

# A Simple, No-Cost, Conversion of a Descriptive Lab Exercise to One That Promotes Critical Thinking and Honors-Program Participation

**William P. Rivers**

SUNY Canton, Science Department, 34 Cornell DR, Canton NY 13617 USA  
([riversw@canton.edu](mailto:riversw@canton.edu))

Our undergraduate microbiology course has historically served 2-year nursing students and 2-year veterinary technology students. The laboratory exercises for this course have largely been descriptive rather than experimental. In an effort to increase the critical thinking skills of our students and to better serve the growing number of 4-year nursing and 4-year veterinary students, I have developed a simple methodology for changing a lab designed to merely sample microbes in the environment to one that answers two basic clinical questions: *How long does a sterile field stay sterile?* and *Which method of hand cleaning (hand washing or alcohol-based hand sanitizer) is most effective?* One hundred students were randomly assigned to one of three treatment groups for each experiment. For experiment one, students exposed sterile nutrient agar plates to the air for 1, 15, or 30 minutes. For experiment two, students placed their index, middle, and ring fingers onto the surface of a sterile nutrient agar plate either after washing their hands with soap and water, using an alcohol-based hand sanitizer, or doing nothing. Plates were incubated at room temperature for one week and then the number of colonies on each plate was counted and treatment comparisons were made and discussed. These two experiments are designed to facilitate critical thinking and allow students opportunity to relate these lab exercises to practical clinical issues. This shift toward more experimental laboratory exercises also provided opportunities for more advanced students to develop research posters which they presented at our college's nascent honors program symposium.

## Link to Original Poster

<http://www.ableweb.org/volumes/vol-36/poster?art=76>

## Mission, Review Process & Disclaimer

The Association for Biology Laboratory Education (ABLE) was founded in 1979 to promote information exchange among university and college educators actively concerned with teaching biology in a laboratory setting. The focus of ABLE is to improve the undergraduate biology laboratory experience by promoting the development and dissemination of interesting, innovative, and reliable laboratory exercises. For more information about ABLE, please visit <http://www.ableweb.org/>

Papers published in *Tested Studies for Laboratory Teaching: Peer-Reviewed Proceedings of the Conference of the Association for Biology Laboratory Education* are evaluated and selected by a committee prior to presentation at the conference, peer-reviewed by participants at the conference, and edited by members of the ABLE Editorial Board.

## Citing This Article

Rivers, W.P. 2015. A Simple, No-Cost, Conversion of a Descriptive Lab Exercise to One That Promotes Critical Thinking and Honors-Program Participation. Article 76 in *Tested Studies for Laboratory Teaching*, Volume 36 (K. McMahon, Editor). Proceedings of the 36th Conference of the Association for Biology Laboratory Education (ABLE). <http://www.ableweb.org/volumes/vol-36/?art=76>

Compilation © 2015 by the Association for Biology Laboratory Education, ISBN 1-890444-18-9. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the copyright owner.

ABLE strongly encourages individuals to use the exercises in this proceedings volume in their teaching program. If this exercise is used solely at one's own institution with no intent for profit, it is excluded from the preceding copyright restriction, unless otherwise noted on the copyright notice of the individual chapter in this volume. Proper credit to this publication must be included in your laboratory outline for each use; a sample citation is given above.