

# BioBricks



Synthetic Biology Module 3  
University of Rochester iGEM 2020

# Checklist for Module #3

- Explore the article “What are BioBricks?”
- Open Google Form #3
- Activity: Putting BioBricks Together

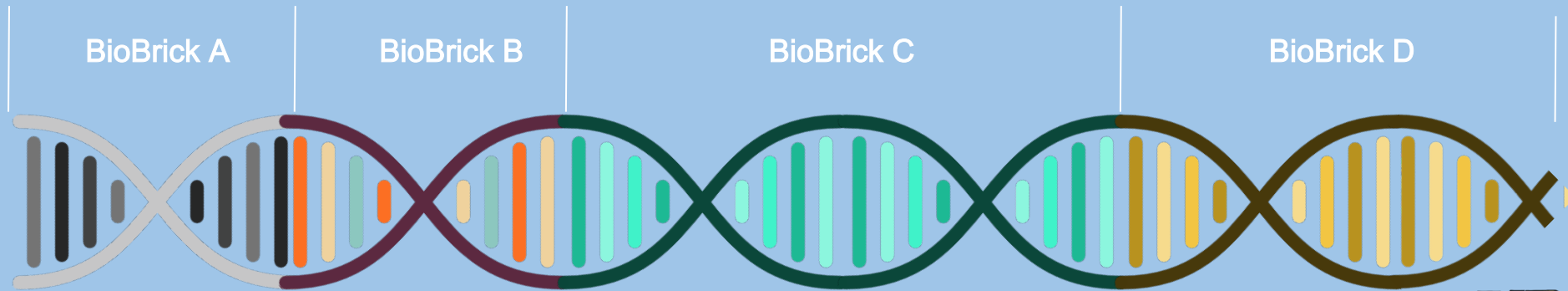
# Module Overview

- What is a BioBrick?
  - Common BioBricks and Their Function
  - Why are BioBricks Useful to Synthetic Biologists?
  - Synthetic Biology Open Language for Communication
-

How can standardizing a process be beneficial?



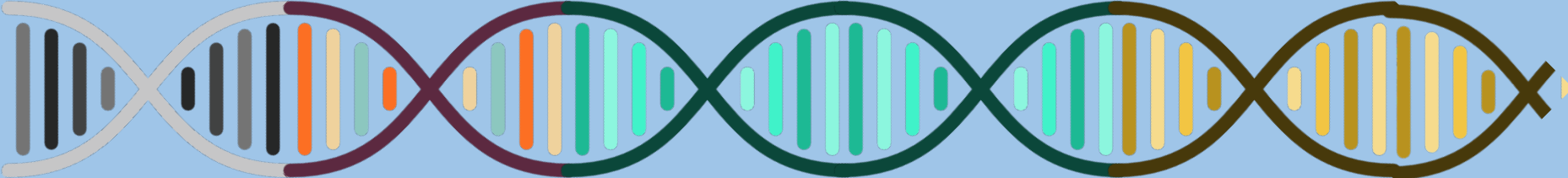
# What is a BioBrick?



# Let's talk about Legos

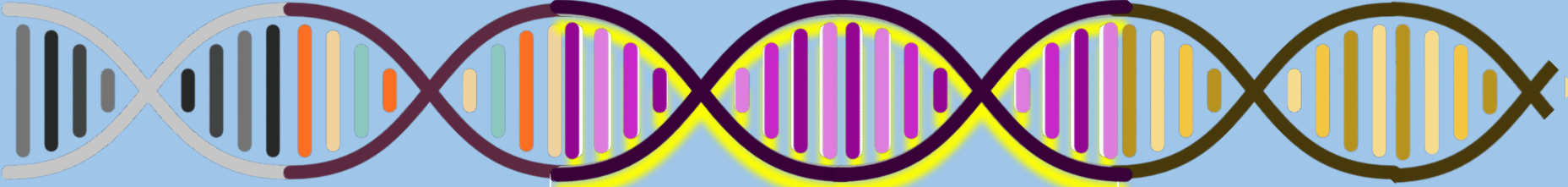


# Blueberry Smell




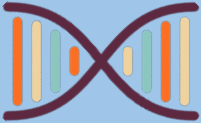
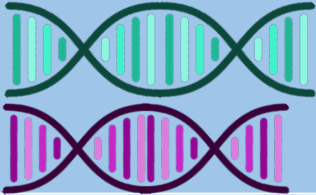
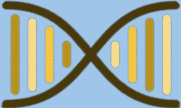
BioBrick C

# Grape Smell



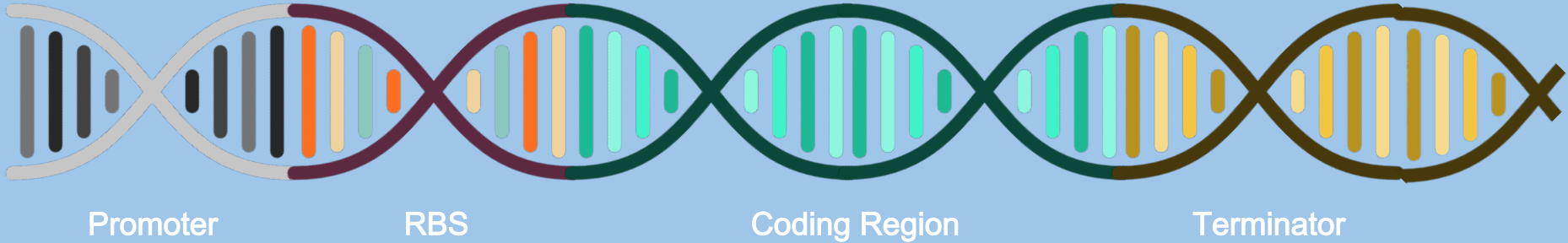
BioBrick E

# Common BioBricks

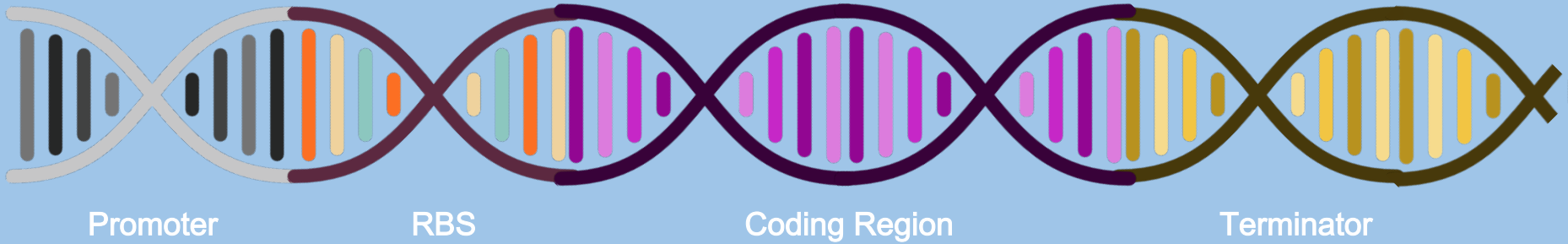
BioBrick	Defined Function
Promoter 	Recruits transcription machinery
Ribosome Binding Site (RBS) 	Encodes part of mRNA that binds to ribosome
Coding Region (CDS) 	Encodes amino acid sequence of protein
Terminator 	Causes transcription to stop



# Blueberry Smell



# Grape Smell



# Why are BioBricks useful to synthetic biologists?

Speeds up designing process

Decreases error

Enables communication

But wait, there's more...

# Synthetic Biology Open Language (SBOL)

Müller, 2012




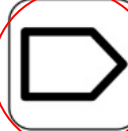
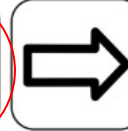
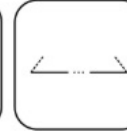
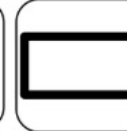
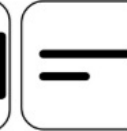











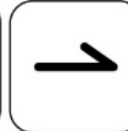
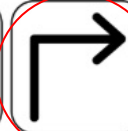
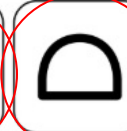
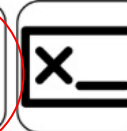








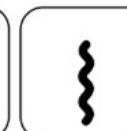







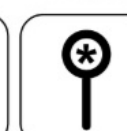
<https://sbolstandard.org/>



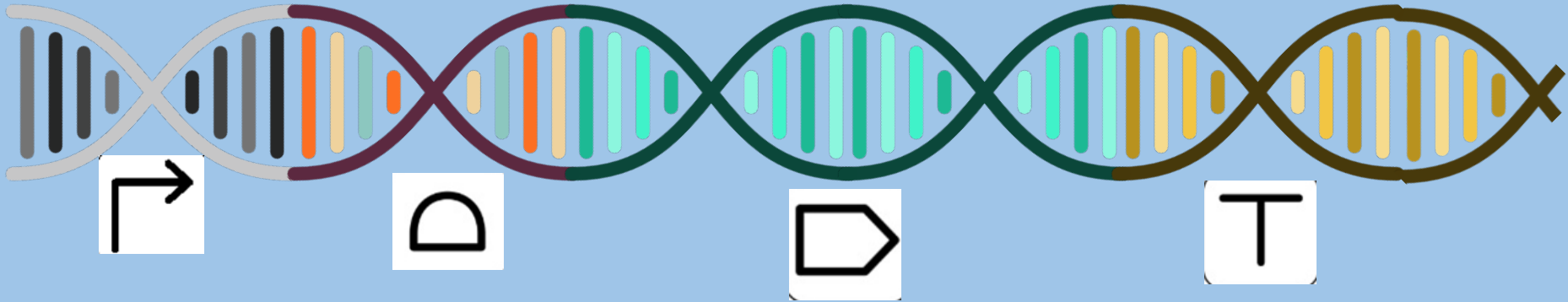
# Sequence Feature Glyphs

Aptamer	Assembly Scar	Blunt Restriction Site	(recommended) CDS	(alternate) CDS	Composite	Engineered Region	3' Overhang Sticky End
5' Overhang Sticky End	3' Sticky Restriction Site	5' Sticky Restriction Site	Insulator	No Glyph	Non-Coding RNA	Omitted Detail	Operator
ORI	ORI-T	Poly-A Site	Primer Binding Site	Promoter	Ribosome Entry Site	Signature	Recombination Site
Terminator	(recommended) Unspecified	(alternate) Unspecified	(recommended) DNA Location	(recommended) RNA Location	(recommended) Protein Location	(alternate) DNA Location	(alternate) RNA Location
(alternate)	DNA	RNA	Protein	DNA	RNA	Protein	Transcription

# Sequence Feature Glyphs

							
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(alternate)	DNA	RNA	Protein	DNA	RNA	Protein	Transcription

# Blueberry Smell












All together:



# Review

- BioBricks are segments of DNA with a defined, biological function
  - BioBricks help standardize synthetic biology
  - Promoter, RBS, Coding Region and Terminator are types of BioBricks
  - Synthetic biologists use Synthetic Biology Open Language to communicate their work
-

# Activity: Putting BioBricks Together

BioBrick	Function	DNA Segment
Promoter A	Medium level transcription of gene	
Promoter B	Low level transcription of gene	
Promoter C	High level transcription of gene	
Ribosome Binding Site	Codes part of mRNA that binds to ribosome	
Coding Region 1	Amino acid sequence for apple smell	
Coding Region 2	Amino acid sequence for blueberry smell	
Coding Region 3	Amino acid sequence for pear smell	
Coding Region 4	Amino acid sequence for orange smell	
Terminator	Causes transcription of gene to stop	

## Example using DNA sequence from Module #3 Lesson

DNA Sequence:



SBOL Symbol:



**Output:** This sequence leads to medium level of blueberry smell protein

After completing this activity, answer questions #3 - #5 in Google Form #3



# Thank you!

Email us at [uofr.igem@gmail.com](mailto:uofr.igem@gmail.com)



# Sources

Dna Structure Clipart Transparent Dna Structure Transparent Background , Transparent Cartoon, Free Cliparts & Silhouettes - NetClipart. (n.d.). Retrieved May 25, 2020, from [https://www.netclipart.com/isce/hbJwTb\\_dna-structure-clipart-transparent-dna-structure-transparent-background/](https://www.netclipart.com/isce/hbJwTb_dna-structure-clipart-transparent-dna-structure-transparent-background/)

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