Responsive Teaching: Cognitive Science and Formative Assessment in Practice

SOK - Friday, 29th November, 2019

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What's the problem and what does a solution look like?

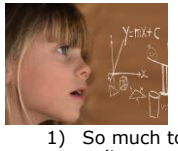
How can we plan effectively and efficiently?

How can we respond to student understanding effectively?

Conclusions and next steps

2

Endemic problems



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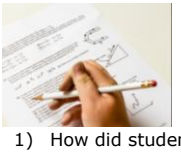

1) How did students do?
2) What are students thinking?
3) How can I help all students improve?

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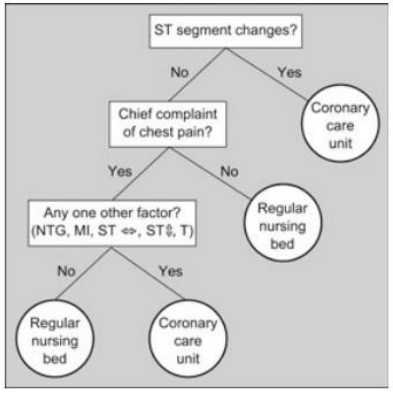
> *Unlike statistical optimization procedures, heuristics do not try to optimize (i.e., find the best solution),*
>
> *but rather satisfice (i.e., find a good-enough solution).*
>
> Gigerenzer, 2008



5 Wegwarth, Gaissmaier and Gigerenzer, 2009

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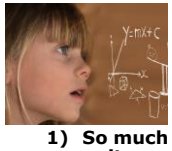

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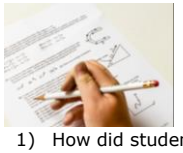

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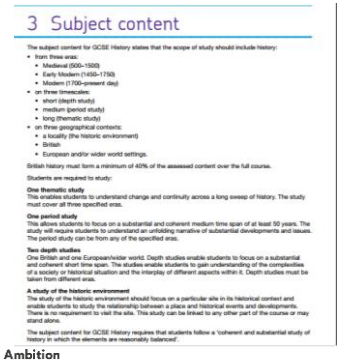

3 Subject content

The subject content for GCSE History states that the scope of study should include history:

- from three eras:
  - Medieval (500–1500)
  - Early Modern (1400–1750)
  - Modern (1700–present day)
- on three timescales:
  - short (depth study)
  - medium (period study)
  - long (thematic study)
- on three geographical contexts:
  - a locality (the historic environment)
  - British
  - European and/or wider world settings.

British history must form a minimum of 40% of the assessed content over the full course.

Students are required to study:

One thematic study
This enables students to understand change and continuity across a long sweep of history. The study must cover all three specified eras.

One period study
This allows students to focus on a substantial and coherent medium time span of at least 50 years. The study will require students to understand an unfolding narrative of substantial developments and issues. The period study can be from any of the specified eras.

Two depth studies
One British and one European/wider world. Depth studies enable students to focus on a substantial and coherent short time span. The studies enable students to gain understanding of the complexities of a society or historical situation and the interplay of different aspects within it. Depth studies must be taken from different eras.

A study of the historic environment
The study of the historic environment should focus on a particular site in its historical context and enable students to study the relationship between a place and historical events and developments. There is no requirement to visit the site. This study can be linked to any other part of the course or may stand alone.

The subject content for GCSE History requires that students follow a 'coherent and substantial study of history in which the elements are reasonably balanced'.

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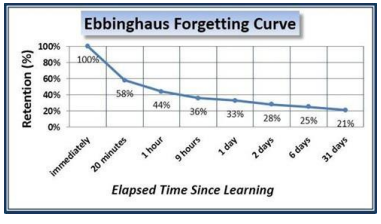

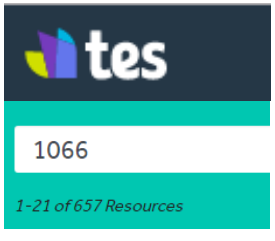

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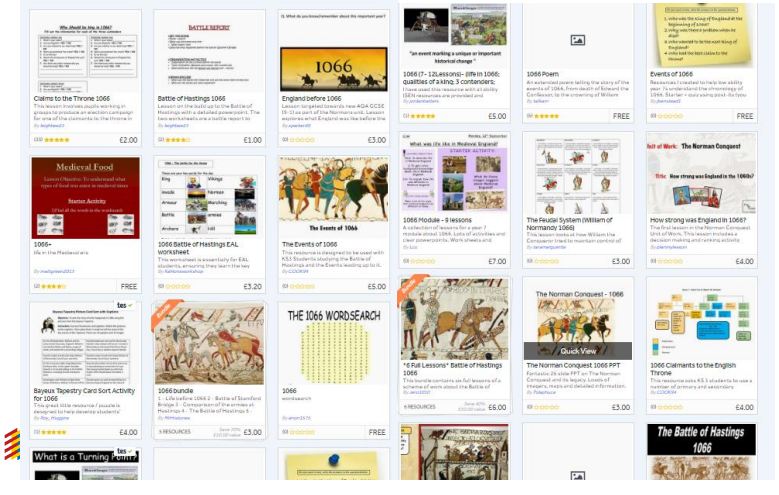

The Nazi rise to power and seizure of control	
1929	**Wall Street Crash** in America leads to a depression and **6 million unemployed** in Germany; Nazi messages seem more relevant.
1930	Election: Nazis win **18.3%** of votes: **second largest party** in Reichstag. Weak centre-right governments are supported by Hindenburg.
1932 Apr Jul Nov	Presidential election: **Hindenburg wins again**, Hitler comes second. Election: Nazis gain **37.4%** of votes but no government is formed. Election: Nazi vote falls to **33.1%,** Communist vote increases; Kurt von Schleicher appointed chancellor but can't gain support
1933 Jan Feb Mar May Jul	Von Papen convinces Hindenburg to **appoint Hitler chancellor** as part of a **coalition government** which will limit Nazi power. The **Reichstag Fire; Reichstag Fire Decree** restricts civil liberties. Election: Extensive intimidation by Nazis; Nazis win **44%** of votes, **ban the Communist Party**, pass the **Enabling Act**. **Trade unions** are **banned.** All other **political parties are banned**.
1934 Jun Aug	**Night of the Long Knives**: Hitler curbs the power of the **SA, Röhm is killed**, leading **opponents arrested** including von Schleicher**.** Hindenburg dies, **Hitler becomes Führer.** Armed forces swear a personal **oath of loyalty** to Hitler.

Key factors	
1. **Unemployment**	8 million unemployed people felt let down by the government.
2. Propaganda	The Nazis offered appealing messages through powerful propaganda, Hitler was an effective speaker.
3. Terror	The SA attacked opposing politicians and supporters; violence created an atmosphere of crisis Hitler promised to solve.
4. Fear of Communism	Unemployment and anger increased votes for the Communists: this scared many middle-class voters.
5. Uncommitted democrats	Hindenburg and many right-wing non-Nazis were not committed to democracy and underestimated Hitler.

Key terms	
1. Chancellor	Head of government
2. Coalition	Government with two or more parties sharing power
3. Enabling Act	Law giving Hitler power to make laws without Reichstag approval.
4. Führer	The combination of chancellor and president
5. President	Head of state
6. Reichstag	The German national parliament
7. SA	Organisation of Nazi supporters, 2 million members by late 1933.
8. SS	Hitler's elite bodyguard

Key people	
1. Paul von Hindenburg	President, First World War general and hero
2. Franz von Papen	Right-wing member of the Centre Party
3. Ernst Röhm	Leader of the SA
4. Kurt von Schleicher	Right-wing politician, former general, not a Nazi

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Representations

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Misconceptions

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Horizon knowledge

1, 2, 3 → + → x

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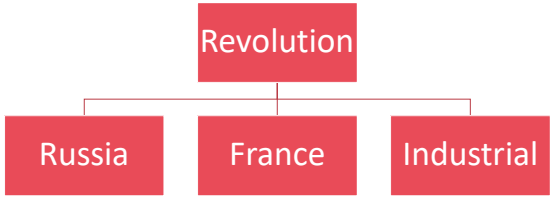
Knowledge structures



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Decision rule #1

Plan the key points in a unit in advance

- Knowledge
- Representations (to explain key ideas)
- Misconceptions
- Horizon knowledge (prior knowledge and future topics)
- Knowledge structures

Don’t worry (so much) about lesson planning

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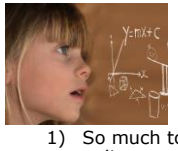
Endemic problems



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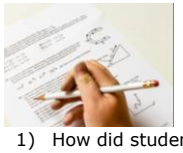

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Decision rule #2

Cut everything from the lesson except one, academic purpose

Don't try to achieve multiple academic goals

Don't try to achieve non-academic goals

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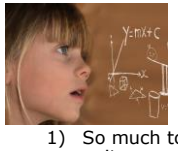
Endemic problems



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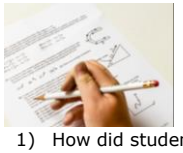

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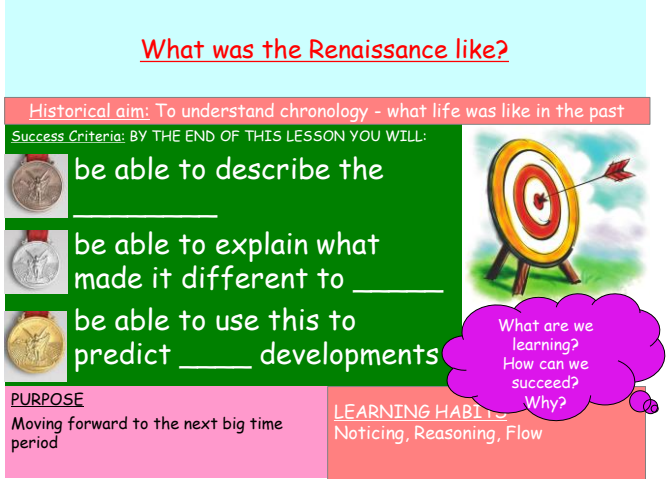
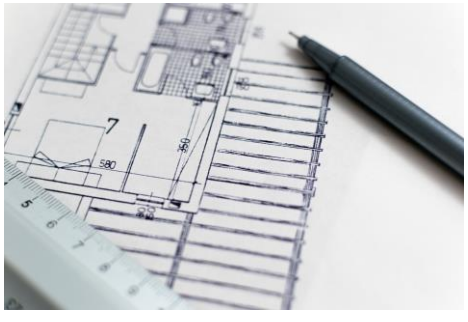


Do your best.

Write an elegant and insightful response.



Worked example

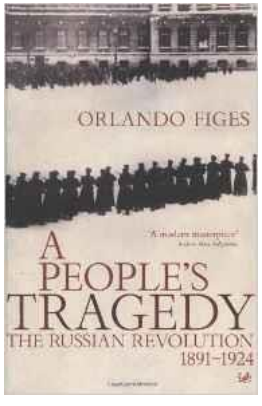
$\frac{3}{5} + \frac{1}{4} =$

Your turn

$\frac{2}{3} + \frac{1}{5} =$

Ericsson and Pool, 2016
Sadler, 1989

Barton, 2018



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Year 12 Figes Criteria	
1	Uses personal accounts and detailed contemporary source material to **exemplify** and **characterise** a historical situation. Uses individual **stories to explain** or **illustrate the bigger picture**. "Juicy evidence".
2	Relevant, rich, **dense evidence** used to **support his argument.**
3	Using multiple, **carefully chosen**, sources to support his argument.
4	Using the content (sometimes provenance) and context of contemporary source material **AND** other historians' arguments, to strengthen his argument/undermine alternative arguments.
5	**Clear sense of argument** – use of signposts and skilfully pulling "argument threads" together at the end of a paragraph/section/chapter.
6	Clear sense of where evidence fits into his argument, and the status it has.
7	Explains how and why things changed over time (analytical) but **without being stale or boring. Builds a picture.**
Extra	Shows where his argument fits into what other historians have argued.

What would *Figes* do? (Action)	
	Section B
1	*Re-draft this answer using feedback.*

Massey, 2016

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Renkl, Hilbert and Schworm, 2008

Wittwer and Renkl, 2010

Decision rule #3

If you want students to do something, show them a good one and a bad one first and let them compare.

Don’t worry about copying

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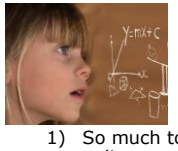
Endemic problems



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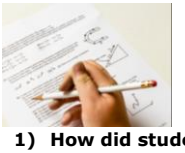

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Poor Proxies for Learning

(Easily observed, but not really about learning)

1. Students are busy: lots of work is done (especially written work)
2. Students are engaged, interested, motivated
3. Students are getting attention: feedback, explanations
4. Classroom is ordered, calm, under control
5. Curriculum has been 'covered' (ie presented to students in some form)
6. (At least some) students have supplied correct answers (whether or not they really understood them or could reproduce them independently)

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Coe, 2013

Objective:
Students can add two fractions with shared, and with different, denominators.

Exit ticket:

1) $\frac{2}{7}+\frac{3}{7}=$

2) $\frac{4}{5}+\frac{3}{5}=$

3) $\frac{1}{5}+\frac{2}{6}=$

4) $\frac{2}{3}+\frac{3}{4}=$

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Objective:
Students can explain what made Greek civilisation unique.

Exit ticket:
What made Greek civilisation unique?

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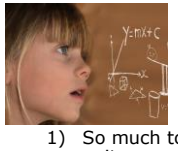
Decision rule #4

Check what every student understood at the end of every lesson.

Don't:

- Rely on substitutes
- Assume it will stick
- Feel you have to mark it

Endemic problems



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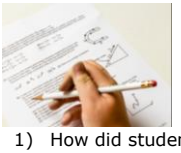

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Among patients who died in intensive care, doctors who were "completely certain" of their diagnosis…

…were wrong 40% of the time.

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Kahneman, 2011

Which of these campaigns was Martin Luther King involved in?

a) The March on Washington
b) The American Civil War
c) Barack Obama's presidential campaign

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Which of these campaigns was Martin Luther King involved in?

a) The March on Washington
b) The Freedom Riders Campaign
c) Lunch counter sit-ins.

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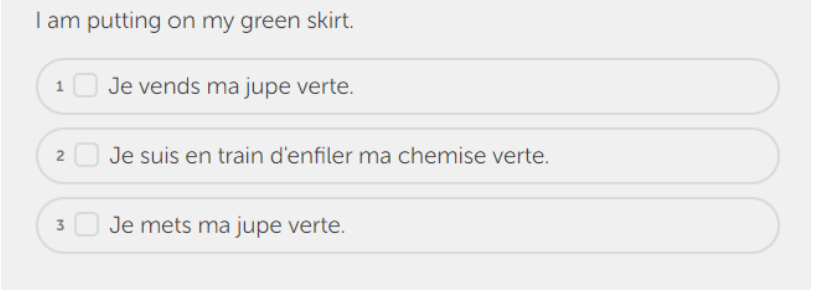

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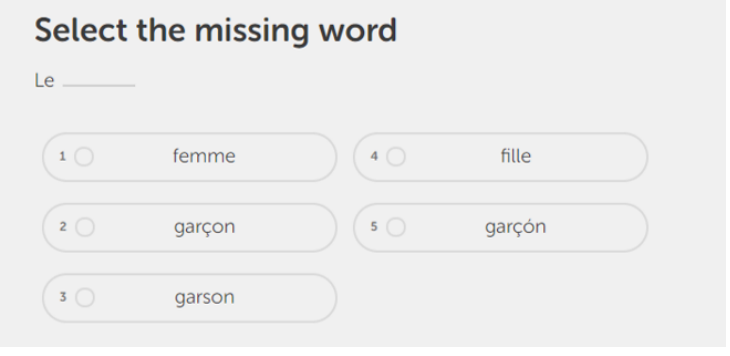
Duolingo



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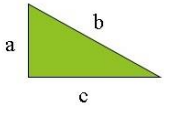
Duolingo

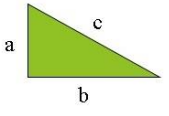
Which of these is correct?

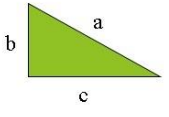
A. Its on its way.
B. It's on its way.
C. Its on it's way.
D. It's on it's way.

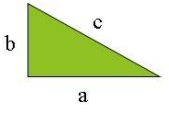
Wiliam

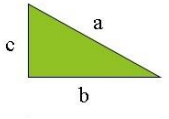
- In which of these right-angled triangles is $a^2 + b^2 = c^2$?

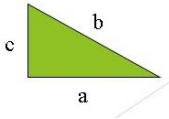
A 

B 

C 

D 

E 

F 

Wiliam, 2013

At the end of Act I, Scene 2, which of these is true?

a) The Montagues and the Capulets are enemies.
b) Romeo is in love with Juliet.
c) The Capulets have invited Romeo to their party.

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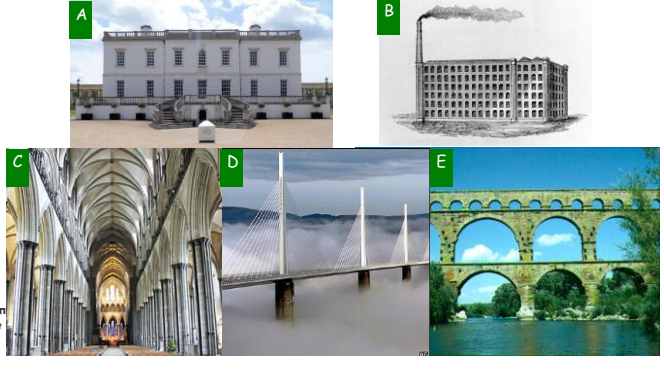
How did life change in the Industrial Revolution?

Which of these shows a building from the Industrial revolution?



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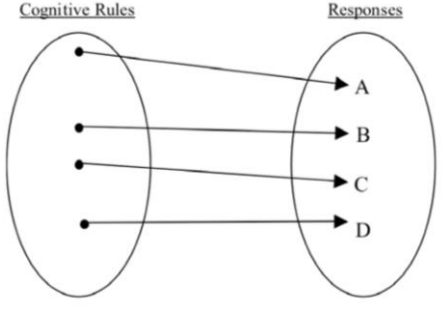


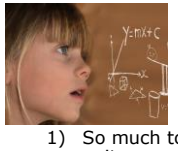
Wylie and Wiliam, 2007

Decision rule #5

Put a hinge question in your lesson after you introduce the key idea

Don’t worry about this until you’re using exit tickets every lesson.

Endemic problems



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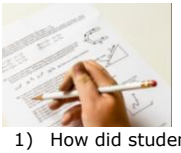

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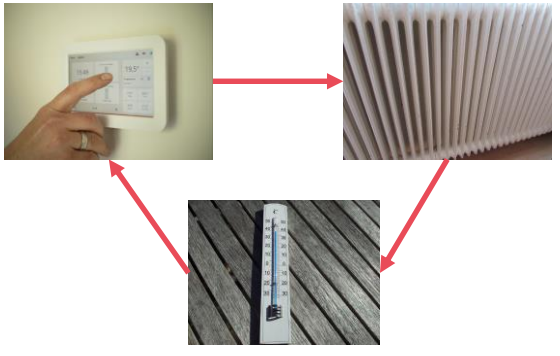
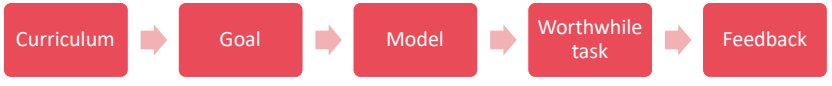


What do we need before we give feedback?



Decision rule #6

Give less feedback, get students to do more with it.

Don't worry about what/how much you're writing. Worry about how much they're improving.

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What's the problem and what does a solution look like?

How can we plan effectively and efficiently?

How can we respond to student understanding effectively?

Conclusions and next steps

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Responsive teaching =

What do I want students to know/do?
(guidance from cognitive science)

What did students understand?
(guidance from formative assessment)

What do I do next?

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Six decision rules

1) Plan the key points of the unit in advance (knowledge, representations, misconceptions, horizon knowledge)
2) Cut everything from the lesson except a single, academic purpose
3) If you want students to do something, show them a good one and a bad one first and let them compare.
4) Always check what everyone understood at the end of every lesson.
5) Put a hinge question in your lesson after you introduce the key idea
6) Give less feedback, get students to do more with it.

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Responsiveness =

Understanding

Validation

Care/support

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Reis, 2007

Dank u wel!

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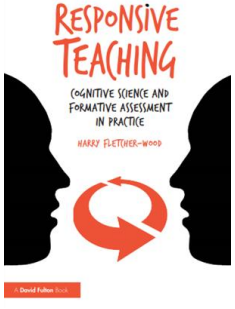

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