

**Noyce Professional Development Workshop: Sense of Place**  
**November 13, 2019**

**TOPIC:** CRISPR gene editing technology [Clustered Regularly-Interspaced Short Palindromic Repeats]

**High Leverage Teaching Practice:** Diagnosing patterns in student thinking in domain-specific areas

**Social justice topic:** LGBTQ students

**Place-based/civic engagement connection:** ethics of language and inclusion in the classroom

Dr. Dan Sloan (Biology) described what gene editing and CRISPR technology entails and why it is considered a valuable tool for certain areas of study (e.g., agriculture/ food production; human health/ disease prevention). However, there is also concern about how the technology might be used by scientists around the US and the globe, who either do not follow norms of ethical research or who do not have any laws by which to abide. Moreover, some people are concerned that if genes or suites of genes are correlated with specific traits that might be considered undesirable, it may be tempting for individuals to “edit these out,” and, in effect, discriminating against certain phenotypes. This was the case with the recent publication in *Science* this past August regarding the “genetic architecture of same-sex sexual behavior” in humans.

Materials:

- Ganna, A., Verweij, K. J., Nivard, M. G., Maier, R., Wedow, R., Busch, A. S., ... & Lundström, S. (2019). Large-scale GWAS reveals insights into the genetic architecture of same-sex sexual behavior. *Science*, 365(6456), eaat7693.
- Belluck, P. (2019). Many genes influence same-sex sexuality, not a single ‘gay gene.’ The New York Times. Retrieved from: <https://www.nytimes.com/2019/08/29/science/gay-gene-sex.html>

Activity:

- **HLTP Connection:** Pair up with another student. Select any figure in the full Science paper. On a notecard/ post-it note, write what the figure is trying to convey. Exchange cards/post-it notes with another pair of students. Read their sentence(s) and determine which figure they were explaining.
  - Visualizing data and interpreting graphs are skills that students in both science and mathematics classes will need. What did you learn from this activity?
  - What did you find challenging? How might you integrate this into your teaching?
- **Social Justice Connection:** In the Science paper (above Figure 1), find Box 1. The authors explain what language they chose to use.
  - Have you read this type of explanation in other primary journal articles? Why might it have been included here?
  - Can you think of other examples of explanations that are warranted in other STEM papers?
- **Civic Engagement Connection:** Skim the NYT articles about how some gay scientists argued that the study was important, while other gay scientists were concerned about the implications.
  - What were arguments of the authors for publishing this study?
  - What were the concerns of the opponents of the paper?