

# CRISPR IN A BOX™

Preparing the next generation of scientists by providing **authentic, hands-on** learning experiences.



Carolina is a registered trademark.





The Gene Editing Institute is born in the Helen F. Graham Cancer Center & Research Institute.



National Science Foundation awarded a near \$1M grant to The Gene Editing Institute and Delaware Technical Community College to create a gene editing program for students.



### The Gene Editing Institute accelerates innovation to improve patient outcomes in Delaware and beyond.

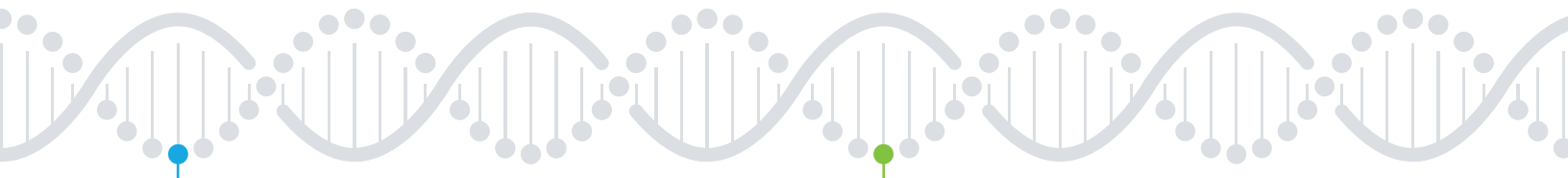
Together with ChristianaCare, one of the country's most dynamic health care organizations, we continue to bring genomic medicine to the forefront of cancer care.

We commit ourselves to **community outreach and connection**. To **demystify gene editing for our community**, we transformed an experiment from our laboratory into a teaching tool in partnership with the National Science Foundation and Delaware Technical Community College.

## That's how CRISPR in a Box™ was developed.

CRISPR in a Box™ is a teaching toolkit designed to introduce high school and college students to the world of gene editing with a safe, comprehensive CRISPR reaction with a color change readout in bacteria. The kit was created organically from researchers who used CRISPR to edit DNA outside of the cell for the first time using a human cell-free extract. This gene editing reaction gives students real world experience with lab protocols being actively used in gene therapy.










CRISPR in a Box™'s first iteration is completed in collaboration with Delaware Technical Community College.

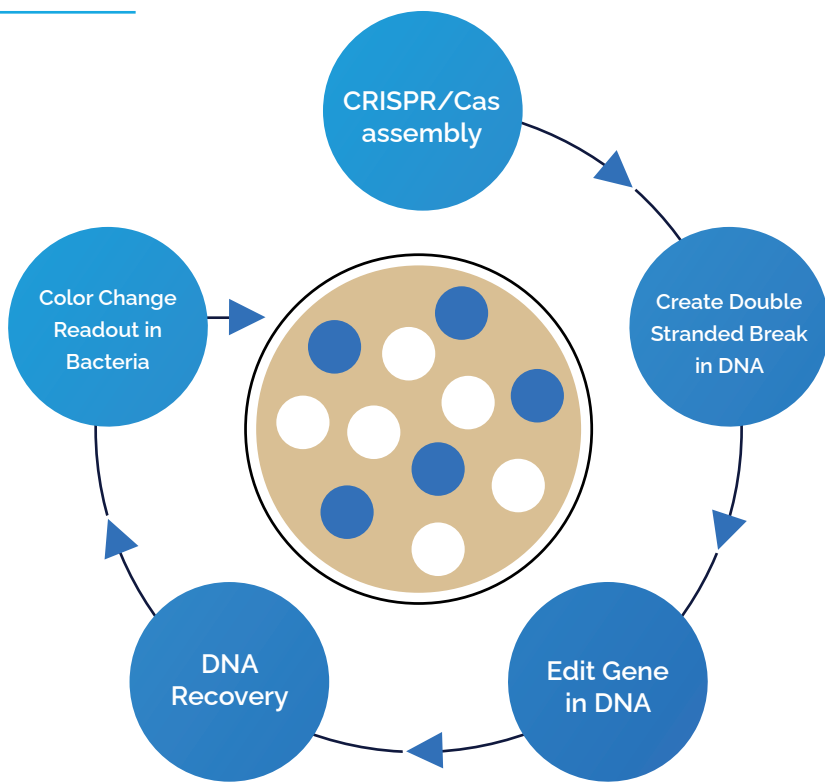


Carolina Biological Supply Company becomes the chief distributor for the new and improved CRISPR in a Box™ kit.

# How does it work?

**CRISPR in a Box™** features experiences that mirror the work our scientists do every single day.

-  Lab safety skills
-  Micropipetting, Centrifuging, and other essential lab skills
-  Lessons on multiple DNA repair pathways
-  A primer on gene editing and its use in cancer research
-  A chance to cut DNA with CRISPR/Cas technology



Our mission is to ensure that CRISPR education remains affordable and accessible to schools across the country, **bringing more students into the lab space and increasing STEM literacy** in this new and groundbreaking field.



# Experimental breakdown

CRISPR (short for clustered regularly interspaced short palindromic repeats) is a relatively new technology with great utility within the fields of healthcare, agriculture, and environmental science. CRISPR in a Box™ presents flexible lessons to teach the basic concepts of CRISPR. This hands-on experience can be tailored to your classroom, no matter your schedule. There are convenient stopping points to break up the experiment, or it can be accomplished in a single 3-hour block of time.

## EACH BOX DEMONSTRATES



Key CRISPR Learnings



DNA Repair Pathways



Phenotypic Readout



Genotypic Editing Outcomes



Molecular Laboratory Skills:

Micropipetting

Restriction Digestion

Centrifugation

Gel Electrophoresis

Bacterial Transformation

Data Analysis

DNA Isolation

In our Learning Lab, which uses CRISPR in a Box™ as its primary teaching tool...

90%

of students report feeling more confident using a micropipette and performing basic lab skills

85%

of students gained more positive attitude toward CRISPR



**Complex** Cas12a protein and CRISPR RNA to form ribonucleoprotein (RNP)



**Cut** plasmid DNA using RNP



**Clean & concentrate** linearized plasmid DNA



**Rejoin** plasmid with homology-directed repair template & cell-free extract



**Clean & concentrate** the re-circularized plasmid DNA



**Transform** DNA into bacterial cells for color change readout



**Visualize** blue & white colonies on transformation plates



**Isolate** plasmid DNA and restriction digest

## What do teachers say about the kit?

"I got to use CRISPR and gene editing in my lab space with students in high school. Students began asking questions about the future of medicine, healthcare, and their place in STEM careers. **This experiment made students feel like "real scientists"** highly suggest it."

"Not only is this CRISPR kit convenient and nicely packed, but it is also **a game changer for educators**. The instructions are user friendly, the materials are high quality, and the knowledge it teaches can be adapted for multiple experience/grade levels"

"The gene editing focus of the project ensures that technicians are graduating with critical entry-level skills, employability skills and skills supporting emerging technology areas in the biosciences."

## CRISPR in a Box™ vs. Leading Competitors in the Field

Features	CRISPR in a Box™	Competitor
<b>Gene Repair Mechanism</b>	Non-homologous end joining AND homology-directed repair represented	Non-homologous end joining OR homology-directed repair represented
<b>Human Cell-Free Extract</b>	✓	✗
<b>Genotypic Analysis</b>	Restriction Digest Sanger Sequencing	Not often included
<b>Phenotypic Readout</b>	Outcomes reflect experimental variability	Pre-selected Outcomes



**CRISPR in a Box™ is available for purchase today at [Carolina.com](https://www.carolina.com).**

