SCIENCE TEACHERS' COLLECTIVE SENSEMAKING: A CONCEPTUAL AND ANALYTIC FRAMEWORK FOR UNDERSTANDING IMPLEMENTATION

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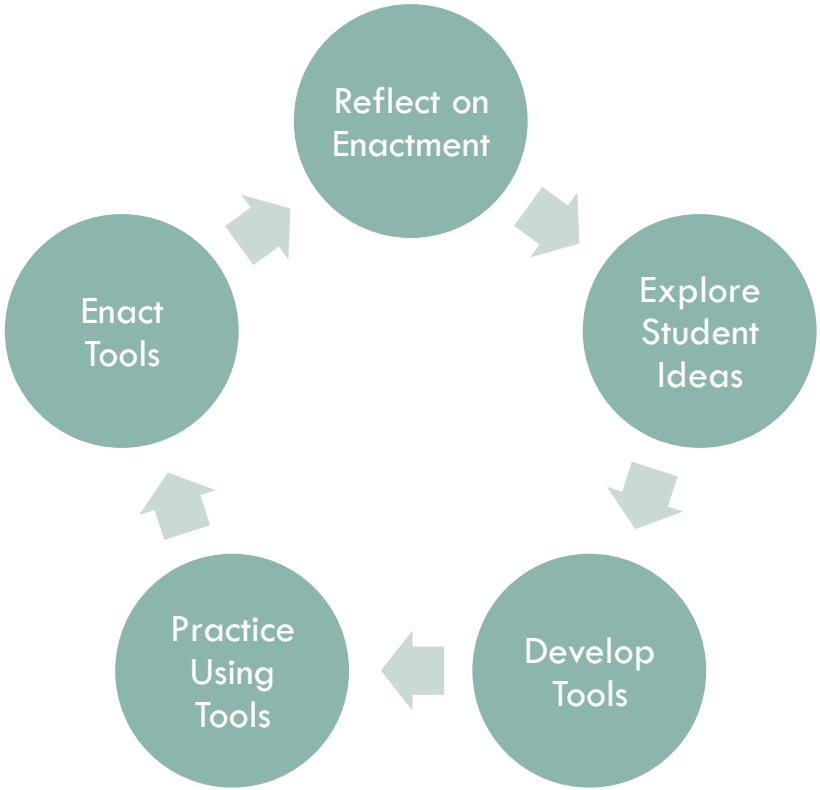

Sequencing of 'correct' ideas

Increasingly sophisticated ideas

Random Mutations	Transformationist incorrect	Variation
Environment causes change with genetic basis	Transformationist ideas	Variation - unclear or vague
Unclear or Vague	Unclear usage of 'adapt to environment'	No variation
Trait not present	No transformationist ideas	

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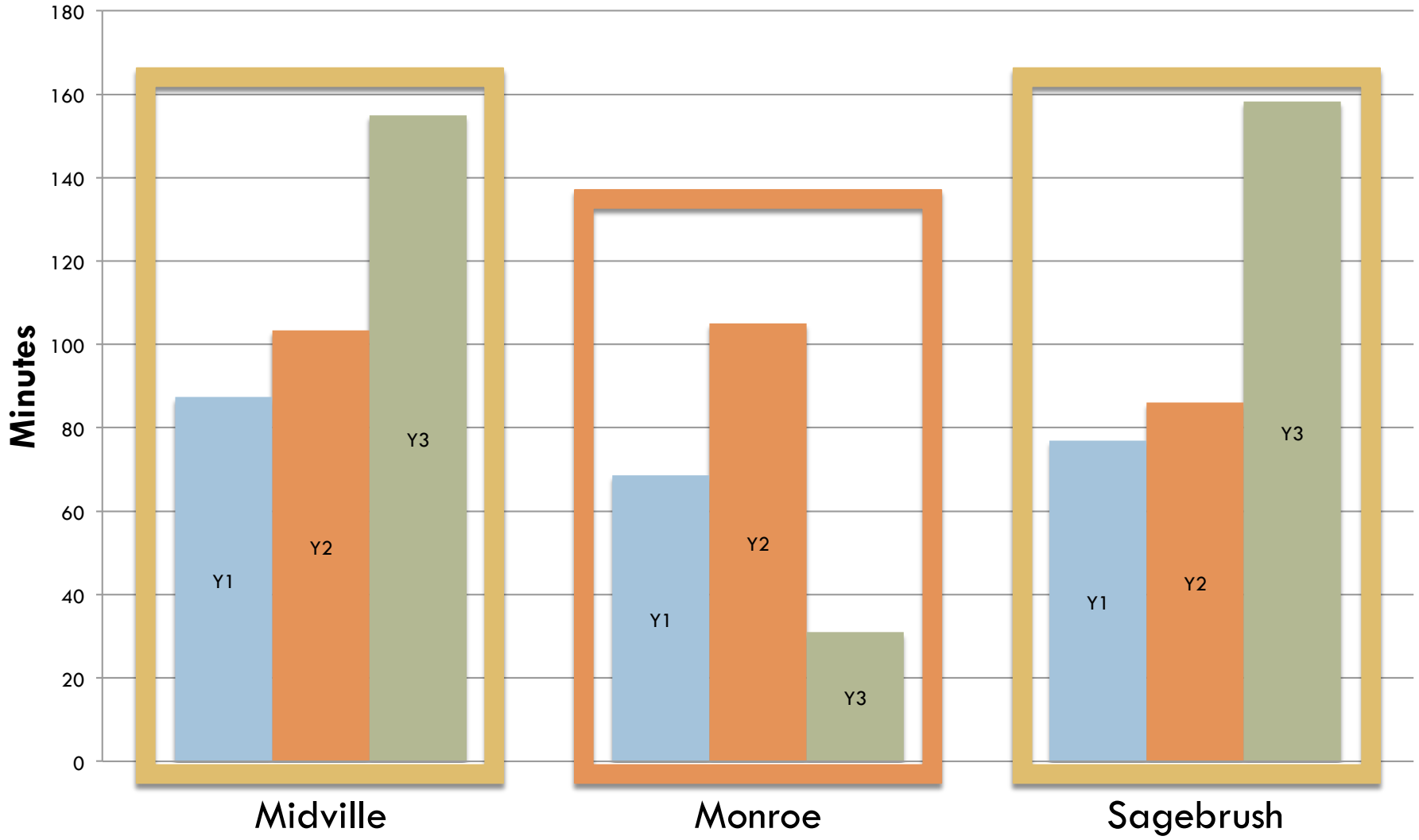
Average number of minutes each teacher spent using formative assessment tools in the classroom during the evolution unit each year



Sensemaking

- Reorganization of activity after change to work environment
- Retrospective and prospective communication
- Ambiguity and uncertainty

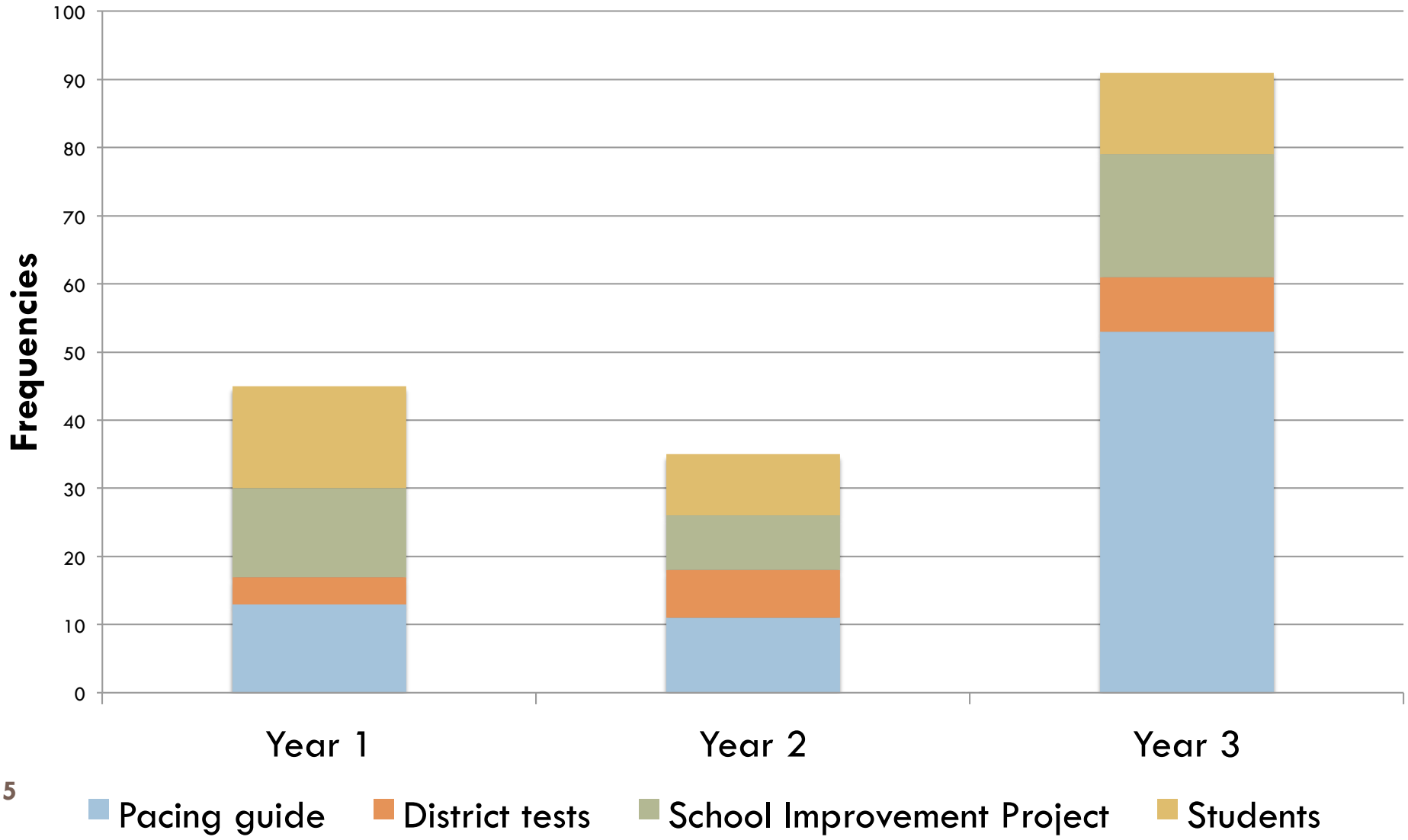
(Weick, 1995)

Teachers' collective sensemaking

- Interpret and act on messages about reform
- Resources for sensemaking include:
  - Perceptions about teaching and learning
  - Experiences with reform
  - Shared understanding of their students and their school/district

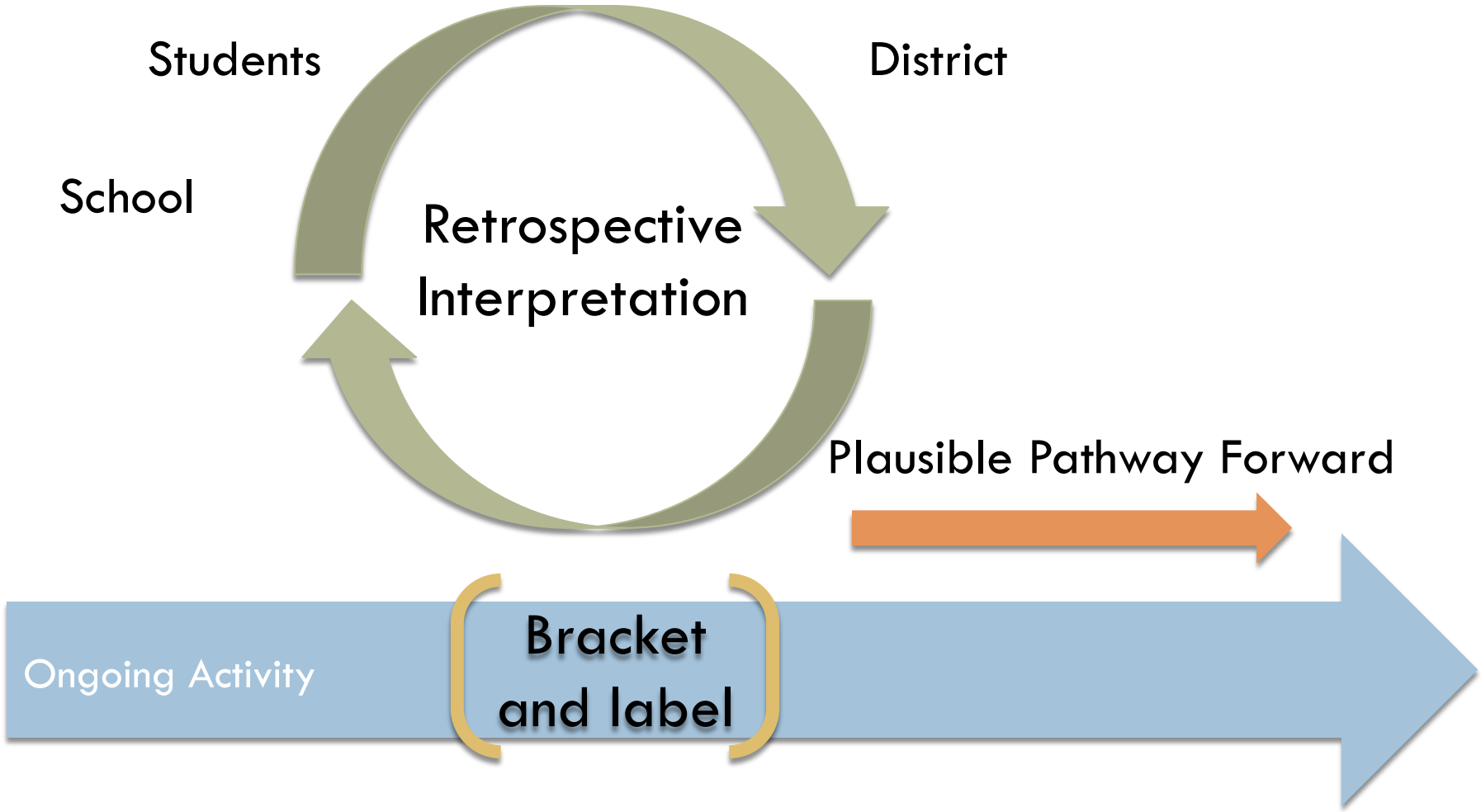
(Coburn, 2001; 2004; Spillane et al. 2002)

Count of teachers' references of organizational aspects of their work environment in professional development meetings at Monroe



Year of PD	Change	Uncertainty or Ambiguity
1	The pacing guide changed from 9 to 6 units of instruction across the school year and moved Evolution to the end of the year.	Teachers were unsure what they needed to teach in the first part of the school year and then were confused about what was left out
2	Kim left the school and Pamela (physics teacher) took over as lead science teacher. The planning responsibility shifted to Donna	How students would act or do during new types of activities. Donna in particular was concerned her students wouldn't focus and get work done.
3	The entire administration in Y1 and Y2 were fired and a new administrative staff was hired in their place.	Teachers talked a lot about the expectations for rigor and higher level thinking by the new administration and there was a lot of ambiguity about how that was measured and evaluated.

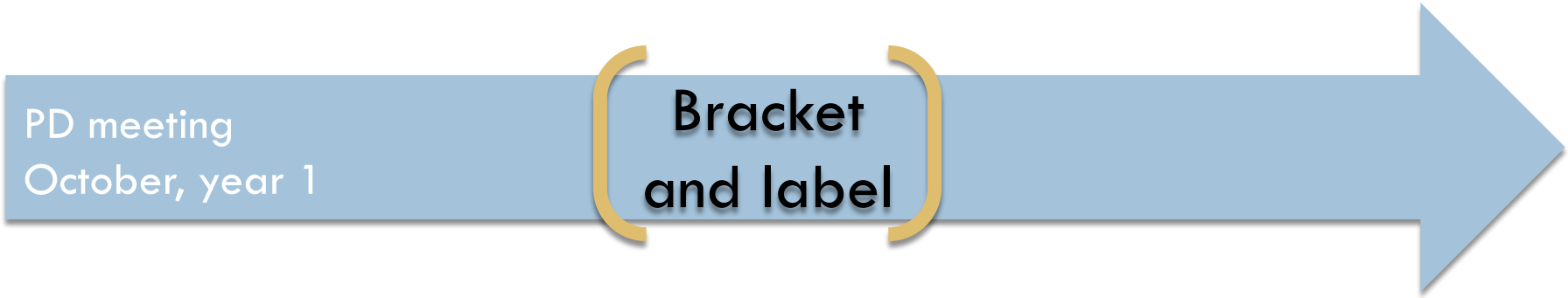
Process of sensemaking



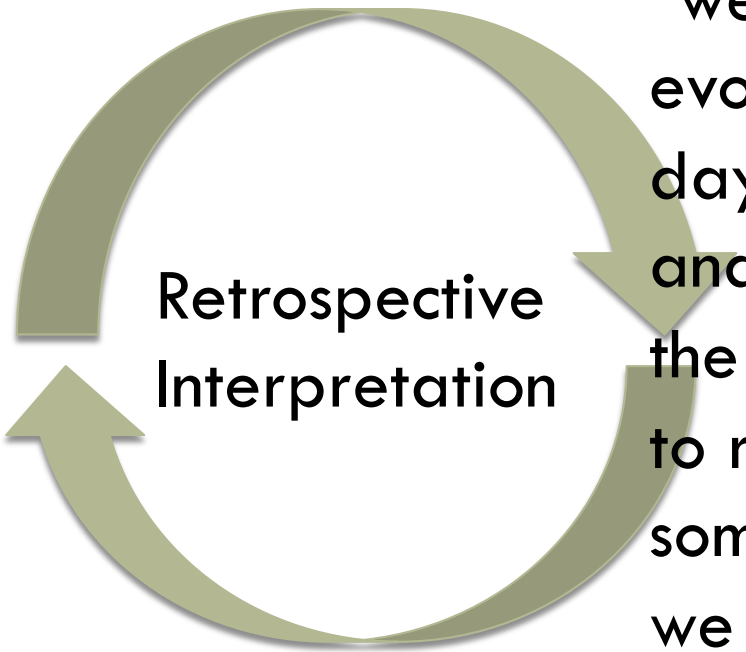
(Weick, Sutcliffe & Obstfeld, 2005)

Process of sensemaking

And to be honest I feel like although we didn't get to all of these [referring to pieces of learning progression]



Process of sensemaking

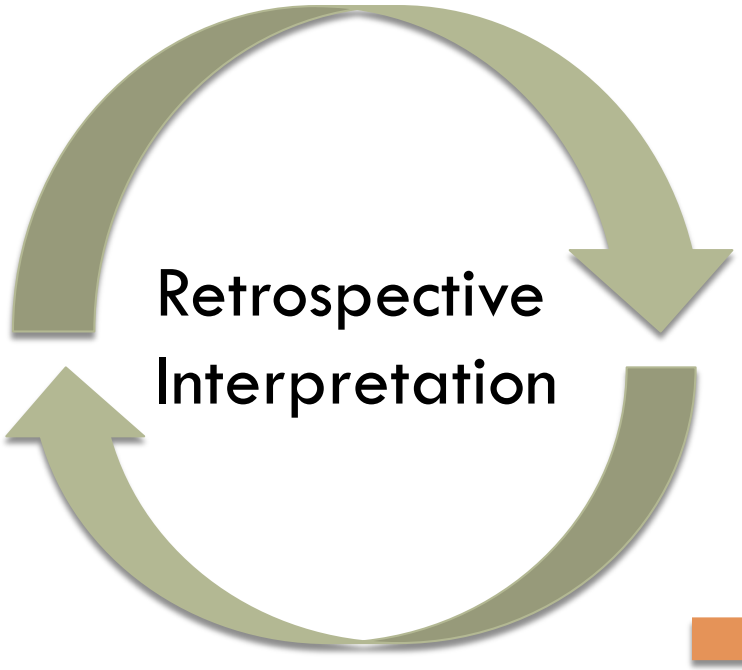


"we had what 2, 3 weeks to teach evolution...we were spending like one day sometimes on these big things so and then having to move on and feeling the crunch and not having enough time to really focus on and I know that's something we've always dealt with. Do we just do surface level on lots of things or do we go deep on a few?"

PD meeting
October, year 1

Bracket and label

Process of sensemaking



I think that's going to make a big difference this year because we aren't doing deep surface on a lot we are going to be doing deep on a few.

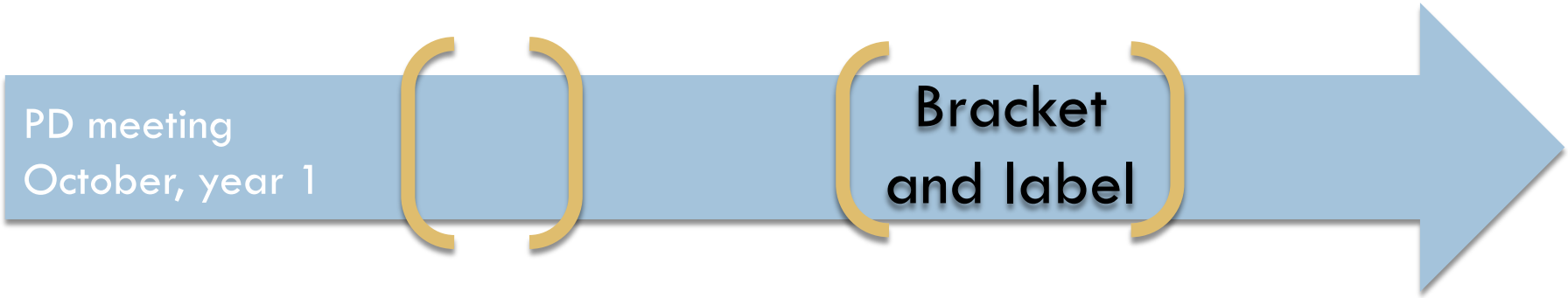
Plausible Pathway Forward

PD meeting
October, year 1

Bracket and label

Process of sensemaking

Well and without having seen the [pacing guide] as far as it goes with natural selection, evolution, it's hard to pick where we should go



Year 1 planning tool

Step 1: Setting Learning Goals	
Science content	
Overarching learning goal	
Big idea question	
Supporting learning goal	
Step 2: Finding Out What Students Know	
Assessment purpose	
Placement in unit	
Assessment activity	
Data to be collected about student learning	
Step 3: Anticipating Feedback	
Probable student alternative conceptions	
Feedback ideas	

Learning Progression

Random Mutations	Transforma-tionist incorrect	Variation
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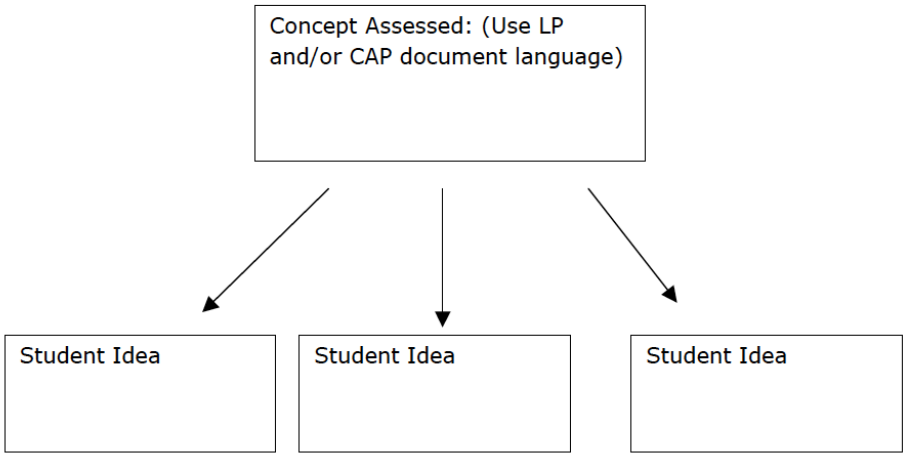
Year 3 planning tool

Sample Data Analysis Plan

Formative Assessment:_____



Implications

- Supports localized design and implementation
- Local sources of ambiguity and uncertainty

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