

# Active Learning in Large Lectures

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# What is Active Learning?

Students do more than listen

- Read, write, discuss, solve problems
- Analyze, synthesize, evaluate

# Why Active Learning?

- Improve learning
- Students have short attention span

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- Distracting devices
- PowerPoint<sup>®</sup>-induced narcolepsy

# Types of Activities

- Model building

# Molecular Geometry

Formula	# electron clouds around central atom	Shape of molecule
$\text{SiCl}_4$		
$\text{PH}_3$		
$\text{OF}_2$		



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- Model building
- Note consolidation<sup>1</sup>

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- Think-pair-share<sup>2</sup>

# Solutions

- Unsaturated
- Saturated
- Supersaturated

# Types of Activities

- Model building
- Note consolidation<sup>1</sup>
- Think-pair-share<sup>2</sup>
- Demonstrations

# Chemical Kinetics

## (How Fast?)

Atoms or molecules must collide for a chemical reaction to occur.

Factors that affect rate:

1. Properties of reactants
2. Concentration of reactants
3. Temperature of reaction
4. Presence of catalyst

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- Assessment

Group/individual quizzes

**Your name**

**Partners' Names**

**(4 points)  $^{12}\text{B}$  is a radioactive isotope that decays by both alpha and beta decay. What element would be the final product of this decay process?**

**(6 points) Fill in the missing information:**

<b>Symbol</b>	<b># protons</b>	<b>#neutrons</b>	<b>Atomic No.</b>
$^{60}\text{Ni}$			
		<b>45</b>	<b>32</b>

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Concept tests<sup>3,4,5</sup> [Eric Mazur video](#)



# Sample Concept Questions

# Types of Activities

- Model building
- Note consolidation<sup>1</sup>
- Think-pair-share<sup>2</sup>
- Demonstrations
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Concept tests<sup>3,4,5</sup> [Eric Mazur video](#)

Muddiest point<sup>6</sup>

# Collecting Responses

- Raise hands
- Finger signals
- Cards
- Notecards
- Electronic systems<sup>7,8,9</sup> (clickers)

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- Keep students engaged
- May boost attendance
- Easy data collection
- Students get immediate feedback

# Analysis of Clicker Data

- Instructor has instant assessment of student learning, can change lecture
- Quizzes are scored and available in spreadsheet format
- Report option shows semester achievement on standards as well as individual questions

# Obstacles to Active Learning

Time considerations

Tradition

Student resistance

Lack of support

Instructor discomfort

# Summary

Students learn better when actively engaged.

Positive impact on student attitudes:  
they enjoy a break from taking notes;  
they learn which topics are challenging;  
see that others understand new concepts.

Positive impact on instruction:

more time can be spent on challenging topics.

# References

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# More Information on [www.uwosh.edu](http://www.uwosh.edu)

Additional data analysis from 1st semester of  
clicker usage

[/faculty\\_staff/mihalick/clickerreport.html](http://www.uwosh.edu/faculty_staff/mihalick/clickerreport.html)

Chemistry Department Assessment Plan

[/departments/chemistry/assess/program.html](http://www.uwosh.edu/departments/chemistry/assess/program.html)