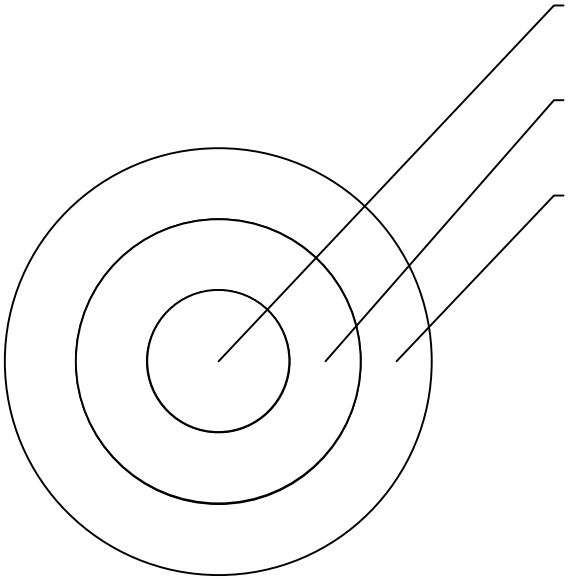
Secondary Science On-Ramps: Getting Everyone Up to Speed

Shannon C'de Baca

Exploding Colors Of Milk

- Pour milk in plastic dish
- Add 5 or 6 drops of food color around milk
- Notice the colors do not diffuse much
- Add a drop of dish soap
- Observe phenomena

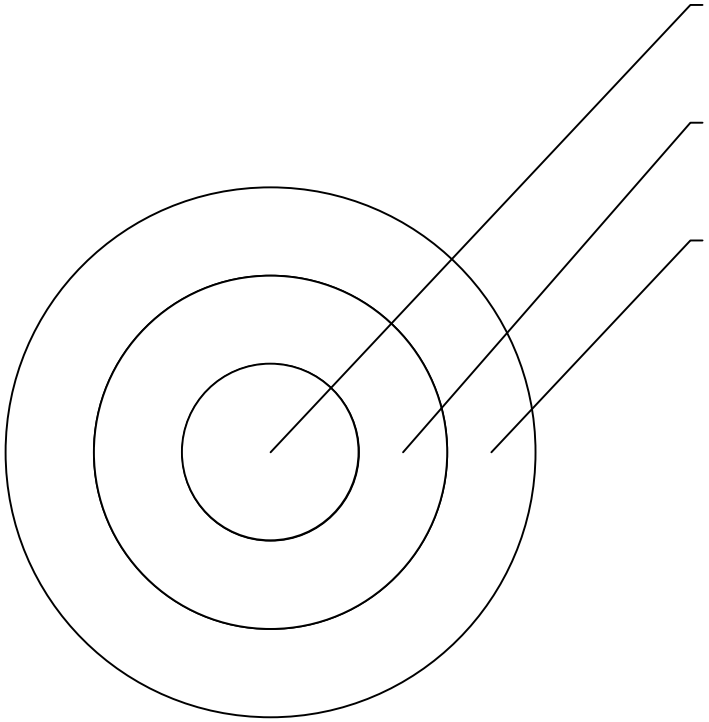
Unpacking the Standards



Key concept

Supporting conceptual information

Missed learning



Polarity

Like dissolves like

Attraction/Repulsion

Teach vs. Tell

- Water and surface tension
- Attraction/Repulsion
- Polar and non-polar molecules
- Emulsifiers
- Diffusion
- Density in liquids

Teaching 3 X deep

	1 X	2X	3X
Surface Tension	Sinkin' Lincoln	Pennies in a glass of water	Model on the board
Check for conceptual understanding	Explain to partner	Explain in writing	Formative assessment

Identify the Speed Bumps

- Mathematical understandings
- General skills
- Complex understandings
- Left field

On-Ramps

- Move faster, not slower
- Have tighter content focus than other parts of lesson
- Are filled with feedback and formative assessments
- Are “learning styles” based
- Have 3 levels if needed (not all levels are used)
- Should not be viewed as remediation...just a helpful nudge
- Group when appropriate
- Resist the urge to spoon feed

Lab Report as Exit Assessment

- 2 grades: process and content
- Argues from evidence
- Consistency of data
- Strong links between data and conclusions
- Opportunities for revision
- Focus is on learning at deeper level
- Illustrate points with tricks of the trade (graphs, charts, diagrams…)

Links to the Standards

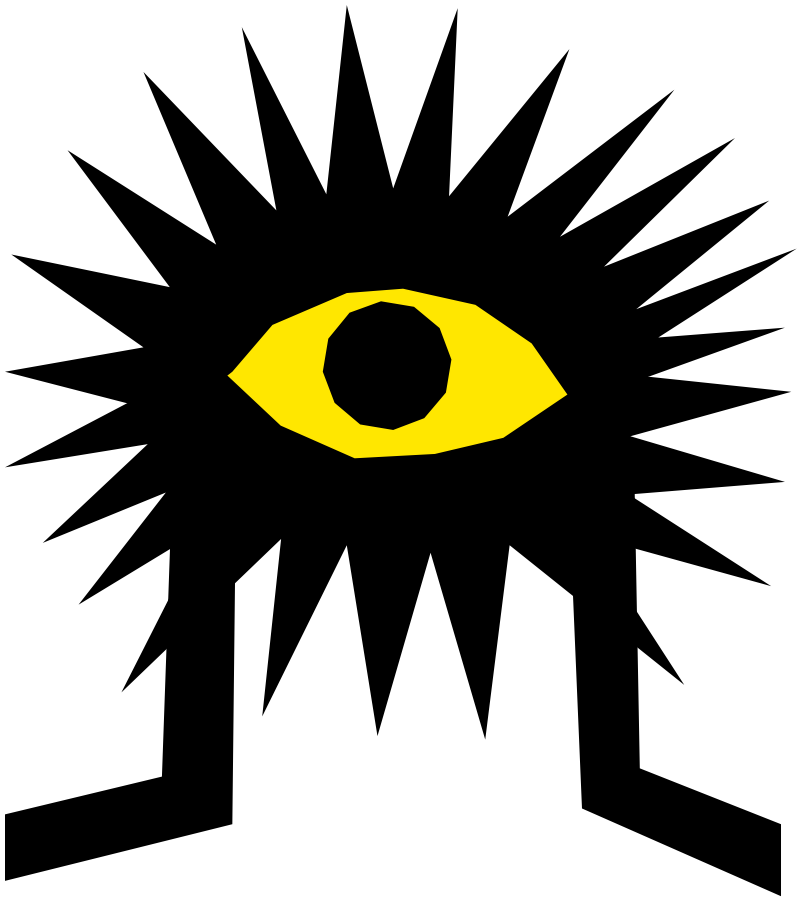
- **Properties of objects and materials**
  - Objects have observable properties
  - Objects can exist in different states
  - Characteristic properties of materials help identify them (5-8)

- **Position and motion of objects**
  - The position of an object can be described by its location relative to another object

Trying It On Your Own

- Select a lesson that is content rich
- Briefly describe it
- Unpack the standards
- ID teach vs. tell
- ID speed bumps to understanding
- Design on-ramps
- Construct an acceptable conclusion
- Example…example…example!
- Teach, revise, teach, assess

Proof is in the Pudding



- **Examining student work**
  - Why a 4 point scale?
  - Above the bar
  - Below the bar
- **Explaining 3 deep**
- **Models and analogies/metaphors**
- **Giving feedback**
  - Preserving your sanity
  - Student peer assessment
  - Parents as assessors

The Path to Success For All

- Identify the content clearly
- Find a great activity that illustrates the content
- Explore with the kids (lots of questions)
- Tighten up connections in examples
- Ask more questions
- Do not go too far…keep it tied to content level
- Let kids wrap it up