

# What Will You Teach with CRISPR?

Clustered Regularly Interspaced Short Palindromic Repeats

## Ethics

- Germline vs. somatic changes
- Potential for powerful cures/therapies
- Release of gene drives into ecosystem
- Safety
- Non-medical enhancements
- Informed consent
- Justice and equity
- DIY science



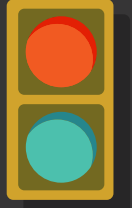
## Natural History

- Adaptive immune system in archaea and bacteria
- Safeguard against bacteriophages
- DNA repair mechanisms



## Regulation

- Lack of global regulations
- Varied stakeholders
- No established safeguards against off-target effects



## Legal

- Patent wars between research institutions



## Transformative Science

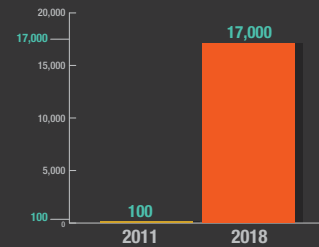
So much more than a bacterial transformation

- Agricultural innovation
- Immunotherapies
- Cures for genetic diseases
- Create novel infectious disease therapeutics



## Impact

CRISPR Publications:



**1987**  
1st report on CRISPR published

**April 2012**  
1st commercialization of CRISPR-Cas9 technology for pizza cheese by DuPont

**December 2012**  
Fast track patent application submitted by Zhang (Broad Institute)

**November 2015**  
US Scientists edit mosquito genome to combat malaria

**November 2018**  
1st gene edited babies announced by Chinese scientist

**2002**  
"CRISPR" name coined

**May 2012**  
1st patent application submitted for CRISPR-Cas 9 technology by Doudna, Charpentier (UC Berkeley, U. of Vienna)

**April 2015**  
NIH reaffirms ban on gene editing of human embryos

**August 2018**  
1st CRISPR-Cas 9 clinical trial launched for sickle cell disease

Get ready to teach CRISPR! Bring true CRISPR gene editing into your classroom. In addition to ideas and facts from this infographic, see [bio-rad.com/outoftheblue](http://bio-rad.com/outoftheblue) for additional resources including videos, publications, and more.

## Ordering Information

Catalog # Description

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