



**WebbAlign™**

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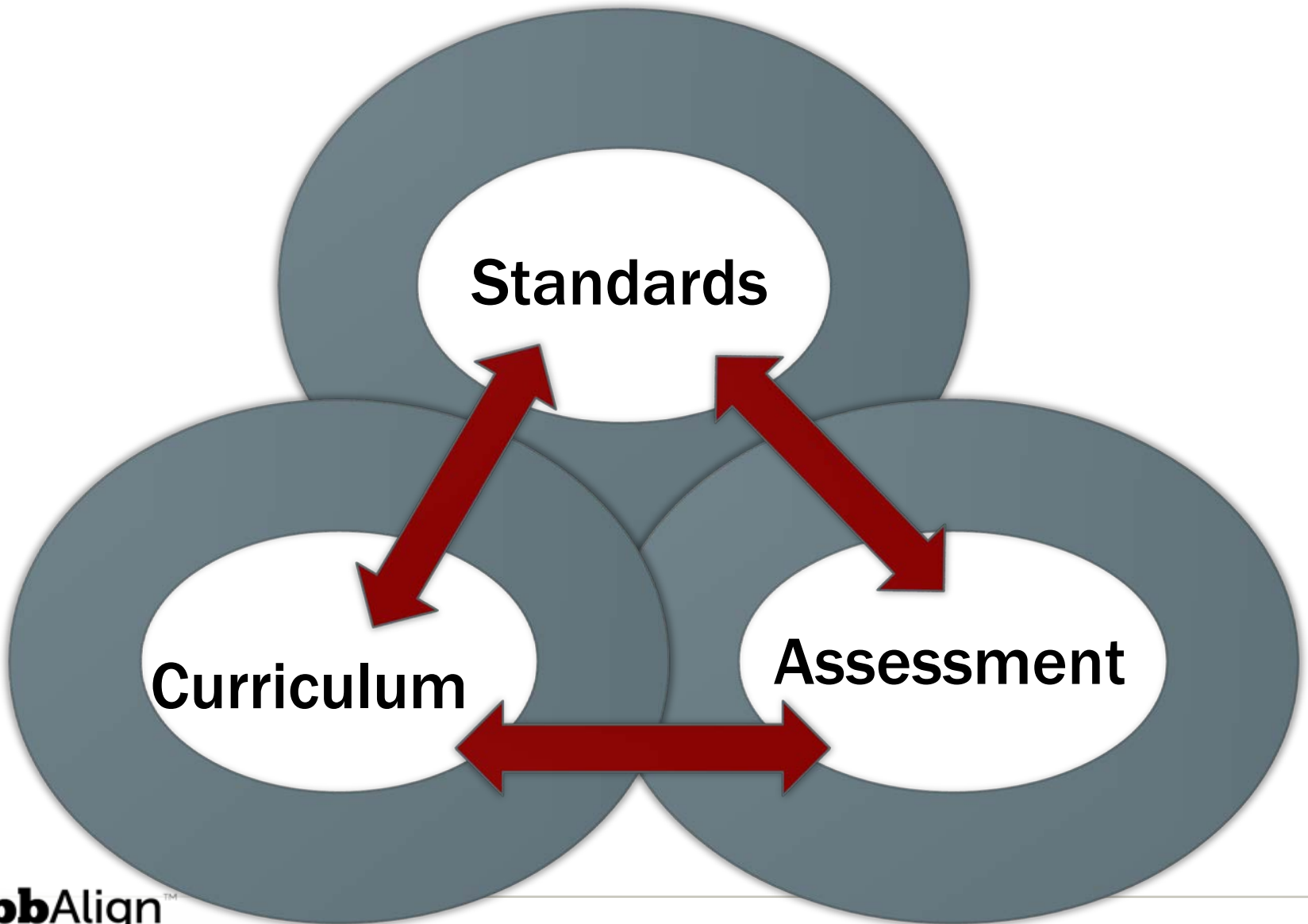
# Meeting the NGSS “Alignment Challenge”

- Current alignment models may provide relevant and appropriate frameworks for understanding NGSS alignment but will require some modifications.
- Use of a language system such as DOK allows for consistent and efficient communication about the intended complexity of NGSS expectations and alignment of corresponding assessment tasks.

# Alignment: A powerful tool for focusing instruction, curricula, and assessment

**“Alignment** is the degree to which expectations[, curriculum,] and assessments are in agreement and serve in conjunction with one another to guide the system toward students learning what is expected.” (Webb, 1997)

# ALIGNMENT



# Alignment Criteria (Webb, 1997)

<b>Categorical Concurrence</b>	same or consistent content in standards and assessment
<b>DOK Consistency</b>	assessment elicits work that is as cognitively demanding as the expectations in the standards
<b>Range of Knowledge</b>	comparable span of knowledge required for assessment as expressed in the standards
<b>Balance of Representation</b>	emphasis on assessment

# Defining Categorical Concurrence in the Context of NGSS

- how 3-dimensionality is evaluated
- appropriateness of stimulus
- scientific accuracy
- (depends on targeted construct)

# How might we map multivariate Categorical Concurrence?

SEP



DCI



CCC



# DOK Consistency and NGSS Alignment

“The NGSS PEs were designed to be very cognitively demanding, so student proficiency will require a higher level of rigor (for example, a higher Depth of Knowledge [DOK] or Bloom’s Taxonomy Level) than did most previous sets of state science standards.”

From NGSS Evidence Statements Front Matter (2015):

<https://www.nextgenscience.org/sites/default/files/Front%20Matter%20Evidence%20Statements%20PDF%20Jan%202015.pdf>

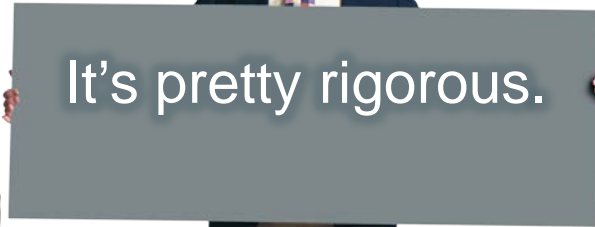


# NGSS and Complexity

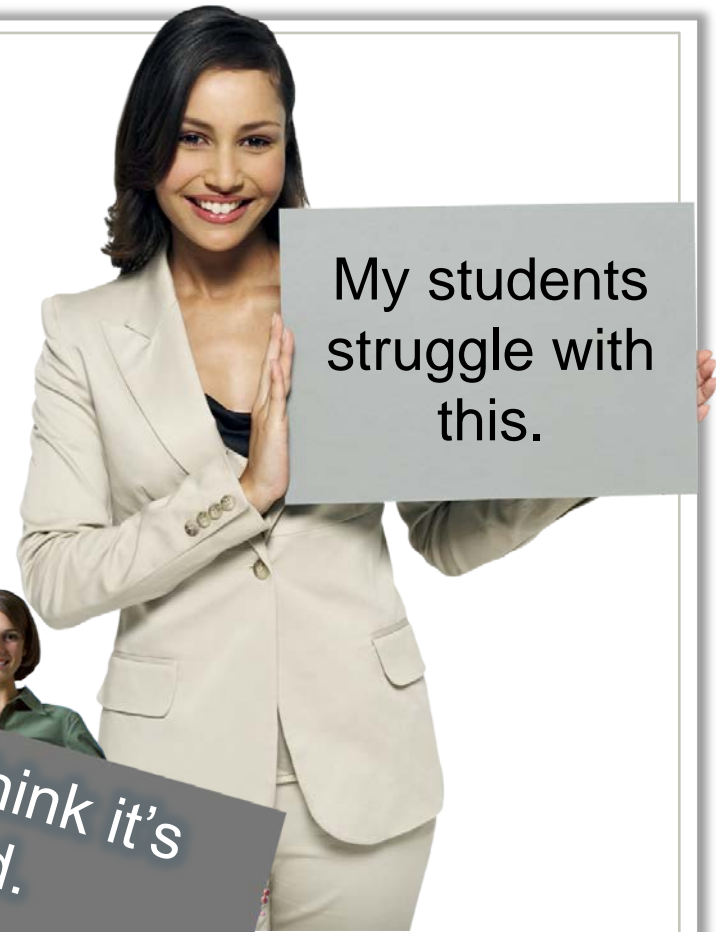
- “complex task design”
- “rich cognitive processes”
- “purposeful complexity”



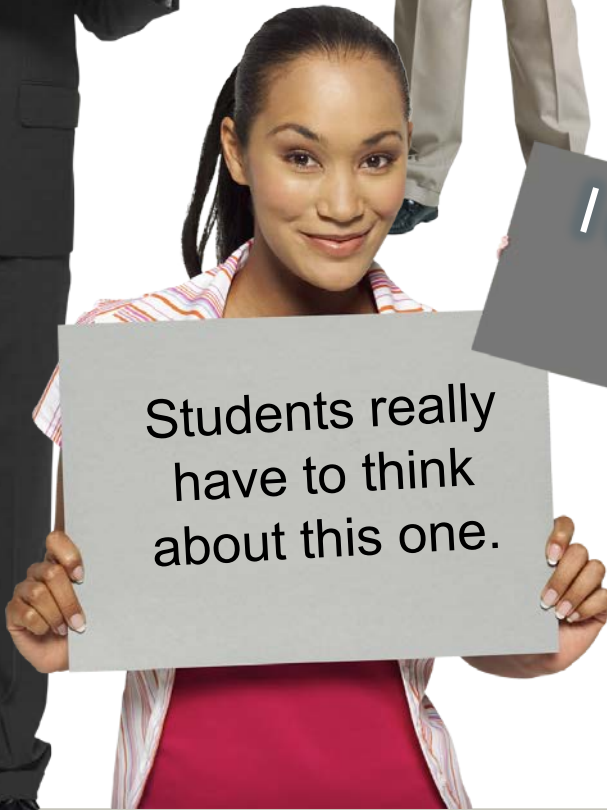
It's  
Challenging



It's pretty rigorous.



My students  
struggle with  
this.



Students really  
have to think  
about this one.



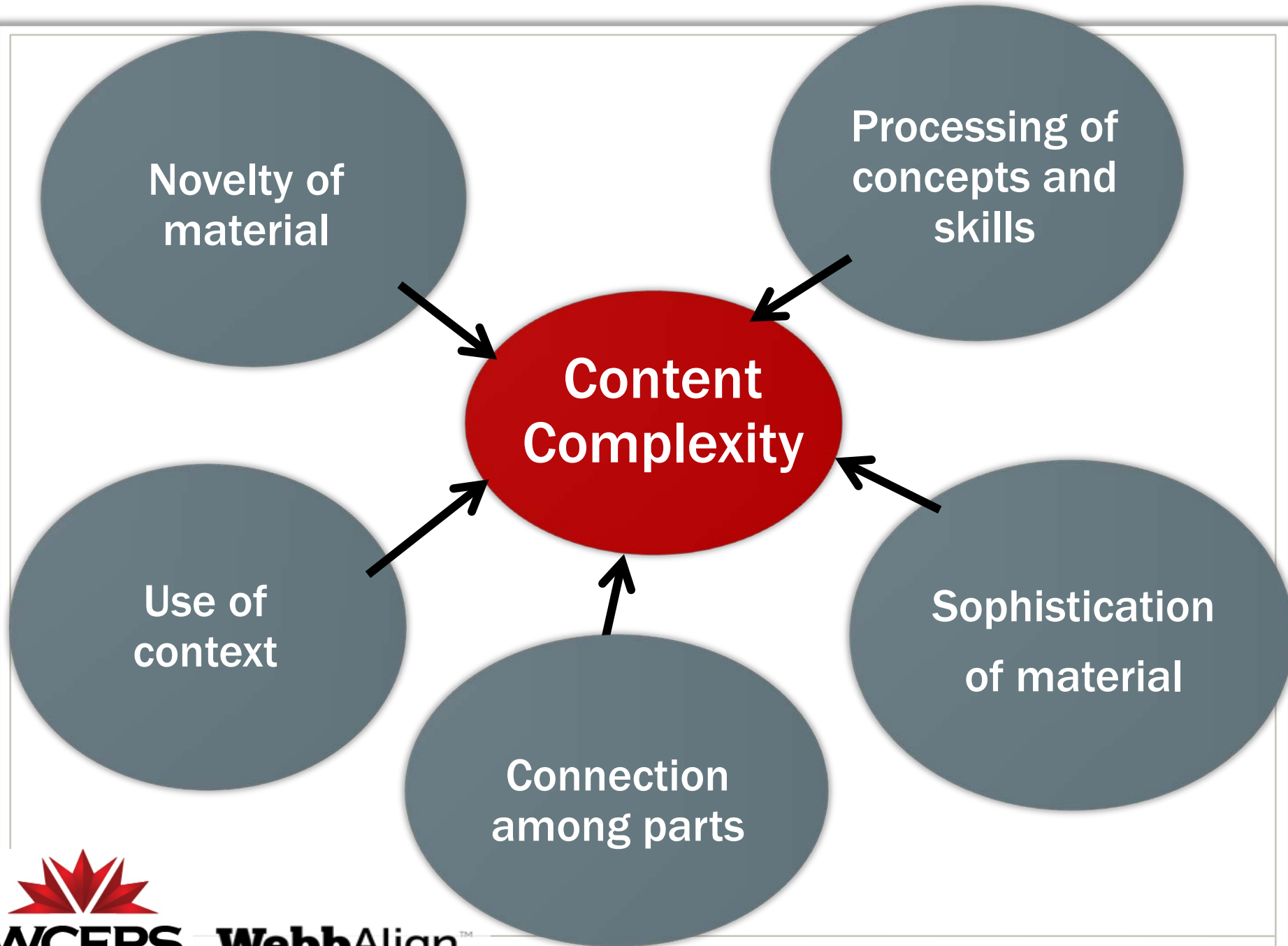
I don't think it's  
hard.

# **Depth of Knowledge (DOK)**

**is a powerful language system  
for talking about content  
complexity.**

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**DOK helps us differentiate between and  
among different levels of content  
complexity.**



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# HS-1E. Develop response plans to emergency situations.

Does it mean....?

If



then  
call



# HS-1E. Develop response plans to emergency situations.

## Does it mean...?



HS-PS-1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

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HS-LS-1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

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HS-LS-3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

# Depth of Knowledge (Webb, 1997)

<b>Level 1:</b>	<b>Recall and Reproduction</b> recall or reproduction of a fact, information, or procedure, etc.
<b>Level 2:</b>	<b>Skills and Concepts</b> interpret phenomena in terms of science concepts, connecting ideas, explaining relationships, etc.
<b>Level 3:</b>	<b>Strategic thinking</b> requires demanding reasoning, use of evidence to develop and support a logical argument, abstract and non-routine problem-solving, etc.
<b>Level 4:</b>	<b>Extended thinking</b> authentic science investigation or project; involves extended time spent on complex problems





# PISA 2006: Three Categories of Science Items (OECD, 2007)

- identifying scientific issues
- explaining phenomena scientifically
- using scientific evidence

# Takeaways: DOK & NGSS

- “NGSS is where DOK 1 goes to die” – Peter McLaren (2016ish)
- An aligned assessment should NOT include DOK 1 items
- Differentiating between DOK 2 and DOK 3 expectations could help promote alignment.
- Use of a common language to differentiate between and among levels of complexity can help support alignment endeavors.



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