

**Getting people to start asking good questions in science and ecology. Helen Alexander, August 2, 2018**

First day of class – need to get our brains working while we also get to know each other

How do we define science? (get ideas from students). Colleague has a simple definition:

- “Science is the process of asking good questions, and finding good ways to answer them.”
- All of us do science everyday -- if your dad drives a car and it starts to make odd noises, he ask “questions” – does this noise depend on the speed? – and he does a little experiment by slowing down or speeding up.
- Only difference between your dad and a “scientist” is that “scientists” tend to be more complete and systematic about setting up studies. So, important to realize that science is a universal process that all of us do and not something only done in “ivory towers.”
- So, we’re going to be “asking good questions and finding good ways to answer them” in this course. But the trick is that “asking good questions” can be challenging. So let’s think of ways to generate good questions.
- So I’m going to give everyone some seeds – do you know what species they are? (I used milkweed pods, maple seeds, and ash seeds)
- I’d like you start by working by yourself - spend some time looking at these seeds and please make 15 observations – I don’t care if you do these on one species or many
- Now, please pair up with someone else (that you don’t already know) – share your lists of observations and if you like what they have, add it to your own list.
- Now that you’ve looked at these items closely, please come up with 15 questions about the seeds.
- Again, pair up with someone you don’t know – share your list of questions
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- I’d then like each group to choose their two “best” questions and write them on the board. (You decide what makes them “best questions”).
- Let’s look at these questions. Reflect on what makes a good question:
  - o Sometimes people refer to open and closed questions. What do you think – are these open or closed? What ones do you like? My understanding is that an open question promotes discussion and leads to an experiment or further exploration of the process..... while a closed question can be answered quickly without much deeper thinking (like how many hairs are there on a milkweed seed). Can you “open up this question?” (Here is an “open question” on the same topic that leads to the design of a



