TRANSMITTAL for UNDERGRADUATE PROGRAMS:
Changes or Proposals

I. INFORMATION:
1. Program Title: General Science For Elementary Education
2. Department(s): TED, CHEM, BIOL, Plant and Earth, PHYS
3. College(s): CEPS
4. Proposal prepared by: Michael Martin Brenda Wright Date: 2/10/2016
5. Check all that apply
   - New program
   - Change in course name
   - Change in major
   - Change in course content
   - Existing program
   - Change in number of credits
   - Change in minor
   - Change in emphasis/option

6. Other Programs/Departments Consulted (Requires letters of comment from all Departments or Programs substantially affected):
   a. Chemistry
   b. Physics
   c. Biology
   d. Plant and Earth

7. Catalog year (and semester) of Implementation: Semester Fall Year 2016

8. Have all courses in this program been approved? Yes [ ] No [ ]
   If “No” which courses have not been approved?

9. Attach Request Narrative
   Include in narrative on attached pages a rationale for the requested changes or creation of program.
   Include clarification concerning any courses that have not yet been approved. If requesting a
   program change also include a listing of course array for both the current and proposed program?

10. UNIT APPROVALS: Requires signatures of all Department Chairs and Deans whose programs will
    be substantially affected by the changes or proposal. Signature lines for the affected Departments and
    Colleges (noted in “6” above), are on the addendum to this form. These signatures should be obtained
    prior to review by all other shared governance levels.

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Brenda Wright</td>
<td>3/3/16</td>
</tr>
<tr>
<td>[signature]</td>
<td>3/23/16</td>
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<td>[signature]</td>
<td>7/4/16</td>
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<tr>
<td>Alex Turner</td>
<td>4/14/16</td>
</tr>
</tbody>
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*NOTE: The master copy of this transmittal & accompanying documents must be filed in the Provost’s office upon final approval. The Provost’s office will notify all appropriate administrative offices [Registrar, Dean(s), Department Chair(s)] of approvals & necessary actions to implement changes.

Revised December 2012
TRANSMITTAL for UNDERGRADUATE PROGRAMS: Changes or Proposals - Addendum

Signatures of Additional Department & Colleges Affected

<table>
<thead>
<tr>
<th>Department Chair</th>
<th>Signature</th>
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<tr>
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<td>MSB</td>
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<th>Department Chair</th>
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<td>Keal P.</td>
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<th>Department Chair</th>
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<td>Donovan</td>
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<td>Department Chair</td>
<td>James Madison</td>
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<td>Dean of College</td>
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Revised December 2012
General Science for Elementary Education Minor Proposal

Rationale:
The general science minor was developed for students in the undergraduate elementary education major, for students interested in teaching middle school science. This minor used to lead to a 621 5th – 8th grade science license. However, in 2004 this license was discontinued by the Department of Public Instruction and replaced with Middle Childhood – Early Adolescence, ages 6 -13, general science licenses (1634 and 1601). The design of the current minor is outdated due to curricular changes that have occurred in the departments that offer the approved courses in the program. Several of the courses have not been offered recently. In addition, the Department of Instruction’s regulations regarding the minor changed in 2004. This proposal reflects those changes and current best practices to prepare middle school generalist science teachers. The current minor was administered by the general science committee and was housed in the physics department. The general science committee has since dissolved and the physics department has requested to have the minor administered through the Teacher Education department because the minor is designed specifically for students in the elementary program. This revision of the minor was developed collaboratively with the Biology, Chemistry, Physics and the Plant and Earth Science departments. This proposal will create a high quality minor and credit savings for students, which will help reduce time to program completion. This is achieved by utilizing courses in general education, and removing outdated DPI requirements which required this program to consist of 10 credits in a single science discipline with six credits in each of the other three science disciplines. The content courses support the Next Generation school science standards for middle school, along with the Wisconsin Department of Public Instruction recommended middle school science content standards.
General Science Minor  (Current)  

30 credits total

24 credits not double counted

Select 12 credits from one area and 6 credits from each of the remaining three areas:

**Biology 6-12 cr. hrs.**
- BIOL 150 General Biology 3 cr. – current course
- BIOL 210 General Botany 3 cr. – current course (prerequisite of BIOL 150)
- BIOL 230 General Zoology 3 cr. – current course (prerequisite of BIOL 150)
- BIOL 253 Human Biology 3 cr. – current course (prerequisite of BIOL 150 or 100)

**Chemistry 6-12 cr. hrs.**
- CHEM 101 Elementary Principles of Chemistry 3 cr. – course may be discontinued (last offering spring 2015)
- CHEM 200 Chemistry and the Environment 3 cr. – last offered spring 2007 - 08
- CHEM 220 Chemistry of Life 3 cr. – last offered spring 2010 - 11
- CHEM 230 General Organic Chemistry 3 cr. – active course requires a prerequisite of CHEM 115

**Geology 6-12 cr. hrs.**
- GEOL 101 Introductory Geology 3 cr. – current course
- GEOL 102 Introductory Geology Lab 1 cr. – current course (with restricted enrollment)
- GEOL 150 Geological Perspectives of Global Change 4 cr. – current course (prereq of geology 101)
- GEOL 115 Oceanography 3 cr. – current course
- GEOL 269 Environmental Geology 2 cr. – current course, Ethical Citizenship only offered once per year
- GEOL 305 Geology of the Planets 2 cr. – current course, prerequisite of geology 101 or physics 117
- GEOL 330 Meteorology 2 cr. – last offered fall 2013-2014

**Physics 6-12 cr. hrs.**
- PHYS 114 Conceptual Physics 3 cr. – current course
- PHYS 117 Introductory Astronomy 3 cr. – current course
- PHYS 220 The Science of Light 4 cr. last offered spring 2010-11
- PHYS 318 Astrophysics 3 cr. current course (prereq of PHYS 117)
- PHYS 321 The Science of Sound 2 cr. last offered spring 2000 - 2001

Notes:

- This minor is based on a Department of Instruction middle school science license that was discontinued in September of 2004. (621 grades 5-8 general science license)
  - This license required a course distribution of 12 credits in a single science discipline, and six credits in the remaining three disciplines.
  - Disciplines were defined as (Biology, Chemistry, Physics, Earth)
  - License was available to both secondary and elementary programs
- Many of the courses listed in the minor are either no longer offered, or have prerequisites that would create several hidden credits in order to complete the minor.
- The only two main focus areas which currently can be completed without exception are Biology and Earth Science.
## Proposed Elementary Science Minor

<table>
<thead>
<tr>
<th>Category</th>
<th>Courses</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Physical Science</strong></td>
<td>PHYS 114 Concepts in Physics</td>
<td>3 credits</td>
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<tr>
<td></td>
<td>CHEM 115 Concepts in General Chemistry (prerequisite of math 146)</td>
<td>4 credits</td>
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<tr>
<td></td>
<td>CHEM 215 Chemistry Laboratory Concepts and Techniques</td>
<td>1 credit</td>
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<tr>
<td><strong>Life Science &amp; Environmental Science</strong></td>
<td>BIOL 150 General Biology</td>
<td>3 credits</td>
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<tr>
<td></td>
<td>BIOL 103 Fundamentals of Biological Evolution</td>
<td>3 credits</td>
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<tr>
<td></td>
<td>ESM 300 Environmental Education</td>
<td>3 credits</td>
</tr>
<tr>
<td><strong>Earth and Space Science</strong></td>
<td>GEOL 101 Introduction to Geology</td>
<td>3 credits</td>
</tr>
<tr>
<td></td>
<td>GEOL 102 Introduction to Geology Lab</td>
<td>1 credit</td>
</tr>
<tr>
<td></td>
<td>PHYS 117 Astronomy</td>
<td>3 credits</td>
</tr>
<tr>
<td><strong>Required supporting course</strong></td>
<td>MATH 146 or higher</td>
<td>3 credits</td>
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### Notes:
- Minor would be restricted to elementary education majors.
- Six credits will be applied towards general education goal 3 (SI).
- ESM 300 is a required element of the major, so by default there are 9 credits in Biological and Environmental Science.
- There may be a possibility to exempt MATH 146/147 based on ACT or Math Placement Test Scores.
- In the future I would like to investigate developing a Middle School Science Methods course which would include the Engineering strands in it. (we are light in this area)

### References

Next Generation Science Standards

- MS-PS1 Matter and Its Interactions
- MS-PS2 Motion and Stability: Forces and Interactions
- MS-PS3 Energy
- MS-PS4 Waves and their Applications in Technologies for Information Transfer
- MS-LS1 From Molecules to Organisms: Structures and Processes
- MS-LS2 Ecosystems: Interactions, Energy, and Dynamics
- MS-LS3 Heredity: Inheritance and Variation of Traits
- MS-LS4 Biological Evolution: Unity and Diversity
- MS-ESS1 Earth's Place in the Universe
- MS-ESS2 Earth's Systems
- MS-ESS3 Earth and Human Activity
- MS-ETS1 Engineering Design
Hi Mike

I have reviewed the proposed changes to the General Science Minor for Elementary Education. I have also consulted with Dr. Jamie Schneider, the education specialist in our department. We agree that the changes are good for your students and that the changes make the best use of our currently offered course array for meeting the needs of this program.

We support the proposed revisions.

Kind regards,

Karl

Karl P. Peterson, Ph.D.
Professor and Chair
Department of Chemistry and Biotechnology
University of Wisconsin-River Falls
715-425-3523

---

Hello,

Please review the attached program change transmittal form for the General Science Minor for Elementary Education we have previously discussed. I have made the modifications suggested by the Physics department, and I have copied the faculty from your respective departments that have consulted with me regarding these proposed changes. After completing your review of this proposal, if you approve, please forward letters of comment to me. Once I have received all letters I will schedule times to visit with each of you individually for approval signatures.

If you have concerns please let me know and I can convene a time for us to meet to discuss any new concerns that you may have.

Respectfully submitted,

Michael
Michael Martin, Sr. Advisor / Teacher Certification Officer
Education Preparation Program
College of Education and Professional Studies
University of Wisconsin - River Falls
410 South 3rd Street
River Falls WI 54022
Office Phone: 715-425-3774   Cellular / Text: 651-428-2359   Fax: 715-425-0622
Facetime: michael.martin@uwrf.edu   Skype: Thraxzz   facebook: michael.martin@uwrf.edu

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Hi Michael,

The Department of Plant and Earth Science supports the proposed changes to the General Science Minor for Elementary Education.

Regards,
Donavon Taylor, Chair
Department of Plant and Earth Science

---

From: Michael Martin
Sent: Thursday, February 11, 2016 4:43 PM
To: Donavon Taylor <donavon.h.taylor@uwrf.edu>; Mark Bergland <mark.s.bergland@uwrf.edu>; Karl Peterson <karl.peterson@uwrf.edu>; James Madsen <james.madsen@uwrf.edu>
Cc: Earl Blodgett <earl.d.blodgett@uwrf.edu>; Jamie Schneider <jamie.schneider@uwrf.edu>; Brenda Wright <brenda.wright@uwrf.edu>; Bradley Caskey <bradley.j.caskey@uwrf.edu>; Larry Solberg <larry.c.solberg@uwrf.edu>; Michael Harris <michael.d.harris@uwrf.edu>; Dale Gallenberg <dale.gallenberg@uwrf.edu>
Subject: Elementary General Science Proposal

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Michael

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College of Education and Professional Studies
University of Wisconsin - River Falls
410 South 3rd Street
River Falls WI 54022
Office Phone: 715-425-3774 Cellular / Text: 651-428-2359 Fax: 715-425-0622
Facetime: michael.martin@uwrf.edu Skype: Thraxz Facebook: michael.martin@uwrf.edu

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Hi Mike,

This looks good to me – we plan on continuing to offer BIOL 150 and BIOL 103.

Mark

Mark Bergland, Chair  
Biology Department, AGS 410  
University of Wisconsin - River Falls  
River Falls, WI 54022  
mark.s.bergland@uwrf.edu  
715-425-4043 (office) or 715-529-8845 (cell)

From: Michael Martin  
Date: Friday, February 12, 2016 at 8:41 AM  
To: Karl Peterson, Donavon Taylor, Mark Bergland, James Madsen  
Cc: Earl Blodgett, Jamie Schneider, Brenda Wright, Bradley Caskey, Larry Solberg, Michael Harris, Dale Gallenberg  
Subject: RE: Elementary General Science Proposal

Thank you Karl,

You are correct! I missed that update when moving classes around!

Attached is the corrected version of the proposal.

Take care,

Mike

******************************************************************************  
Michael Martin, Sr. Advisor / Teacher Certification Officer  
Education Preparation Program  
College of Education and Professional Studies  
University of Wisconsin - River Falls  
410 South 3rd Street  
River Falls WI 54022  
Office Phone: 715-425-3774 Cellular / Text: 651-428-2359 Fax: 715-425-0622  
Facetime: michael.martin@uwrf.edu Skype: Thraxzz facebook: michael.martin@uwrf.edu

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Hi Mike

I was just reviewing the proposal. Everything seems reasonable, but I think I am missing something on the credit counting. The new plan says 25 total credits, but I only count 24; 8 credits Physical Science, 9 credits Life Science & Environmental Science, 7 credits Earth and Space Science. \(8 + 9 + 7 = 24\). If this is correct, then I believe the 16 credits of unique courses would need to be changed to 15 to have 9 credits double counted + 15 credits of unique courses = 24 total credits. Am I reading this correctly?

Karl

---

Hello,

Please review the attached program change transmittal form for the General Science Minor for Elementary Education we have previously discussed. I have made the modifications suggested by the Physics department, and I have copied the faculty from your respective departments that have consulted with me regarding these proposed changes. After completing your review of this proposal, if you approve, please forward letters of comment to me. Once I have received all letters I will schedule times to visit with each of you individually for approval signatures.

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Respectfully submitted,

Michael

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Hi Mike:
Physics approves.
Thanks,
Jim

Jim Madsen
Professor, Chair
Physics Department
UWRF
410 South Third Street
River Falls, WI 54022

Associate Director for Education and Outreach
IceCube Collaboration
715-425-4390 Office
715-425-0652 FAX

From: Michael Martin
Sent: Wednesday, March 02, 2016 8:08 AM
To: Earl Blodgett <earl.d.blodgett@uwrf.edu>; James Madsen <james.madsen@uwrf.edu>
Cc: Brenda Wright <brenda.wright@uwrf.edu>
Subject: FW: Elementary General Science Propsal

Greetings,

I following up to see if you have had time to review the proposal for the general science minor for elementary education. If you have any questions please feel free to let me know. I am working on moving this through committee so the timelines are getting a little tight. The other three departments have approved of the proposal,

Thank you in advance for taking the time to review this.

Mike

From: Michael Martin
Sent: Thursday, February 11, 2016 4:43 PM
To: Donavon Taylor <donavon.h.taylor@uwrf.edu>; Mark Bergland <mark.s.bergland@uwrf.edu>; Karl Peterson <karl.peterson@uwrf.edu>; James Madsen <james.madsen@uwrf.edu>
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Michael

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Science, Standard A: Science Connections Performance Standards - Grade 8

By the end of grade eight, students will:

A.8.1 Develop their understanding of the science themes by using the themes to frame questions about science-related issues and problems.

A.8.2 Describe limitations of science systems and give reasons why specific science themes are included in or excluded from those systems.

A.8.3 Defend explanations and models by collecting and organizing evidence that supports them and critique explanations and models by collecting and organizing evidence that conflicts with them.

A.8.4 Collect evidence to show that models developed as explanations for events were (and are) based on the evidence available to scientists at the time.

A.8.5 Show how models and explanations, based on systems, were changed as new evidence accumulated (the effects of constancy, evolution, change, and measurement should all be part of these explanations).

A.8.6 Use models and explanations to predict actions and events in the natural world.

A.8.7 Design real or thought investigations to test the usefulness and limitations of a model.

A.8.8 Use the themes of evolution, equilibrium, and energy to predict future events or changes in the natural world.

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/contact/contact) (608) 266-3359.
Science, Standard B: Nature of Science
Performance Standards - Grade 8

By the end of grade eight, students will:

B.8.1 Describe how scientific knowledge and concepts have changed over time in the earth and space, life and environmental, and physical sciences.

B.8.2 Identify and describe major changes that have occurred over in conceptual models and explanations in the earth and space, life and environmental, and physical sciences and identify the people, cultures, and conditions that led to these developments.

B.8.3 Explain how the general rules of science apply to the development and use of evidence in science investigations, model-making, and applications.

B.8.4 Describe types of reasoning and evidence used outside of science to draw conclusions about the natural world.

B.8.5 Explain ways in which science knowledge is shared, checked, and extended, and show how these processes change over time.

B.8.6 Explain the ways in which scientific knowledge is useful and also limited when applied to social issues.

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/user/15651/contact) (608) 266-3319.
Science, Standard C: Science Inquiry Performance Standards - Grade 8

By the end of grade eight, students will:

C.8.1 Identify* questions they can investigate* using resources and equipment they have available

C.8.2 Identify* data and locate sources of information including their own records to answer the questions being investigated

C.8.3 Design and safely conduct investigations* that provide reliable quantitative or qualitative data, as appropriate, to answer their questions

C.8.4 Use inferences* to help decide possible results of their investigations, use observations to check their inferences

C.8.5 Use accepted scientific knowledge, models*, and theories* to explain* their results and to raise further questions about their investigations*

C.8.6 State what they have learned from investigations*, relating their inferences* to scientific knowledge and to data they have collected

C.8.7 Explain* their data and conclusions in ways that allow an audience to understand the questions they selected for investigation* and the answers they have developed

C.8.8 Use computer software and other technologies to organize, process, and present their data

C.8.9 Evaluate*, explain*, and defend the validity of questions, hypotheses, and conclusions to their investigations*

C.8.10 Discuss the importance of their results and implications of their work with peers, teachers, and other adults

C.8.11 Raise further questions which still need to be answered

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/user/15651/contact) (608) 266-3319
Science, Standard D: Physical Science Performance Standards - Grade 8

By the end of grade eight, students will:

PROPERTIES AND CHANGES OF PROPERTIES IN MATTER

D.8.1 Observe, describe, and measure physical and chemical properties of elements and other substances to identify and group them according to properties such as density, melting points, boiling points, conductivity, magnetic attraction, solubility, and reactions to common physical and chemical tests.

D.8.2 Use the major ideas of atomic theory and molecular theory to describe physical and chemical interactions among substances, including solids, liquids, and gases.

D.8.3 Understand how chemical interactions and behaviors lead to new substances with different properties.

D.8.4 While conducting investigations, use the science themes to develop explanations of physical and chemical interactions and energy exchanges.

MOTIONS AND FORCES

D.8.5 While conducting investigations, explain the motion of objects by describing the forces acting on them.

D.8.6 While conducting investigations, explain the motion of objects using concepts of speed, velocity, acceleration, friction, momentum, and changes over time, among others, and apply these concepts and explanations to real-life situations outside the classroom.

D.8.7 While conducting investigations of common physical and chemical interactions occurring in the laboratory and the outside world, use commonly accepted definitions of energy and the idea of energy conservation.

TRANSFER OF ENERGY

D.8.8 Describe and investigate the properties of light, heat, gravity, radio waves, magnetic fields, electrical fields, and sound waves as they interact with material objects in common situations.

D.8.9 Explain the behaviors of various forms of energy by using the models of energy transmission, both in the laboratory and in real-life situations in the outside world.

D.8.10 Explain how models of the atomic structure of matter have changed over time, including historical models and modern atomic theory.

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/user/1565/contact) (608) 266-3319.
Science, Standard E: Earth and Space Science Performance Standards - Grade 8

By the end of grade eight, students will:

STRUCTURE OF EARTH SYSTEM

E.8.1 Using the science themes, explain and predict changes in major features of land, water, and atmospheric systems

E.8.2 Describe underlying structures of the earth that cause changes in the earth's surface

E.8.3 Using the science themes during the process of investigation, describe climate, weather, ocean currents, soil movements and changes in the forces acting on the earth

E.8.4 Using the science themes, analyze the influence living organisms have had on the earth's systems, including their impact on the composition of the atmosphere and the weathering of rocks

EARTH'S HISTORY

E.8.5 Analyze the geologic and life history of the earth, including change over time, using various forms of scientific evidence

E.8.6 Describe through investigations the use of the earth's resources by humans in both past and current cultures, particularly how changes in the resources used for the past 100 years are the basis for efforts to conserve and recycle renewable and non-renewable resources

EARTH IN THE SOLAR SYSTEM

E.8.7 Describe the general structure of the solar system, galaxies, and the universe, explaining the nature of the evidence used to develop current models of the universe

E.8.8 Using past and current models of the structure of the solar system, explain the daily, monthly, yearly, and long-term cycles of the earth, citing evidence gained from personal observation as well as evidence used by scientists.

For questions about this information, contact KevinAnderson (http://dpi.wi.gov/user/15651/contact) (608) 266-5319
Science, Standard F: Life and Environmental Science Performance Standards - Grade 8

By the end of grade eight, students will:

STRUCTURE AND FUNCTION IN LIVING THINGS

F.8.1 Understand the structure and function of cells, organs, tissues, organ systems, and whole organisms

F.8.2 Show how organisms have adapted structures to match their functions, providing means of encouraging individual and group survival within specific environments

F.8.3 Differentiate between single-celled and multiple-celled organisms (humans) through investigation, comparing the cell functions of specialized cells for each type of organism

REPRODUCTION AND HEREDITY

F.8.4 Investigate and explain that heredity is comprised of the characteristic traits found in genes within the cell of an organism

F.8.5 Show how different structures both reproduce and pass on characteristics of their group

REGULATION AND BEHAVIOR

F.8.6 Understand that an organism is regulated both internally and externally

F.8.7 Understand that an organism’s behavior evolves through adaptation to its environment

POPULATIONS AND ECOSYSTEMS

F.8.8 Show through investigations how organisms both depend on and contribute to the balance or imbalance of populations and/or ecosystems, which in turn contribute to the total system of life on the planet

DIVERSITY AND ADAPTATIONS OF ORGANISMS

F.8.9 Explain how some of the changes on the earth are contributing to changes in the balance of life and affecting the survival or population growth of certain species

F.8.10 Project how current trends in human resource use and population growth will influence the natural environment, and show how current policies affect those trends.

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/ser/15653/contact) (608) 266-3319
Science Applications, Performance Standards G Grade 8

By the end of grade eight, students will:

G.8.1 Identify and investigate the skills people need for a career in science or technology and identify the academic courses that a person pursuing such a career would need.

G.8.2 Explain how current scientific and technological discoveries have an influence on the work people do and how some of these discoveries also lead to new careers.

G.8.3 Illustrate the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life.

G.8.4 Propose a design (or re-design) of an applied science model or a machine that will have an impact in the community or elsewhere in the world and show how the design (or re-design) might work, including potential side-effects.

G.8.5 Investigate a specific local problem to which there has been a scientific or technological solution, including proposals for alternative courses of action, the choices that were made, reasons for the choices, any new problems created, and subsequent community satisfaction.

G.8.6 Use current texts, encyclopedias, source books, computers, experts, the popular press, or other relevant sources to identify examples of how scientific discoveries have resulted in new technology.

G.8.7 Show evidence of how science and technology are interdependent, using some examples drawn from personally conducted investigations.

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/merf15651/contact) (608) 266-5319.
Science, Standard H: Science in Personal and Social Perspectives Performance Standards - Grade 8

By the end of grade eight, students will:

H.8.1 Evaluate the scientific evidence used in various media (for example, television, radio, Internet, popular press, and scientific journals) to address a social issue, using criteria of accuracy, logic, bias, relevance of data, and credibility of sources.

H.8.2 Present a scientific solution to a problem involving the earth and space, life and environmental, or physical sciences and participate in a consensus-building discussion to arrive at a group decision.

H.8.3 Understand the consequences of decisions affecting personal health and safety.

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/user/15631/contact) (608) 266-3319.
Content Standard: Students in Wisconsin will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change, and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines.

These themes relate and interconnect the Wisconsin science standards to one another. Each theme is further defined in the Science Glossary [http://dpi.wi.gov/science/standards/glossary].

Rationale
These unifying themes are ways of thinking rather than theories or discoveries. Students should know about these themes and realize that the more they learn about science the better they will understand how the themes organize and enlarge their knowledge. Science is a system and should be seen as a single discipline rather than a set of separate disciplines. Students will also understand science better when they connect and integrate these unifying themes into what they know about themselves and the world around them.

For questions about this information, contact Kevin Anderson [http://dpi.wi.gov/serve/15651/contact], (608) 266-5519.
Content Standard Science Standard B (Nature of Science)

Content Standard: Students in Wisconsin will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

Rationale
Students will realize that scientific knowledge is developed from the activities of scientists and others who work to find the best possible explanations of the natural world. Researchers and those who are involved in science follow a generally accepted set of rules to produce scientific knowledge that others can confirm with experimental evidence. This knowledge is public, replicable, and undergoing revision and refinement based on new experiments and data.

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/user/1366/contact) (608) 266-3519

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Content Standard Science Standard C - Science Inquiry

Content Standard: Students in Wisconsin will investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

Rationale
Students should experience science in a form that engages them in actively constructing ideas and explanations and enhances their opportunities to develop the skills of doing science. Such inquiry (problem solving) should include questioning, forming hypotheses, collecting and analyzing data, reaching conclusions and evaluating results, and communicating procedures and findings to others.

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Content Standard Science Standard D - Physical Science

Content Standard: Students in Wisconsin will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

Note: For more details of the content of physical science, see National Science Education Standards* (1996, p. 115 - 201).

Rationale
Knowledge of the physical and chemical properties of matter and energy is basic to an understanding of the earth and space, life and environmental, and physical sciences. The properties of matter can be explained in terms of the atomic structure of matter. Chemical reactions can be explained and predicted in terms of the atomic structure of matter.
Natural events are the result of interactions of matter and energy. When students understand how matter and energy interact, they can explain and predict chemical and physical changes that occur around them.

For questions about this information, contact Kevin Anderson (608) 266-3319

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Content Standard Science Standard E - Earth and Space Science

Content Standard: Students in Wisconsin will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

Note: For more details of the content of earth and space sciences, see National Science Education Standards* (1996, p. 115 - 201).

Rationale
By studying earth, its composition, history, and the processes that shape it, students gain a better understanding of the planet on which they live. In addition, all bodies in space, including earth, are influenced by forces acting throughout the solar system and the universe. Studying the universe enhances students' understanding of earth's origins, its place in the universe, and its future. Understanding these geologic, meteorological, astronomical, and oceanographic processes allows students to make responsible choices and to evaluate the consequences of their choices.

For questions about this information, contact Katie Anderson (http://dpi.wi.gov/user/15651/contact) (608) 266-3319

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Content Standard Science Standard F - Life and Environmental Science

Content Standard: Students in Wisconsin will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.

Note: For more details of the content of life and environmental science, see National Science Education Standards* (1996, p. 115 - 201).

Rationale
Students will enhance their natural curiosity about living things and their environment through study of the structure and function of living things, ecosystems, life cycles, energy movement (transfer), energy change (transformation), and changes in populations of organisms through time. Knowledge of these concepts and processes of life and environmental science will assist students in making informed choices regarding their lifestyles and the impact they have on communities of living things in their environment.

For questions about this information, contact Kevin Anderson (http://dpi.wi.gov/user/35551/contact) (608) 266-3319

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TED Faculty Meeting—April 19, 2016

Present: Brenda Wright, Elisa Nordin-Berghuis, Tyler Christensen, Hilary Pollack, Florence Monsour, Melina Papadimitriou, Susan Ahrendt, Molly Gerrish, Rachelle Haroldson, Satomi Shinde

Not Present: Amy Frederick, Katie Sciurba, Mary Wright, Michael Miller, Geoff Scheurman

Guests: Michael Martin and Diane Bennett

Meeting began at 3:37pm

1. Approve Meeting Minutes: Florence motioned to approve, Rachelle seconded, all in favor. Minutes approved.

2. Updates
   a. Molly shared that the EC/SPED search had 12 applicants and will be doing phone interviews with 5 of them next week (April 26 & 28).
   b. Hilary shared that the MSE redesign proposal was presented to AP&P and was approved. Next, it will go to Faculty Senate. Larry submitted the MSE El Ed proposal to DPI on Monday, April 18, 2016.
   c. Melina will be leaving on Thursday, April 21 to go to Milwaukee for a grant presentation and will be touring four of the Montessori school locations. (This is for the “Improve Teacher Quality” grant).
   d. Molly has 10 years of service at UWRF and will be recognized at the awards banquet. (Congrats Molly!)

3. Action Items:
   a. Diane Bennett presented STEMteach proposal changes, discussion ensured. Florence motioned to approve, Hilary seconded, all in favor and approved with the exception of one abstention. Proposal changes approved.
   b. Mike Martin shared the proposed changes to the General Science for Elementary Education Minor. Discussion ensued. Joel motioned to approve the changes as proposed by Mike, Florence seconded. Proposal changes approved.
   c. Melina shared the proposed changes to the Montessori Program. Molly motioned to approve the changes as presented by Melina, Rachelle seconded. Proposal changes approved.
   d. Florence shared the updates and answers to questions from faculty in connection with the newly revised retention and promotion criteria (all of the information is available for reference in the faculty handbook). Discussion ensued. Molly motioned to approve the changes to retention and promotion criteria and accept the revised department criteria as presented by Florence. Florence seconded, Rachelle, Melina and Tyler abstained, all others were in favor. The revised TED retention and promotion criteria was approved.

Meeting Adjourned at 4:20pm
Physics Department Meeting Minutes
Thursday, April 14, 2016
Present: Earl Blodgett, Rellen Hardtke, Eileen Korenic, Arriety Lowell, Jim Madsen (Chair), Lowell McCann, Suruj Seunarine, Matt Vonk

1) Approved minutes of last meeting, April 8, 2016; Minutes from Advisory Board Meeting March 24, 2016 still under review.

2) Reminders
   a) Earl - PHYS spring picnic will be held on Friday, May 6th at the building shelter (lg. side) from 4:30 pm – 8:00 pm. Pot luck, all are welcome.
   b) Public Astronomy Lectures
      May 2 8:00 pm CSH 271 “Who Really Discovered the Expansion of the Universe?” – Rellen Hardtke
   c) Suruj at Stony Brook from 4/18-4/23
      Reminder of class coverage in Phys 132 planned at Mar. 4 meeting:
      - Monday 4/18 9:00-9:50 AM (Intro to Waves) – Matt will cover
      - Tuesday 4/19 9:00-9:50 AM (Exam 3) – Arriety will cover
      - Wednesday 4/20 9:00-9:50 AM (More on Waves/Wave Speed)- Matt will cover
      - Thursday 4/21 9:00-10:50 AM (Waves on String Lab or Activity) – Earl will cover
   d) Jim at IceCube Collaboration Meeting 4/15 – 4/23
   e) Jim at Madison, College of Dupage 4/29 – 4/30
   f) Rellen at Physics with the Twins 4/19

3) Announcements
   a) CAS Curriculum Committee needs a member for next year. Jim volunteered with Earl agreeing to be the standing alternate.
   b) The American Waterworks Association has announced a scholarship opportunity for a student intending to work on water-related issues after graduation. Rellen suggested student Monroe Maher and she will contact him with the info.
   c) Angela Ludvigsen was selected by SPS as 1 of 2 students awarded for their research. She will receive $500 and a paid trip to Malta to present her work and the UWRF chapter of SPS will also receive $500. Matt pointed out that she will be a Maltese Falcon (Humphrey Bogart, Peter Lorre and Sydney Greenstreet, move over!)
   d) Matt and Peter Bohacek have formed their own company to make Direct Measurement videos: Physics Interactives SBC. Congratulations!
   e) Matt has been invited to be on the Advanced Placement Committee for the Physics C Test. Congratulations again!
   f) By email, Glenn announced that both rockets teams had test flights on Saturday Apr. 9. Neither crashed and both teams learned how to improve their rockets for competition.

3) New Business
   a) Earl/Matt moved to approve the Elementary Education General Science Minor proposal. Passed unanimously.
   b) The program exception for Nathan Ireland was tabled pending getting more information and clarification.
   c) ALC discussion: Jim is considering proposing a lower tech version of the ALC in CSH 152.
   d) The University is trying to figure out how to fund department computers as they need replacing. DoTS’ plan involved going to a lease program which would be less expensive than the cost of
buying new computers, with replacement every four years. Half of the leasing cost is to come from an as-yet unidentified source and half from the colleges. The latter half will be covered half by the dean and half by the department. For Physics the proposed yearly cost is $3919. No university-wide action has been taken and no other plan has been proposed. Earl/Matt moved that we accept covering the $3919 from our budget should the plan be re-introduced. Passed unanimously.

c) Foundation funding ideas for Physics were discussed:
f) Matt wants to apply for a Fulbright fellowship for Spring 2018 and asked for the department’s support. All nodded vigorously.

**Meeting adjourned** 4:12 pm
Submitted by Eileen Korenic