

Conceptual Understanding and Problem Solving

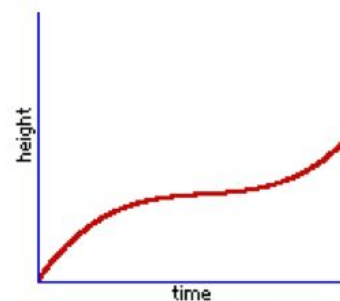
Steve Weimar
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**What is challenging about
teaching for conceptual
understanding?**

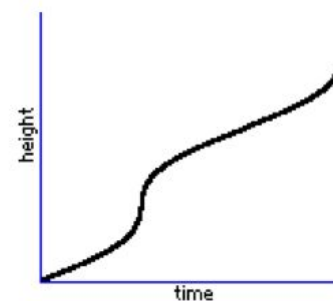
Notice and Wonder

- In a small group each say one thing you notice or wonder.
- Keep going until no more ideas come.
- If you identify some interesting problems to work on, hold off on solving and stick with noticing and wondering for now.
- Each write down what you notice and wonder

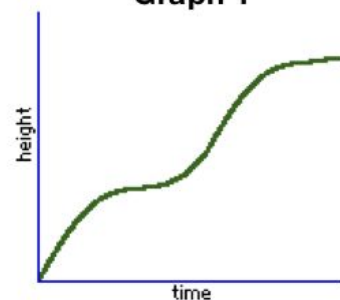
Filling Glasses



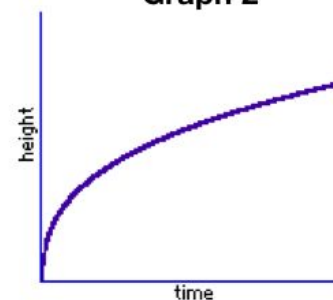
Graph 1



Graph 2



Graph 3



Graph 4

**What does Notice and Wonder
offer for conceptual
understanding?**

**What helps it work well? What
does it mean to get good at it?**

**What concepts might be
developing here?**

What was this about?

Student work and conceptual understanding

- In a small group, go around and say one thing you notice or wonder about in the student work.
- Stick to the data.
- If you find yourself making judgements about what is going on in the student's head, try turning those into wonderings.
- Continue until no more ideas come
- Think of a question or task that would be both engaging to the

Kierra (8th grade) Answer:

graph 1 goes with glass a/graph 3 goes with glass c/graph 4 goes with glass b

Explanation:

I think that glass b go with graph 4 because if you look at the glass, it's a little narrow at the top, and as you look at glass b it got a little curve then it just go straight up. On graph 4 it shows that it is going up faster than what it had start's to go the same amount, but it's still increasing going to the right.

Glass a goes with graph 1, because if you look at the glass, you can see that it is skinny then it goes up wider and wider each time. The graph is showing the same exact thing. You can also see that it is going to the right and going up, then it's staying that same size until it starts to increase more.

I thought glass c go with graph 3, because glass c have a little skinny curve then it go up, going to the right. first it increase then it stop, then it start to increase some more then as it get to the top it start to stay the same amount. so really it go up, down, up, down each time.

Kirin (3rd grade)

Answer:

My answer was that Glass A matches up with Graph 1, Glass B matches up with Graph 4, and Glass C matches up with Graph 2.

Explanation:

We know that if you are putting water into a glass at a constant rate the wider the glass the slower it will fill up. For Glass A it would get higher pretty slowly. Then we would reach a spot where the the glass has the same width for a little bit. Now the glass raises higher very slowly. this is shown on Graph 1.

For Glass B it keeps on getting higher. this is shown on Graph 4. for Glass C it gets higher very slowly and then since the width is smaller it get higher faster. now it gets higher little by little. This is shown on Graph 2.

**What conceptual understanding
is developing here?**

**What questions or tasks might
help move it forward?**

Notice and Wonder

<https://tinyurl.com/nwgf2018>

Resources:

Problems of the Week:

<https://www.nctm.org/pows/>

Notice and Wonder:

<https://www.nctm.org/mathforum/>

**IMPROVING FEEDBACK THROUGH ONLINE
PROFESSIONAL DEVELOPMENT,
MATHEMATICS TEACHER | Vol. 110, No. 5 •
December 2016/January 2017. Klein,
Fukawa-Connelly, Silverman**

**An Online Professional Development Model to
Support Teachers' Ability to Examine Student
Work and Thinking**

***Mathematics Teacher Educator* • Vol. 6, No. 2,
March 2018. Fukawa-Connelly, Klein, Silverman**

Resources:

**Powerful Problem Solving
*Activities for Sense Making with the
Mathematical Practices***

By [Max Ray-Riek](#)
Heinemann

<https://tinyurl.com/nctm-2018-nw>

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