



*Isolating and Identifying Bacteriophages:  
New Course Designs that Target K-12 and  
Undergraduate Students*

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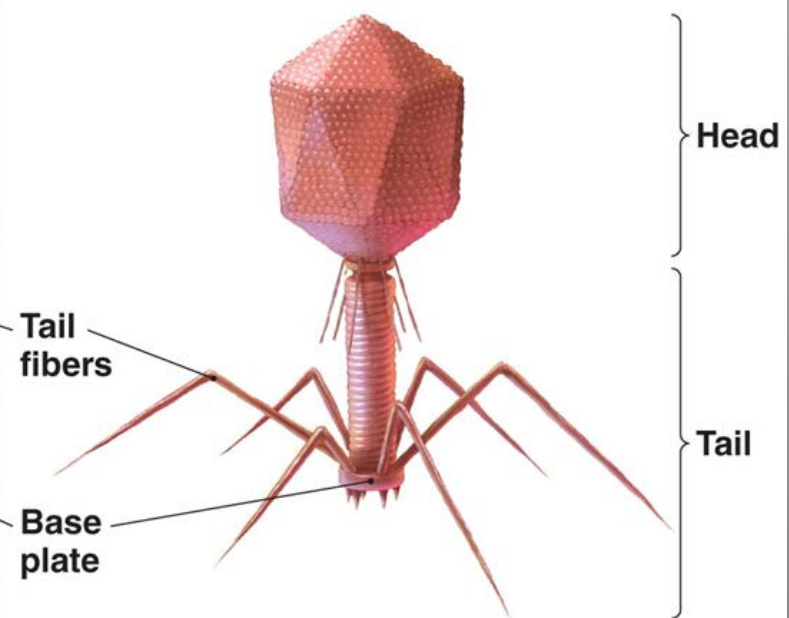
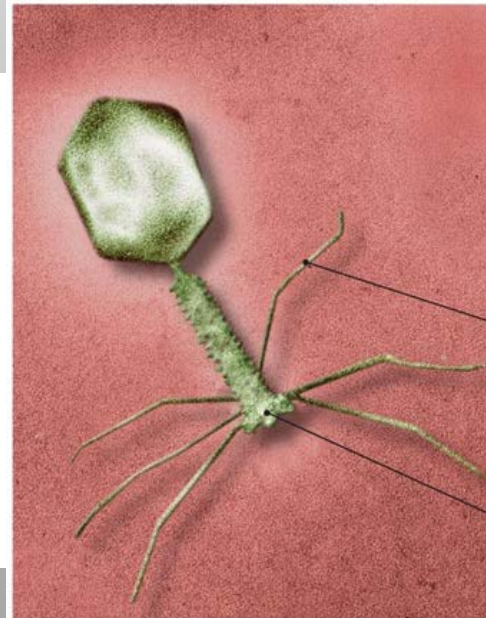
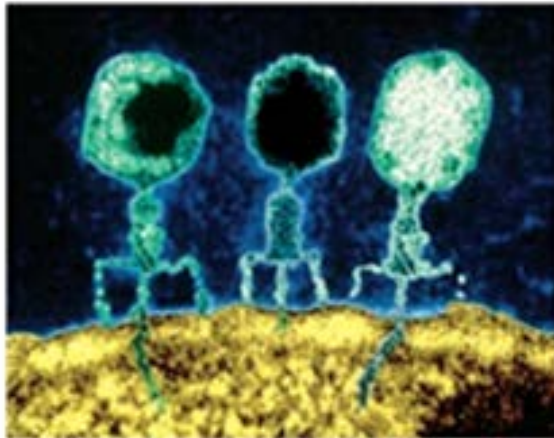
*Georgia College  
Milledgeville, GA*

# GOALS

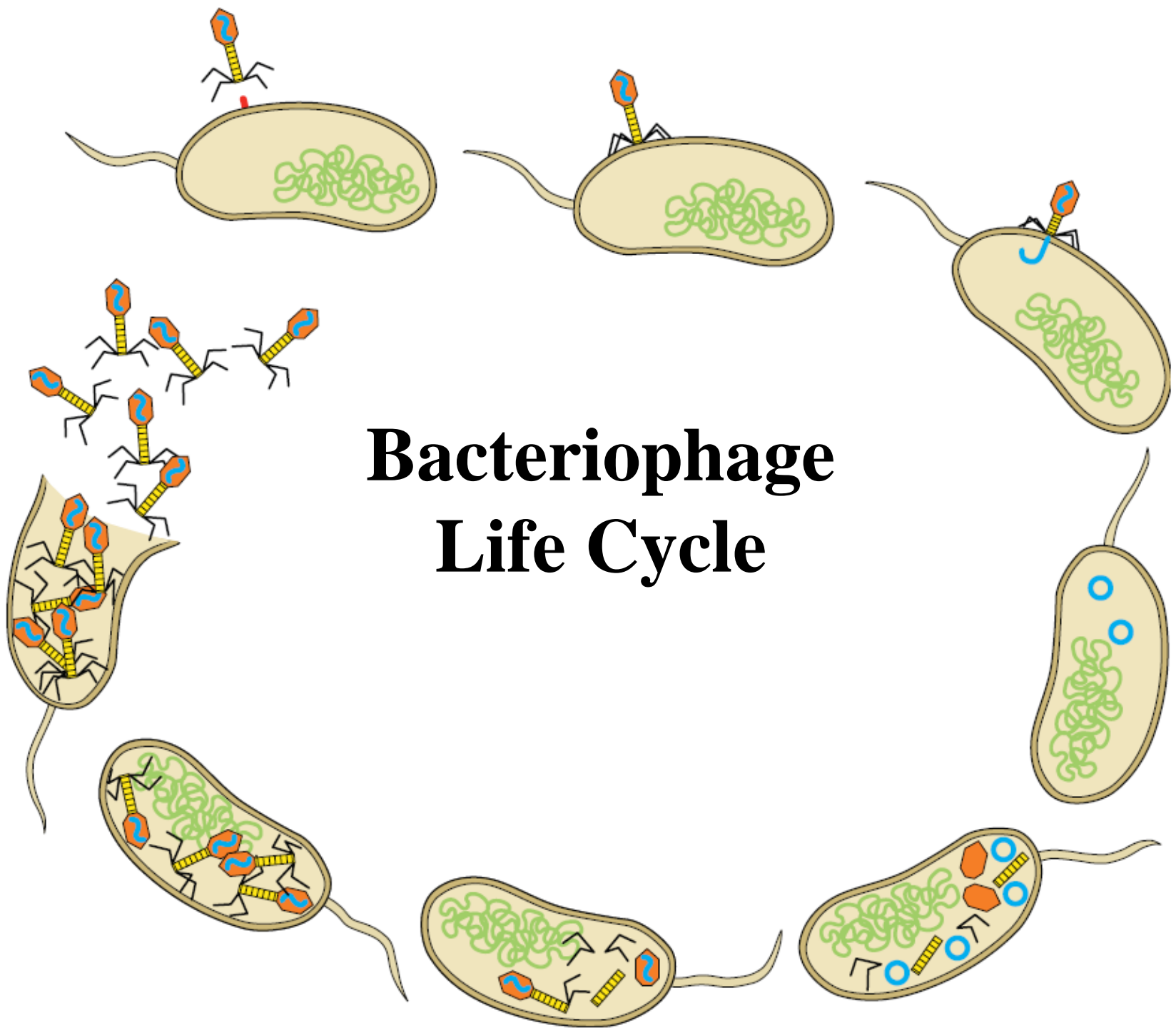
- ❖ **Inspire** K-12 students to follow a STEM path
  - ❖ **Educate** them on bacteria, viruses & their environment
- ❖ **Retain** undergraduates in the STEM pipeline



# Bacteriophages: viruses that infect bacteria



# Bacteriophage Life Cycle



# METHODS

Collect soil or water sample



Isolate bacteriophages



Purify bacteriophages



Identify and characterize bacteriophage



Bacteriophages form plaques on a lawn of bacteria.

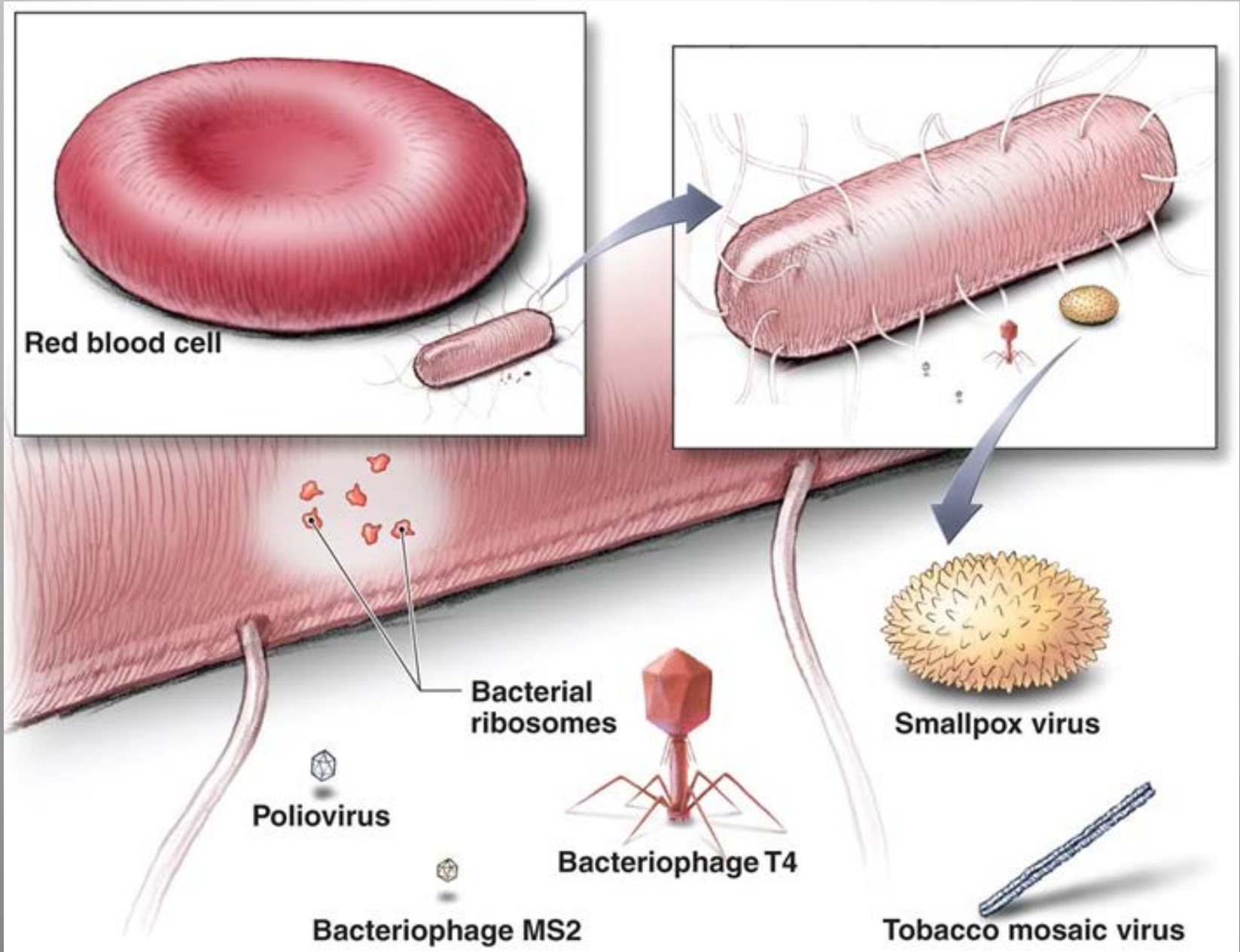


## Georgia Performance Standards

**Fifth Grade:** students investigate scientific concepts and use hands on activities to discover and explain phenomena.

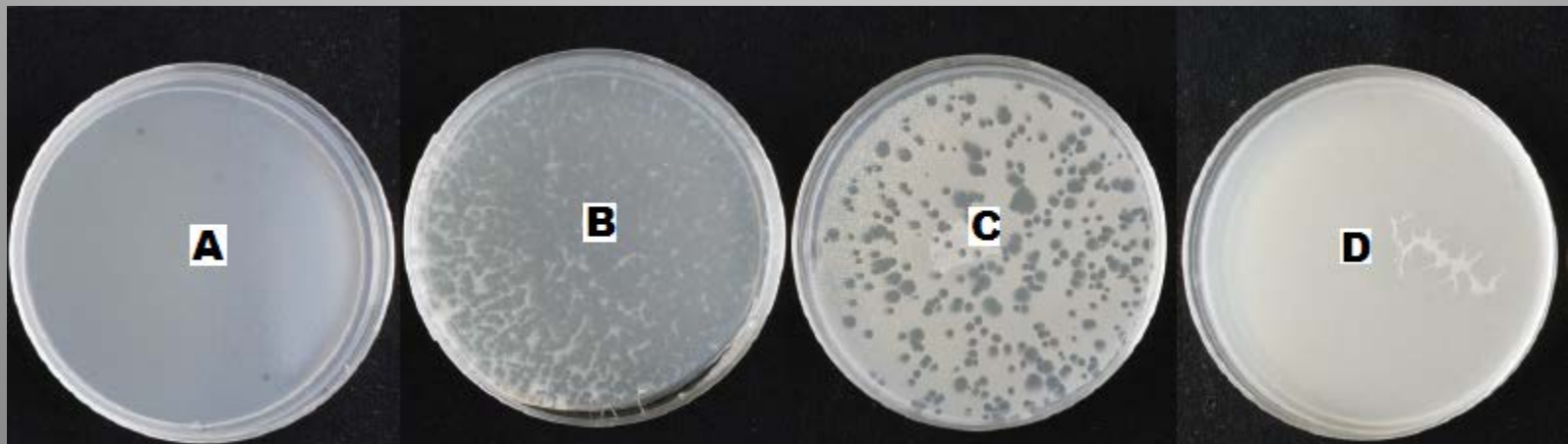
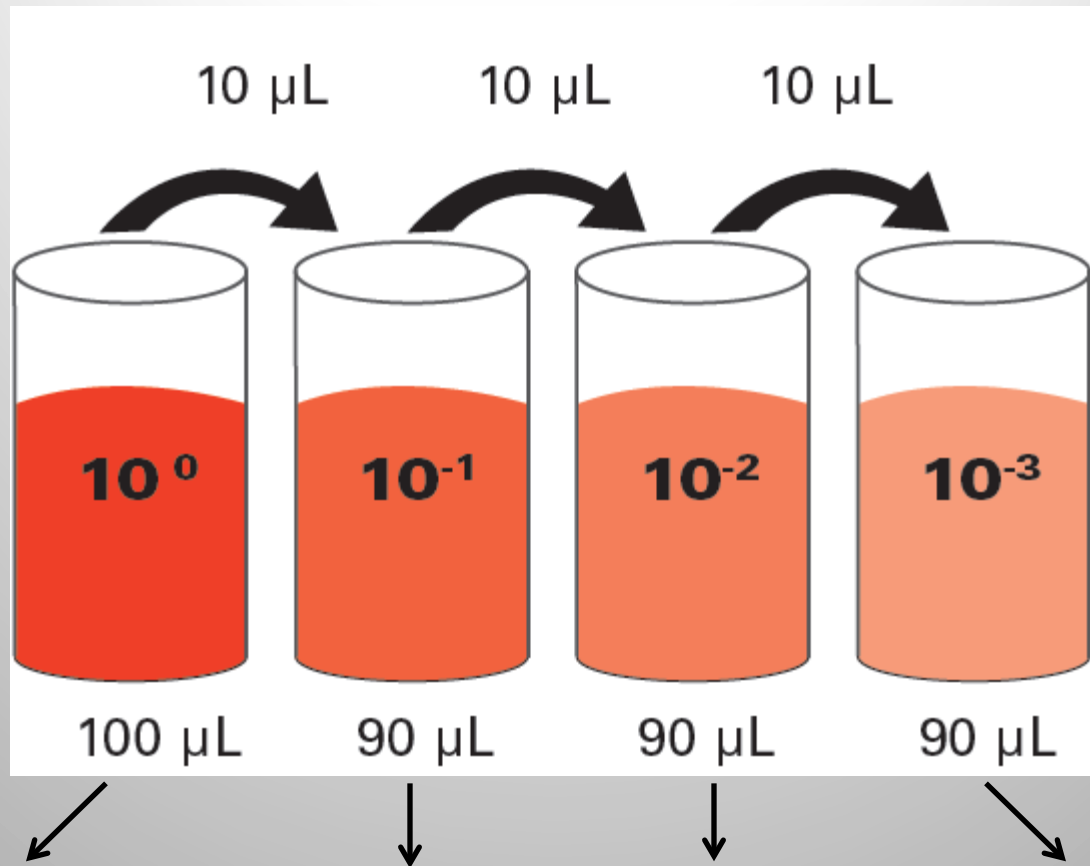
**S5L4.** Students will relate how microorganisms benefit or harm larger organisms.

# Virus Size





# Serial Dilutions



# Classroom Activity

- Students are given a water sample containing bacteriophages and asked to dilute the sample.
- Instructors then mix virus dilutions with bacterial cultures and plate.

# Pre-test / Post-test

	<b>Pre-test</b>	<b>Post-test</b>
1. Where is the best place to look for microorganisms?	<b>81</b>	<b>86</b>
2. What makes food bad?	<b>87</b>	<b>86</b>
3. In what ways can microorganisms harm people?	<b>68</b>	<b>88</b>
4. What is the difference between bacteria and viruses?	<b>29</b>	<b>46</b>
5. What are bacteriophages? Are they organisms?	<b>14</b>	<b>39</b>
6. How can microorganisms be useful to people?	<b>27</b>	<b>66</b>

# Undergraduates in the Biological & Environmental Sciences

## ❖ Principles of Biology Laboratory

- ❖ Lower-level majors
- ❖ Soil bacteriophages
- ❖ 2-lab protocol

## ❖ Applied Field Hydrogeology

- ❖ Upper-level majors
- ❖ Water bacteriophages



## Future Directions

- ❖ K-12 teacher workshops
- ❖ ‘Bacteriophages in a Box’





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