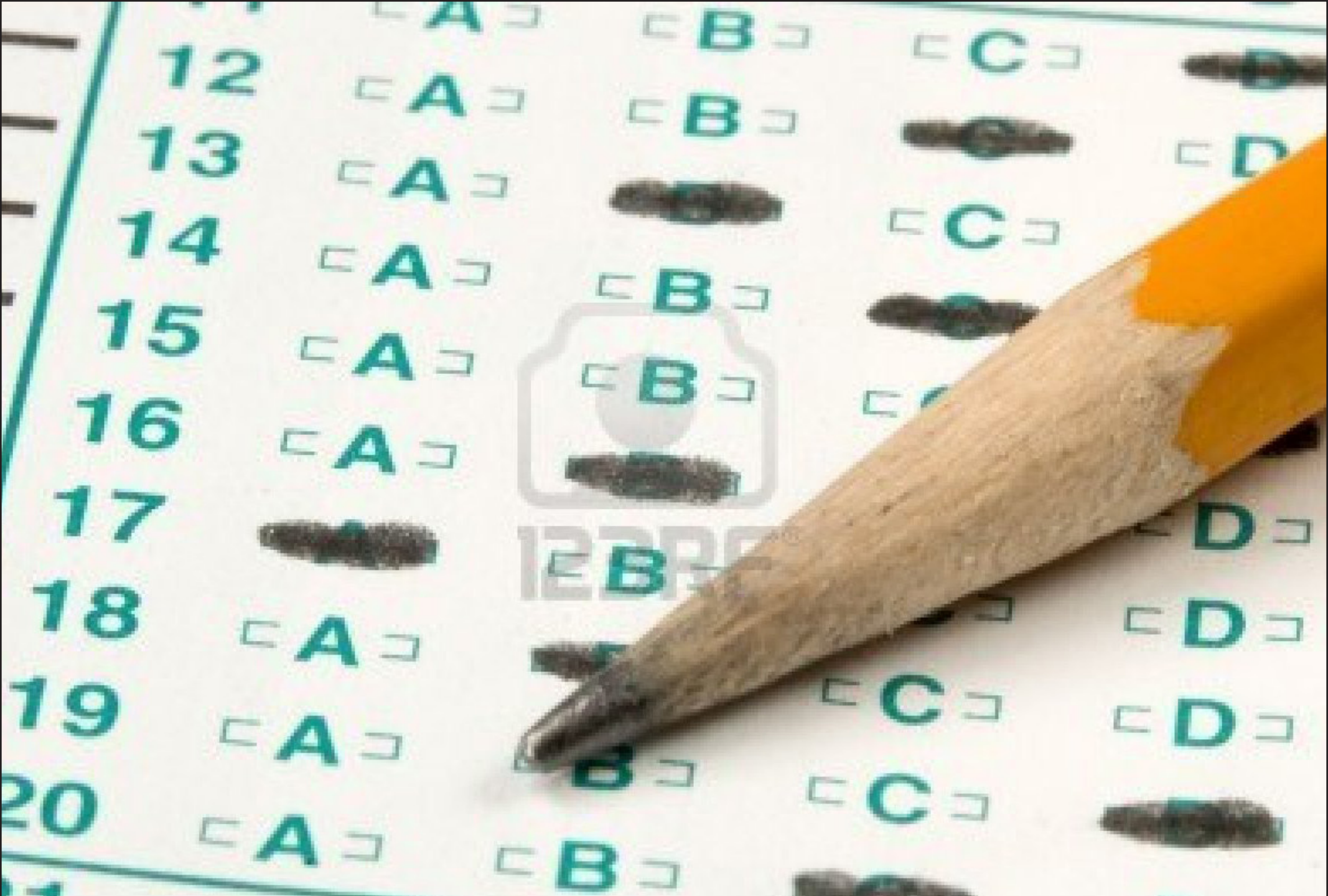


1 purposes



① purposes

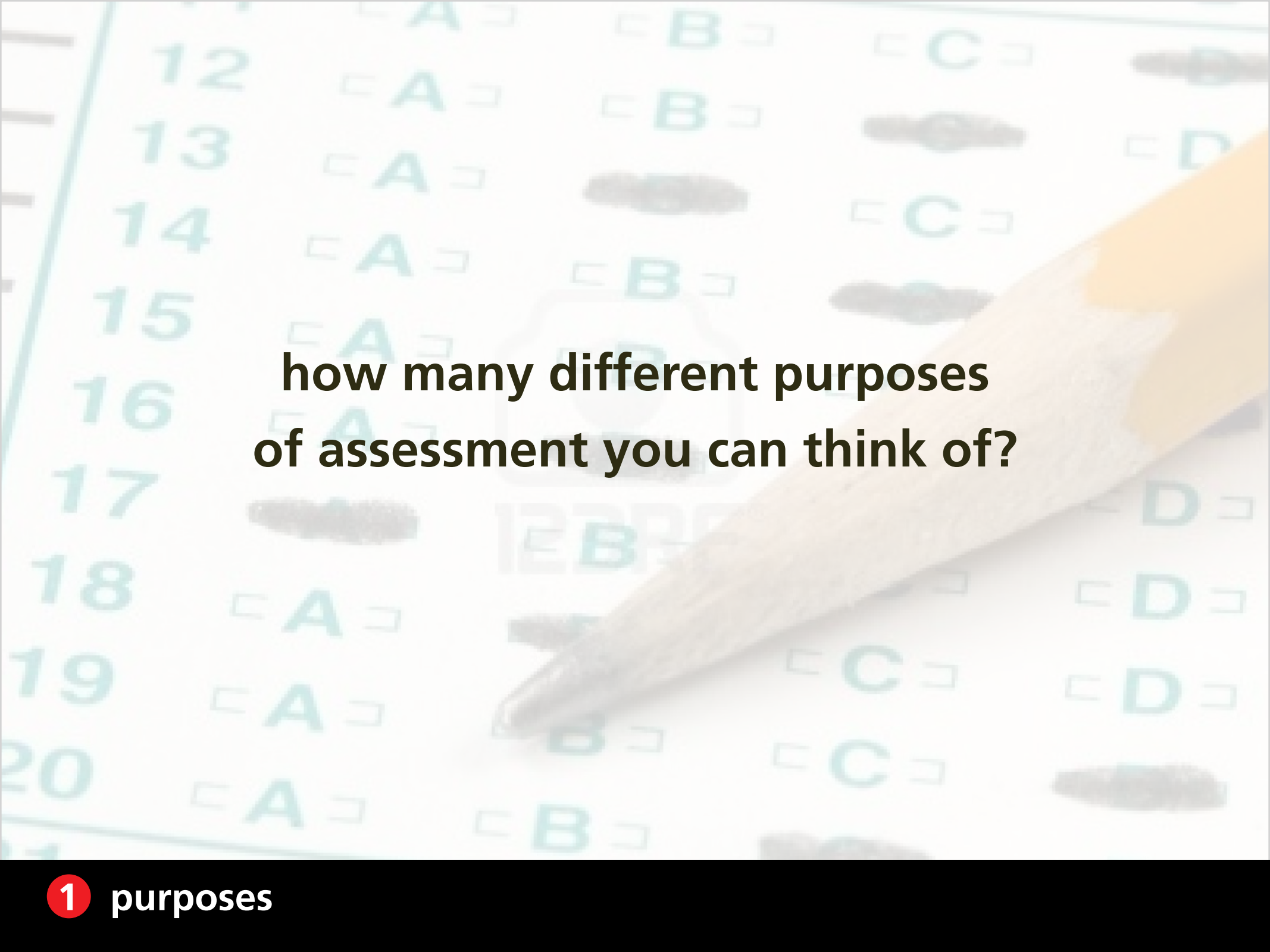
② problems



1 purposes

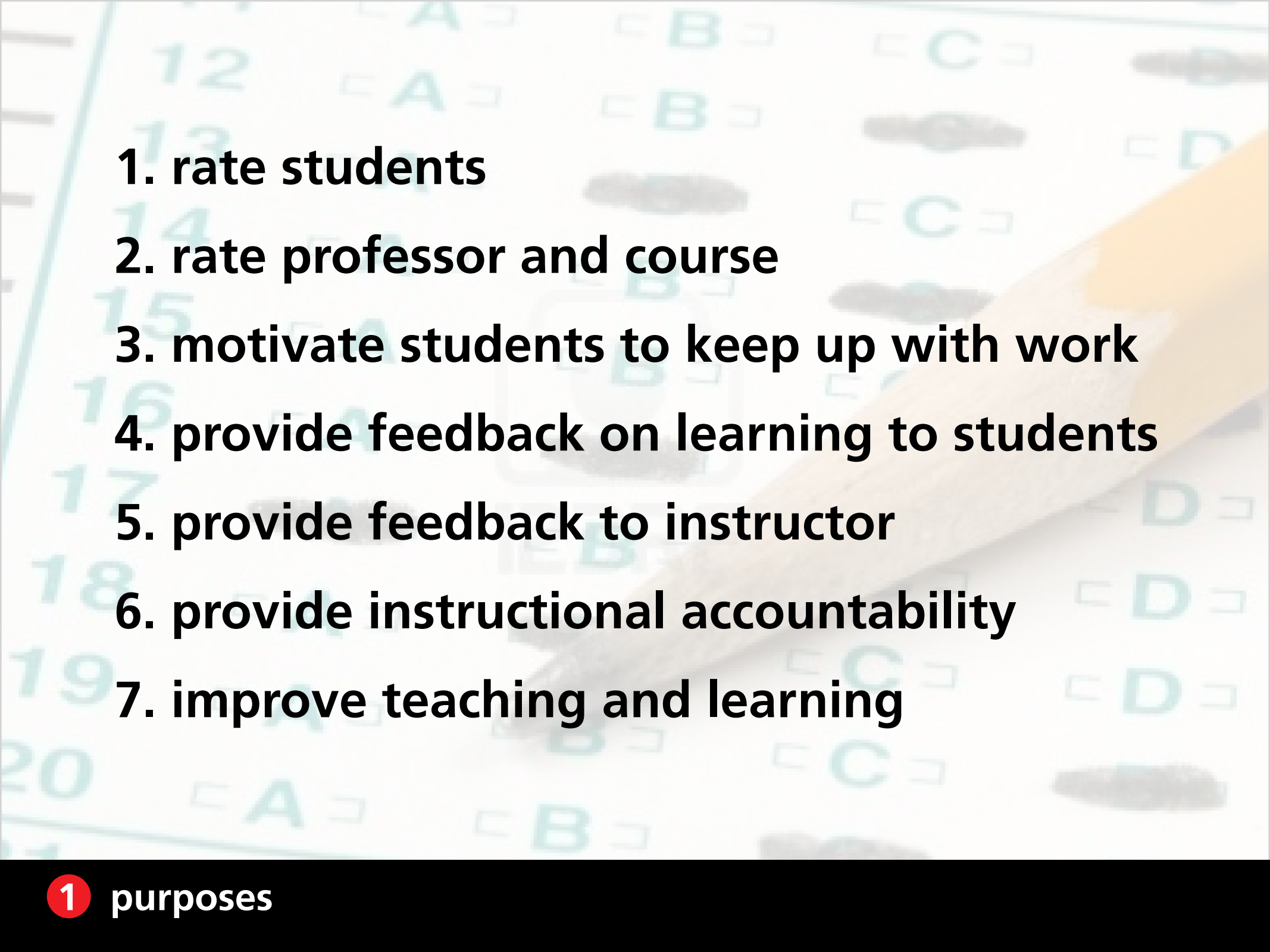
2 problems

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.

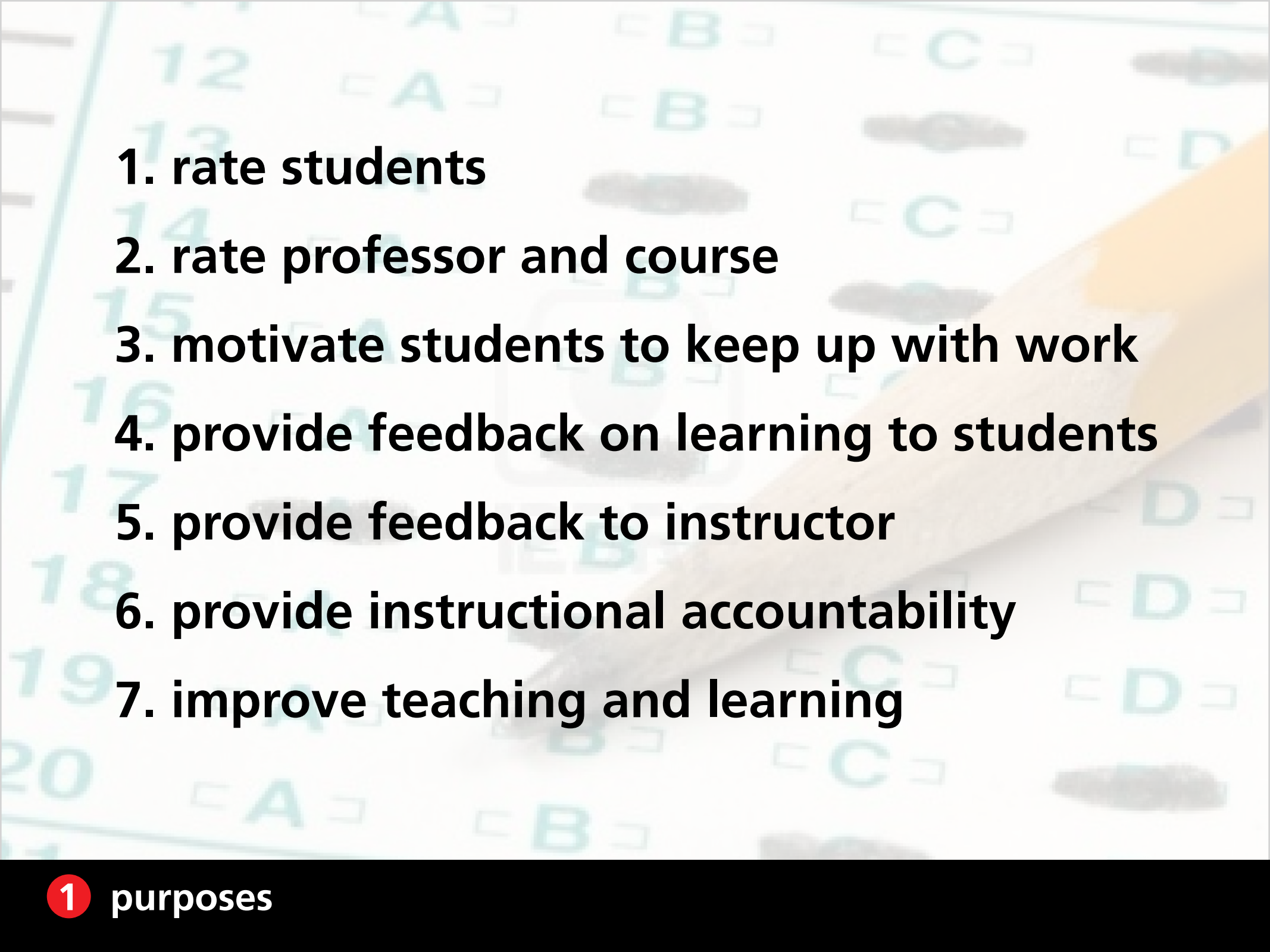
**how many different purposes
of assessment you can think of?**

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 text in the background includes:
- | | A | B | C | D |
|----|---|---|---|---|
| 12 | | | | |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | | | | |
| 20 | | | | |
- 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 IDs (12-20) and grades (A, B, C, D). The text is overlaid on this image.
- 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

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

The background is a grayscale image of a book cover. The word "EDUCACIÓN" is printed in large, bold, capital letters at the bottom. Above it, there is a large, stylized graphic that appears to be a face or a mask. The overall texture is grainy and aged.

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

UNKNOWN

UNKNOWN

problem

procedure

answer

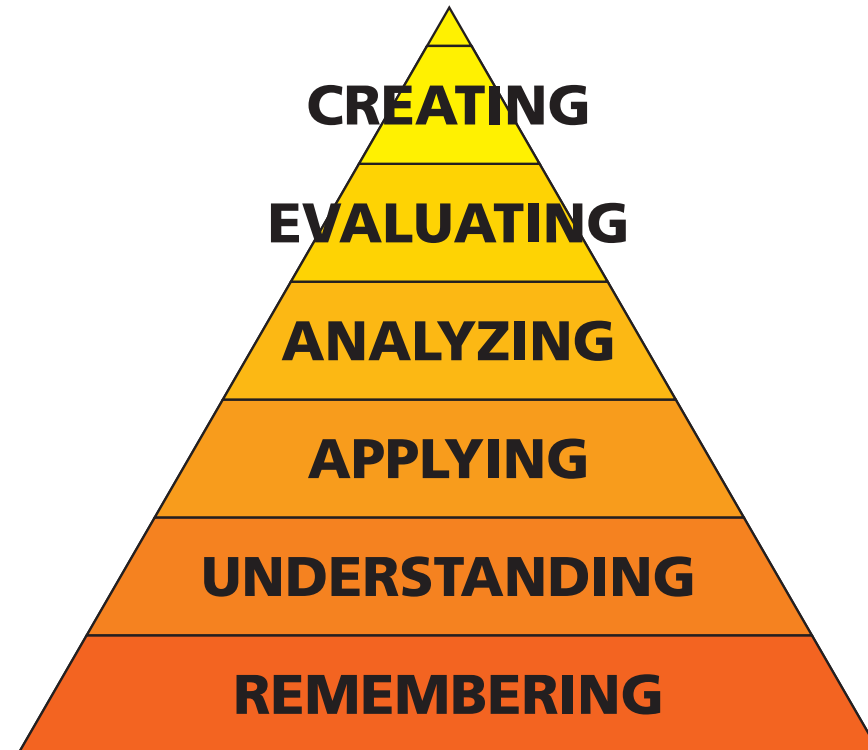
KNOWN

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

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.

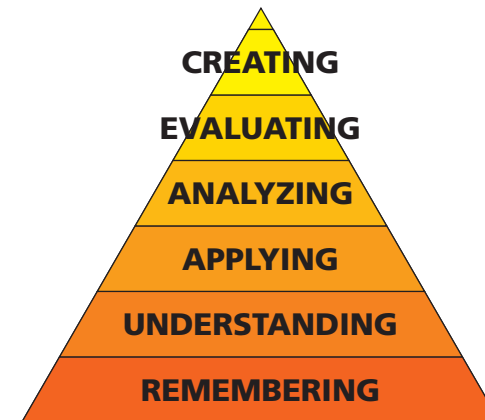
How long do you have to wait before someone frees up a space?

Requires:

Assumptions

Developing a model

Applying that model



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.**

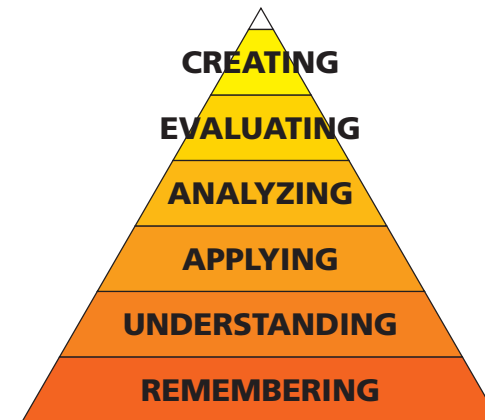
How long do you have to wait before someone frees up a space?

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.

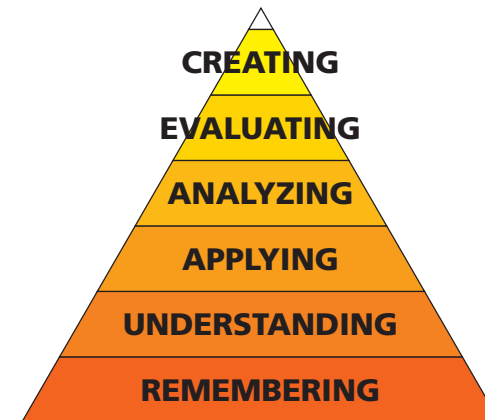
Assuming people leave at regularly-spaced intervals, how long do you have to wait before someone frees up a space?

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.

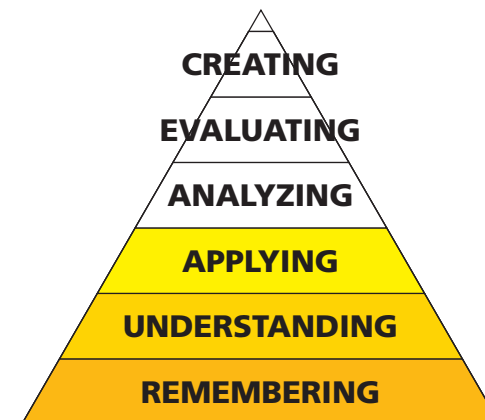
Assuming people leave at regularly-spaced intervals, how long do you have to wait before someone frees up a space?

Requires:

Assumptions

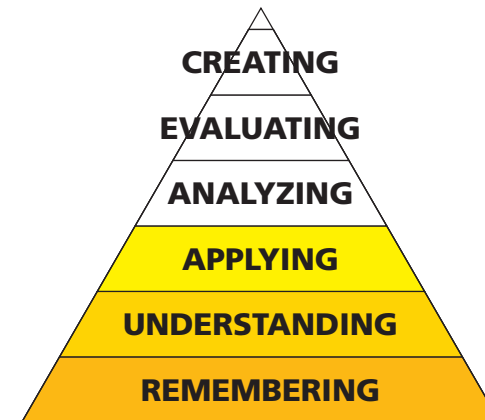
Developing a model

Applying that model



On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area, 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.

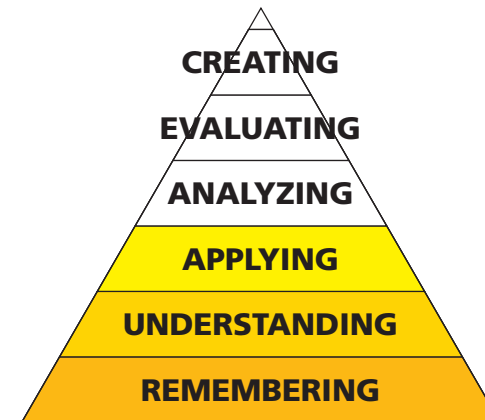
How long do you have to wait before someone frees up a space?



On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area, 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.

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

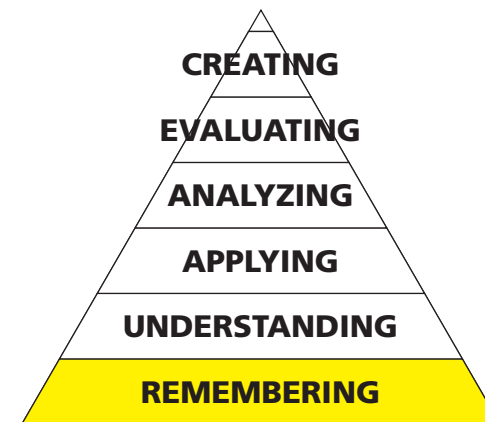
$$t_{wait} = \frac{T_{shop}}{N_{spaces}}$$

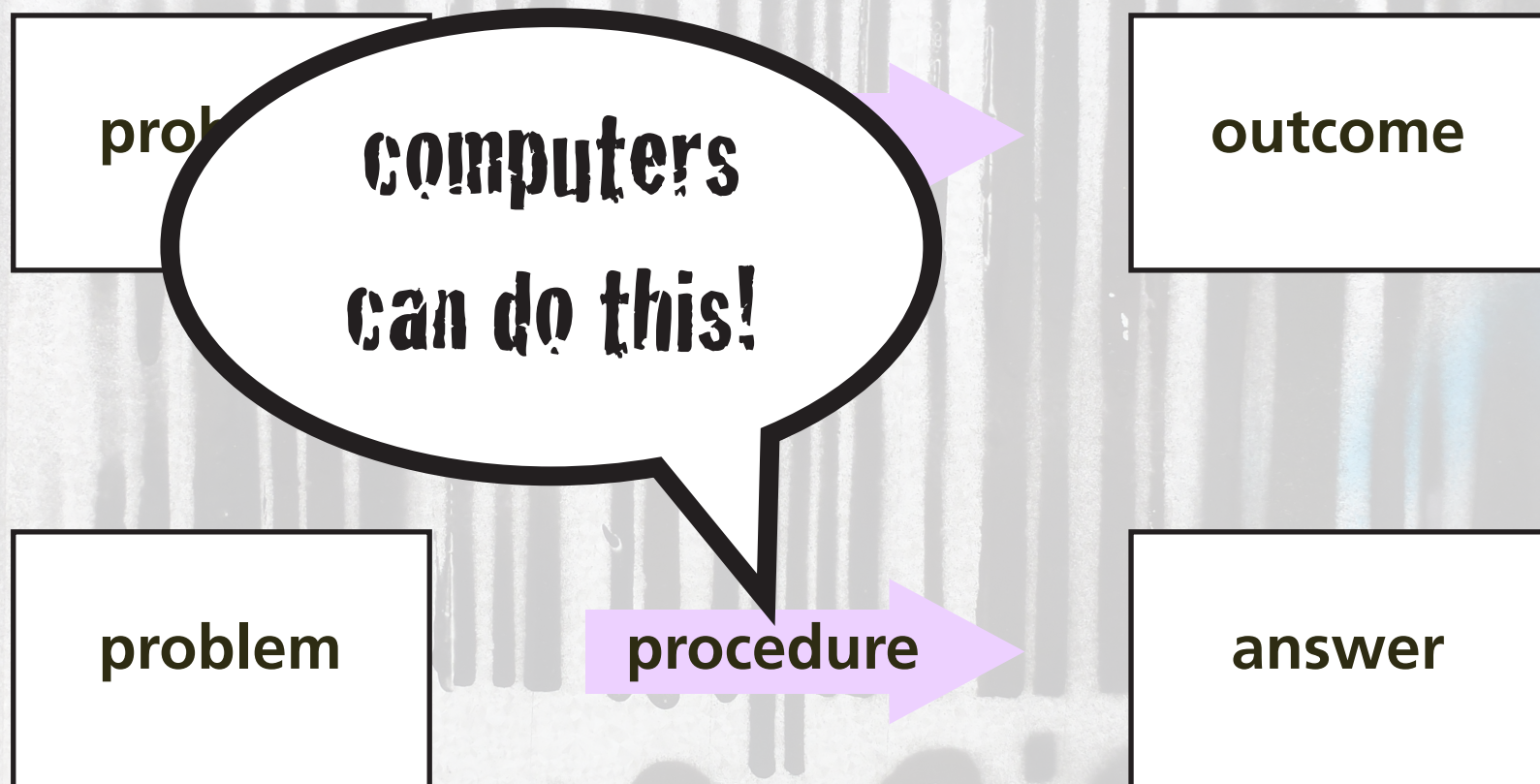


On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area, where people are known to shop, on average, for 2 hours. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.

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

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





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

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 near 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, 12, 1, and 2 are visible. The hour hand is between 10 and 11, and the minute hand is pointing at 2.

1 purposes

2 problems



no retention

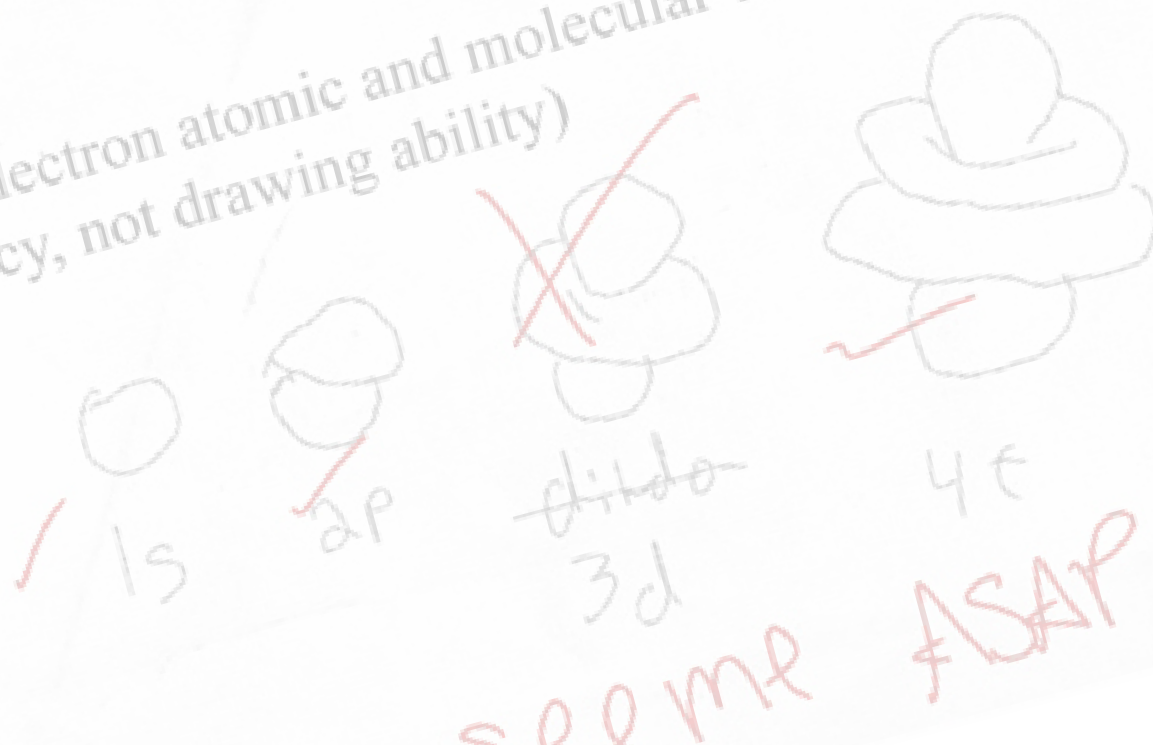
information stored in short-term memory

no transfer

1 purposes

2 problems

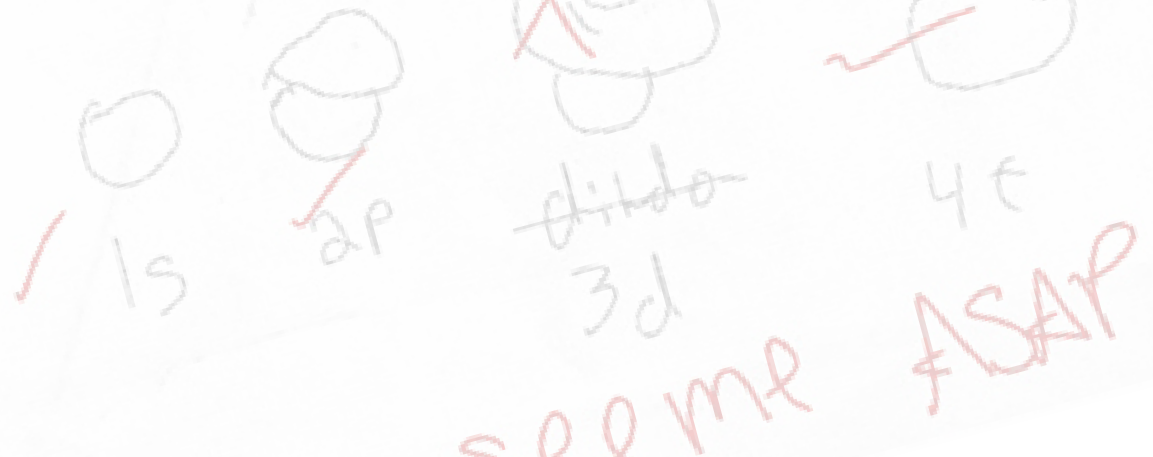
grades: measure of standing relative to others



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:

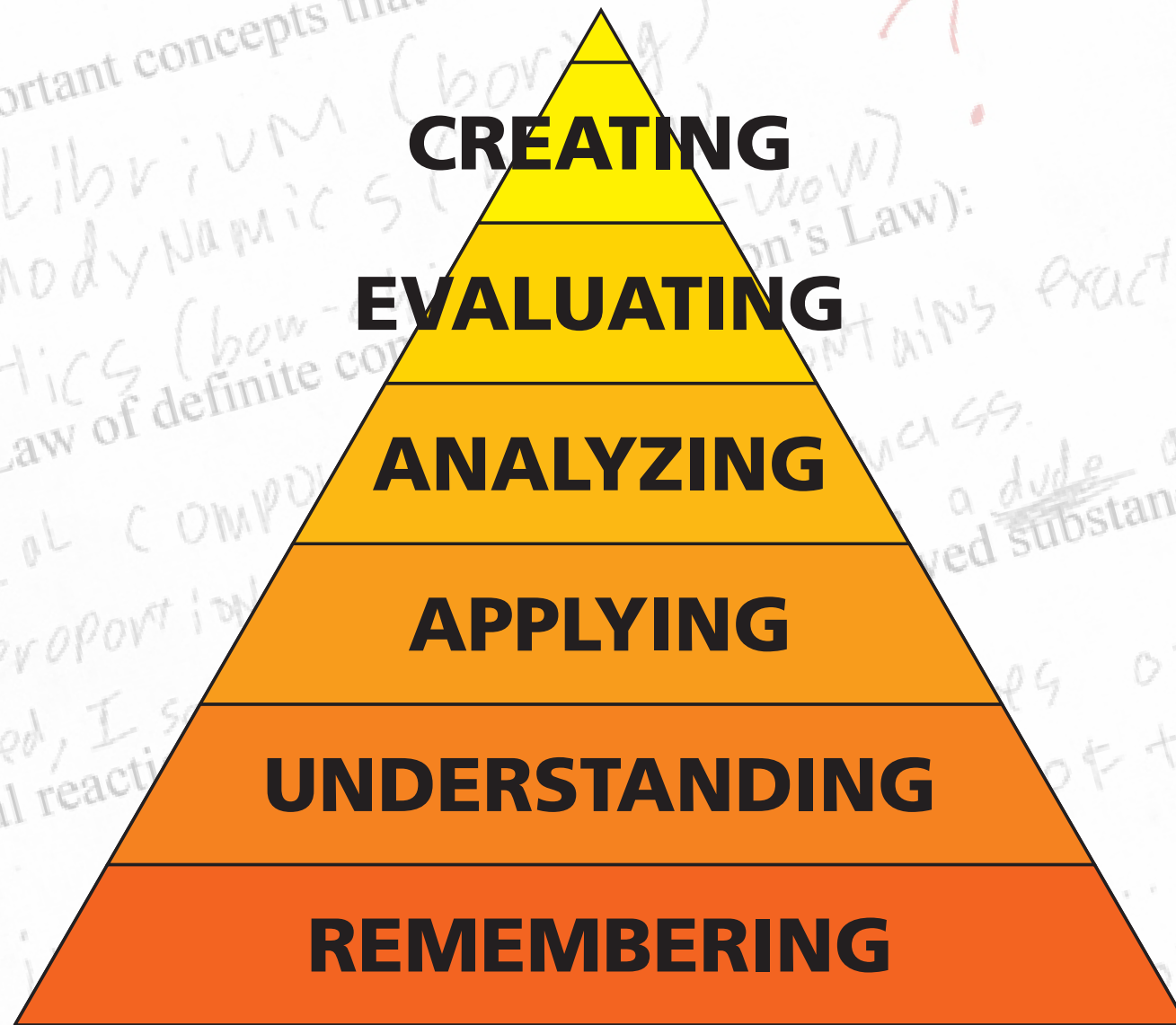
Increases or decreases the
energy of the substance
involved ... sometimes in
the form of heat or light

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

... but ...

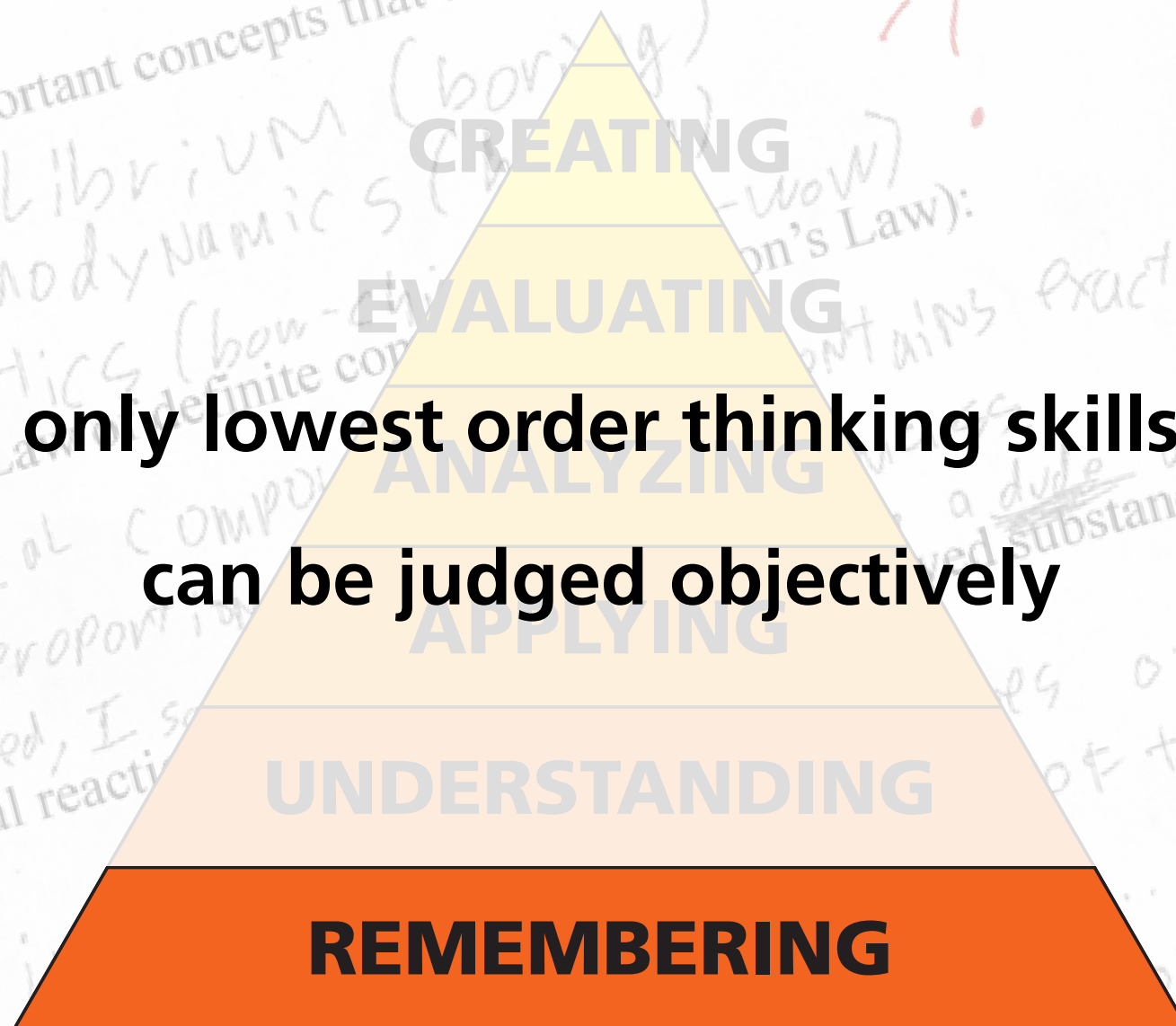
1 purposes

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

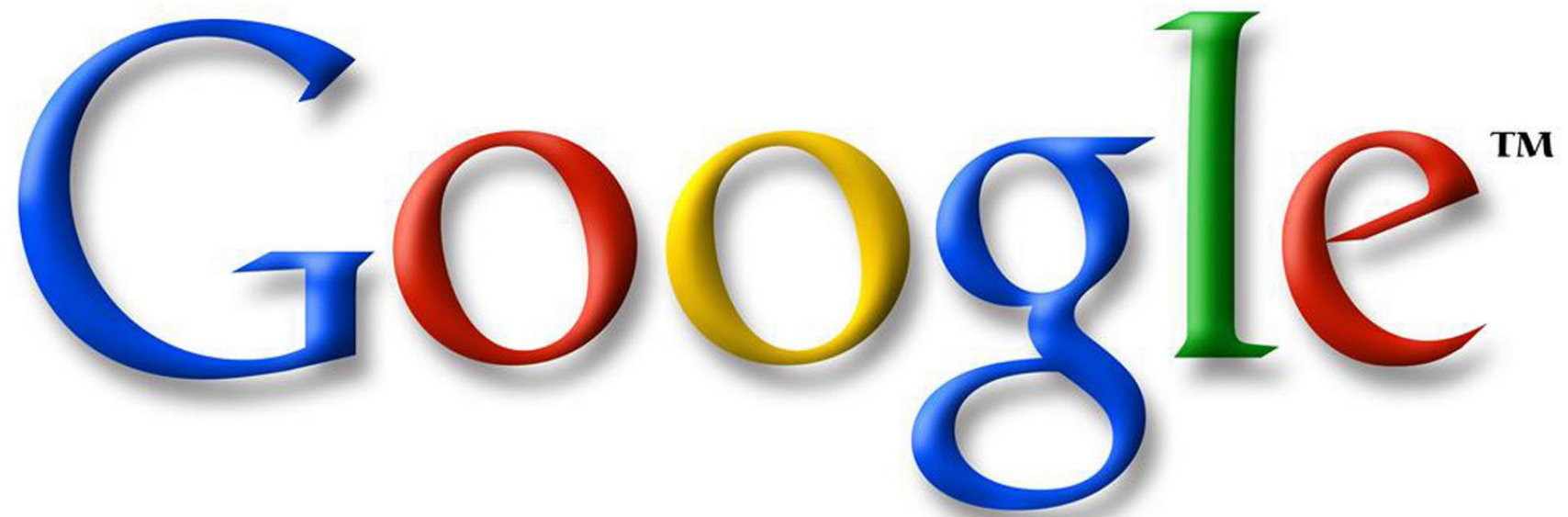


open-book exam

1 purposes

2 problems

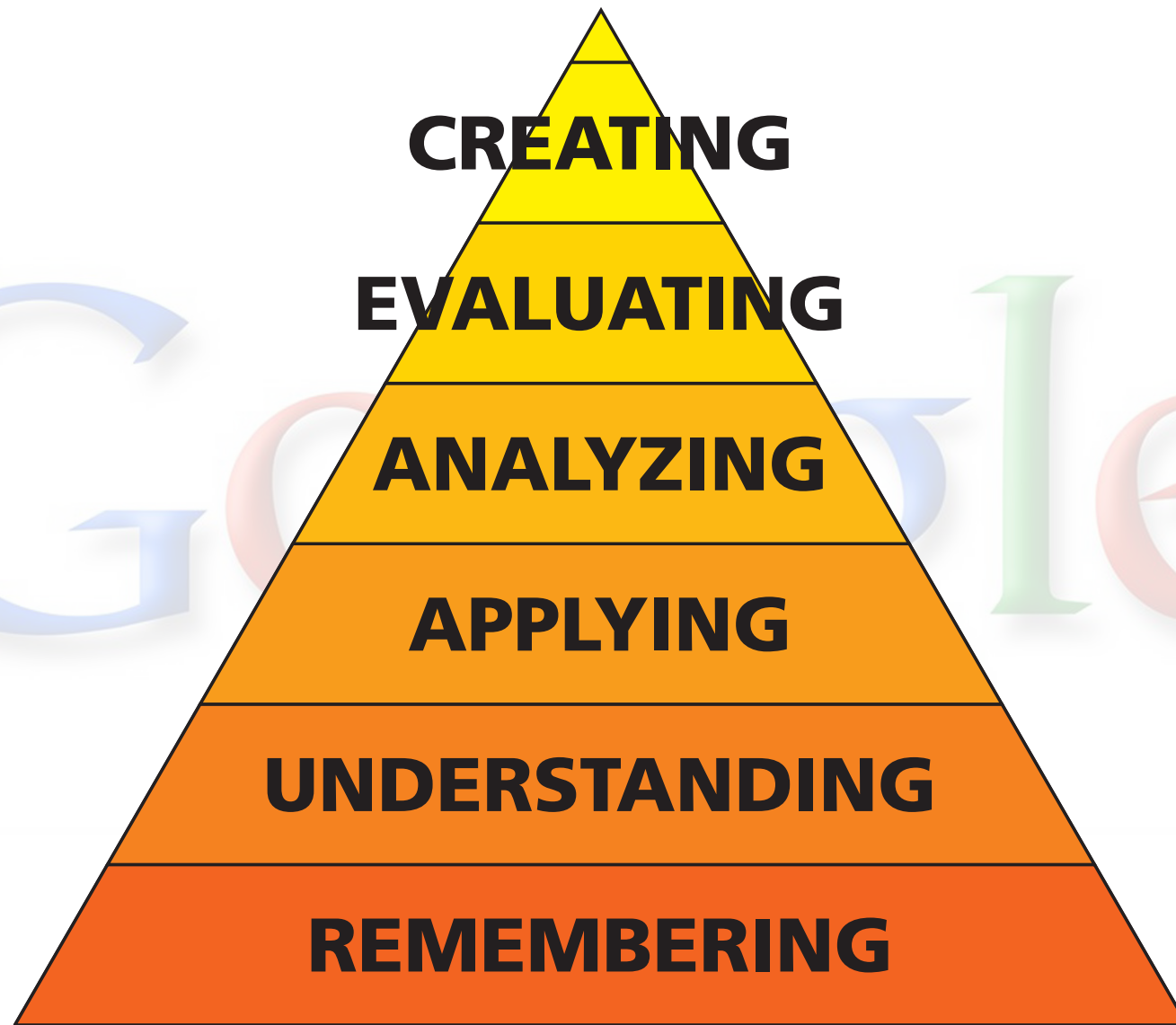
3 improvements



1 purposes

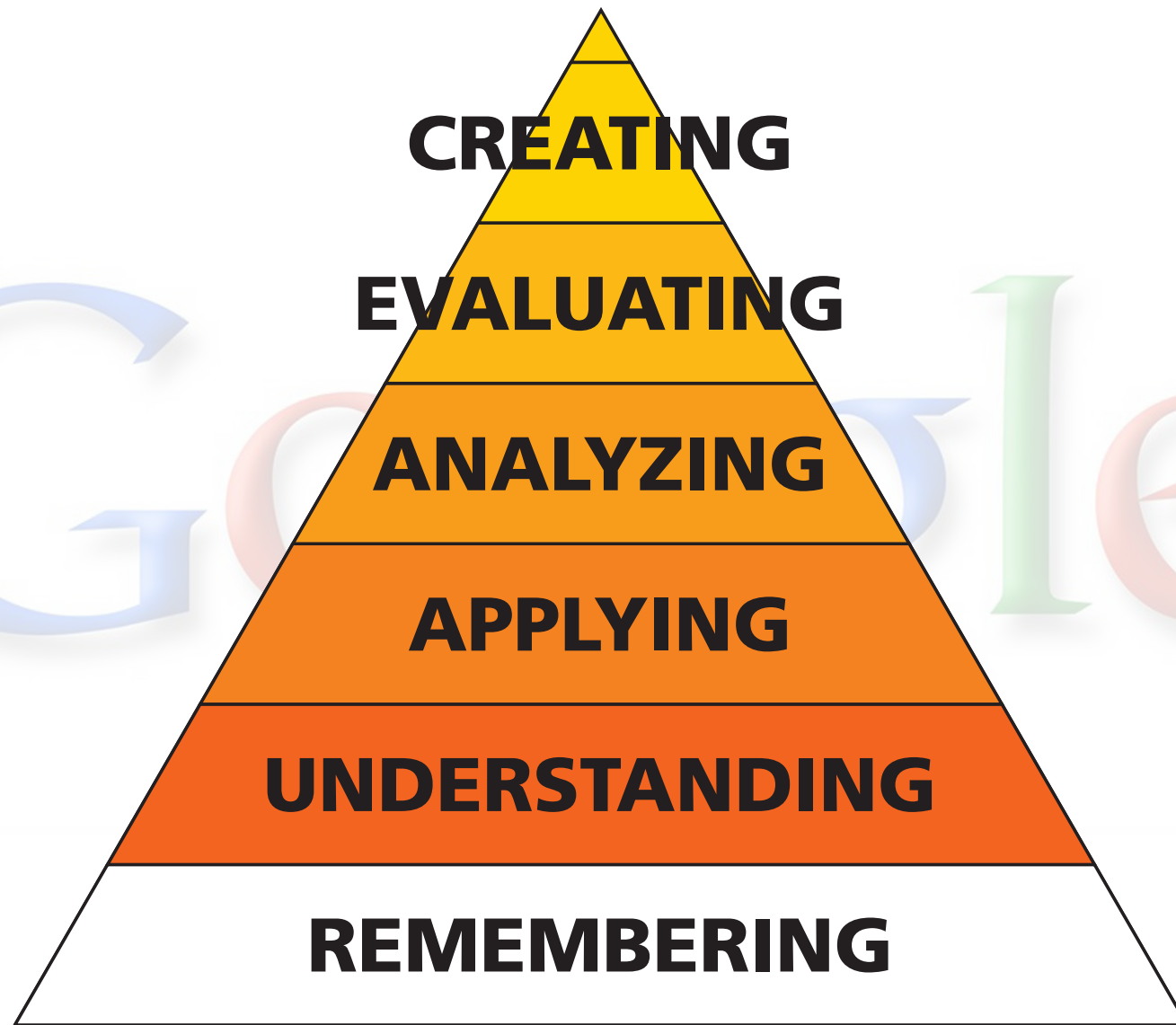
2 problems

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



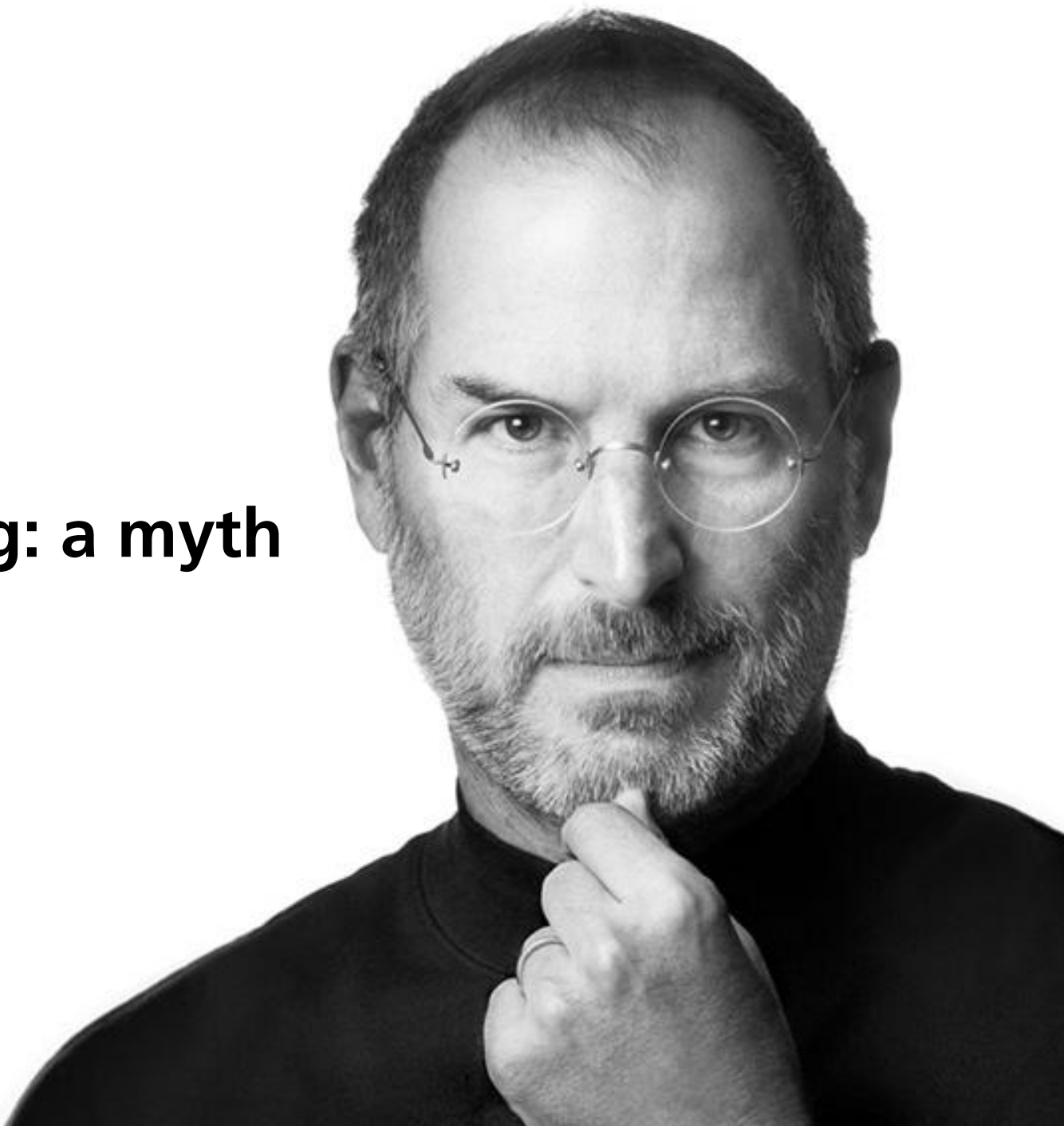
focus on feedback, not ranking

1 purposes

2 problems

3 improvements

objective ranking: a myth

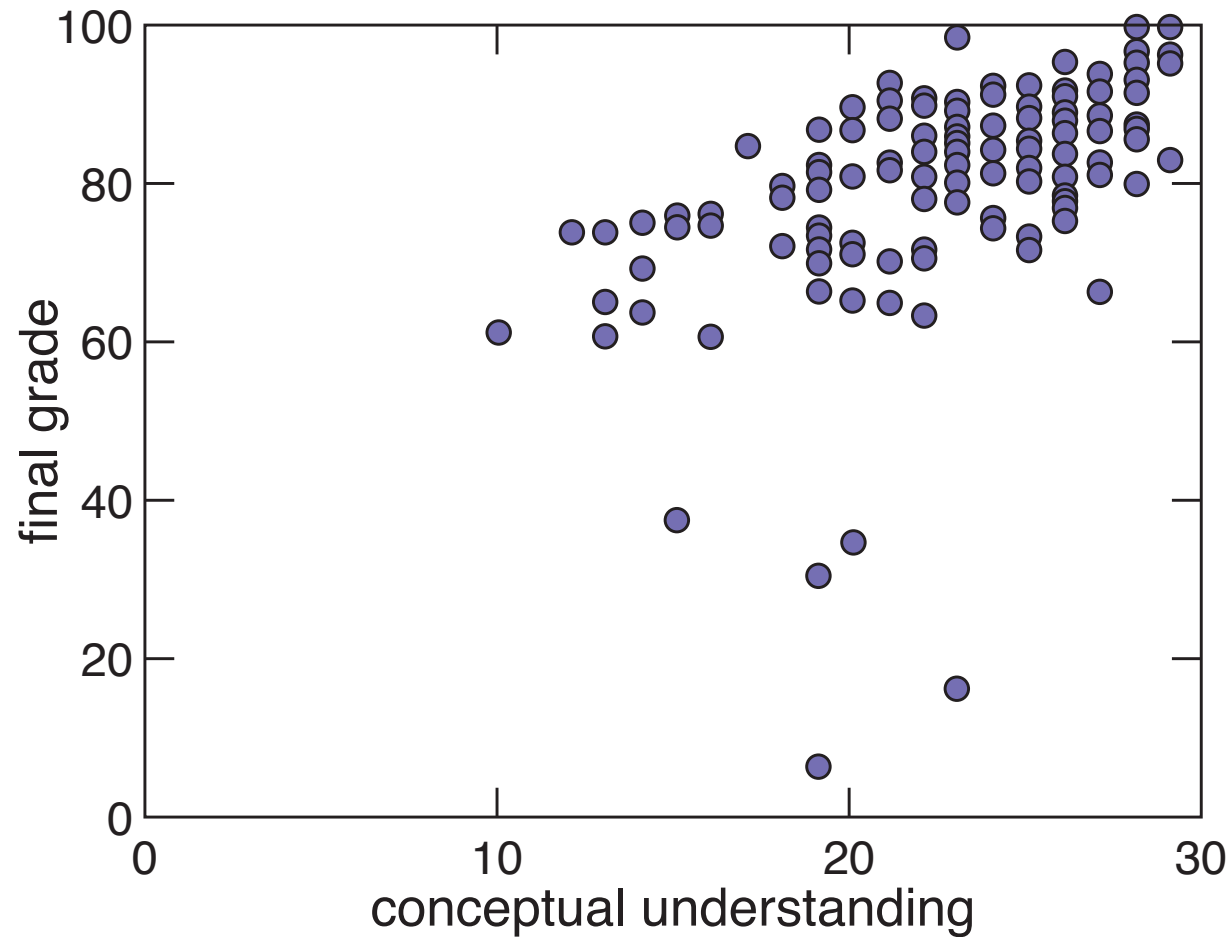


1 purposes

2 problems

3 improvements

2 metrics, 2 results

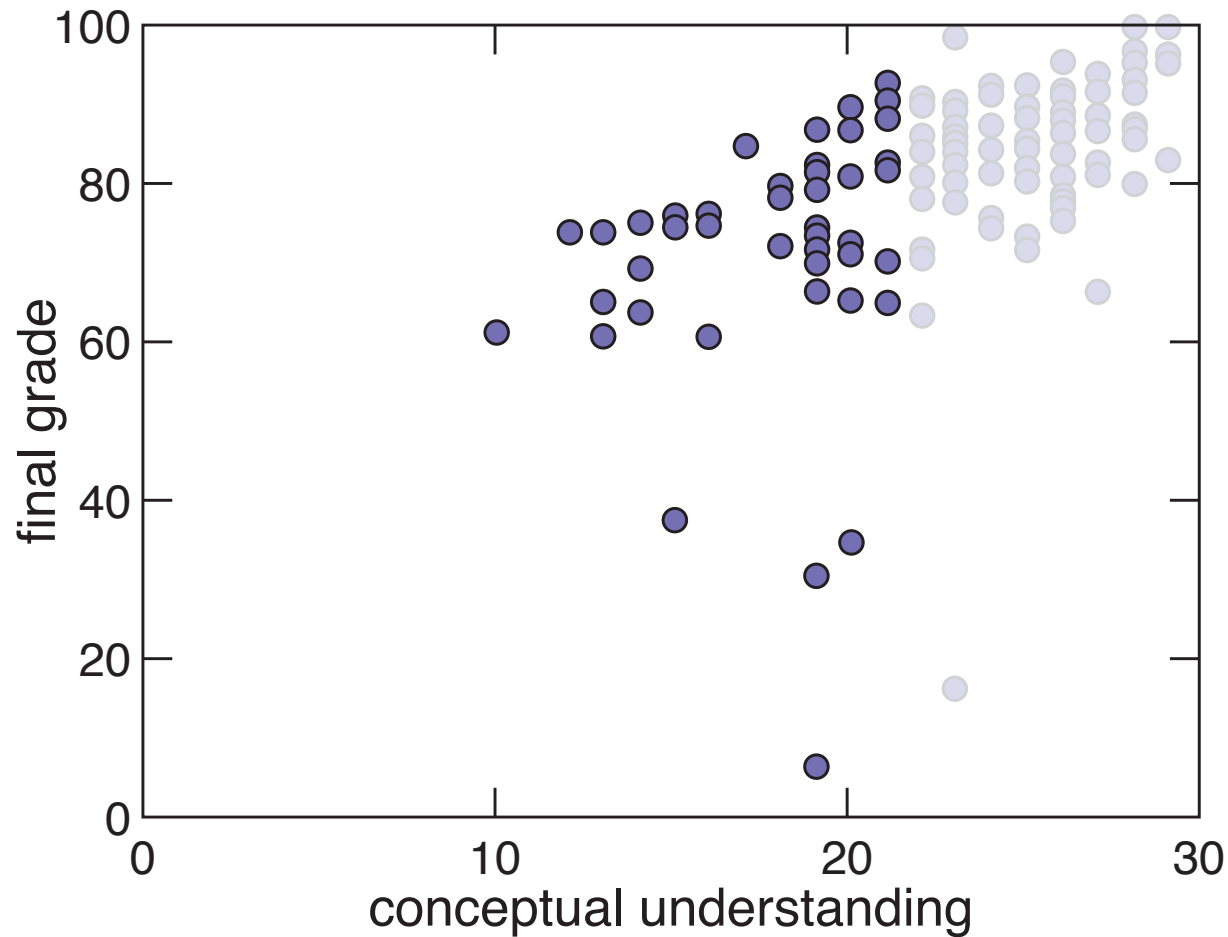


1 purposes

2 problems

3 improvements

Aristotelian thinkers

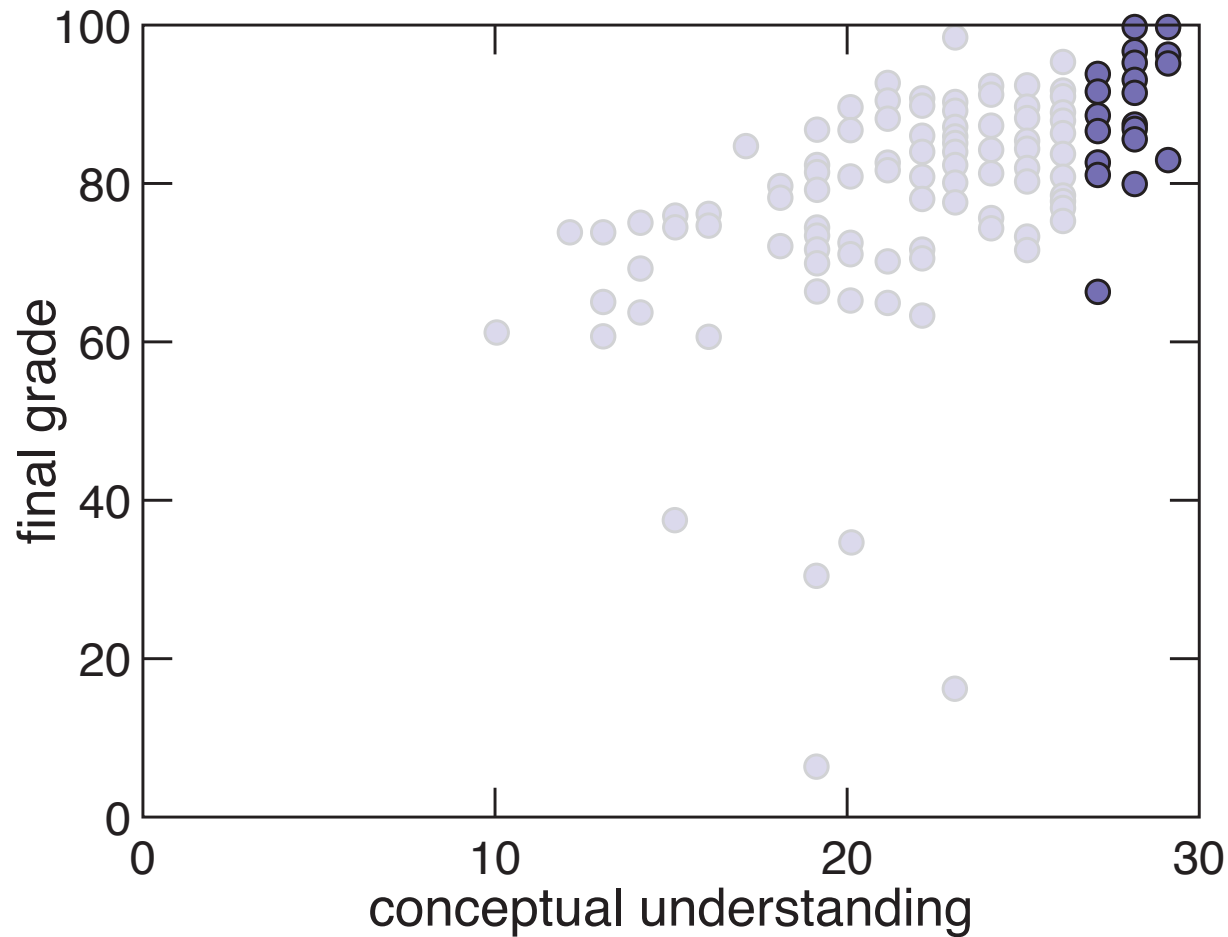


1 purposes

2 problems

3 improvements

top performers, broad grade distribution

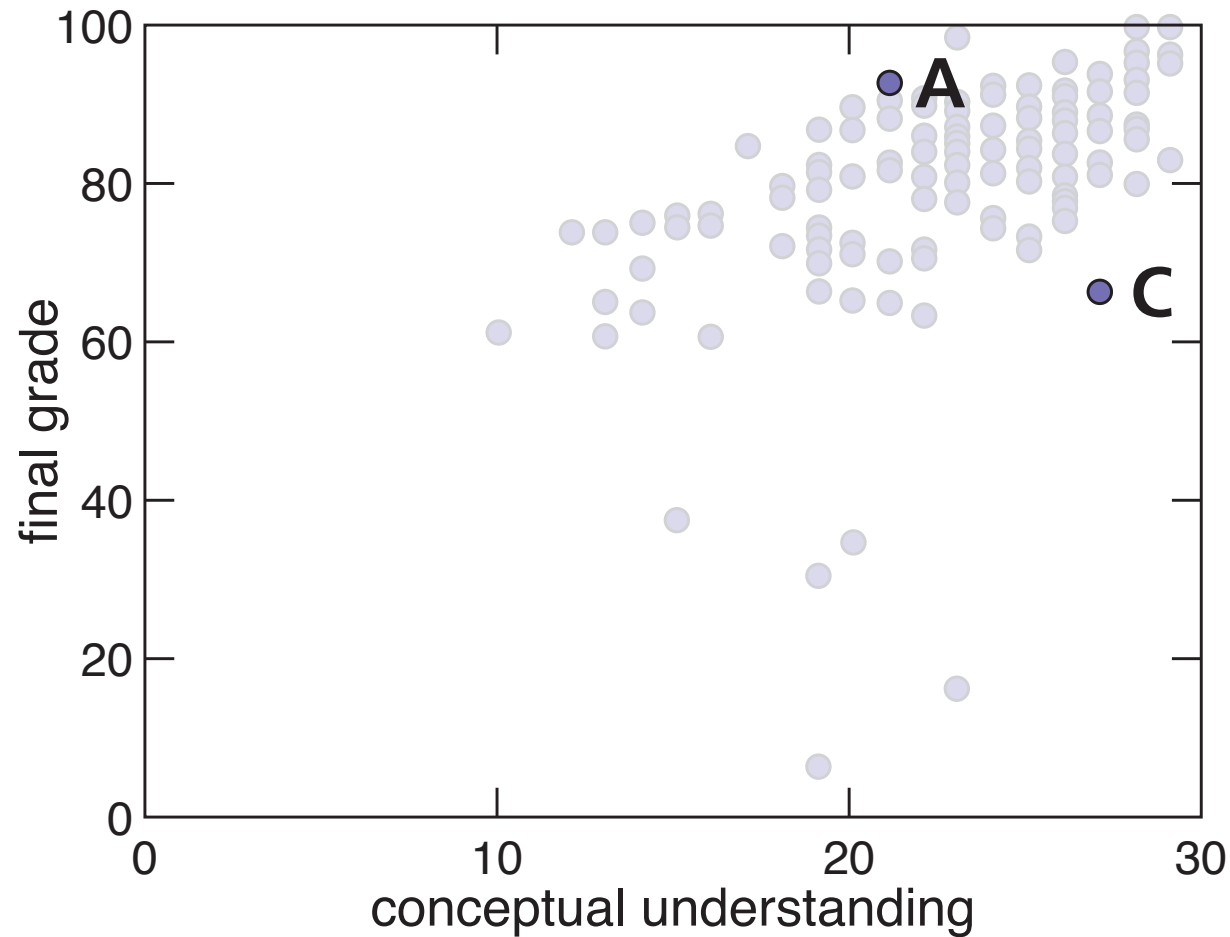


1 purposes

2 problems

3 improvements

objectivity or injustice?



1 purposes

2 problems

3 improvements

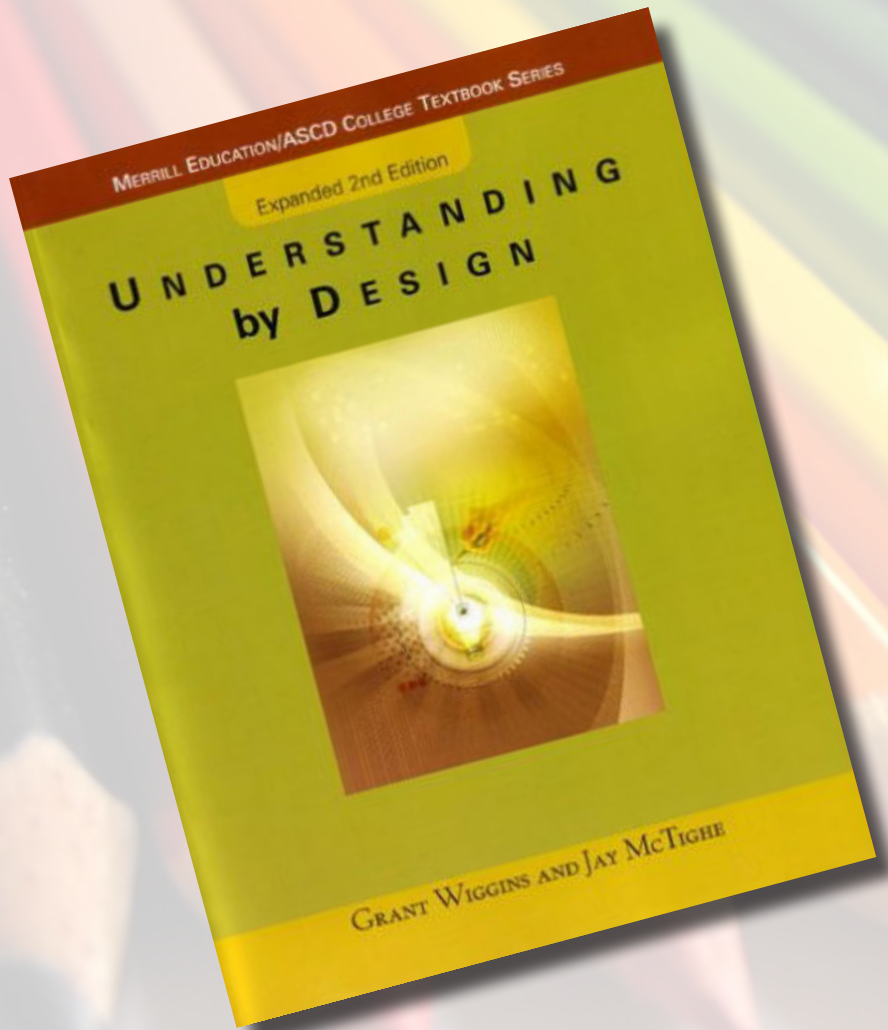


focus on skills, not content

1 purposes

2 problems

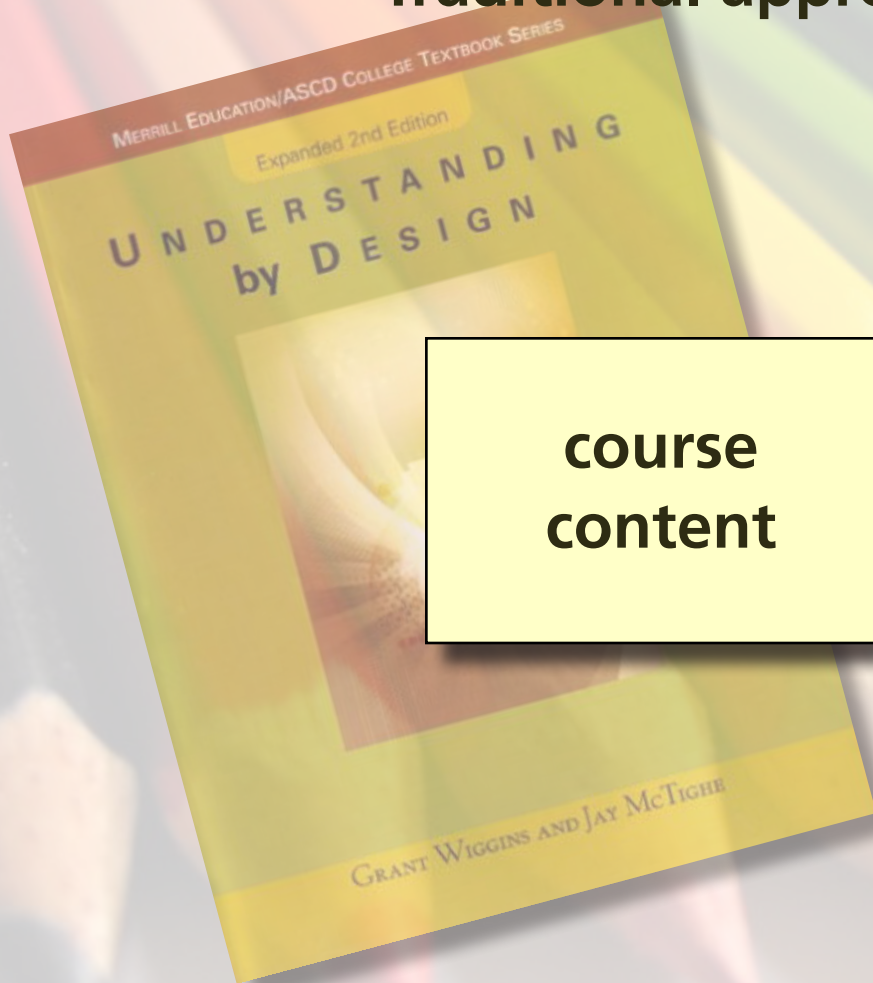
3 improvements



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

- 1 purposes
- 2 problems
- 3 improvements

Traditional approach to course planning



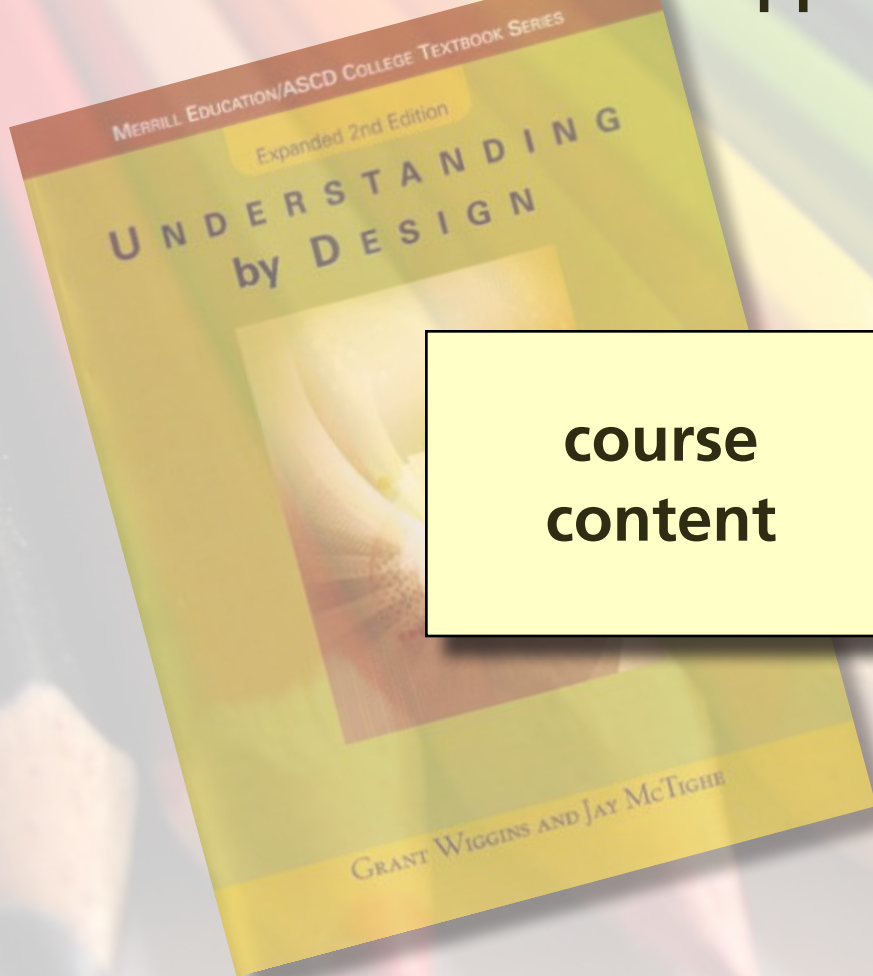
**course
content**

1 purposes

2 problems

3 improvements

Traditional approach to course planning



**course
content**



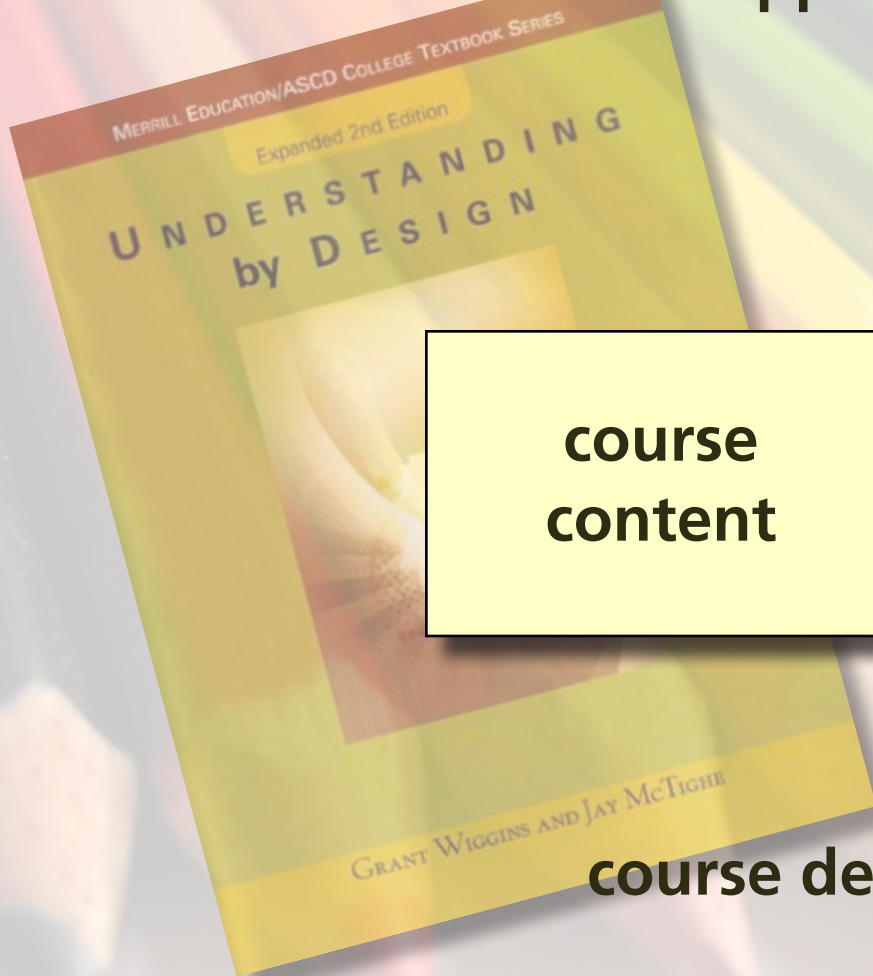
assessment

1 purposes

2 problems

3 improvements

Traditional approach to course planning



**course
content**



assessment

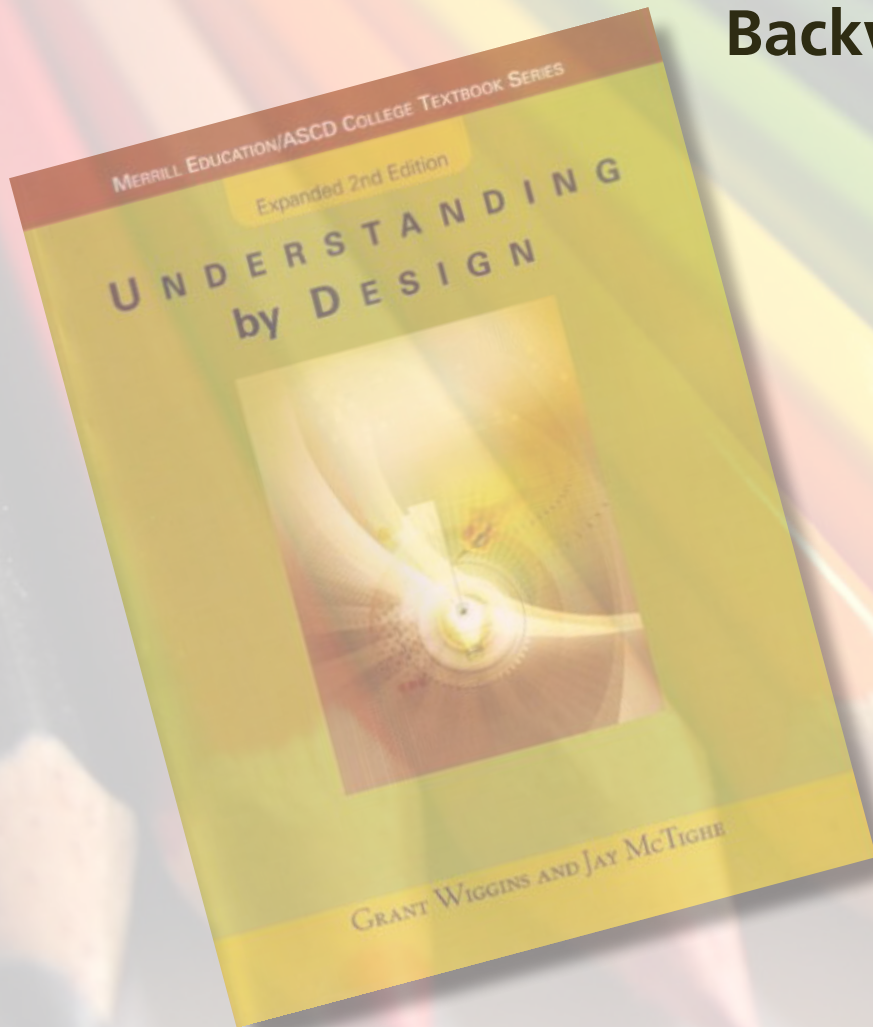
course defined by content

1 purposes

2 problems

3 improvements

Backward design



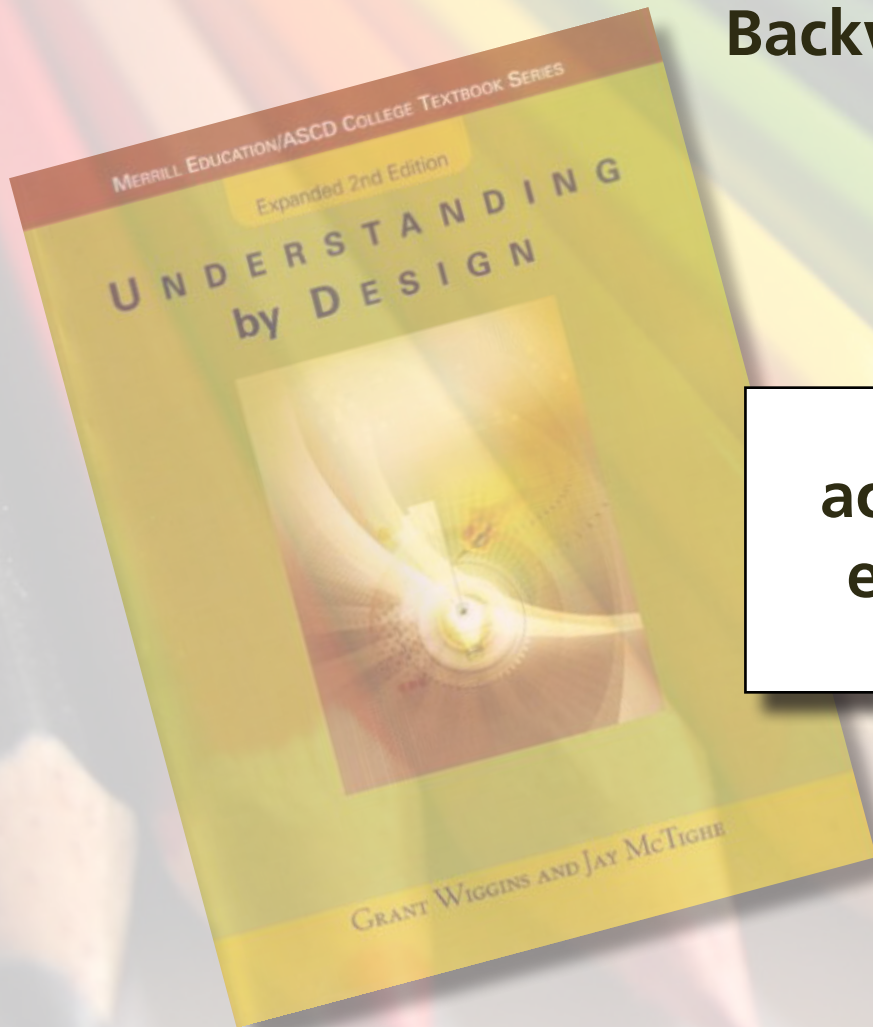
**desired
outcomes**

1 purposes

2 problems

3 improvements

Backward design



**acceptable
evidence**



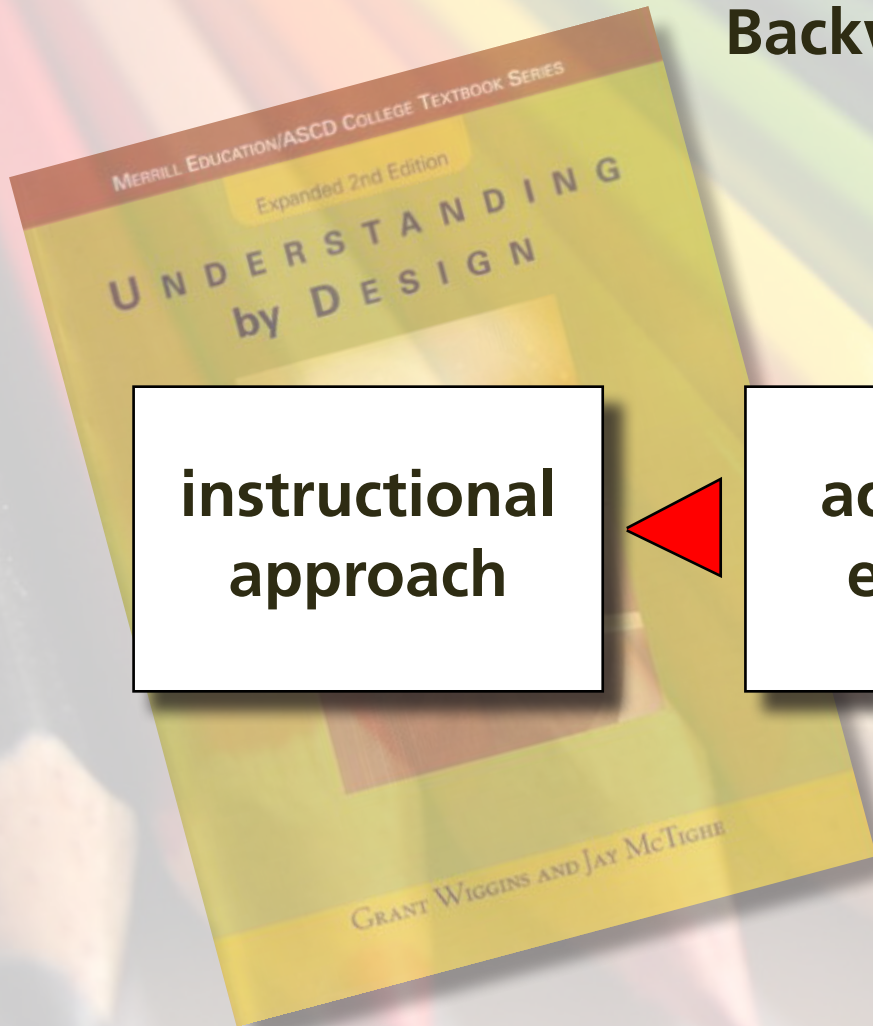
**desired
outcomes**

1 purposes

2 problems

3 improvements

Backward design



**instructional
approach**

**acceptable
evidence**

**desired
outcomes**

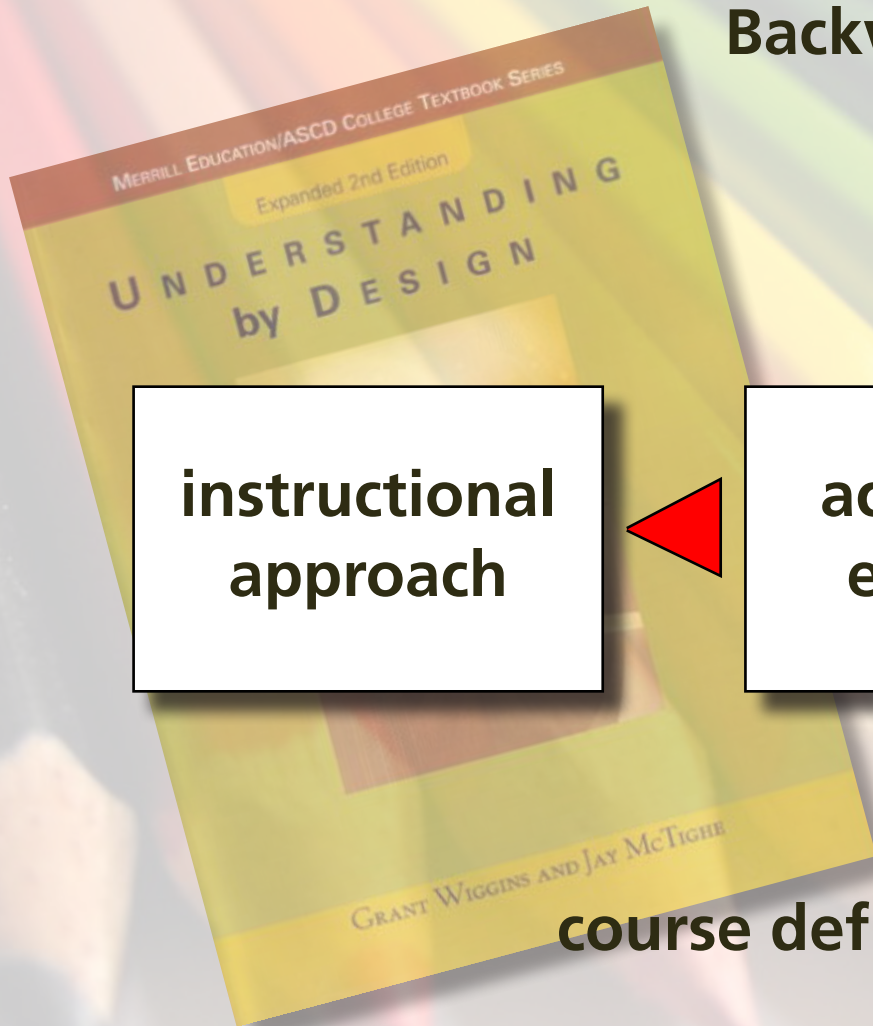


1 purposes

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

cpr.molsci.ucla.edu

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

cpr.molsci.ucla.edu

1 purposes

2 problems

3 improvements

Calibrated Peer Review

UPLOAD

cpr.molsci.ucla.edu

- 1 purposes
- 2 problems
- 3 improvements

Calibrated Peer Review

UPLOAD



CALIBRATION

cpr.molsci.ucla.edu

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

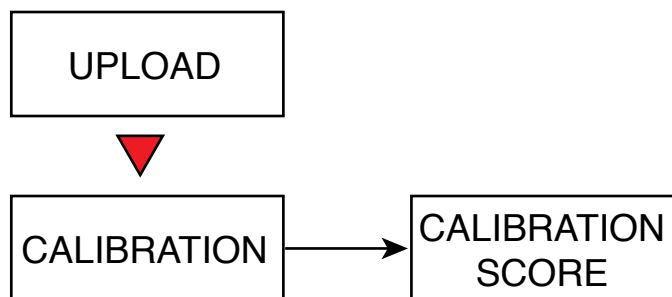
Yesterday at about 4 p.m., I observed a peculiar object appear in the sky. A glowing flash emitted a few seconds, accompanied its appearance. The object was visible even in broad daylight. How did this unprecedented event affect the consequences for Earth? In order to understand the implications for 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

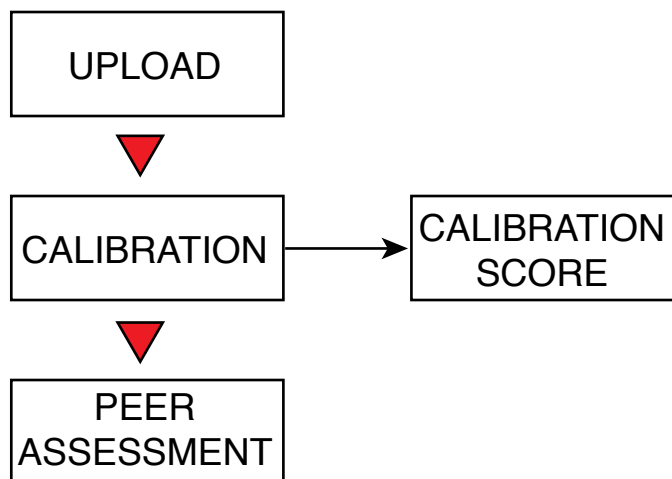
Calibrated Peer Review



cpr.molsci.ucla.edu

- 1 purposes
- 2 problems
- 3 improvements

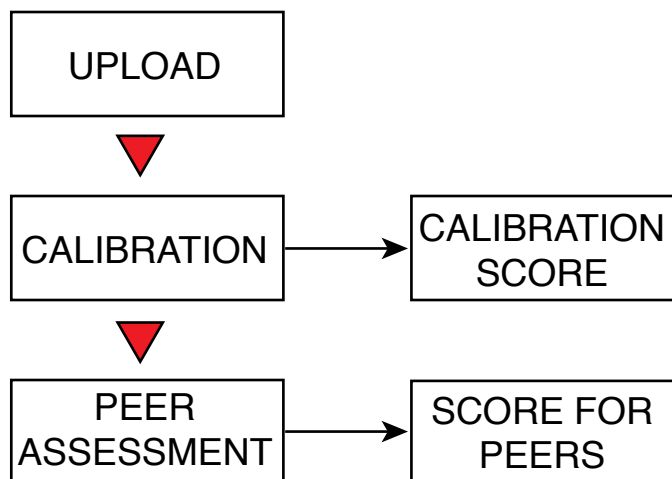
Calibrated Peer Review



cpr.molsci.ucla.edu

- 1 purposes
- 2 problems
- 3 improvements

Calibrated Peer Review



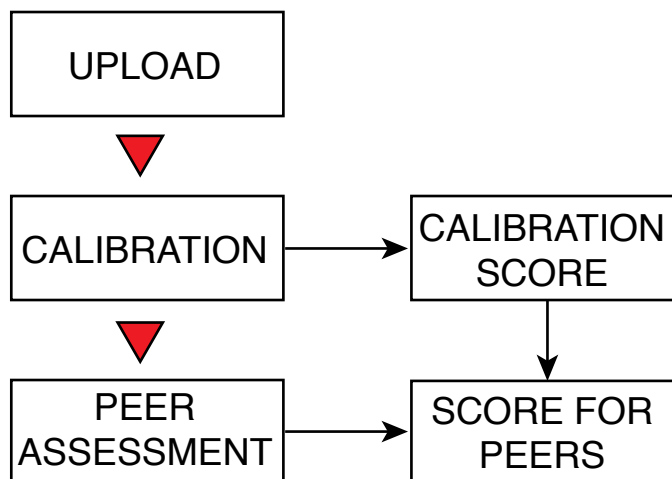
cpr.molsci.ucla.edu

1 purposes

2 problems

3 improvements

Calibrated Peer Review



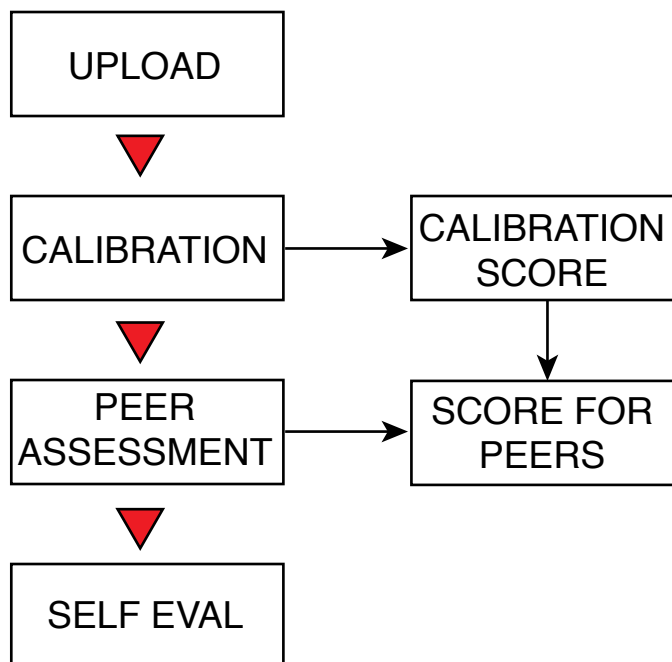
cpr.molsci.ucla.edu

1 purposes

2 problems

3 improvements

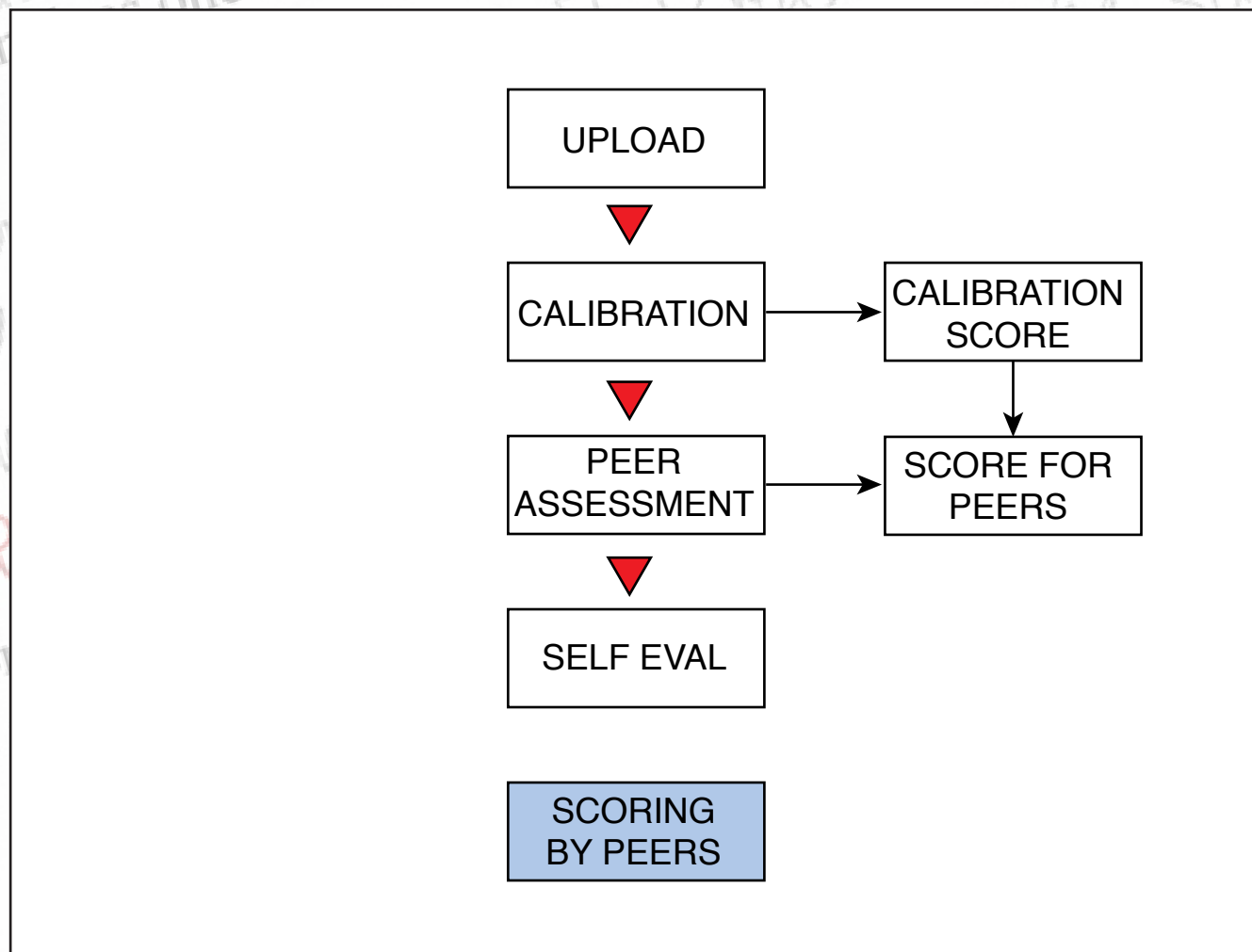
Calibrated Peer Review



cpr.molsci.ucla.edu

- 1 purposes
- 2 problems
- 3 improvements

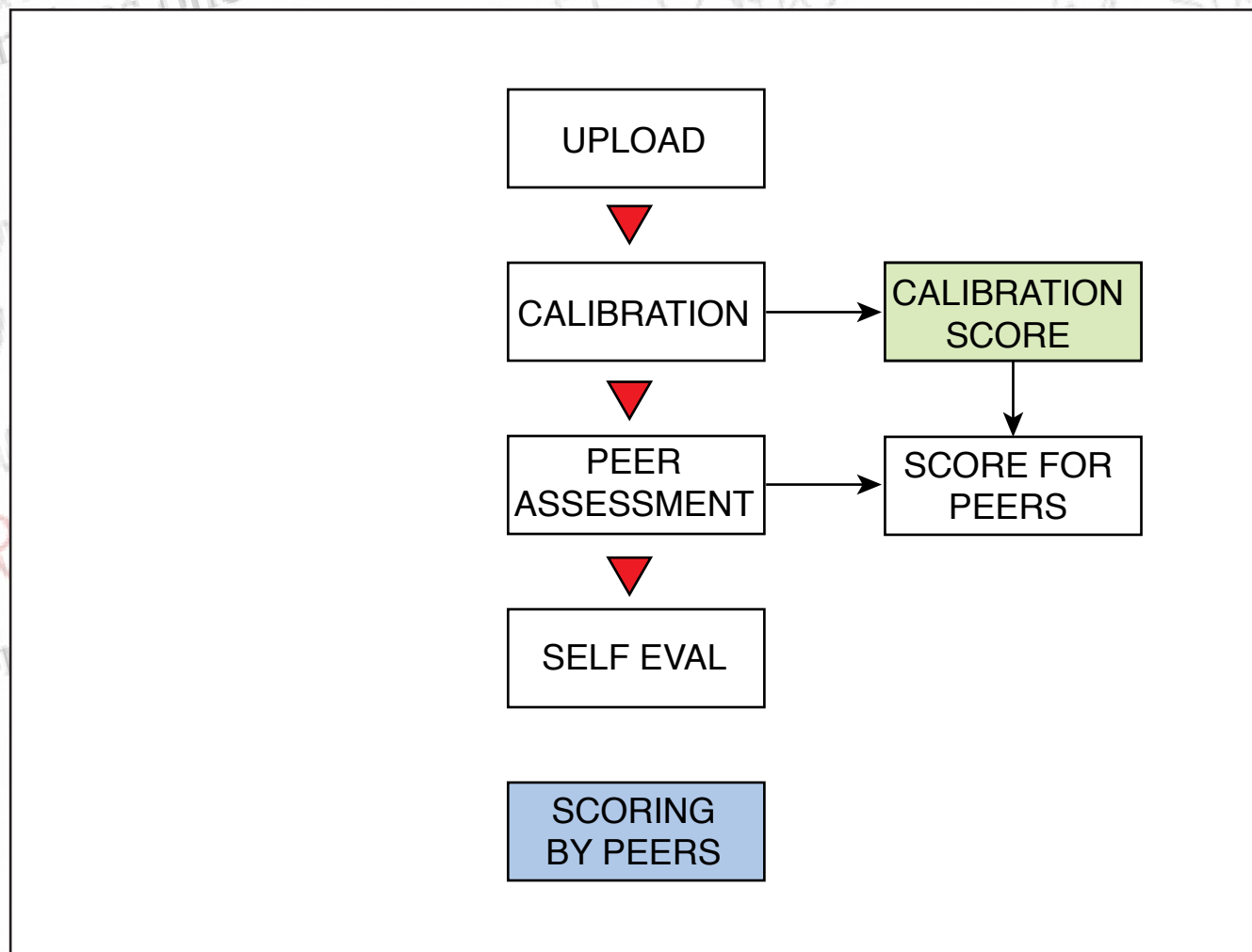
Calibrated Peer Review



cpr.molsci.ucla.edu

- 1 purposes
- 2 problems
- 3 improvements

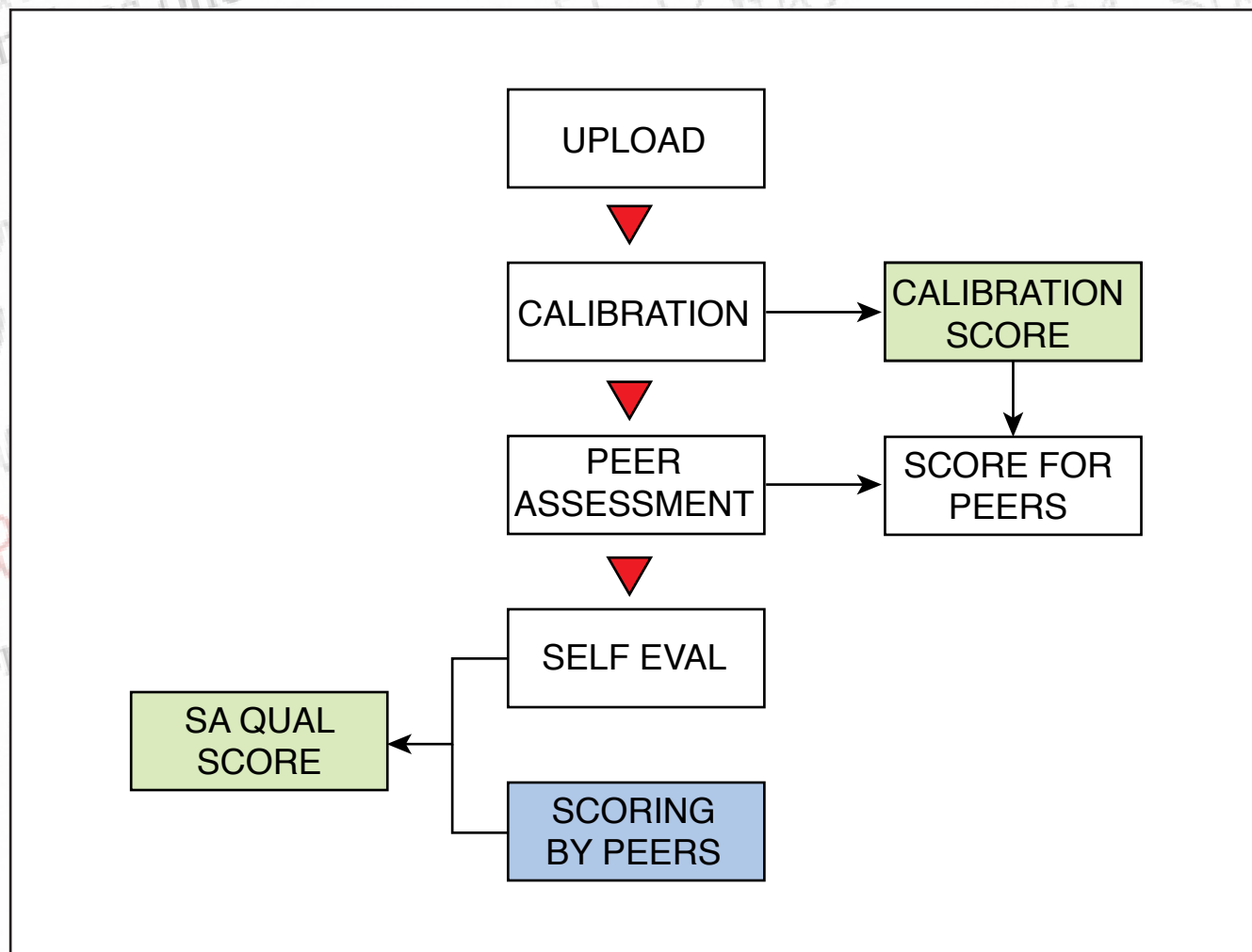
Calibrated Peer Review



cpr.molsci.ucla.edu

- 1 purposes
- 2 problems
- 3 improvements

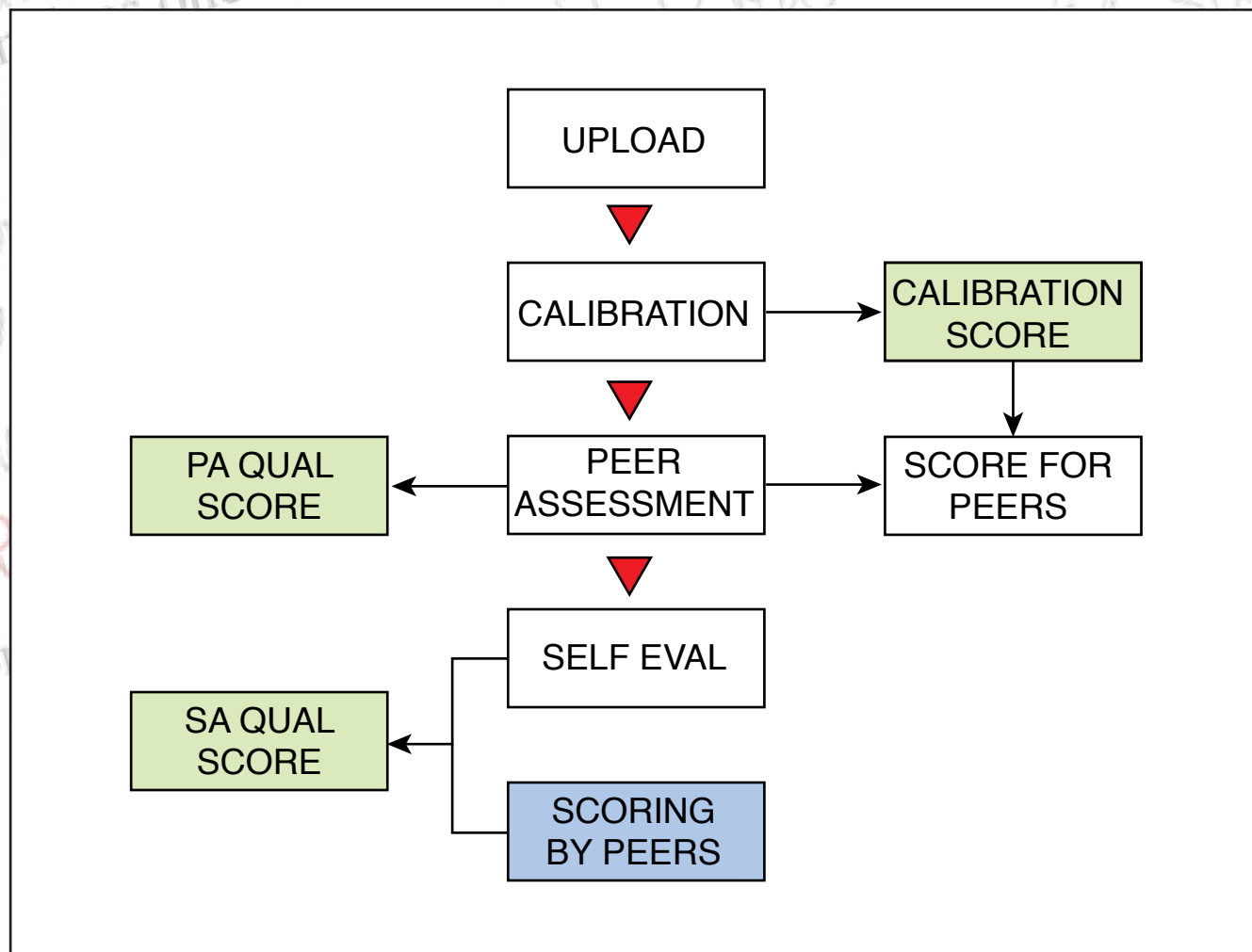
Calibrated Peer Review



cpr.molsci.ucla.edu

- 1 purposes
- 2 problems
- 3 improvements

Calibrated Peer Review



cpr.molsci.ucla.edu

- 1 purposes
- 2 problems
- 3 improvements



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

**rethink
assessment**



mazur.harvard.edu

Follow me!



eric_mazur