

## Ecological-Belonging Activity for Physics ACTIVITY SCRIPT

This document contains the materials that we have used to run an ecological-belonging intervention at the University of Pittsburgh for students in our introductory calculus-based Physics 1 course. Details about the social psychology underlying the intervention, as well as the results in both introductory biology and physics classes, are in the following paper:

<https://journals.sagepub.com/doi/full/10.1177/0956797620929984>

Although what we describe is called an intervention by psychologists, we prefer the more generic term “activity” when discussing it with those who will lead and participate.

At Pitt, the activity was carried out in recitation sections of 20-40 students and led by graduate students. The graduate students who would lead the activity were required to attend a 90-minute training session, which included (a) an overview of the need for the activity, how it works, and what the results are; (b) the graduate students experiencing the activity as participants, and (c) the graduate students practicing leading the activity via role-play. Developing buy-in is key in this training session.

Pages 2-3 of this document contain the script that graduate students use when conducting the activity in-person (please contact us for an online version). Page 4 includes the quotes from past students. Page 5 contains the first writing prompt. Page 6 contains the writing prompt that students complete the following week during the first 5 minutes of their next recitation period.

In total, this activity should take about 30 minutes, plus 5 minutes the following week. We have found that the time can be up to 30% shorter or longer, depending on the approach of the activity leader.

Ecological-Belonging Activity for Physics  
ACTIVITY SCRIPT

I. Introduction (2 minutes)

Hi, my name is \_\_\_\_\_. I am a \_\_\_\_\_ working in the physics department. Today we are going to take a break from the regular classroom activities to talk about going to college. We are always trying to make things better for our students, and so today the Physics Department is asking for your help to tell us a little about your experiences since you have started classes. For many of you, this is the first time you are leaving home. You are meeting a lot of new people, taking on a lot of new courses, and trying to find your place here. It can be easy to feel overwhelmed and to ask yourself, “Do I really belong here?” and “Am I smart enough to make it?” These kinds of experiences are normal in the transition to college. Everyone goes through them, and they get better with time as you adjust to college.

II. Writing (10 minutes)

Today, we'd like each of you to reflect on some of the experiences you have had so far in coming to college. So, please take about ten minutes to write on this sheet of paper about the experiences and challenges you have had since coming to college. What has been difficult or challenging for you? You can think about your experiences meeting other students, making friends, taking classes, adjusting to dorm life. Coming to college is a big transition. Please write about some of the difficulties you have experienced in the transition to college and, as well, how some of these difficulties and challenges have begun to improve with time as you have spent more time in college. Please don't include your name or other identifying information in what you write. When the ten minutes are up, we will collect what you've written. Please write on your own, individually. We'll talk about this later.

What if a student isn't writing?

Try first asking (or nonverbally signing) to see if they are okay and understand the directions. If they are okay, do understand, and aren't being disruptive, let them work at their own pace.

What if a student or group of students is being disruptive?

First, try nonverbally signing to get them back on track. If that doesn't work, “Hey, we want everyone to be able to think and write, so it'd be helpful if you were [describe appropriate behavior]?”

At the end of 10 minutes, collect the students writing samples.

### III. Reading (5 minutes)

Skim several student examples of writing, then stand in front of the class:

As I'm looking at a few examples of what you all have written, I see a lot of common concerns. I am also not surprised. I had some of the same concerns when I took introductory physics. To prepare for today's exercise, a team interviewed a number of upper-level students who described their transition to college and some of their experiences in the intro physics course. I'd like to take a few minutes to provide some examples that these students have provided.

Hand out the quotes. Read each quote in full.

### IV. Small group discussion (10 Minutes)

Write/summarize the two questions on the board. After speaking, ensure students are speaking in groups of 2-6.

For the next ten minutes, I ask that you please discuss with a small group of 3-4 students sitting near you what you wrote about and the quotes you have just read. Please answer the following questions as a group:

- What are some common themes across several of the quotes we read?
- Why do you think that sometimes students don't realize that other people are also struggling with the course?

What if a student says something that is off-topic or inappropriate?

- Blink and continue. Don't contradict, but breeze past it.
- Consider reframing or drawing on personal experience.

What if people aren't talking or are starting to run out of things to say.

- Approach group and ask students "why" and "how":
  - Why do you think people wonder at first if they belong?
  - Why do you think people often think they're the only one who worries about whether they fit in in college?
  - Why and how does people's experience change over time? What do people do that helps them improve their experience with time?
- Ask students to share additional experiences that resonate with what the group has been discussing.
- Share your own experience that resonates with what the group has been discussing.

### V. Closing (5-7 minutes)

Now the facilitator will ask the students to share their group discussion with the class. Moderate this discussion.

Alright, let's come back together. I've been overhearing some great discussions and I'd love to hear your thoughts. I think your feedback is going to be very helpful for the physics department.

## Quotes from former intro physics students

"I remember taking my first Physics class as a freshman. Before coming to college, I didn't worry much about grades, so I felt unprepared for the increased workload and differences in grading. I remember being surprised after getting burned grade-wise several times and feeling stressed as a result. But then I got some help from the instructor and the TA, found a study group, and was able to turn things around. Looking back now, I think my struggles were pretty normal. Even though people don't like to admit it, basically everyone has trouble with certain concepts. Although it was a somewhat rocky start, it felt good to learn from my mistakes, and I am proud of the success I have had."

-Nathan, Pitt Bioengineering Senior

I was one of just a handful of women in one of my intro physics study groups, and sometimes I felt a little embarrassed to ask questions. However, I quickly learned that other students usually had the same question I did, and we all benefitted from working with each other and learning from each other. Sometimes I had difficulty with an idea that my classmates understood. Other times, they struggled with concepts that I understood. I remember there wasn't always an "aha!" moment, where everything clicked. It was usually much more gradual, with some concepts only becoming clear after lots of practice and discussion with my study group. I realized that everyone struggles sometimes, and the important thing is to not give up and help each other out."

-Allison, Pitt Electrical Engineering Senior

"When I first got here, I was worried because I was really struggling with some of the physics concepts. It felt like everyone else was doing just fine, but I just wasn't sure if I was cut out for a physics course. At some point during the first semester, I came to realize that, actually, a lot of other students were struggling, too. And I started to look at struggling as a positive thing. After I struggled with a hard problem and then I talked to other classmates and my TA about the solution—I realized that all that effort was worth it because it helped me learn and remember much more."

-Aniyah, Pitt Chemical Engineering Graduate

"I didn't go to a very good high school, and was I worried that my high school courses had not prepared me well for college. Honestly, when I got here, I thought professors were scary. I thought they were critical and hard in their grading, and sometimes it felt like they put things on the quizzes or exams that we hadn't discussed in class. But then I realized that the professor wanted me to be able to apply the physics concepts in many different situations. So, I started to study in a way that would help me do that, and I did my best to learn from my mistakes on quizzes and exams. And I saw that even when the professors' grading seemed tough, it didn't mean they looked down on me or that I didn't belong. It was just their way of motivating high achieving students."

- Anil, Pitt Civil Engineering Senior

Many students experience difficulties and worries coming to college, from living in a new place, to trying to make new friends, to finding their way in a new academic environment. Take a few minutes to write about some concerns you have about college, e.g., the challenges in the transition to college, worries about your coursework, or thoughts about taking a college physics course. How do you think these concerns will change over time?

Please don't put your name on it. It will not be graded.

Name \_\_\_\_\_

Student ID \_\_\_\_\_

### Writing Assignment – Intro Physics

Imagine that one year from now, a freshman student who is enrolled in intro physics says to you: “I’m really worried that I’m going to struggle in this physics course. How can I do well in this class?” Please write a paragraph to this student that includes at least three concrete suggestions that you believe will help them succeed in intro physics.