University Senate
TRANSMITTAL FORM

Senate Document #:	10-11-22
PCC ID #:	10000
Title:	Proposal to Establish a Bachelor of Science Degree Program in Middle School Education
Presenter:	David Salness, Chair, Senate Programs, Curricula, and Courses Committee
Date of SEC Review:	October 27, 2010
Date of Senate Review:	November 11, 2010
Voting (highlight one):	1. On resolutions or recommendations one by one, or 2. In a single vote 3. To endorse entire report
Statement of Issue:	The College of Education and the Department of Curriculum and Instruction wish to establish a new Bachelor of Science degree program in Middle School Education. Preparation of middle school teachers has been identified by the State as a major need in Maryland public schools. Increased attention has also turned to Science, Technology, Engineering and Math (STEM) education initiatives at the national, state, and local levels, and the University System of Maryland has identified STEM education as a high priority. It is an institutional objective of the University of Maryland to provide increased opportunities for teacher certification through Bachelor degree programs or as part of a Master's Certification program. The proposed Bachelor of Science in Middle School Education, which focuses on math and science, will prepare candidates to meet the Maryland State Department of Education requirements for certification in grades 4 through 9. The curriculum will provide a balanced program of mathematics and science content accompanied by pedagogical preparation designed specifically to address teaching and learning in middle

	school. In mathematics education, the content standards for teachers call for knowledge in mathematical problem solving, reasoning and proof, mathematical connections, mathematical representation, number and operation, algebra and geometry, data analysis, statistics and probability, and measurement. The six mathematics courses required in this program focus on these topics, including three courses tailored to this cohort. The science curriculum includes six courses from our current programs in biology, physics, chemistry, geology, atmospheric and ocean science, and geology, with options in plant and soil science or astronomy. These curricula align with the standards set by the National Council for Teachers of Mathematics and National Science Teachers Association. The education curriculum aligns with standards set by the National Middle School Association. The program is expected to attract about 20-30 students per year, drawing primarily from our current program in Elementary Education, which produces about 90-120 majors per year. A proportionate amount of funding will be reallocated from the Elementary Education program to the Middle School program in order to cover most of the expenditures related to the program. The Senate PCC committee approved the proposal at its meeting on October 15, 2010. The Academic Planning Advisory Committee approved the proposal on September 30, 2010.
Relevant Policy # & URL:	
Recommendation:	The Senate Committee on Programs, Curricula, and Courses recommends that the Senate approve this new degree program.
Committee Work:	The Committee considered the proposal at its meeting on October 15, 2010. Professor Linda Valli of the Department of Curriculum and Instruction presented the proposal to the committee and responded to questions. After discussion, the Committee voted unanimously to recommend the proposal.
Alternatives:	The Senate could decline to approve the proposed program.
Risks:	If the Senate does not approve the proposed program, the University will lose an opportunity to serve the State of Maryland by better preparing middle school teachers of math and science.

Financial Implications:	There are no significant financial implications with this proposal. Resources will be drawn primarily from a redirection of effort within the College of Education, with a small enhancement for new courses in mathematics.
Further Approvals Required: *(*Important for PCC Items)*	If the Senate approves this proposal, it would still require further approval by the President, the Board of Regents, and the Maryland Higher Education Commission.

THE UNIVERSITY OF MARYLAND, COLLEGE PARK
PROGRAM/CURRICULUM/UNIT PROPOSAL

- Please email the rest of the proposal as an MSWord attachment to pcc-submissions@umd.edu.
- Please submit the signed form to the Office of the Associate Provost for Academic Planning and Programs, 1119 Main Administration Building, Campus.

PCC LOG NO. 10000

College/School: College of Education
College/School Unit Code-First 8 digits: 01203100
Unit Codes can be found at: https://hypprod.umd.edu/Html_Reports/units.htm

Department/Program: Curriculum and Instruction
Department/Program Unit code-Last 7 digits: 1310901

Type of Action (choose one):

- ❑ Curriculum change (including informal specializations)
- ❑ *Renaming of program or formal Area of Concentration*
- ❑ *Addition/deletion of formal Area of Concentration*
- ❑ *Suspend/delete program*
- x *New academic degree/award program*
- ❑ New Professional Studies award iteration
- ❑ New Minor
- ❑ Other

Italics indicate that the proposed program action must be presented to the full University Senate for consideration.

Summary of Proposed Action:
Establish a new degree program: Bachelor of Science in Middle School Education: Science and Mathematics

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APPROVAL SIGNATURES - *Please print name, sign, and date. Use additional lines for multi-unit programs.*

1. Department Committee Chair Wayne Slater 9/9/10 Wayne Slater
2. Department Chair Francine Hultgren Francine Hultgren 9-9-10
3. College/School PCC Chair ~~Stephe~~ Robert G Croninger Robert G Croninger 9-10-10
4. Dean Stephen Kozicki Stephen Kozicki 9/10/10
5. Dianna L Wiseman 9/10/2010
6. Chair, Senate PCC David Wolness 10/15/10
7. University Senate Chair (if required) _____
8. Vice President for Academic Affairs & Provost _____

PROPOSAL FOR NEW INSTRUCTIONAL PROGRAM
UNIVERSITY OF MARYLAND, COLLEGE PARK

Bachelor of Science in Middle School Education:
Science and Mathematics

COLLEGE OF EDUCATION
DEAN DONNA WISEMAN
KIND OF DEGREE: BACHELOR OF SCIENCE
Proposed Initiation Date: Fall 2012

I. Overview and Rationale

A. Briefly describe the nature of the proposed program and explain why the institution should offer it.

The proposed program would create a Bachelor of Science degree in middle school education with a mathematics and science area of concentration that would prepare candidates for Maryland state certification for the middle-level grades. Preparation of middle school teachers has been identified by State Superintendent of Schools Nancy S. Grasmick as a major need in Maryland public schools. The Maryland State Board of Education approved certification regulations for the middle years in July 2005, while the State's Professional Standards and Teacher Education Board adopted the regulations the following month. As of September 24, 2009, the only Maryland institution the MSDE website has posted as having an accredited middle school certification program is Stevenson College. And, despite the national pattern of licensing teachers at the middle school level, only two universities from the 2009 *U.S. News & World Report* top ten specialty ranking in Curriculum and Instruction (U-Georgia and Ohio State) and only one University of Maryland peer institution (U-North Carolina) have middle school programs. As the flagship institution of the state university system, the University of Maryland, College Park should be at the forefront of national efforts to design model teacher preparation programs for the middle-level grades.

In addition to the needs for teachers prepared for the middle grades, increased attention has turned to Science, Technology, Engineering and Math (STEM) education initiatives at the national, state, and local levels, and the University of Maryland System has identified STEM education as a high priority. The proposed program would focus on preparing candidates to teach middle-level mathematics and science by providing a balanced program of mathematics and science content accompanied by pedagogical preparation designed specifically to address teaching and learning in middle school.

Currently, both the mathematics and science education programs do prepare candidates who wish to teach middle school, but this is done within the confines of the existing secondary education programs. As a result, candidates must complete an entire major in either mathematics or science, which leaves little opportunity to get adequate content preparation to teach both in middle school. In addition, secondary programs only prepare teachers for Grades 7-12, while this program would prepare teachers for the middle grades specified by the Maryland State Department of Education (MSDE): Grades 4-9. The state requires that prospective middle school teachers who seek certification through a program must prepare to qualify in two content areas (from among mathematics, science, language arts, social studies). In the future, the Department of Curriculum and Instruction (EDCI) may develop additional plans for middle school certification

in mathematics or science and one of the two other areas. However EDCI foresees that one of the areas will always be in STEM. Here we propose only the mathematics and science combination.

The proposed program would require mathematics and science content that would provide substantive content preparation for candidates to teach the middle grades in both subjects. Furthermore, the program would also attract candidates, currently in the elementary education program, who wish to become highly qualified to teach middle school mathematics and science. The demands of the existing elementary education program make it difficult for candidates to receive adequate content preparation in particular subject areas. The proposed program would thus draw from both the current elementary and secondary education programs, attracting candidates from both pools who are primarily interested in teaching middle school mathematics and science.

The program we propose builds upon the best of professional standards, the models at the University of Georgia, Ohio State University, and the University of North Carolina, and our own long history of innovative, research-based teacher preparation. In keeping with NMSA standards, each of the other three universities emphasizes the needs of the middle school learner and the importance of teachers having depth of subject matter knowledge in two areas. We go further by designing coursework that explicitly requires middle school teacher candidates to integrate curriculum across traditional disciplinary boundaries by using innovative technologies and working collaboratively with fellow teachers. In addition, we draw on the expertise and findings from research grants of our own faculty to help prospective teachers find ways of accessing and assessing student thinking in order to promote cognitive growth and equitable classroom environments, especially for English language learners and special needs students.

B. How big is the program expected to be? From what other programs serving current students, or from what new populations of potential students, onsite or offsite, are you expecting to draw?

The program is expected to attract 20-30 students per year. It will draw from current elementary education candidates who are interested in teaching middle school mathematics and science and prospective secondary science and mathematics education candidates who do not want to commit to a full content major in either subject. Additionally, the program will attract students from other pre-professional tracks (e.g., pre-med students or engineering students) who have decided to leave those tracks and are interested in teaching. A survey queried students in the Fall 2009 senior level Methods classes as to their interest in enrolling in a Middle School program if it were available. With responses from 85 of 98 students polled online, the option, “Yes… I want to be a Middle School Teacher so I would have applied to be a Middle School major,” was selected by 12% of the students. An additional 19% checked the response, “Maybe. I would have looked into it, but I'm not sure if I would have applied to be a Middle School major.” We feel these percents are somewhat inflated, since the respondents lacked knowledge of the number of mathematics and science credits proposed in the program. Nevertheless it signals an interest on the part of students in the Middle School option. Since our Secondary Education program has moved to a single placement (either high school or middle school) for the spring of their year-long internship, PDS coordinators report that a very small percent request middle school placements. For example, of the last 20 Secondary Education Science majors, two requested middle school placements. These numbers exclude many potential students who would not wish to complete a major in science or in mathematics and thus do no appear in our secondary preservice population, but who would complete the mathematics and science courses for the degree being proposed.

II. CURRICULUM

A. Provide a full catalog description of the proposed program, including educational objectives and any areas of concentration.

The Middle School Education Program (Mathematics and Science Concentration) is designed to prepare candidates to earn a Bachelor of Science degree and to meet the MSDE requirements for certification in grades 4-9, with a specific focus on mathematics and science teaching. The program prepares reflective practitioners, skilled in inquiry, with the knowledge of content, pedagogy and student learning necessary for teaching middle school mathematics and science in alignment with the National Middle School Association (NMSA), National Council for Teachers of Mathematics (NCTM), National Science Teachers Association (NSTA) standards, and the College of Education Conceptual Framework. The subject matter courses in mathematics and science are closely aligned with the State of Maryland Middle School Voluntary State Curriculum, which is based on professional association (e.g., NSTA and NCTM) content standards.

The subject matter courses in mathematics and science are indicated in Appendix A. EDCI has worked closely with the Mathematics department in the College of Computer, Mathematical and Physical Sciences (CMPS) and with life-sciences faculty in the College of Chemical and Life Sciences (CLFS). Letters of support are attached as Appendix B.

In mathematics education, the content standards for teachers call for knowledge in mathematical problem solving, reasoning and proof, mathematical connections, mathematical representation, number and operation, algebra and geometry, data analysis, statistics and probability, and measurement. The six courses required in this program focus on these topics. The remaining two knowledge areas that NCTM lists for middle school teachers—calculus and discrete mathematics—are treated implicitly and at a level appropriate for middle-grade teachers. For example, several of the courses, but especially Math 315, deal with the conceptual ideas behind calculus: how quantities change, and their rates of change. Similarly, the fundamental ideas of discrete mathematics (i.e., combinatorics, recursion, and finite graphs) are distributed across and contained within the other content standards that the courses address. In science education, the content NSTA standards call for middle grades teachers to have background in chemical, and physical, life, and earth/space sciences. This program requires students to have courses in each of those areas.

Program requirements are listed below. Those College of Education departments other than EDCI, namely Human Development (EDHD) and Education Policy Studies (EDPS), that are responsible for courses listed as requirements for this program, have also indicated their support, as included in Appendix B.

Appendix C includes a plan indicating how this program might be completed in four years.

List the courses (number, title, semester credit hours) that would constitute the requirements and other components of the proposed program. Provide a catalog description for any courses that will be newly developed or substantially modified for the program.

Pre-Professional/Subject Area Courses	Credits
GEOL 100/110 Physical Geology and Laboratory	4
PHYS 115 Inquiry into Physics or PHYS 121 Fundamentals of Physics I	4
BSCI 103 The World of Biology or BSCI 105 Principles of Biology I or BSCI 122 Microbes in Society	4
CHEM 131/132 Fundamentals of General Chemistry and Laboratory	4
AOSC 200/201 Weather and Climate with Laboratory	4
MATH 212 Elements of Numbers and Operations	3
MATH 213 Elements of Geometry and Measurement	3
MATH 214 Elements of Probability and Statistics	3
*MATH 312 Mathematical Reasoning and Proof for Pre-service Middle School Teachers (new course)	3
*MATH 314 Introduction to Probability, Data Analysis, and Statistics for Pre-Service Middle School Teachers (new course)	3
*MATH 315 Algebra for Pre-Service Middle School Teacher (new course)	3
One from:	3-4
ANTH 220 Introduction to Biological Anthropology	
ASTR 100/111 Introduction to Astronomy and Observational Astronomy Laboratory *or* ASTR 101 General Astronomy	
ASTR 121 Introductory Astrophysics II – Stars and Beyond	
BSCI I06 Principles of Biology II	
BSCI 120 Insects	
BSCI 124/125 Plant Biology and Laboratory for Non-Science Students	
CHEM 104 Fundamentals of Organic and Biochemistry	
ENST 200 Fundamentals of Soil Science	
GEOG 201/211 Geography of Environmental Systems and Laboratory	
PHYS 102/103 Physics of Music and Laboratory	
PHYS 106/107 Light, Perception, Photography, and Visual Phenomena and Laboratory	
PLSC 100 Introduction to Horticulture	
PLSC 101 Introductory Crop Science	
Subtotal	**41-42**

Pre-Professional Education Courses	
EDPS 210 Historical and Philosophical Perspectives on Education *or* EDPS 301 Foundations of Education	3
EDCI 280 Introduction to Teaching**	3
EDCI 297 Schooling, Students, Families, and Communities (new course, approved)	3
EDHD 4XX Adolescent Development (a middle school version of EDHD 413)	3
*EDHD 436 Cognition and Motivation in Reading: Reading Acquisition for Middle School Students (new course being proposed)	3
*EDCI 465 Teaching Reading in Middle School Content Areas (new course Proposed)	3

Subtotal	**18**

Professional Education Courses

*EDCI 360 Field Experience in Middle School Education (new course, proposed)	1
EDCI 411 Knowledge, Reasoning, and Learning in Science	3
EDCI 413 Interdisciplinary Middle School Teaching Methods (new course, approved)	2
EDCI 414 Interdisciplinary Middle School Teaching Methods II (new course, approved)	2
EDCI 424 Equitable Classrooms (new course, approved)	2
EDCI 425 Equity and Pedagogy (new course, approved)	2
EDCI 457 Teaching and Learning Middle School Mathematics	3
*EDCI 460 Student Teaching: Middle School (course title change)	12
EDCI 474 Inclusion, Diversity, and Professionalism in Secondary Teaching	2
Subtotal	**29**

Total	**88-89**

**** Courses in the process of approval. See Appendix D for descriptions.***
***** EDCI 280 to provide field experiences in grades through grade 12.. Currently field experiences are almost all in elementary school, This lists a new title to be proposed.***

B. Describe any selective admissions policy or special criteria for students selecting this field of study.

The College of Education has a selective admissions program for all education majors. First a prospective student needs to apply and be admitted as an undergraduate student to the University of Maryland. Next, the student will be considered a pre-major until she or he meets the admission requirements of the College. To be admitted to the College of Education students must meet the following criteria:

1. Completion of 45 credits or more
2. Cumulative grade-point average of. 2.50 with at least one semester's grades (12 - 15 semester hours) from UM
3. Completion of freshman English composition with a "C" or better
4. Completion of a freshman level math course (equivalent of MATH 110 or higher) with a "C" or better
5. Completion of the Praxis I exam

III. STUDENT LEARNING OUTCOMES AND ASSESSMENT

The program's learning outcomes are driven by the National Middle School Association (NMSA) standards, and aligned with the College of Education Conceptual Framework. The chart in Appendix E summarizes the program's learning outcomes and where and how the outcomes are assessed.

IV. FACULTY AND ORGANIZATION

A. Who will provide academic direction and oversight for the program? [

The directors of the EDCI Center for Mathematics Education and the Science Teaching Center will be responsible for the academic direction and oversight for this program. A clinical faculty member in the mathematics education unit, will be primarily responsible for day-to-day administration of the program, with support from The Director of Undergraduate Advising, and Chair of the Department of Curriculum and Instruction. The Teacher Preparation Leadership committee has the responsibility for oversight of all teacher education programs in the department.

B. If the program is not to be housed and administered within a single academic unit, provide details of its administrative structure.

The program will be housed in EDCI.

V. OFF CAMPUS PROGRAMS

The program will not be offered off campus.

VI. OTHER ISSUES

A. Describe any cooperative arrangements with other institutions or organizations that will be important for the success of this program.

The program will join the University of Maryland Professional Development Schools (PDS) network. In cooperation with PDS coordinators, site coordinators, and mentor teachers, program administrators will work to ensure that candidates are placed in student teaching positions that afford them the opportunity to teach both mathematics and science in middle school.

B. Will the program require or seek accreditation? Is it intended to provide certification or licensure for its graduates? Are there academic or administrative constraints as a consequence?

Using NMSA standards, the program will seek accreditation from NCATE/MSDE. The program is intended to prepare graduates for middle-level certification in the state of Maryland. These goals have guided the development of the program such that NMSA and MSDE standards have influenced the learning outcomes of the program and development of new courses (particularly EDCI 413 and 414).

VII. COMMITMENT TO DIVERSITY

Identify specific actions and strategies that will be utilized to recruit and retain a diverse student body.

Recruitment for the program will focus on students in elementary education or in STEM related academic departments, specifically targeting populations of students who are traditionally under-represented in middle school teaching. Additionally, we will recruit candidates from community

colleges who are planning to transfer to the University. Retention will be enhanced by mandatory advising, and by creating early opportunities (e.g., early field experiences such as in EDCI 280, tutoring via America Counts) for candidates to become accustomed to middle-level students and the organization and administration of middle schools.

VIII. REQUIRED PHYSICAL RESOURCES

Existing physical resources are adequate to support the proposed program. The small size of the program relative to the size of existing programs administered by EDCI means that the program will have minimal impact on the use of existing facilities and equipment. Additionally, as this program draws on resources currently used in the elementary and secondary programs, there are sufficient curriculum and library resources available. The required library staff evaluation letter is attached as Appendix F.

IX. RESOURCE NEEDS and SOURCES

A. List new courses to be taught, and needed additional sections of existing courses. Describe the anticipated advising and administrative loads. Indicate the personnel resources (faculty, staff, and teaching assistants) that will be needed to cover all these responsibilities.

Cooperative work between EDCI faculty and UM Mathematics Department Faculty has over the past two years led to the development of three 3-credit mathematics courses for prospective middle school teachers (MATH 312, 314, and 315). We understand that these courses are currently making their way through the department and campus program review process.

Four new semester-long 2-credit courses are being designed for this program (EDCI 424/425 and EDCI 413/414) and one semester-long 3-credit course (EDCI 297). These five courses have been approved at the campus level. A one-credit field experience course, EDCI 360, has also been developed. These courses have been approved by the College of Education PCC.

We are proposing two new reading courses that parallel to the existing EDHD 426 and EDCI 463. The new courses, tentatively EDHD 436 and EDCI 465, will emphasize those issues most relevant to middle school learners. We intend to offer one section of these courses each year, We are seeking to have EDCI 465 approved for teaching on a "shared" basis with EDCI 463, if needed to avoid unduly restricting students' schedules.

EDHD has agreed to develop a course parallel to EDHD 413 (Adolescent Development) but to deal specifically with middle school child development issues.

Costs of New Program by Department

	Year 1	**Year 2**	**Year 3**	**Year 4 and ff**
EDCI-Total*	$ 19,500	$52,500	$112,240	$112,240
EDHD	0	$19,500	$19,500	$19,500
EDPS	$9,750	$9,750	$9,750	$9,750
MATH	$9,750	$29,250	$29,250	$29,250
TOTAL	**39,000**	**$111,020**	**$ 170,740**	**170,740**

* Course Instructors and supervision

It is our expectation that, at least initially, students in the program will not be new to the university but instead will come from our existing Elementary Education program or possibly the Secondary Education programs. We have therefore constructed a budget that assumes no new tuition resources. Within the College of Education, resources will be reallocated to support the education portions of the curriculum, based on projected shifts of students among these majors. Under the assumption that each cohort will be about 25 students, 11 EDCI course sections (40 credits) currently provided for Elementary Education majors will be discontinued and replaced with 12 sections (38 credits) in the new curriculum. Somewhat smaller shifts will be required in EDHD and EDPS. The number of sections dropped and the number of sections added by elimination of one group of elementary education majors and the addition of one group of middle school majors is shown in the table below. The only reallocation needed outside the College of Education will be the new sections for the MATH department. Estimated costs (not allowing for inflation) for the three start-up and fully operational years are included in the financial tables in Appendix G.

Department	Course Sections Dropped	Course Sections Added	Net Gain/Loss
EDCI	11 (40 credits)	12 (38 credits)	-2 credits*
EDHD	2 (6 credits)	2 (6 credits)	0
EDPS	1 (3 credits)	1 (3 credits)	0
MATH	0, Math 212, 213 and 214 are required in the Middle School Program.	3 (9 credits)	+9

The projected cost of a new middle school program is modest for one that has the potential to enhance STEM initiatives on campus and prepare substantially more teachers with math/science expertise. While expenditures in the first two years are slightly over the amount reallocated, the third and future year differences are in the other direction. Over the first five years total expenditures amount to $662,240 while reallocation of resources will provide $662,750.

We anticipate being able to staff the new courses with existing tenure-line and full-time clinical faculty. Advanced graduate students are also available to serve as the instructor of record and even beginning graduate students can often supervise field placements.

A. Identify the source to pay for the required physical resources identified in Section VIII above.

Not Applicable

B. List any other required resources and the anticipated source for them.

None

C. Provide the information requested in Table 1 and Table 2 (for Academic Affairs to include in the external proposal submitted to USM and MHEC).

See Appendix G.

Appendix A

Content Course Requirements for Middle School Science Teaching Program
Alignment with Maryland Voluntary State Curriculum

Course	Description	Mapped to Maryland Voluntary State Curriculum for Middle School
AOSC 200/201 Weather and Climate and Laboratory**	Weather observations, weather map analysis, use of the Internet, forecasting practice and climate modeling.	2.3 The student will explain how the transfer of energy and matter affect Earth systems. 6.1 The student will explain how matter and energy move through the biosphere (lithosphere, hydrosphere, atmosphere and organisms).
GEOL 100/110 Physical Geology and Laboratory**	A general survey of the rocks and minerals composing the earth, its surface features and the agents that form them, and the dynamic forces of plate tectonics.	2.1 The student will identify and describe techniques used to investigate the universe and Earth. 2.2 The student will describe and apply the concept of natural forces and apply them to the study of Earth/Space Science. Indicator 2.4 The student will analyze the dynamic nature of the geosphere. 2.5 The student will investigate methods that geologists use to determine the history of Earth.
PHYS 115 Inquiry into Physics	Use of laboratory-based and inquiry-based methods to study some of the basic ideas of physical sciences.	5.1 The student will know and apply the laws of mechanics to explain the behavior of the physical world. 5.2 The student will know and apply the laws of electricity and magnetism and explain their significant role in nature and technology. 5.3 The student will recognize and relate the laws of thermodynamics to practical applications. 5.4 The student will explain and demonstrate how vibrations and waves provide a model for our understanding of various physical phenomena.

Chart continues on next page.

BSCI 103 World of Biology or BSCI 105 or 106: Principles of Bio I & II or BSCI 122: Microbes in Society	Molecular biology, cell biology, evolution & organismal biology. Cellular and molecular biology; Organismic, ecological and evolutionary biology. Microbiology lens to introduce students to biology that they encounter in everyday life including microbes, plants, and animals including humans.	3.1 The student will be able to explain the correlation between the structure and function of biologically important molecules and their relationship to cell processes. 3.2 The student will demonstrate an understanding that all organisms are composed of cells that can function independently or as part of multicellular organisms. 3.3 The student will analyze how traits are inherited and passed on from one generation to another. 3.4 The student will explain the mechanism of evolutionary change. 3.5 The student will investigate the interdependence of diverse living organisms and their interactions with the components of the biosphere. 6.2 The student will investigate the interdependence of organisms within their biotic environment.
CHEM 131/132 Chemistry I - Fundamentals of General Chemistry and Laboratory** (formerly CHEM 103)	The Periodic Table, inorganic substances, ionic and covalent bonding, bulk properties of materials, chemical equilibrium, and quantitative chemistry.	4.1 The student will explain that atoms have structure and this structure serves as the basis for the properties of elements and the bonds that they form. Indicator 4.2 The student will explain how the properties of compounds are related to the arrangement and type of atoms they contain. 4.3 The student will apply the basic concepts of thermodynamics (thermochemistry) to phases of matter and phase and chemical changes. 4.4 The student will explain how and why substances are represented by formulas. 4.5 The student will explain that matter undergoes transformations, resulting in products that are different from the reactants.

Electives (Choose two of the following): ASTR 100/111; ASTR 101; ASTR 121; GEOG 201/211; PHYS 102/103; PHYS 106/107; PHYS 117; ANTH 220; BSCI 122; BSCI 124/125; BSCI 224; CHEM 104; ENST 200; PLSC 100; PLSC 101; AOSC 200; GEOL 124; BSCI 120; PHYS 105; ENEE 132; ENMA 150

Content Course Requirements for Middle School Mathematics Teaching Program

Course	Description	Mapped to Maryland Voluntary State Curriculum for Middle School
MATH 212 Elements of Number and Operations	Topics from algebra and number theory designed to provide insight into arithmetic: sets, functions, number systems, number theory; operations with natural numbers, integers, rational numbers; linear equations.	6.A.1 Apply knowledge of rational numbers and place value 6.B.1 Apply number relationships 6.C.1 Analyze number relations and compute 6.C.2 Estimation 6.C.3 Analyze ratios, proportions, or percents
MATH 213 Elements of Geometry and Measurement	Properties of geometric objects in two and three dimensions; parallel lines, curves and polygons; ratio, proportion, similarity; transformational geometry and measurement, constructions, justifications and proofs.	2.A.1 Analyze the properties of plane geometric figures 2.A.2 Analyze geometric relationships 2.C.1 Represent plane geometric figures 2.D.1 Analyze congruent figures 2.E.1 Analyze a transformation on a coordinate plane 3.B.1 Measure in customary and metric units 3.B.2 Measure angles in polygons 3.C.1 Estimate and apply measurement formulas 3.C.2 Analyze measurement relationships
MATH 214 Elements of Probability and Statistics	Permutations and combinations; probability; collecting and representing data; using statistics to analyze and interpret data.	4.A.1 Organize and display data 4.B.1 Analyze data 4.B.2 Describe a set of data 5.A.1 Identify a sample space 5.B.1 Determine the probability of an event comprised of no more than 2 independent events 5.B.2 Determine the probability of a second event that is dependent on a first event of equally likely outcomes

Chart continues on next page.

MATH 312 Reasoning, Justification, and Proof for Pre-service Middle School Teachers	Examines modes of reasoning and proof as addressed in the middle school curriculum. Topics covered include: developing and evaluating mathematical arguments and proofs, selecting and using various types of reasoning and methods of proof, foundations of rational numbers and application of the central ideas to proportional reasoning, distinctions among whole numbers, integers, rational numbers, and real numbers and whether or not the field axioms hold, and the development of Euclidean and non-Euclidean geometries.	6.C.3 Analyze ratios, proportions, and percents. 7.B.1 Justify ideas or solutions with mathematical concepts or proof

MATH 314 Introduction to Probability, Data Analysis, and Statistics for Pre-service Middle School Teachers	Engages learners in mathematics with an overall aim toward development of a profound understanding of fundamental mathematics, and an understanding of the development of statistical thinking in the middle grades. Topics covered will include: analysis of bivariate data, probability and randomness, law of large numbers, probabilities for independent and dependent events, counting techniques, random variables and probability distributions, expected values, sampling distributions, informal and formal statistical inference, and confidence intervals.	5.A.1 Identify a sample space 5.B.1 Determine the probability of an event comprised of no more than 2 independent events 5.B.2 Determine the probability of a second event that is dependent on a first event of equally likely outcomes 5.C.1 Analyze the results of a probability experiment/ survey or simulation 5.C.2 Conduct a probability experiment 5.C.3 Compare outcomes of theoretical probability with the results of experimental probability 5.C.4 Describe the difference between theoretical and experimental probability 7.D.1 Relate or apply mathematics within the discipline, to other disciplines, and to life

Chart continue on next page.

MATH 315 Algebra for Pre-service Middle School Teachers	Examines the algebraic concepts developed in the middles grades and the larger mathematical context for these concepts. The different roles of variables will be identified: variables as specific unknowns, as quantities that vary in relationship, as parameters, and as generalized numbers. Multiple representations of relationships will be studied. The relationships investigated will include equations (linear and quadratic), inequalities (linear), systems of equations (linear), functions (linear, quadratic, exponential, logarithmic, and power functions). Algebraic reasoning used to justify conjectures related to properties of numbers.	1.A.1 Identify, describe, extend, and create patterns, functions and sequences 1.B.1 Write, simplify, and evaluate expressions 1.B.2 Identify, write, solve, and apply equations and inequalities 1.C.1 Locate points on a number line and in a coordinate plane 1.C.2 Analyze linear relationships

Across MATH 212, 213, 214, 312, 314, and 315		7.A.1 Apply a variety of concepts, processes, and skills to solve problems 7.B.1 Justify ideas with mathematical concepts or proofs (point of emphasis in MATH 312) 7.C.1 Present mathematics ideas using words, symbols, visual displays, or technology 7.D.1 Relate or apply mathematics within the discipline, to other disciplines, and to live (point of emphasis in MATH 214 and 314)

CMPS
at the edge of discovery...

Office of the Dean

August 11, 2009

Dr. Linda R. Valli
Professor & Acting Chair
Curriculum & Instruction
2311 Benjamin Building
Campus ZIP-1175

Dear Dr. Valli:

I am pleased to endorse the College of Education's proposal to create a Bachelor of Science in Middle School Science and Mathematics Education. This is a worthy and important endeavor, and consistent with the state's goal of improving STEM degree production overall.

Along with their counterparts in the Department of Curriculum and Instruction, faculty members from our Mathematics Department in CMPS have been actively engaged on development of three new courses that will play a role in this program, and I understand good progress is being made in their preparation. The Mathematics Department will be responsible for making its own commitments as to any resources needed to offer these courses in support of the new degree. Our understanding is that the new program ought to have minimal impact on our other science course enrollments.

Looking forward to the successes of this new program, I remain

Yours sincerely,

Steve Halperin

Steve Halperin, Dean

College of Computer, Mathematical and Physical Sciences
Room 3400 A.V.Williams Building • College Park, Maryland 20742-3281
301.405.2677 TEL • 301.405.9377 FAX • www.cmps.umd.edu

Subject: Re: EDCI proposal for B.S. in Middle School Science (fwd)
From: "Elizabeth J. Beise" <beise@umd.edu>
Date: Thu, 14 Oct 2010 11:36:51 -0400
To: "Elizabeth J. Beise" <beise@umd.edu>

Hi, Linda. I forgot to copy to you directly,
so here it is.

Mike

---------- Forwarded message ----------
Date: Wed, 3 Mar 2010 15:03:30 -0500 (EST)
From: M. Michael Boyle <mmb@math.umd.edu>
To: Elizabeth Beise <beise@umd.edu>
Cc: M. Michael Boyle <mmb@math.umd.edu>, Scott A. Wolpert
<saw@math.umd.edu>,
Denny Gulick <dng@math.umd.edu>, JAMES YORKE <yorke@umd.edu>
Subject: Re: EDCI proposal for B.S. in Middle School Science (fwd)

Dear Betsy,

In Math, we don't think that the middle school program would
compromise high school teaching.

As Linda says, teachers already can qualify to move up
to high school by passing an exam.

Here is the status of the three new courses. MATH 315 is up
on VPAC; Monday I did a final review of materials with Karen
Mclaren; I'll add items soon and then that course will be
ready to proceed. The other two courses have been gone over
a good deal, and I'm waiting for final detailed materials from
the development committee, after which we should be able to
move forward quickly to review in Math and proceed on VPAC.

Mike

UNIVERSITY OF
MARYLAND
COLLEGE OF CHEMICAL AND LIFE SCIENCES
Undergraduate Academic Program Office

Symons Hall, Room 1322
College Park, Maryland 20742
301.405.6892 TEL 301.405.1655 FAX

August 27, 2009

Dr. Linda Valli
Professor and Interim Chair
Department of Curriculum and Instruction
2311 Benjamin Building
Campus 1175

Dear Dr. Valli:

The College of Chemical and Life Sciences is happy to support the curriculum/requirements as proposed for the College of Education's Bachelor of Science in Middle School Teaching of Science and Mathematics and your assessment of the estimated impact.

One thing I note in passing -- I am very happy to see three introductory courses for majors: BSCI 105, 106 and CHEM 131/32 on this list. I have talked with Joelle, and concur with the rationale for those courses being there. In my opinion, this is precisely the type of courses/level of rigor we would like to see middle school science teachers capable of handling/tackling. However, all three courses have math placement requirements HIGHER than that required by the major. And, the level of rigor of the courses is significantly higher than the non-majors alternatives. I hope that you can be attentive to this in your advising of students, as for students strong in math, the preparation that these science "majors" courses would provide would be more desirable.

I hope that these efforts will continue to increase the pipeline of well-trained science teachers!

Sincerely,

Robert L. Infantino, Ph.D.
Associate Dean,
College of Chemical and Life Sciences

UNIVERSITY OF MARYLAND
COLLEGE OF CHEMICAL AND LIFE SCIENCES

Office of the Dean

Symons Hall
College Park, Maryland 20742
301.405.2071 TEL 301.314.9949 FAX
www.chemlife.umd.edu

March 25, 2010

Dr. Linda Valli
Professor and Interim Chair
Department of Curriculum and Instruction
College of Education

Dear Dr. Valli,

The College of Chemical and Life Sciences is happy to re-affirm its support of the curriculum requirements as proposed for the College of Education's Bachelor of Science in Middle School teaching of Science and Mathematics and your assessment of the estimated impact.

I know that EDCI is aware that the mathematics requirements for the required BSCI 105/6 and CHEM 131/2 are somewhat higher than those for the current Elementary Education Program. I understand that EDCI has investigated these requirements and believes that those students attracted to the middle school program would demonstrate the needed level of competence in mathematics.

I am also aware that what other certifications graduates of the middle school program might pursue (e.g., for high school) is an issue for the state licensing policy and should not stand in the way of providing a program that will help to meet the need for middle school science teachers, with at least some science training in the relevant science fields.

We are enthusiastic partners in the effort to produce an excellent training program to produce more highly qualified middle school science teachers.

Sincerely,

Robert L. Infantino, Ph.D.
Associate Dean

UNIVERSITY OF
MARYLAND
COLLEGE OF EDUCATION
Department of Education Policy Studies

Harold W. Benjamin Building
College Park, Maryland 20742-1165
301.405.3570 TEL 301.405.3573 FAX

October 7, 2009

Professor Anna O. Graeber
Interim Associate Chair for Teacher Education
University of Maryland
Department of Curriculum and Instruction
College of Education
2311 Benjamin Building
College Park, MD 20742

Dear Professor Graeber:

We are pleased to support your department's proposal to create a Bachelor of Science degree in middle school mathematics and science education. We are happy to teach an additional section of EDPS 210 or EDPS 301 to accommodate the 20-25 students you anticipate yearly in this new degree program. The budgeted amount for an additional instructor seems appropriate.

Best wishes with this new and important program for middle school certification.

Sincerely,

Francine Hultgren

Francine Hultgren, Professor and Interim Chair
Department of Education Policy Studies (EDPS)

Department of Human Development
3304 Benjamin
University of Maryland
College Park MD 20742

October 29, 2009

Dr.Linda Valli
Interim Chair
Department of Curriculum and Instruction
College of Educaiton
2311 Benjamn Building
College Park, MD 20742

Dear Dr. Valli:

EDHD is supportive of your department's proposal to create a Bachelor of Science degree in middle school education in mathematics and science. We understand that EDHD will be teaching a newly developed reading course, proposed as EDHD 436, as well as a special section of our adolescent development course (currently numbered EDHD 413) that is geared toward middle school. It is anticipated that we will teach one section of each of these courses per year and that each will accommodate 20 – 30 students. The budgeted amount for the additional instructors seems appropriate.

With all best wishes on this endeavor,

Allan Wigfield
Professor and Chair
Department of Human Development

Appendix C
Middle School Academic Plan-(Math/Science)

FRESHMAN:

Fall Semester:	***Cr.***	***Spring Semester:***	***Cr.***
ENGL 101 (FE)	3	***Content A (Geol 100/110)***	4
Freshman Math	3	CORE –Lab	3
Core –SB	3	***Other Content 1 (Math 212)***	3
Core –SH	3	Core –HL	3
UNIV 101	2		
Total Credits	**14**	*Total Credits*	**13**

SOPHOMORE: ***Apply to Professional Program between 45 and 60 credits***

Fall Semester:	***Cr.***	***Spring Semester:***	***Cr.***
Content B (Phys 115)	4	**EDCI 297**	3
Other Content 2 (Math 213)	3	***Other Content 3 (Math 214)***	3
EDCI 280 (as rev. 2009)	3	***Content C (BSCI option)***	4
EDPS 310 or 210	3	CORE Diversity (D) +HA	3
Possible Elective/Core	3	Possible Elective/Core	3
Total Credits	**16**	*Total Credits*	**16**

JUNIOR YEAR:

Fall Semester:	***Cr.***	***Spring Semester:***	***Cr.***
EDHD 436 (proposed)	3	***Content E (AOSC 200/201)***	4
Content D (Chem 131/132)	4	ENGL 39_ Advanced Composition	3
Other Content 4 (Math 312)	3	***Other Content 5 (Math 314)***	3
EDHD 4XX (M.S. equivalent of EDHD 413)	3	**EDCI 465 (proposed)**	3
Content Methods (EDCI 411 or 457)	3	**Content Methods (EDCI 411 or 457)**	3
Total Credits	**16**	*Total Credits*	**16**

SENIOR YEAR

Fall Semester:	***Cr.***	***Spring Semester:***	***Cr.***
Other Content 6 (Math 315)	3	**EDCI 460 Student Teaching**	12
Content F (Sci Elective)	3	**EDCI 414**	2
EDCI 413	2	**EDCI 426**	2
EDCI 425	2		
EDCI 360 (Field Experience)	1		
EDCI 474	2		
Total Credits	**13**	*Total Credits*	**16**

* Two content area classes must be Upper Level 3xx-4xx for Advanced Studies

Total Credits: 120

Field Placements:

Freshman Year- UNIV 101 with America Counts
Sophomore Year- EDCI 280
Junior Year- Methods
Senior Year-Field Practicum, Internship

Appendix D
Descriptions of Courses in Development

EDCI 465: Teaching Reading in Middle School Content Areas: Prerequisites admission to a teacher education program, and 2.5 GPA; or permission of the department. Provides middle school teachers with understanding the need for and approaches to teaching students to read and learn from content area texts.

EDHD 4XX: Middle School Students' Adolescent development (3 cr) Adolescent development ages 9 - 13, including special problems encountered in contemporary culture. This course will parallel EDHD 413, but will focus on the lower end of he adolescent age spectrum.

EDHD 436: Cognition and Motivation in Reading: Reading Acquisition for Middle School Students: Prerequisites: admission to a teacher–education program, and 2.5 GPA, or permission of the department. Students preparing for middle school teaching will learn the cognitive and motivational aspects of reading and learning from text in subjects of literature, science, social studies, and mathematics. Different structured approaches to using text for content learning are presented. Classroom contexts that enable students to engage productively with diverse texts and internet resources are identified.

MATH 312: Reasoning, Justification, and Proof for Pre-service Middle School Teachers (3 cr) Prerequisite Math 212. Examines modes of reasoning and proof as addressed in the middle school curriculum. Topics covered include: developing and evaluating mathematical arguments and proofs, selecting and using various types of reasoning and methods of proof, foundations of rational numbers and application of the central ideas to proportional reasoning, distinctions among whole numbers, integers, rational numbers, and real numbers and whether or not the field axioms hold, and the development of Euclidean and non-Euclidean geometries.

MATH 314: Introduction to Probability, Data Analysis, and Statistics for Pre-service Middle School Teachers (3 cr) Prerequisite Math 214. Engages learners in mathematics with an overall aim toward development of a profound understanding of fundamental mathematics, and an understanding of the development of statistical thinking in the middle grades. Topics covered will include: analysis of bivariate data, probability and randomness, law of large numbers, probabilities for independent and dependent events, counting techniques, random variables and probability distributions, expected values, sampling distributions, informal and formal statistical inference, and confidence intervals.

MATH 315: Algebra for Pre-service Middle School Teachers
Examines the algebraic concepts developed in the middles grades and the larger mathematical context for these concepts. The different roles of variables will be identified: variables as specific unknowns, as quantities that vary in relationship, as parameters, and as generalized numbers. Multiple representations of relationships will be studied. The relationships investigated will include equations (linear and quadratic), inequalities (linear), systems of equations (linear), functions (linear, quadratic, exponential, logarithmic, and power functions). Algebraic reasoning used to justify conjectures related to properties of numbers

APPENDIX E

Learning Outcomes and Assessment

Learning Outcomes	COE Conceptual Framework Theme Alignment	Assessment Examples
Candidates understand the major concepts, principles, theories, and research related to young adolescent development, and they provide opportunities that support student development and learning (NMSA Standard 1).	Knowledge of Learners Diversity *Diversity* *Technology* *Research & Inquiry*	1. In EDHD 4XX (Adolescent Development) candidates study major theories of adolescent development including psychosocial, social cognitive, and cognitive development theories and take quizzes and tests that assess their understanding of the material. 2. Performance-based Assessment (PBA) (Planning and Delivery of Instruction)
Candidates understand the major concepts, principles, theories, and research underlying the philosophical foundations of developmentally responsive middle level programs and schools, and they work successfully within these organizational components (NMSA Standard 2).	Knowledge of Social and Cultural Context Knowledge of Educational Goals and Assessment *Diversity* *Technology* *Research & Inquiry*	1. In EDCI 413 candidates research a specific issue related to middle school teacher and/or learning and construct a literature review to articulate their understanding of philosophical foundations of middle level education. 2. PBA (Professionalism)
Middle level teacher candidates understand the major concepts, principles, theories, standards, and research related to middle level curriculum and assessment, and they use this knowledge in their practice (NMSA Standard 3).	Knowledge of Curriculum Knowledge of Educational Goals and Assessment Knowledge of Subject Matter *Technology* *Collaboration* *Research & Inquiry*	1. In EDCI 411 candidates review and critically analyze curriculum with an eye toward the appropriateness for middle-level science students of the scope and sequence of content, opportunities for inquiry, embedded assumptions about the nature of science, and opportunities for connections to societal issues. 2. In EDCI 457, candidates preparing tutoring plans draw on knowledge of local curriculum, the Maryland Voluntary State Curriculum and NCTM. 3. In EDCI 414 candidates collect data from their

		classrooms, or on their students' performance, to identify potential student concerns or achievements, and use this information in their instruction. 3. PBA (Assessment of Student Learning)
Middle level teacher candidates understand and use the central concepts, tools of inquiry, standards, and structures of content in their chosen teaching fields, and they create meaningful learning experiences that develop all young adolescents' competence in subject matter and skills (NMSA Standard 4).	Knowledge of Subject Matter *Research and Inquiry*	1. Content course grade point average of 3.0 or above. 2. Praxis II Test Scores 3. PBA (Knowledge of Content, Delivery of Instruction)
Middle level teacher candidates understand and use the major concepts, principles, theories, and research related to effective instruction and assessment, and they employ a variety of strategies for a developmentally appropriate climate to meet the varying abilities and learning styles of all young adolescents (NMSA Standard 5).	Knowledge of Pedagogy Knowledge of Learners Knowledge of Educational Goals and Assessment *Diversity* *Collaboration* *Technology* *Research & Inquiry*	1. In EDCI 413 candidates plan a lesson to incorporate at least two disciplines. They review their plan with classmates, teach the lesson, reflect on it and suggest modifications for the future, including suggestions for using technology to enhance instructional delivery or learning opportunities for students. 2. PBA (Planning, Delivery of Instruction, Student Teacher Interaction/Interpersonal Skills, Classroom Management and Organization)
Middle level teacher candidates understand the major concepts, principles, theories, and research related to working collaboratively with family and community members, and they use that knowledge to maximize the learning of all young adolescents (NMSA Standard 6).	Knowledge of Social and Cultural Context *Diversity* *Collaboration*	1. In EDCI 474 candidates develop a plan to collaborate with members of students families and the community and they implement and report on the plan. 2. In EDCI 424/425, candidates analyze dilemmas they face in their teaching practice that are related to equitable practice for all students.

		2. PBA (Professionalism)
Middle level teacher candidates understand the complexity of teaching young adolescents, and they engage in practices and behaviors that develop their competence as professionals (NMSA Standard 7).	Knowledge of Pedagogy Knowledge of Learners Knowledge of Educational Goals and Assessment *Diversity* *Technology* *Research & Inquiry*	1. PBA (Professionalism/Student Teacher Interaction/Interpersonal Skills) 2. In EDCI 414 candidates develop a portfolio that meets the standards outlined in the College of Education's conceptual framework and demonstrates their understanding and continued professional commitment toward incorporating technology in their planning, implementation, and assessment of middle-level students. 3. In EDCI 425 and 474 candidates reflect on their current practices and understandings, assessing their current strengths and weaknesses in the classroom related to equitable practices and from that develop personal goals and a philosophy for continuing the work of equitable teaching in their classrooms.

UNIVERSITY OF
MARYLAND
THE UNIVERSITY LIBRARIES

College Park, Maryland 20742

DATE: September 23, 2009

TO: Dr. Anna O. Graeber
Interim Associate Chair for Teacher Education

FROM: Karen Patterson
Education Librarian

Gerri Foudy
Manger, Collections and Scholarly Communication

Desider Vikor
Director, Collection Management & Special Collections Division

RE: Library Resources to Support Bachelor of Science in Middle School Education (Mathematics and Science Concentration) in the Department of Curriculum and Instruction, College of Education

The University of Maryland (UM) Libraries currently support the undergraduate and graduate students of the Department of Curriculum and Instruction in the area of science education and math education. The Engineering and Physical Sciences Library and Chemistry Library support the undergraduate and graduate students in the sciences. With this new proposal, the University of Maryland Libraries collections can adequately support the instruction and research needs of the newly proposed Bachelor of Science in Middle School Education (Mathematics and Science Concentration).

The Collection: Monographs and Serials

Science Education
McKeldin Library houses the education collection of monographs and serials relevant to science education. Since science education is an interdisciplinary area of study, the library resources in Science [i.e. physics, life sciences, chemistry] and the Government Documents Collection will supplement the science education holdings.

With science education drawing from the sciences and education, it is difficult to provide precise figures on the number of library materials that support this program. A spot check of the University of Maryland, College Park catalog and the USMAI [University Systems of Maryland and Affiliated Institutions, which is a consortium of sixteen institutions] catalog was done for the following subject headings: "science – study & teaching – middle school" was done. The "Science – Study & teaching (Middle school)" search retrieves: 55 titles from the University of Maryland, College Park catalog, and 69 from the USMAI catalog.

To further analyze the strength of our holdings, a spot check of the holdings of peer institutions was done. The search results for "Science – Study and teaching (Middle School)" from peer institutions are as follows: University of Wisconsin-Madison: 75 titles; University of North Carolina at Chapel Hill: 181 titles;

Teacher's College of Columbia: 66 titles; Michigan State University: 161 titles; Stanford University [Cubberley Education Library]: 47 titles and University of Michigan: 25 titles. The catalogs of the University of Georgia and Ohio State University were also spot checked, since both were presented as models for the program. The search results were: University of Georgia: 186 titles; Ohio State University : 108 titles . When reviewing all of the catalog searches, our monographic holdings in UM libraries is lower than other university holdings in science education [middle school], but when you consider the USMAI consortium, the holdings are adequate. With the initial program attracting 20-30 students, the collection is adequate; but within the next five year time period as the program grows, the monograph collection needs to increase by 40 titles per year, at the average book price (2008) of $53 per title. Additional funds of approximately $2,120 would provide a stronger monograph collection, particularly in regards to the model programs' collections.

The UM Libraries has a subscription to NSTA's peer-reviewed journal for middle school teachers, *Science Scope*. In addition, our holdings include two additional NSTA titles: *The Science Teacher* and*Science & Children*. Other journals to support the classes are *Instructional Scienc*e, *School Science & Mathematics,* and *Middle School Journal*. With the libraries moving toward electronic serials, the majority of these titles have holdings that are remotely accessible.

A search was performed in *Journal Citation Reports 2008*, a database that uses citation data to rank and determine the impact factor of journals in an academic field. To support the proposed courses, at the present time the Libraries provide access to the following top-ranked journals:

Journal of the Learning Sciences
International Journal of Science Education
Journal of Research in Science Teaching
Science Education

In the area of serials, our collection is strong to support science and middle school education.

Mathematics Education

A spot check of the University of Maryland, College Park catalog and the USMAI [University Systems of Maryland and Affiliated Institutions, which is a consortium of sixteen institutions] catalog was done for the following subject headings: "mathematics – study & teaching (middle school)" was done. The "mathematics – study & teaching (Middle school)" search retrieves: 80 titles from the University of Maryland, College Park catalog, and 107 titles from the USMAI catalog.

To further analyze the strength of our holdings, a spot check of the holdings of peer institutions was done. The search results for "Mathematics – Study and teaching (Middle School)" from peer institutions are as follows: University of Wisconsin-Madison: 82 titles; University of North Carolina at Chapel Hill: 147 titles; Teacher's College of Columbia: 143 titles; Michigan State University: 160 titles; Stanford University [Cubberley Education Library]: 44 titles and University of Michigan: 44 titles. The catalogs of University of Georgia and Ohio State University were also spot checked, since both were presented as models for the program. The search results were: University of Georgia: 106 titles , Ohio State University : 63 titles. When reviewing all of the catalog searches, our monographic holdings in UM libraries is lower than other university holdings in mathematics education [middle school], but when you consider the USMAI consortium, the holdings are adequate.

We currently subscribe to NCTM's *Mathematics Teaching in the Middle School.* Other holdings to support the classes are *Teaching Children Mathematics, Journal of Mathematics Teacher Education, The Mathematics Teacher, Mathematics Teaching, School Science & Mathematics, and the*

Middle School Journal. With the libraries moving toward electronic serials, the majority of these titles have holdings that are remotely accessible.

In the area of serials, our collection is strong to support mathematics and middle school education.

The Collection: Government Documents

As a regional depository library, University of Maryland Libraries has a collection of over two million documents. This will provide historic and current relevant government documents for the Science and Math Education program. Some of the agencies that publish documents include: from U.S. Department of Education; National Center for Education Statistics, U.S. Department of Education; the United States. Congress. House. Committee on Science and Technology.

The Collection: Electronic Resources

UM Libraries subscribes to the following significant databases that will support the degree. *Education Research Complete, ERIC, JSTOR,* and the *Web of Science*. *Education Research Complete* is the definitive online resource for education research. The database covers all areas of curriculum instruction.

Interlibrary Loan

When resources are not part of our holdings within the sixteen University System of Maryland and Affiliated Institutions [USMAI] libraries, the Interlibrary Loan Office can obtain monographs, journal articles, dissertations, government documents and technical reports at no charge to the student or faculty. This service will support the instruction and research needs of the EDCI faculty and students. Shady Grove students can request Interlibrary Loan items be shipped to the Shady Grove Library.

Conclusions

At the present time, library holdings are at least adequate to support the proposed set of courses, even without the purchase of additional book titles. Journal collections, however, remain particularly vulnerable. As a result, the level of future support is dependent upon ongoing funding and other circumstances affecting journal subscriptions.

APPENDIX G

FINANCIAL TABLE

UNIVERSITY SYSTEM OF MARYLAND INSTITUTION PROPOSAL FOR

x New Instructional Program
_____ Substantial Expansion/Major Modification
_____ Cooperative Degree Program

University of Maryland

Institution Submitting Proposal

Bachelor of Science in Middle School Education:
Science and Mathematics

Title of Proposed Program

B.S. in Education	**Fall 2012**
Degree to be Awarded	Projected Implementation Date
Proposed HEGIS Code	Proposed CIP Code
EDCI	**Dr. Linda Valli**
Department in which program will be located	Department Contact
301-405-3117	**LRV@umd.edu**
Contact Phone Number	Contact E-Mail Address
Signature of President or Designee	Date

TABLE 1: RESOURCES					
Resources Categories	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)
1.Reallocated Funds[1]	$38,750	$107,250	$172,250	$172,250	$172,250
2. Tuition/Fee Revenue[2] (c+g below)					
a. # F.T. Students[1]	25	50	75	75	75
b. Annual Tuition/Fee					
c. Annual Full Time Revenue (a x b)					
d. # Part Time Students	0	0	0	0	0
e. Credit Hour Rate	0	0	0	0	0
f. Annual Credit Hours	0	0	0	0	0
g. Total Part Time Revenue (d x e x f)	0	0	0	0	0
3. Grants, Contracts, & Other External Sources			0	0	0
4. Other Sources	0	0	0	0	0
TOTAL (Add 1 - 4)	$38,750	$107,250	$172,250	$172,250	$172,250

[1] Based on discontinuation of an Elementary Education cohort of 25 students; 20 in-state, 5 out of state

TABLE 2: EXPENDITURES					
Expenditure Categories	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)
1. Total Faculty Expenses (b + c below)	$39,000	$97,500	$133,250	$133,250	$133,250
a. # FTE					
b. Total Salary```````	30,000	75,000	102,500	102,500	102,500
c. Total Benefits[2]	9,000	22,500	30,750	30,750	30,750
2. Total Administrative Staff Expenses (b + c below)		$13,520	$22,490	$22,490	$22,490
a. # FTE		0.20	0.33	0.33	0.33
b. Total Salary		10,400	17,300	17,300	17,300
c. Total Benefits		3,120	5,190	5,190	5,190
3. Total Support Staff Expenses (b + c below)	0	0	0	0	0
a. # FTE	0	0	0	0	0
b. Total Salary	0	0	0	0	0
c. Total Benefits	0	0	0	0	0
4. Equipment	0	0	0	0	0
5. Library	0	0	0	0	0
6. New or Renovated Space				0	
7. Other Expenses			$15,000	$15,000	$15,000
TOTAL (Add 1 - 7)	$39,000	$111,020	$170,740	$170,740	$170,740

[2] Benefits calculated as 0.3 x salary