

Engaging Students Through Interactive Lessons

Pre-Session Advance Preparation Option

For the “**Engaging Students Through Interactive Lessons**” session, each TA will prepare and deliver a 5-minute lesson of a simple concept from an introductory course in your discipline. The lesson should include an explicitly-stated objective AND at least one good question to generate interaction and discussion AND additional questions to probe for student understanding. When we've run this session in the past we've given TAs 15 minutes during the session to create the lesson in collaboration with another TA (and we've witnessed TAs do great work under those conditions!). When this session runs this year, we're going to do the same thing. That said, we've also gotten feedback from some TAs who participated in this session, and they told us that they had wished that we would have told them about this in advance so they could have prepared better. So we're letting you know now that you'll be given 15 minutes during the session to prepare your 5-minute lesson, but if you want to start thinking about it now and begin preparing in advance, you should feel free to do that. **Know, though, that you'll still be expected to use the 15 minutes of session time as prep time (or tweak time) for your lesson!** If you have any questions, please contact Paula Quinn at pquinn@wpi.edu.

Suggestions for Introductory Concepts to Explain

Biology

- How DNA replicates
- The food chain
- Dominant and recessive traits

Chemistry

- Hydrogen bonding in water
- The mole concept
- pH

Mathematics

- Differentiate or integrate a specific function (e.g. a trigonometric function)
- Compute the area or volume of a specific geometric figure (choose one)
- The Pythagorean theorem

Mechanical Engineering

- Draw a free body diagram for a pulley system.
- Find the normal force exerted on a ramp by an object on the ramp.

Physics

- Gravity
- Force
- Parallel (or series) circuits

Electrical Engineering

- Kirchoff's Voltage law
- Solve a simple resistor circuit using Kirchoff's current law.
- Describe Ohm's Law

Materials Science

- Explain the properties of elastic modulus, yield strength, and tensile strength using a stress-strain curve
- Find the side length of a FCC (Face Centered Cubic) crystal in terms of atom radius r .
- Do a basic lever rule calculation, explaining phase compositions and amounts of phases

Civil Engineering

- Determine the forces on a beam in a bridge truss.
- Find the maximum load that can be applied to a beam of length L with a yield strength of Y .
- Determine if a bridge member is in tension or compression.

Computer Science

- Write a function to find the area under the curve $y=x^2$ from $x=0$ to $x=5$.
- Write a recursive function to find $x!$
- Write a function that will put a list of strings in alphabetical order.

Chemical Engineering

- For the reaction $N_2(g) + 3 H_2(g) \rightarrow 2NH_3(g)$, explain which way the reaction will proceed if the pressure is increased.
- Find the flow rate at which a stream of water exits from a hole of diameter r from a tank of height H and diameter R .
- State the percent change in entropy when air in a piston is compressed from a volume of V to $V/2$.