The most recent assessment report available for the Biological Sciences MSc Program is for the period from July 2010 through June 2011. This assessment was presented in a different format that did not directly relate to the Wright State University learning outcomes as stated at [www.wright.edu/wright-state-core/learning-outcomes](http://www.wright.edu/wright-state-core/learning-outcomes). Despite this, the first four of these core learning outcomes are integral to the Biological Sciences MSc Program and were addressed in the 2012 – 2013 academic year. i.e. Biological Sciences MSc graduates will be able to:

1. communicate effectively,
2. demonstrate mathematical literacy,
3. evaluate arguments and evidence critically, and
4. apply the methods of inquiry of the natural sciences
5. demonstrate understanding of contemporary ethical issues

The primarily responsibility for Biological Sciences MSc student learning in these areas resides with each student's graduate advisor and advisory committee. MSc students in Biological Sciences must write and defend a research proposal and thesis (thesis option students) or a literature critique (non-thesis option students). In these documents, students must demonstrate an understanding of current literature and the ability to use this literature to present a review of the current state of one area of biological sciences research. Thesis option students also must i. be able to use this information to formulate hypotheses that extend the current understanding, ii. be able to formulate experimental tests of these hypotheses, iii. apply statistical methods to evaluate the results of these experiments as they apply to their hypotheses and iv. communicate these results and conclusions in the form of a thesis (and hopefully as a research publication). Most of the required courses in the Biological Sciences Curriculum are designed to train students in scientific and mathematical literacy. These include:

1. BIO 6080 – Writing in the Biological Sciences
2. BIO 7020 – Introduction to Research
3. BIO 8000 – Graduate Seminar
4. BIO 7990 – Literature Critique

BIO 7020 has been modified in the past two years and as of the 2011 – 2012 academic year has been required of all Biological Science MSc students. This course now is focused on two areas that apply directly to the learning outcomes stated above; research ethics and the writing of research proposals. The changes in BIO 7020 content and the change in the Biological Science MSc curriculum to require BIO 7020 for all Biological Sciences MSc students were made in response to a perceived need to improve student skills in written communication and in response to requirements from funding agencies that all students engaged in funded research receive training in research ethics.

B. STUDENT LEARNING OUTCOMES ASSESSED AND EXAMINED

Learning outcomes 1 – 4, as stated above, were assessed and examined in the 2012 – 2013 academic year.

C. METHODS FOR COLLECTING DATA
Faculty advisory committee members were asked to assess graduating Biological Sciences MSc students. Assessments were made through the completion of an assessment form immediately following the students' thesis defense (thesis option students) or presentation of their literature critique (non-thesis option students).

Also, all graduates of the Biological Sciences MSc Program were tracked when they graduated in regard to i. how many papers they published from their MSc work, ii. how many meeting presentations did they make during their MSc careers and iii. where they went following their graduation (e.g. into a PhD program or into a Biological Sciences related career).

D. ASSESSMENT MEASURES

- Thesis option students were assessed based on their written thesis and their oral defense.
- Non-thesis option students were assessed based on their written literature critique and their oral presentation of that critique.

E. SIGNIFICANT FINDINGS

Learning Outcomes.

1. Effective communication – average rating of all graduates for their communications skills placed them in the “upper 25% of students at a comparable stage of development”.
2. Mathematical literacy – average rating of all graduates for mathematical literacy placed them in the upper 25%.
3. Evaluate arguments – not directly tested, related to mathematical literacy (statistics), i.e. upper 25%
4. Methods of inquiry (technical abilities) – average rating of all graduates for their technical abilities placed them in the upper 25%.

Communication skills (and technical expertise) of WSU Biological Sciences MSc graduates also was evident from their publications and meeting presentations. The ten Biological Sciences MSc graduates in 2012 – 2013 averaged 0.9 peer-reviewed publications (1.1 counting manuscripts in review) and 2.9 meeting presentations.

All of the 2012 – 2013 Biological Sciences MSc graduates left Wright State for positions working in Biological Sciences. Four were admitted to and currently are in PhD programs in Biological Sciences. Two are instructors and Sinclair Community College. One became a field biologist at Five Rivers MetroParks. One has a position as an R&D Microbiologist. One is a certified eye bank technician. One is a research technician at WSU.

F. DISCUSSION OF RESULTS

These results will be presented to the Biological Sciences Graduate Committee and then to the Biological Sciences faculty.

G. ACTIONS PLANNED TO IMPROVE STUDENT LEARNING

Faculty participation in post-defense surveys was low. Possible reasons for this low participation rate include the perceived quality of the survey (which has not been updated in several years are has rarely, if ever, been used to support any changes in the MSc program) and the manner in which it is administered (paper survey to be turned in when convenient). Moreover, the current survey does not relate directly to the WSU learning outcome goals. The post-defense assessment questionnaire will be revised to more directly relate to these goals. It also will be modified to provide a more rigorous assessment of MSc student abilities on an absolute rather than on a relative scale.

H. SUPPORTING DOCUMENTS (recommended)