15th ANNUAL

# TEACHING & LEARNING SYMPOSIUM

# Designing Classroom Assessment Ecologies for Universal Student Success


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UNIVERSITY of WASHINGTON

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# Importance of Failure and Feedback in Engineering Education: A Trail Case

Center for Teaching and Learning Symposium

April 17, 2019

“Can kids learn without grades?

Yes.

Can they learn without formative assessment and the feedback that comes with it?

Not at all.”

Rick Wormeli
Middle School Teacher and Author

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- Concept Delivery (3~4 hours)
- Unguided Practice (8~12 hours)
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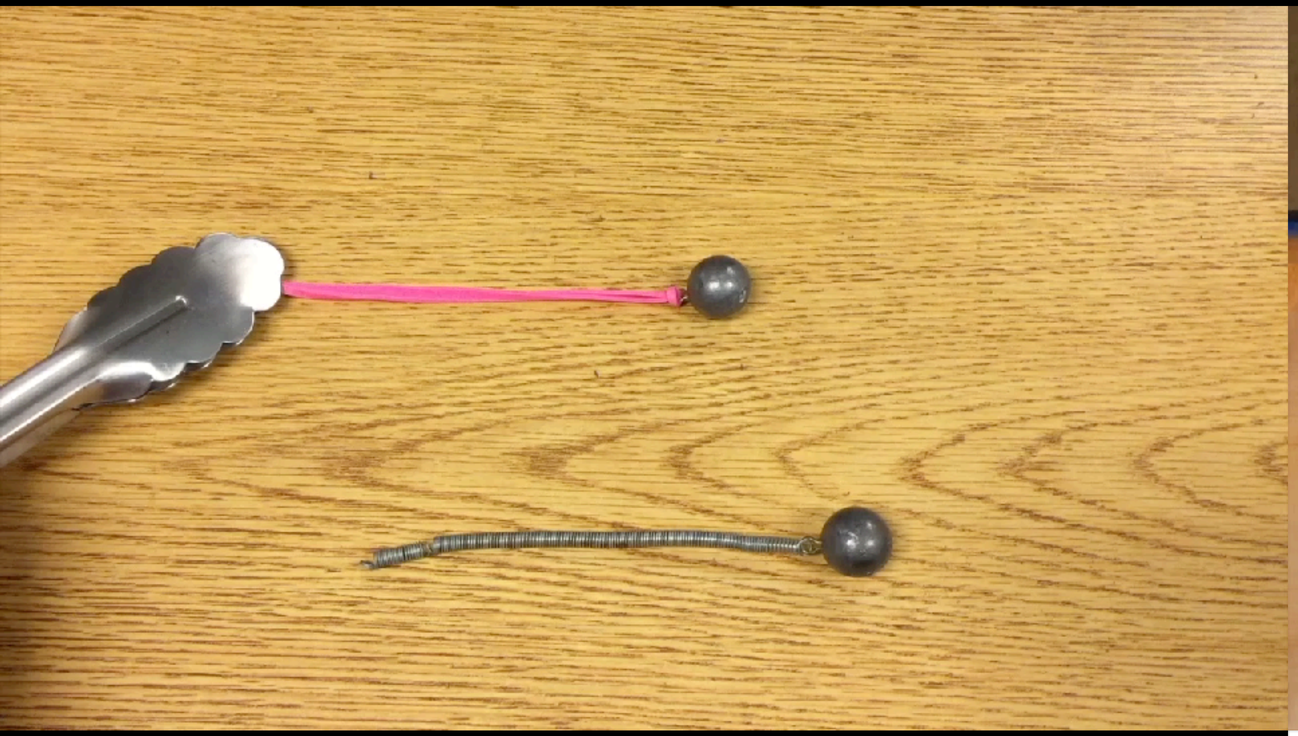
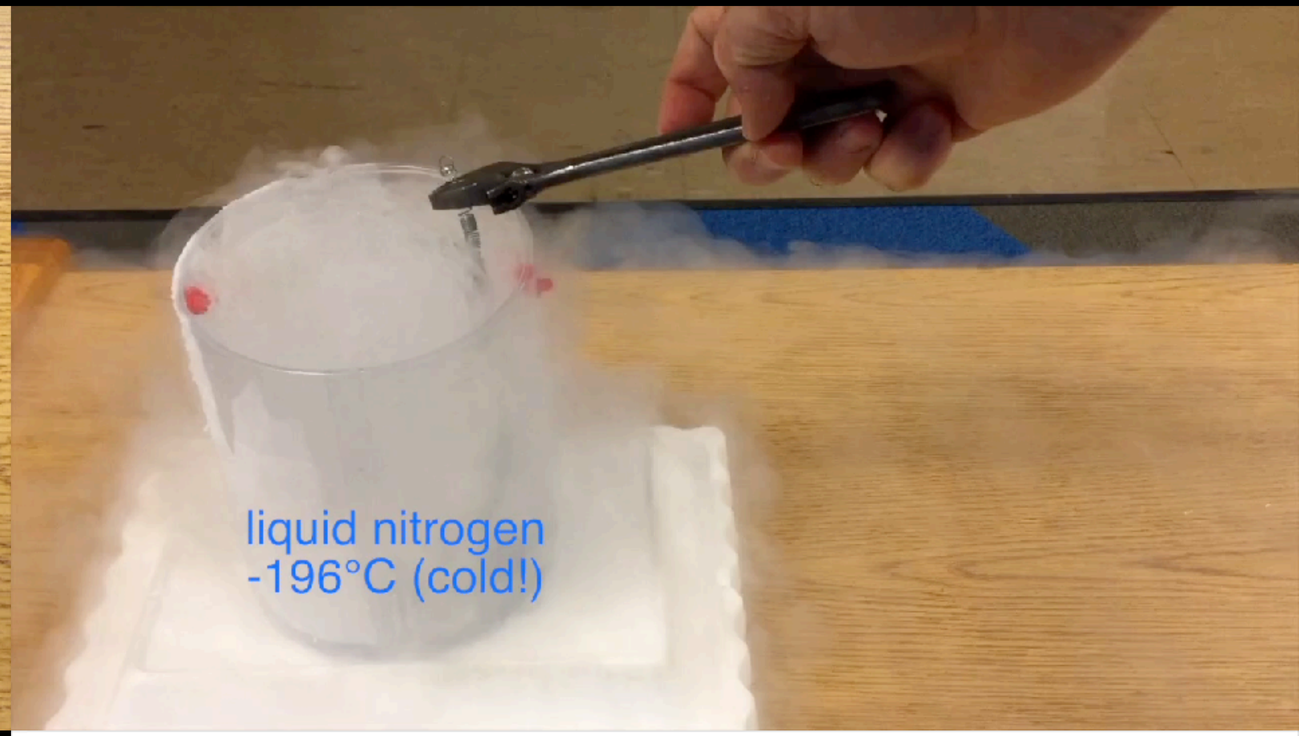
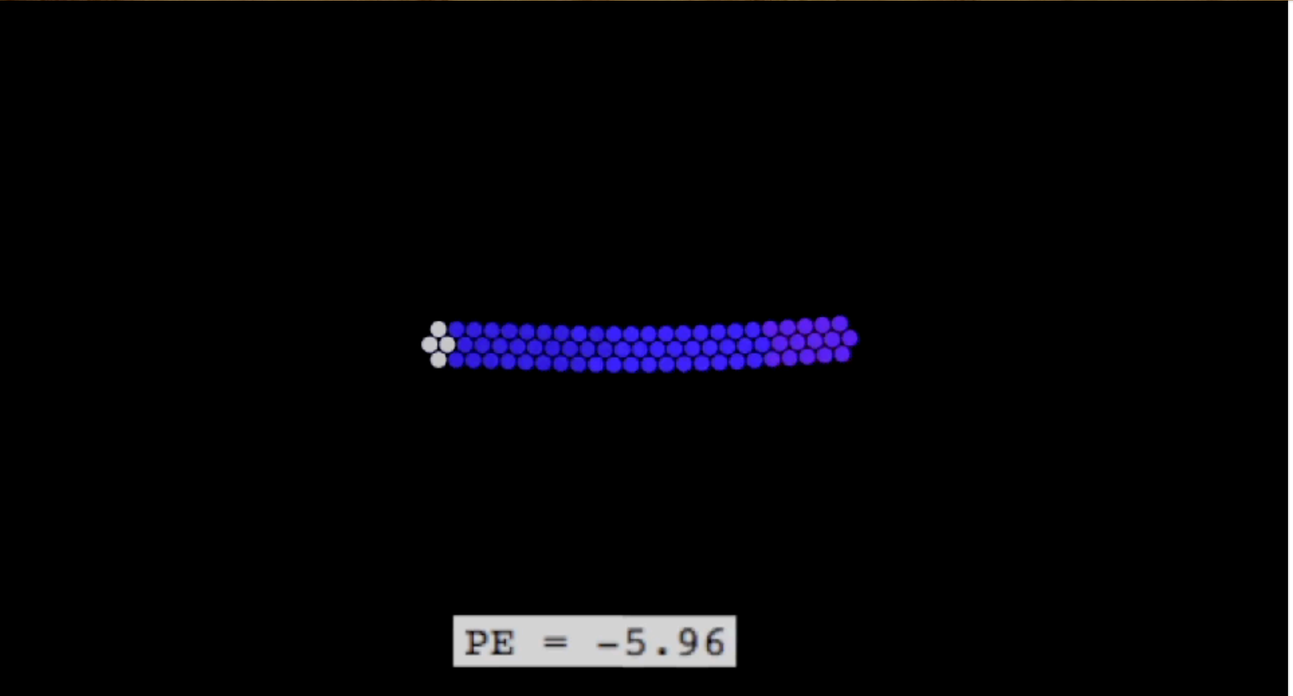
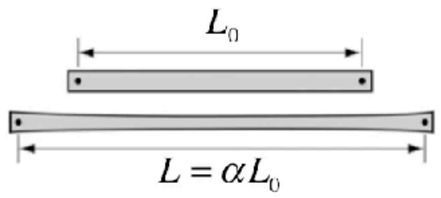
# Online Content






Initial state: $L_1 = 2L_0$ $T_1 = T_0$

final state: $L_2 = L_0$ $T_2 = ?$

# Online Content

**Question 10** *Prep Quiz* **1 pts**

Which analogy is most accurate from a molecular perspective?

- ○ The elastic restoring force of a rubber band is like the elastic restoring force of a metal coil spring.
- ○ The temperature increase of a rubber band when stretched is like the increase in temperature of your hands when you rub them together vigorously.
- ○ The elastic restoring force of a rubber band is like the pressure of an ideal gas.
- ○ Stretching a rubber band is like expanding an ideal gas.

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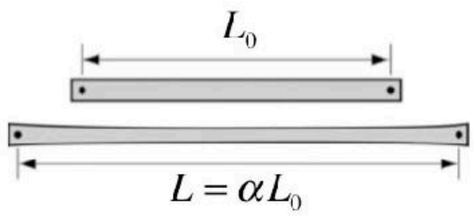


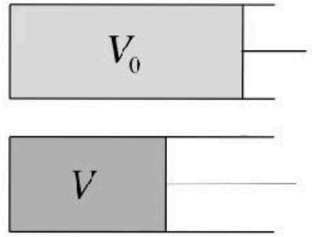


$$\hat{u} - \hat{u}_0 = \hat{C}_p(T - T_0)$$

$$u - u_0 = C_v(T - T_0)$$

$$\hat{s} = \hat{s}_0 + \hat{C}_P \ln\left(\frac{T}{T_0}\right) - \frac{R}{2M}\left(\left(\frac{L}{L_0}\right)^2 + \frac{2L_0}{L} - 3\right)$$

$$s = s_0 + C_P \ln\left(\frac{T}{T_0}\right) - R \ln\left(\frac{1/v}{1/v_0}\right)$$

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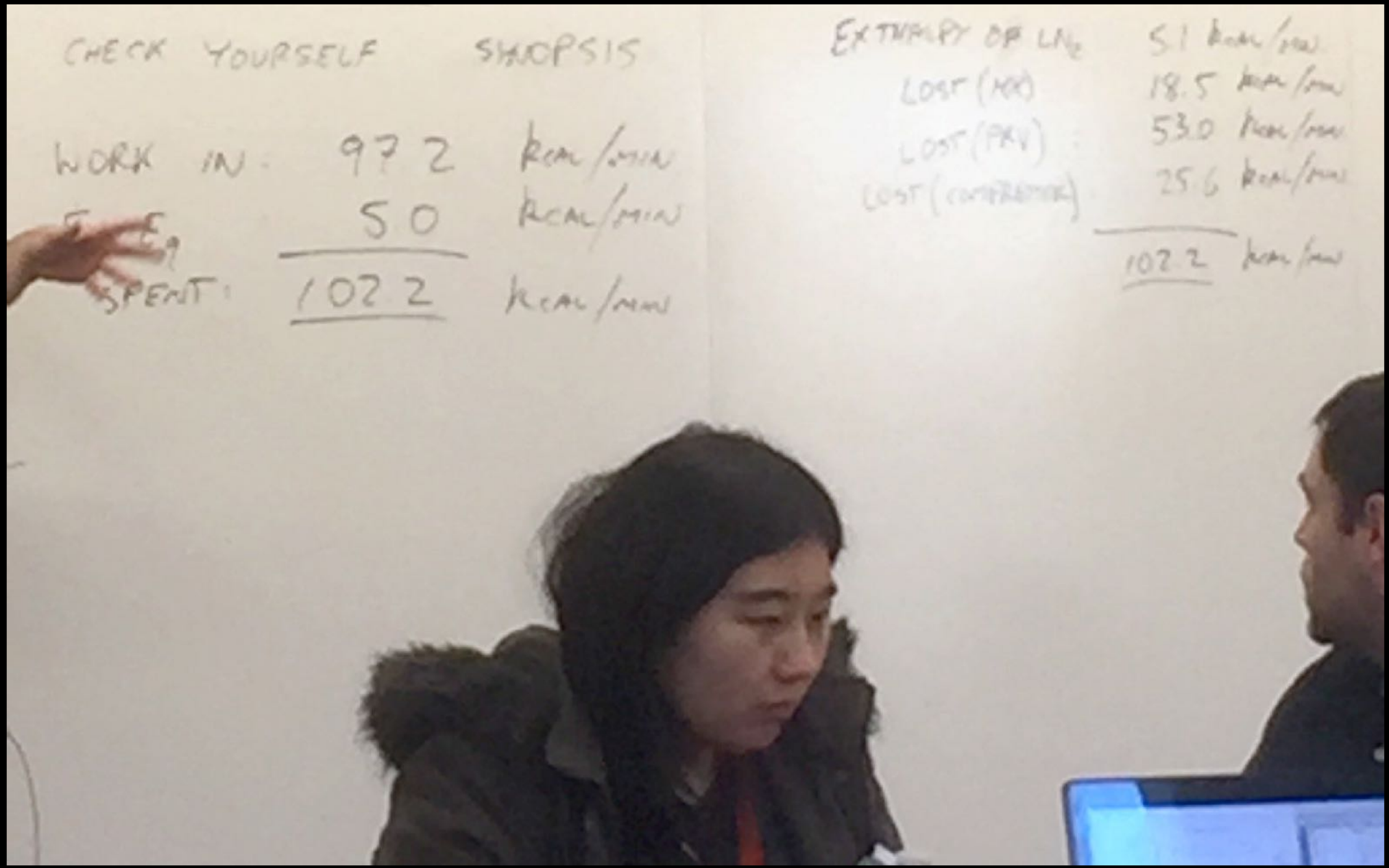
- Not all students need the same thing.

# Guided Practice



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- Debrief + rubric-based *self* grading.

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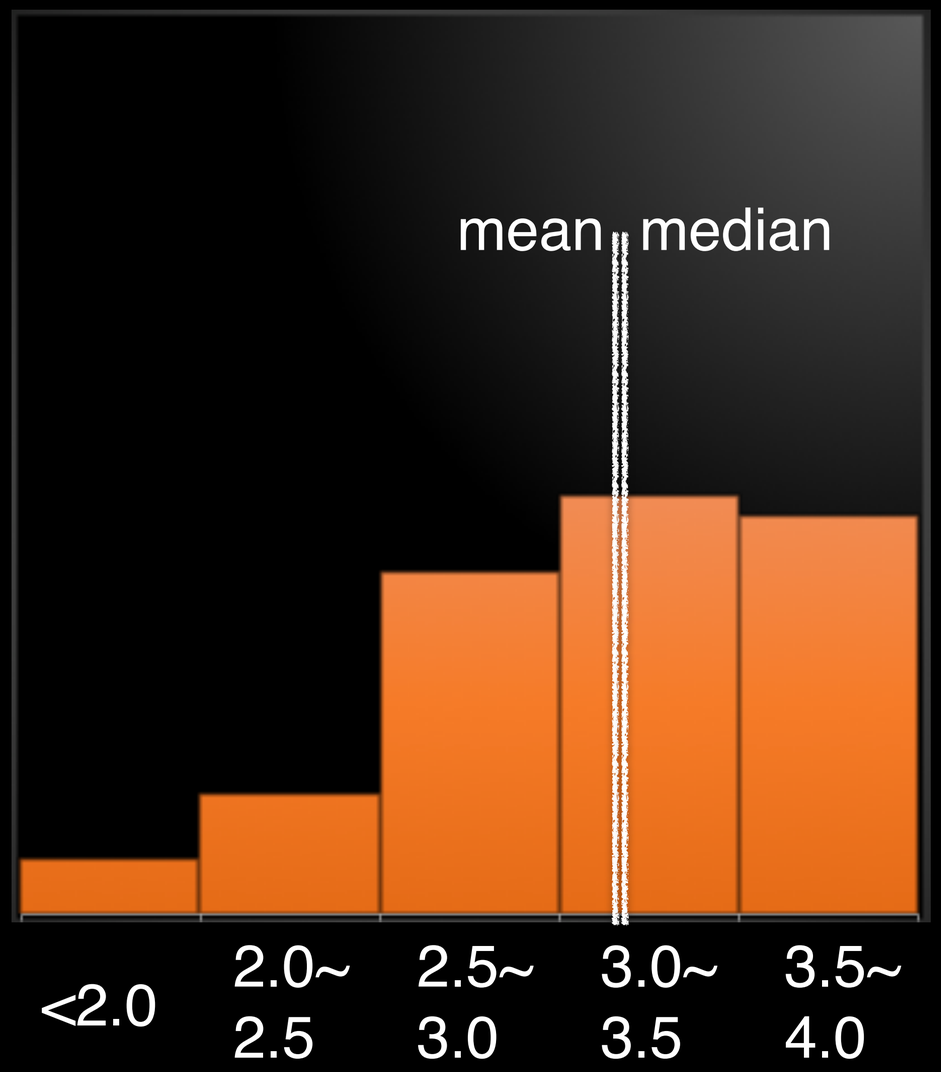

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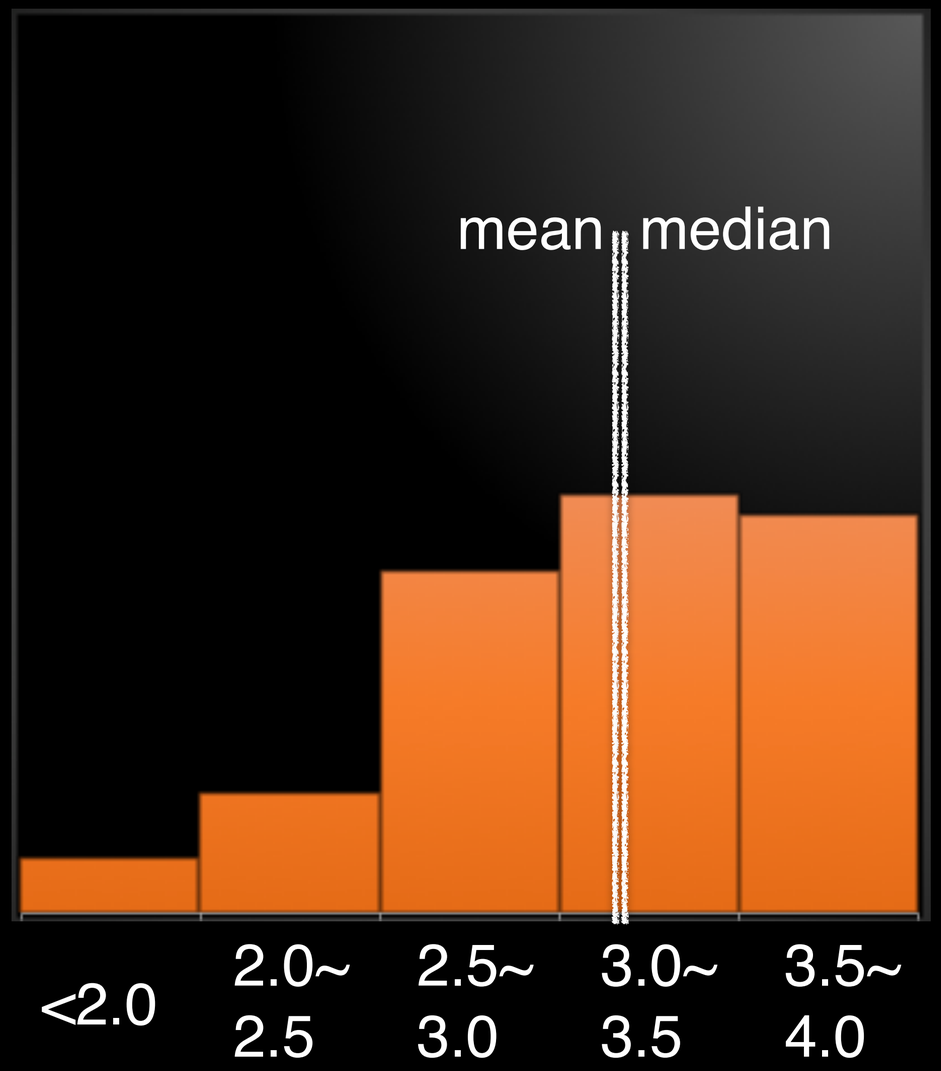


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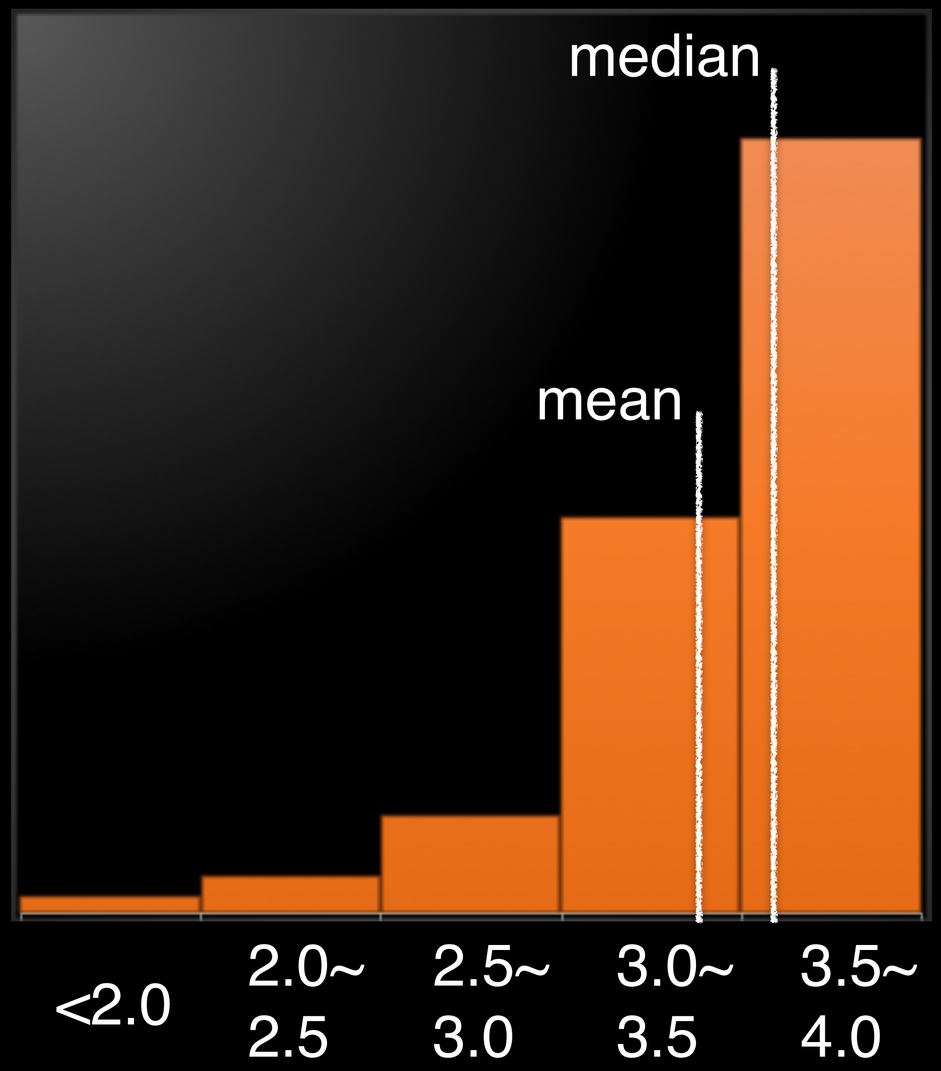

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