

# Creating Effective Clicker Questions in Life Sciences

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*Adapted from workshops developed by: Stephanie Chasteen (CU-SEI),  
Peter Newbury (UC San Diego) and Cynthia Heiner (Freie Universität Berlin)*

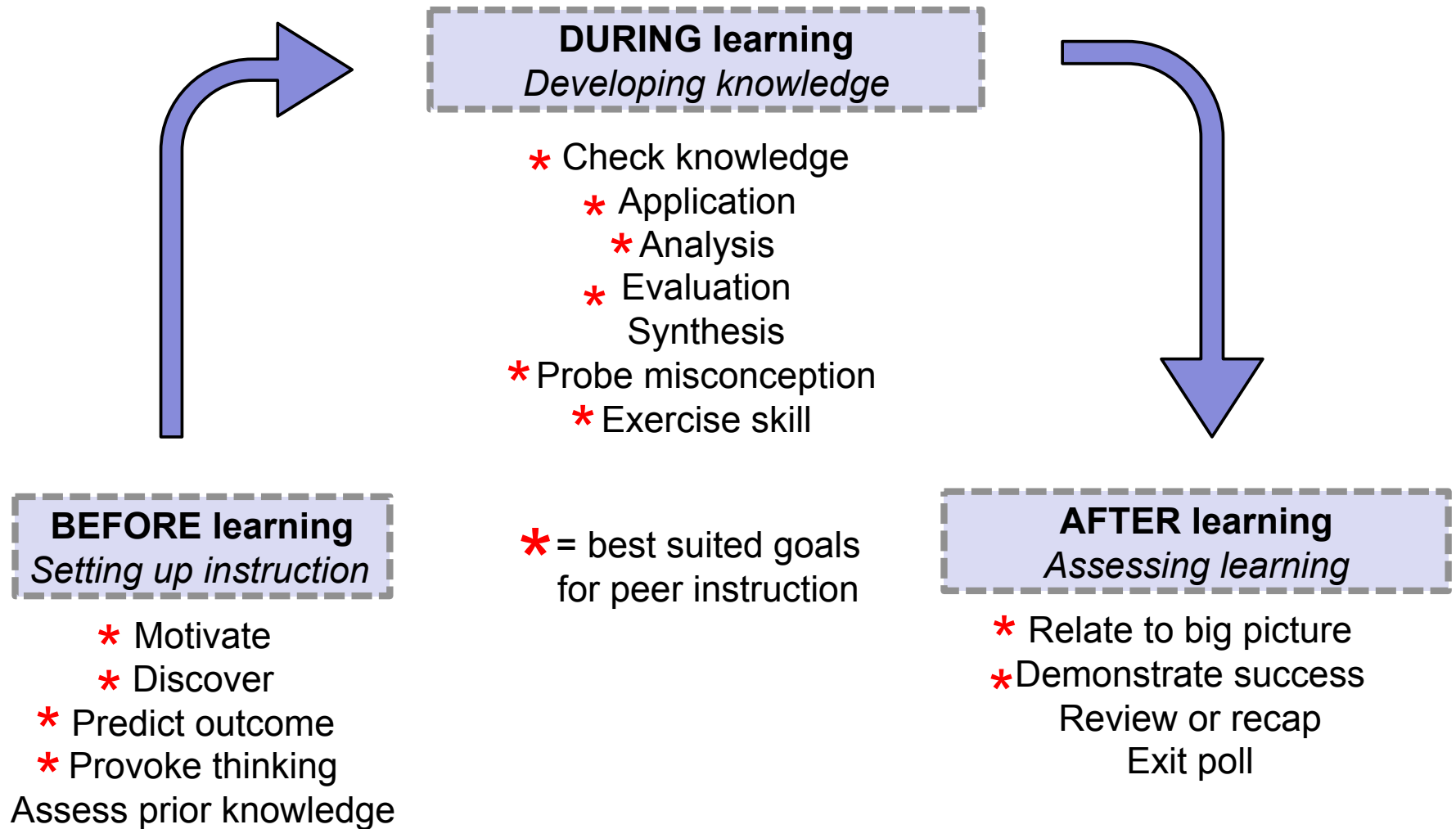
# Exercise 1: Question Goals

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- What *goals* might clickers be used to achieve? Or, put another way, what might you use clicker questions to accomplish in your class?
- Feel free to talk to your neighbour if you finish brainstorming on your own.

# Possible Question Goals (and when to ask)

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# When to ask questions: **Before & After Learning**

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## **Before Instruction**

### **Motivate** students

- Why is it important to...?
- What might we want to...?
- What kinds of things can go wrong?

### Help them **discover** information

- What do we have to take into account when we...?
- What needs to happen when you...?
- Predict and show: We have seen that X happens when we do Y. What do you think will happen when...?

### Assess **prior knowledge** or **provoke** thinking/discussion

- What do you think about...?
- Would you/do you...?
- What do you think will happen if...?

## **After Instruction**

### Have students **recap** what they have learned

- What steps did you go through to solve the problem?
- What are the most important things to remember?
- Exit poll: What did we learn today?

### Ask them to relate information to the **big picture**

- How does this lead into the next topic?

### Demonstrate **success** and **limits** of understanding

- *Ask questions that students have built an understanding of during the class.*
- *Ask questions that go beyond what was done in class*

# When to ask questions: **During** Learning

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## Test **knowledge** of facts

- What are the three types of...?
- Can you define...?

## Test **comprehension** of concepts

- Which statements support...?
- What examples can you think of?

## Test **applications** of concepts

- What would happen if...?
- Which of the following are X?

## Help them **analyze** what they are learning

- Based on the symptoms, what would you say is going on?
- What is the relationship between...?

## Test their ability to **evaluate**

- Here are two solutions. Which is more appropriate and why?
- Which of these is more important?

## Provoke them to **synthesize** their understanding.

- How would you test...?
- Propose a way to...

## Elicit a **misconception**

- *Ask questions where a common student misconception will result in a particular response*

## Exercise a **skill**

- How would you...?
- What is the next step in this problem?

# Remember components of an effective clicker question\*

<b>connection to learning goals</b>	Does the question make students do the right thing to demonstrate they grasp the concept.
<b>context</b>	Is this topic currently being covered in class?
<b>clarity</b>	Students should waste no effort trying to figure out what's being asked.
<b>distracters</b>	What do the “wrong” answers tell you about students’ thinking?
<b>difficulty</b>	Is the question too trivial? too hard?
<b>stimulates thoughtful discussion</b>	Will the question engage the students and spark thoughtful discussions? Is there potential for you to be “agile”?

\*Particularly when using peer instruction

Credit: P. Newbury, C. Heiner,

## Exercise 2: Write a Draft Question

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- Choose one of the question goals (slide 3 in handouts)
- Begin a draft question that aims to achieve this goal.
- *Don't worry about writing answers or distracters yet.*

## Exercise 3: Revisit your Question

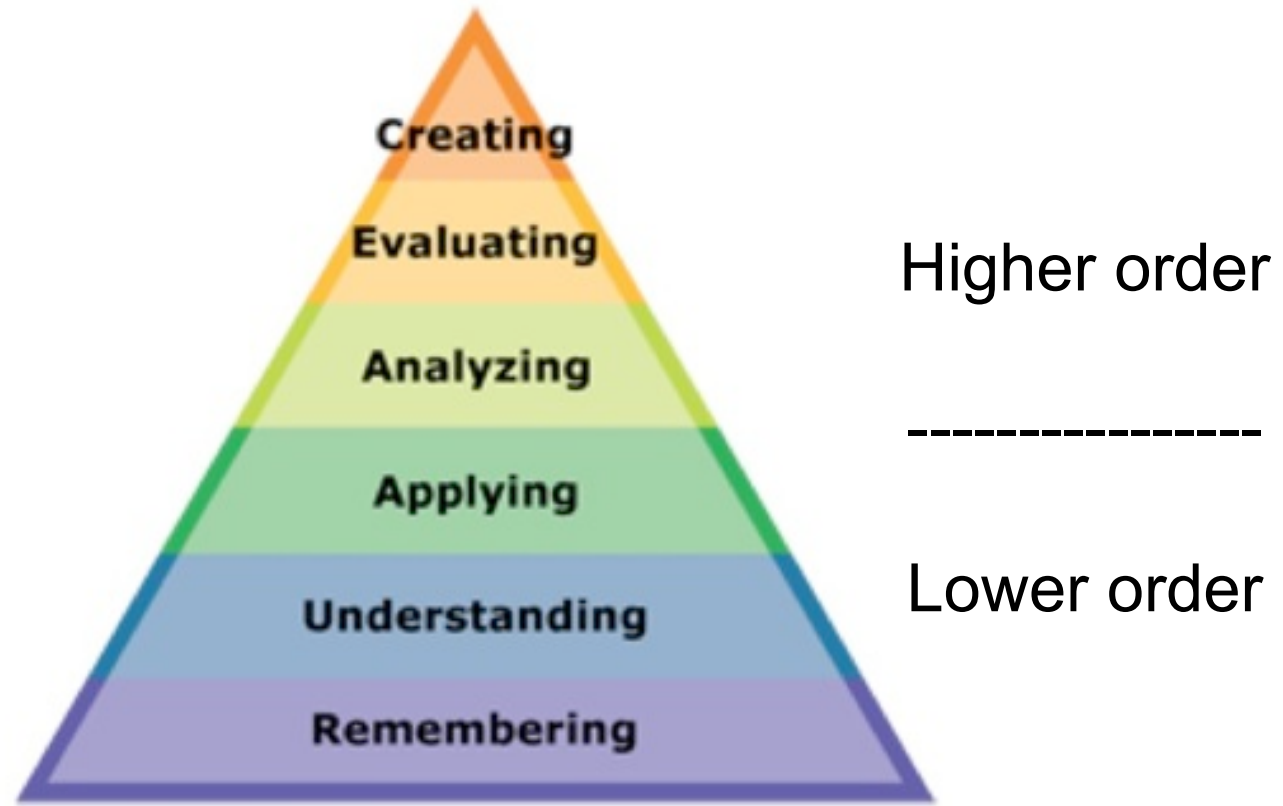
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- Continue drafting your question, using what we've just talked about and the “tips” in your handouts.
- If you wish, swap with your neighbor and discuss when you've finished.



# Bloom's Taxonomy and using questions at a variety of cognitive depth

*If your original question was about assessing factual knowledge, can you revise or write another that is more intellectually challenging for your students? (see slides 5 and 6 for ideas)*



# Other Tips on Question Writing

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This space is for you to jot down any ideas you got from discussions, gallery walk, etc.

# Action Plan

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What will you do to implement ideas you heard about in this workshop?

OR what key ideas will you share with a colleague? (See Goals and Components slides for summary!)

1.

2.

3.