

## **INSTRUCTIONS TO AUTHORS**

### **I. Scope**

The *Journal of Microbiology & Biology Education* publishes manuscripts of hypothesis-driven research in the area of student learning and other facets of microbiology or biology education including, but not limited to:

- outcome-based learning activities and courses that convey important concepts about the micro/biological world, micro/biological processes, or techniques used to study organisms;
- outcome-based learning activities, courses, and programs in the micro/biological sciences that are driven by societal issues;
- assessment of student learning in the micro/biological sciences;
- assessment of teaching techniques and/or program effectiveness in the micro/biological sciences; and
- outcome-based learning activities, courses, and programs organized according to the American Society for Microbiology (ASM) recommended core curriculum for introductory microbiology.

Papers presenting information on courses, curricula, or learning activities must include an evaluation of the technique or activity. Evaluation of a particular course, technique, or activity can manifest itself in different ways depending on the activity, the instructor, and the number and type of students. A central goal of this publication is to increase the recognition of scholarly efforts in micro/biology education. Articles should be 1,500 to 4,000 words in length.

### **II. Deadlines**

Submissions to *JMBE* are due February 1 and October 1 but will be reviewed on a rolling basis if submitted at other times of the year. Manuscripts will appear online after acceptance and final proofing. The print version of the volume will appear in May and consist of all manuscripts that are submitted by October 1 of the previous year and accepted and page proofed by February 15 of the year of the print publication.

### **III. Review Criteria**

Each manuscript is reviewed based upon the following criteria.\*

- **Worthwhileness.** The relevance of a hypothesis-driven research study in micro/biology education is of paramount importance in any attempt to judge its quality. The hypothesis, which clearly states the problem investigated through the research, should be framed by the potential of the study for adding to and deepening our understanding of issues associated with micro/biology teaching and learning. In general, research that leads the field in new directions is often more worthwhile than replications of existing research studies. This is most effectively communicated when accompanied by assessment of the learning outcomes, teaching effectiveness, etc.
- **Coherence.** Thoughtful researchers first give serious attention to identifying interesting and worthwhile research questions and then to selecting the research methods and techniques that best fit the nature of those questions. A potential problem of manuscripts is the mismatch between the research question and the research methods and analysis techniques employed to answer the question.
- **Competence.** It is not enough that a research study involves relevant, interesting questions and be carefully conceptualized, designed, and reported. The conduct of the study itself must include the effective application of appropriate data collection, analysis, and interpretation techniques. Principles

(some tacit, others explicit) for conducting interviews, designing instruments, reducing data, selecting samples, etc. have been developed within various disciplines to guide researchers in carrying out their studies. Although these principles should not be followed slavishly, competent researchers always consider them in order to ensure that every aspect of their studies is appropriately and carefully carried out.

- **Openness.** Openness involves two qualities. First, in planning and conducting their investigations, good researchers are cognizant of the personal biases and assumptions that underlie their inquiry and, to the extent that it is possible to do so, they make these biases and assumptions public. Second, the conceptual/theoretical bases for a study and the research methods and techniques used should be described in sufficient detail to allow the research community to scrutinize them thoroughly. In reporting research results, the researcher should provide the reader with a clear sense of how the data were collected, what data were used to make interpretations, and how the data were analyzed.
- **Ethics.** Considerations of ethics cannot be ignored in establishing criteria for judging research in micro/biology education. These considerations have to do with two concerns: 1) the manner in which the research has been conducted in relation to the research subjects (often students or teachers), and 2) acknowledgment of the contributions of others. The first concern involves matters such as informed consent, confidentiality, and accurate portrayal of situations and persons involved in the research. The second concern includes acknowledgment of the contributions of all persons who contributed to the research project, as well as open recognition of individuals whose research has influenced the present research.
- **Credibility.** This criterion has to do with the extent to which sensible, thoughtful, and open-minded readers find the claims and conclusions made in a research report believable. That is, the claims made and conclusions drawn should be justified in some acceptable way. Moreover, the arguments and interpretations provided in a research report should be presented in a manner that makes it possible to verify or refute the conclusions drawn. Here the openness and credibility criteria intersect and support each other. In addition, it must be clearly stated that the tested hypothesis is substantiated by previous relevant credible research and referenced as such in the report.
- **Other Qualities of Good Research Reports.** A research report that is lucid, clear, and well organized is likely to be more valuable and useful than one that does not possess one or more of these qualities. Similarly, the research community usually values conciseness over verbosity and directness over obscurity.

Originality is another example of a quality that sets good research apart from other types. An original study is not necessarily one that has never been done before. Rather, originality can also result from looking at an old question in a novel manner: using a new technique of analysis, synthesizing evidence in a different way, or providing a new interpretation for old data.

\*Excerpted and adapted from "Criteria to Evaluate Research," Frank K. Lester, Jr., *Journal for Research in Mathematics Education*, Volume 27, Number 2, 130-132. March 1996. Reprinted with permission from the *Journal for Research in Mathematics Education*, copyright 1996 by the National Council of Teachers of Mathematics. All rights reserved.

All manuscripts that meet the scope of the journal are extensively reviewed. A board member is assigned to the manuscript to work with the author to meet the requirements of the journal. This "hands-on" approach is somewhat unique but is reminiscent of good classroom practice and appropriate for a journal that has education in its title. This interactive style of review has been a trademark of the journal since its inception.

#### **IV. Editorial Policy and Copyright**

By submitting a manuscript to this publication, the authors guarantee that the manuscript, or one with substantially the same content, was not published previously and is not being considered for publication elsewhere.

All authors of a manuscript must have agreed to its submission and are responsible for its content, including appropriate citations and acknowledgments. All authors must have agreed that the corresponding author has the authority to act on their behalf on all matters pertaining to publication of the manuscript.

It is expected that the authors will provide written assurance that permission to cite unpublished data or personal communications has been granted.

**Authorship.** An author is one who made a substantial contribution to the manuscript; therefore, ASM considers all authors responsible for the entire paper. Individuals who provided assistance (e.g., critiqued the paper) need not be listed as authors but should be recognized in the Acknowledgments section.

All authors must agree to the order in which their names are listed in the byline. Footnotes regarding attribution of work (e.g., X. Jones and Y. Smith contributed equally to...) are not permitted. If necessary, such statements may be included in the Acknowledgments section.

A change in authorship (order of listing or addition or deletion of a name) after submission of the manuscript will be implemented only after receipt of signed statements of agreement from all parties involved. Disputes about authorship may delay review and/or publication of the manuscript.

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**Conflict of Interest.** All authors are expected to disclose, in the manuscript submittal letter, any commercial affiliations as well as consultancies, stock or equity interests, and patent-licensing arrangements that could be

considered to pose a conflict of interest regarding the submitted article. Specifics of the disclosure will remain confidential. If appropriate, however, the editor may recommend that a general statement regarding the disclosure be included in the Acknowledgments section. All funding sources, institutional and corporate, should be credited in the Acknowledgments section, as described below.

**Review Process.** All manuscripts are considered to be confidential and are reviewed by the editors, members of the editorial board, or qualified ad hoc reviewers. When a manuscript is submitted, it is given a number and sent to the editor. Corresponding authors are notified of this number. Always refer to this number in communications with the editor and the Education Department. It is the responsibility of the corresponding author to inform the coauthors of the manuscript's status throughout the review and publication processes.

The reviewers operate under strict guidelines set forth in "Guidelines for Reviewers" and are expected to complete their reviews within two weeks after receiving the manuscript. The corresponding author is notified, about six weeks after the submission deadline for the volume, of the editor's decision to accept, reject, or require modification. When a manuscript is returned to the corresponding author for modification, it should be returned to the editor within one month; otherwise it may be considered withdrawn. **A point-for-point response to the reviews** must be included with the revised manuscript; an extra copy of the revised manuscript should have the changes highlighted.

**Notification of Acceptance.** When the editor has decided that the manuscript is acceptable for publication, it is sent to the ASM Education Department, where it is checked by the production editor. If the manuscript is completely acceptable according to the criteria set forth in these instructions, it is scheduled for publication and an acceptance letter is mailed to the corresponding author.

**Page Proofs.** Page proofs will be sent to the corresponding author. As soon as the page proofs are corrected, they should be mailed, faxed, or sent electronically to: *Journal of Microbiology & Biology Education*, Education Department, ASM, 1752 N Street, N.W., Washington, D.C. 20036-2904, via fax 202-942-9329, or via e-mail: MicrobeLibrary@asmusa.org and write "JMBE" in the subject line.

The proof stage is not the time to make extensive corrections, additions, or deletions. Limit changes to correction of spelling errors, incorrect data, grammatical errors, and updated information for references to articles that have been submitted or are in press. If URLs have been provided in the article, recheck the sites to ensure that the addresses are still accurate and the material that you expect the reader to find is indeed there.

Questions about late proofs and problems in the proofs should be directed to the Education Department (e-mail: MicrobeLibrary@asmusa.org with "JMBE" in the subject line; phone: 202-942-9299).

**Warranties and Exclusions.** Articles in this publication represent the opinions of the authors and do not necessarily represent the opinions of ASM. ASM does not warrant the fitness or suitability, for any purpose, of any methodology, kit, product, or device described or identified in an article. The use of trade names is for identification purposes only and does not constitute endorsement by ASM.

**Compliance.** Failure to comply with the policies described above may result in a letter of reprimand, a suspension of publishing privileges in the *Journal of Microbiology & Biology Education*, and/or notification of the authors' institutions.

## **V. Submission Instructions**

Manuscripts and corresponding files are accepted via postal or electronic mail.  
E-mail to: MicrobeLibrary@asmusa.org Write "JMBE" in subject line.

Mail to:  
American Society for Microbiology  
Education Department – *JMBE*  
1752 N Street, N.W.  
Washington, DC 20036-2904

Since all submissions must be processed through this office, alternate routings, such as to the editor, will delay initiation of the review process. The manuscript must be accompanied by a cover letter stating the following: the complete mailing address (including the street), e-mail address (if available), telephone and fax numbers of the corresponding author.

Manuscript submission checklist:

- Cover letter
- Original manuscript in Microsoft Word
- Separate files of all figures and tables
- Double space all text, including references and figure legends
- Number all pages
- Number all lines (not including figure legends and tables)
- Format references in ASM style (see below for details)

## **VI. Formatting Requirements**

Manuscripts should be 1,500 to 4,000 words in length. Every portion of the manuscript is to be double spaced, including figure legends, table footnotes, and references. Number all pages and lines of the document in sequence, including the abstract. Do not number figure legends and tables.

Place figure legends and tables after the References section. Manuscript pages must have margins of at least one inch on all four sides. We recommend up to four relevant illustrations, photos, tables, graphs, and other visuals may be submitted with the manuscript.

Submit figures as separate TIFF or Excel files. Submit tables as TIFF, Excel, or Word files. JPG or GIF files are not recommended.

The editorial style follows the guidelines used by all the ASM basic research journals.

The editor reserves the privilege of editing manuscripts to conform to the stylistic conventions set forth in the aforesaid guidelines.

Please adhere to the following format and style when preparing the manuscript.

### **a. Organization and Format**

- **Title, running title, and byline.** Exercise care in composing a main title. On the title page, include the title, running title (not to exceed 54 characters and spaces), name of each author, address(es) of the institution(s) at which the work was performed, each author's affiliation, and a footnote indicating the present address of any author no longer at the institution where the work was performed. Place an asterisk after the name of the author to whom inquiries regarding the paper should be directed and provide the author's telephone number, fax number, and e-mail address.
- **Correspondent footnote.** The complete mailing address, telephone number, fax number, and e-mail address (if available) of the corresponding author should be included on the title page of the

manuscript. This information will be published in the article as a footnote to facilitate communication. If these items are not provided on the manuscript title page, the ASM editorial staff will insert the information from the original letter of submission.

- **Abstract.** Limit the abstract to 250 words or less and concisely summarize the basic content of the paper without presenting extensive details. Avoid abbreviations and references and do not include diagrams. When it is essential to include a reference, use the same format as for the References section but omit the article title. The abstract must be complete and understandable without reference to the text.
- **Introduction.** The introduction should supply sufficient background information to allow the reader to understand and evaluate the paper without referring to previous publications on the topic. It must be clear that references are the reports of credible research and observations upon which the current hypothesis is based.
- **Body.** The body should provide the information to be conveyed to the reader. It is highly recommended that this section includes Materials, Methods, Results, and Discussion. Pedagogical methods, observations, application of techniques, assessment rubrics, and other details should be carefully explained. Any author who believes that any of the above are not necessary in the body will need to provide a persuasive explanation to the Editorial Committee.
- **Acknowledgments.** The source of any financial support received for the work being published must be indicated in the Acknowledgments section. (It will be assumed that the absence of such an acknowledgment is a statement by the authors that no support was received.) The usual format is as follows: "This work was supported by ABC grant DE-01234 from the WXYZ." Recognition of personal assistance should be given as a separate paragraph.
- **Disclaimers.** Statements disclaiming governmental or any other type of endorsement or approval will be deleted by the editor.
- **Verb Tense.** ASM strongly recommends that for clarity you use the past tense to narrate particular events in the past, including the procedures, observations, and data of the study you are reporting. Use the present tense for your own general conclusions, the conclusions of previous researchers, and generally accepted facts.
- **References.** The References section must include all relevant sources and all listed references must be cited in the text. Cite each listed reference by number in the text using numbers in parentheses on line after the matter which they support. Arrange the citations in the References section in alphabetical order, by first author, and number consecutively. Follow the styles shown in the Style Guide for References at the end of the Instructions. If you have questions regarding style for references, please contact ASM at [MicrobeLibrary@asmusa.org](mailto:MicrobeLibrary@asmusa.org).

#### **b. Illustrations and Tables**

- **Computer-Generated Images.** Authors are encouraged to submit digital figures electronically. The use of digital files does not always result in a better final product and the production editor may require hard-copy printouts if there are problems with the transmission of the electronic figures.

The figure number and authors' names should be indicated in the e-mail to which the figure is attached. If submitted hardcopy of figures, number and author names should be on all figures, either in the margin, on the back (marked lightly with a soft pencil) or in the text. Do not clasp figures to

each other or to the manuscript with paper clips. Insert small figures in an envelope. To avoid damage in transit, do not submit illustrations larger than 8 ½ by 11 inches. Figures in published articles will not be returned to authors.

- **Photographs.** Photos must be of sufficient contrast to withstand the inevitable loss of contrast and detail inherent in the printing process. Submit one photograph for each copy of the manuscript; photocopies are not acceptable. If possible, the figures submitted should be the size they will appear when published so that no reduction is necessary. If they must be reduced, make sure that all elements, including labeling, can withstand reduction and remain legible. If a figure is a composite of a photograph and a drawing or labeling, the original composite (i.e., not a photograph of the composite) must be provided. This original, labeled copy may be sent with the modified manuscript to the production editor. Composites should be mounted on lightweight flexible backing, not on heavy cardboard.
- **Drawings.** Submit graphs, charts, diagrams, and other drawings as glossy photographs made from finished drawings. Computer-generated graphics produced on high-quality laser printers are also acceptable. No part of the graph or drawing should be handwritten except when submitting original student work.

### c. Style Guides for References

Published Journal Articles:

**Lowry, O. H., N. J. Rosebrough, A. L. Farr, and R. J. Randall.** 1951. Protein measurement with the Folin phenol reagent. *J. Biol. Chem.* **193**:265-275.

Online version of print journal:

**Linde, E.** 1999. History of clinical microbiology. *Clin. Microbiol.* **100**:123-234. [Online.]

Online-only journal:

**Taylor, P.** 2 October 1998, posting date. History of virology. *Am. Virol. J.* **1**:30-75. [Online.] <http://www.avj.html>.

Published Books:

**Wagner, R. R., and J. K. Rose.** 1996. *Rhabdoviridae: the viruses and their replication*, p. 1121-1135. In B.N. Fields, D.N. Knipe, and P.M. Howley (ed.), *Fields virology*, 3<sup>rd</sup> ed. Lippincott-Raven Publishers, Philadelphia, Pa.

**Miller, J. H.** 1972. Experiments in molecular genetics, p. 23-56. Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y.

Online versions of books:

**Brown, S. J.** 4 October 1998, posting date. Culturing methods, p. 750-800. In G. Xavier (ed.), *Practical procedures for the laboratory*, 5<sup>th</sup> ed. [Online.] DEF Publishing Co., Boston, Mass. <http://ppldef.idn/uk>.

In-Press Books:

**Carson, P. L., and B. T. McInerney.** The nosocomial spread of disease. In R. R. Jones, R. N. Porter, and D. L. Hanley (ed.), *Epidemiology*, 3<sup>rd</sup> ed., in press. Smith Science Press, Boston, Mass.

In-Press Journal Articles:

**Cox, C. S., B. R. Brown, and J. C. Smith.** Homolog of *Drosophila ahc* gene in humans. *J. Gen. Genet.*, in press.

Conference Proceedings:

**Green, P. N., D. Hood, and C. S. Dow.** 1984. Taxonomic status of some methylotrophic bacteria, p. 251-254. *In* R. L. Crawford and R. S. Hanson (ed.), *Microbial growth on C<sub>1</sub> compounds*. Proceedings of the 4<sup>th</sup> International Symposium. American Society for Microbiology, Washington, D.C.

**More, J., and P. Galtier.** 1978. Embryotoxic and teratogenic effects of ochratoxin A in rats, p. 321-326. *In* E. Klika (ed.), *XIXth Morphological Congress Symposia*. Univerzita Karlova, Prague, Czech Republic.

Theses and Dissertations:

**Brown, S. J.** 1989. Ph.D. dissertation. University of Massachusetts, Boston.

**Daly, C. A.** 1991. Effects of spiramycin on *Toxoplasma gondii*. M.S. thesis. Boston University, Boston, Mass.

Government Publications:

**Goehring, H. K., and P. J. Van Soest.** 1970. Forage fiber analyses. Apparatus, reagents, procedures, and some applications. U.S. Department of Agriculture agricultural handbook no. 379. U.S. Department of Agriculture, Washington, D.C.

**Works Cited in the Text Only.** Certain works that are either unpublished or published without scientific review must be cited in the text, not listed in References. These include unpublished data (including manuscripts in preparation), articles submitted for publication (but see above for in-press articles), meeting abstracts and posters, personal communications, letters, editorials, technical bulletins, company publications, patent applications, GenBank entries, and websites. Citations of this type are parenthetical and should follow any reference number cited with them.

Unpublished data:

...has also been identified (2, 5; our unpublished results).

...gave comparable values (data not shown).

Articles submitted for publication:

...has also been found (R. Preston, H. Keel, and G. MacRae, submitted for publication).

...in the work of B. Yardley (submitted for publication).

Abstracts:

...in mitochondria (S. DeWit, C. Thiou, and N. Clumeck, Abstr. 34<sup>th</sup> Intersci. Conf. Antimicrob. Agents Chemother., abstr. 114, 1994).

...as noted by Barton and colleagues (B. Barton, G. Harding, and A. Zuccarelli, Abstr. 94<sup>th</sup> Gen. Meet. Am. Soc. Microbiol. 1994, Abstr. H-249, p. 244, 1994).

Personal communications:

...for other bacteria (A. X. Jones, personal communication).

...is thought to occur (L. M. Enopy [University of Texas, Austin], personal communication).

Websites and data banks:

Website URLs for noncommercial sites may be cited and the URL is incorporated into the text as follows. Note that URLs for companies that produce any of the products mentioned in your study or for products that are being sold may **not** be included. Company URLs that permit access to scientific data related to the study or to share-ware used in the study are permitted, however.

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...information found at the XYZ website (<http://cbx.iou.pgr>).

...the ABC program (version 2.2; Department of Microbiology, University of Wherever [<http://www.stu.micro>]).

...the *phd2* sequence (EMBL accession no. X9352).