PROPOSAL TITLE: *Incorporating genetics and molecular biology into the physical anthropology laboratory curriculum.*

ABSTRACT:
Once you have finished answering the questions within the following application, please provide an abstract below summarizing the description of your sabbatical leave proposal in a paragraph of between 100-150 words. This abstract will become part of the Board Docket. Please include the following information as part of the abstract:

- **Need for the Professional Growth** - describe the purpose of the sabbatical leave.
- **Sabbatical Leave Activities** - describe what you plan to do.
- **Anticipated Outcomes** - describe the primary outcome; instructor and classroom teaching outcomes; professional/faculty relationship outcome; student outcomes.
- **Means of Measurement** - describe what evidence you will submit to demonstrate achievement of your outcomes.
- **Expected benefit to the students, department, college, district, and/or community**

Abstract:
Understanding cell biology and genetics is fundamental to any life science course, including physical anthropology. However, many anthropology students have great difficulty mastering basic concepts in these areas. The purpose of the proposed sabbatical leave is to expand my knowledge of molecular biology and genetics in order to improve the teaching of those areas in the physical anthropology laboratory and lecture courses. I will accomplish this in two ways. First, I will expand my own currency in these topics through training sessions, educator workshops, and background research. Second, I will create and implement new laboratory activities and update course content in these subject areas, tailoring them specifically to anthropology. I will disseminate all curriculum materials to anthropology faculty in the department, and contribute a paper to a teaching conference or professional journal. Students will benefit from enhanced coverage of genetics and cell biology and more engaging practical lab activities. They will gain valuable analytical and quantitative skills and an appreciation for the relevance of genetics in their own lives.
PROPOSAL:
As you prepare this proposal, it is also strongly recommended that you consult with the Department Chair/Coordinator and Dean prior to submittal to address any issues or to provide additional information or clarification regarding the proposal.

Please answer each question carefully and completely (do not say "please see above") in order to provide the Sabbatical Leave Committee with as much information as possible for their review and scoring. Provide background information and/or references to supporting documentation where appropriate.

Need for Sabbatical

1. How does your proposed activity meet the need for professional and personal growth?

The proposed sabbatical activity provides the opportunity to study up-to-date and intellectually challenging material in genetics, molecular biology and biotechnology, and use the information acquired to improve my physical anthropology laboratory and lecture courses. While I have a doctorate in physical anthropology, my specialization was in the analysis of human skeletal remains; consequently, I lack extensive experience in genetics or molecular biology. The sabbatical leave will allow me to keep up with this rapidly changing scientific field. I will also benefit by collaborating with science educators and learning about new and innovative teaching methods in laboratory science courses.

2. How does your proposed activity benefit (please address at least three of the following):
   a. the students?

   Anthropology 131 is a laboratory course in physical anthropology that fulfills the laboratory science General Education requirement for Grossmont College. Understanding cell biology and genetics is fundamental to any life science course, including physical anthropology. However, many students have great difficulty with these topics. Although students find genetics personally interesting, existing anthropology laboratory manuals tend to give short shrift to these topics, presenting them in a static, theoretical manner, with few opportunities for practical experience. Weak student performance on quizzes and exams indicates that they are failing to master basic genetic concepts. Students will benefit from enhanced coverage of genetics and dynamic, hands-on lab exercises such as DNA sequencing and microscopy. They will gain valuable analytical and quantitative skills and an appreciation for the relevance of genetics in their own lives.

   b. the institution?

   Increasing the quality of the Physical Anthropology laboratory course will result in demonstrable student improvement in core competencies assessed in Student Learning Outcomes (SLO). This course, like other laboratory science courses teaches many of the competencies contained within the Institutional Framework for Essential Learning including quantitative and analytical literacy, teamwork and problem solving, and skills for lifelong learning.

   The institution will also benefit by supporting instructional faculty who are not only current in their discipline, but are actively pursuing lifelong learning opportunities outside their particular specialization.
c. the community?

The community will benefit from citizens who are knowledgeable about the process of scientific inquiry and informed consumers of scientific information.

d. the discipline/contribution to scholarship

This sabbatical activity contributes to scholarship in the discipline by developing new and innovative methods for teaching cell biology and genetics tailored specifically to anthropology students who lack experience in science. The resulting genetics curriculum will be shared with colleagues at an anthropology professional meeting, and may be published in a professional journal. The new curriculum may eventually form the basis for a larger undertaking such as writing a lab manual textbook.

3. Describe the relevancy of your activity to your current/new assignment and the improvement of student learning.

As the sole full-time anthropology faculty member, I teach lecture and laboratory courses in physical anthropology and archaeology, and manage the anthropology laboratory. I am responsible for curriculum (proposing new courses and maintaining currency in existing ones) and student learning outcomes in the discipline. I created the anthropology laboratory course at Grossmont in 2008 and have taught at least one section of the lab class every semester since. The proposed sabbatical activity is directly relevant to my current assignment and to improved student learning. Since physical anthropology is classified as a life science, it is essential that students understand fundamentals of biological science such as evolution, genetics and cell biology. However, students in both the lecture and lab classes have considerable difficulty with these concepts, as evidenced by poor performances on exams. Students will benefit from enhanced coverage of genetics and more engaging laboratory activities by demonstrating greater mastery of core competencies on exams and SLO assessments.

Description of Overall Activity

4. Please provide a brief description and purpose of the proposed sabbatical leave activity.

The purpose of the sabbatical leave is to expand my knowledge of molecular genetics and DNA analysis, so that I can produce new curriculum in the physical anthropology laboratory course that I teach (Anthropology 131), and strengthen coverage of genetics concepts in my physical anthropology lecture course (Anthropology 130).

I will accomplish this in two ways. First, I will expand my own currency in these areas through training sessions, educator workshops, and background research. Then, I will produce new laboratory activities for the genetics and cell biology units of Anthropology 131 (Physical Anthropology Lab) that are specifically tailored to physical anthropological concepts, and in accordance with the relevant student learning outcomes (SLO’s).

I will disseminate all of the activities and lab exercises along with detailed lesson plans to anthropology faculty. Finally, I will prepare a paper or presentation for a teaching conference or a professional journal.
5. Please provide a clearly defined set of objectives and the course of action to achieve those objectives that are consistent with the purpose and nature of the proposed leave.

Objective 1: Expand currency in molecular biology and genetics, both with regard to understanding as well as teaching the relevant concepts.
- Research coursework and training opportunities in the above areas.
- Enroll in courses or workshops to enhance general knowledge and obtain technical and pedagogical training in implementing new laboratory activities involving DNA analysis and microscopy. Examples of such workshops include: Human DNA fingerprinting using DNA chip analysis or gel electrophoresis, human mitochondrial sequencing, and genome science.
- Conduct library research and read books, articles and online source material and tutorials.

Objective 2: Implement the concepts learned from the training and study in the Anthropology laboratory course curriculum.
- Determine feasibility of specific laboratory activities given the constraints of laboratory space, equipment, and budget.
- Consult with Life Science faculty at Grossmont College to learn about laboratory setup, equipment requirements, and other protocol.
- Consult with Earth Science faculty (the anthropology lab is currently housed in the Earth Science lab) and administrators concerning sharing of equipment, space constraints, and other logistical issues.
- Design new lab activities and exercises that incorporate new concepts and methods learned.
- Inventory existing equipment and supplies and order necessary materials for the new activities.

Objective 3: Disseminate results of activities to colleagues.
- Make curriculum available to department faculty who teach the laboratory course.
- Present findings to the department, division, or anthropology faculty organization.
- Prepare article for publication in anthropology journal devoted to pedagogy.

6. Please address the feasibility of the activity by discussing:
 a. a proposed timeline that is appropriate to the activity, and

Summer/Fall 2016—Attend workshop(s) on DNA, molecular biology, and biotechnology for educators. Several organizations offer such training such as the National Science Teachers Association (NSTA) and Cold Spring Harbor Laboratories. Attendance depends on specific course offerings and locations, which have not yet been posted for 2016.

Jan-March 2017—If in-person attendance (see above) is not feasible, enroll in online training courses and virtual workshops offered by the NSTA and other scientific and educational organizations.

Jan-March 2017—Library and online research and reading.

March-June 2017—Writing and implementation of laboratory exercises and other curriculum.

March-June 2017—Order equipment and supplies and consult with faculty and administrators.

Summer-Fall 2017—Disseminate information to colleagues in the college and in the professional community.
b. the availability of appropriate resources

I have sufficient funds to personally pay fees for workshops and courses. The Behavioral Sciences department has a budget for laboratory materials and supplies. In the future, grants can be written to fund more substantial equipment purchases, should they be needed.

Outcomes
7. Clearly describe the expected outcomes of your activity.
   - Enhance general knowledge of molecular biology, genetics and biotechnology through workshops and self-study.
   - Obtain technical training and learn new pedagogical methodologies in implementing new laboratory activities involving DNA analysis and microscopy.
   - Compile an annotated bibliography of source material for research and self-study.
   - Produce new laboratory activities for the genetics and cell biology units of Anthropology 131 (Physical Anthropology Lab) that are specifically tailored to physical anthropological concepts, and in accordance with the relevant student learning outcomes (SLO’s).
   - Purchase specific equipment and supplies and inventory existing laboratory materials in order to implement the new curriculum for Anthropology 131.
   - Modify existing lectures, media and class activities for Anthropology 130 (Physical Anthropology lecture course).
   - Prepare conference presentation or paper

8. What evidence will you submit to demonstrate achievement of your outcomes?
   - Certificate(s) and/or other evidence of completion of workshops or training sessions.
   - Annotated bibliography of source material.
   - Revised curriculum for teaching genetics and cell biology in Anthropology 131.
   - Record of purchase of specific equipment and supplies and inventory of existing laboratory materials.
   - Conference presentation or paper