Committee on Educational Policies and Planning (CEPP)
2011-2012 Annual Report

Membership for 2011-2012
Michael Arnush, Classics, faculty representative (11-14 term)
Logan Brenner, ’12, student representative
Rochelle Calhoun, Dean of Student Affairs, administration representative
Janet Casey, English, faculty representative (11-14 term)
Rubén Graciani, Dance, faculty representative (09-12 term)
Mimi Hellman, Art History, faculty representative (09-12 term)
Chris Kopec, Management and Business, faculty representative (10-13 term)
Susan Kress, Vice President for Academic Affairs, administration representative
Josh Ness, Biology & Env Studies, faculty representative (10-13 term); Chair 2011-2012
Thomas Rivera ’13, student representative

Summary
CEPP met 29 times this year, including two retreats. CEPP members served on several committees, including:

- Advisory Committee on Off-Campus Programs (ACOP), a standing CEPP subcommittee (Rubén Graciani)
- CEPP and CAPT joint sub-committee on Revising the Dean’s Cards (Chris Kopec and Josh Ness)
- Institutional Policies and Planning Committee (Josh Ness)
- Transitions and Transformations sub-committee (Rubén Graciani, Mimi Hellman (chair), Chris Kopec, Josh Ness, Thomas Rivera)
- Science Literacy sub-committee (Logan Brenner and Josh Ness (chair))
- CEPP and CC joint sub-committee on Course Caps and Enrollment Inequity (Josh Ness (chair)).

The 2011-2012 CEPP addressed issues including:

The creation and composition of CEPP sub-committees

In spring 2011, the question of whether CEPP instances, such as the Science Literacy sub-committee, the articulations of interest to FEC were used to assist CEPP in identifying candidates for appointment.

Procedures for the creation of a minor

Discussions of the interdisciplinary minor in Arts Administration elicited concerns within FEC, CC and CEPP regarding an absence of clear guidelines regarding the creation of a minor. In the past, the advocates of at least one minor (Environmental Studies) have sought the endorsement of a faculty vote (in addition to the conventional vetting and evaluation by CC), although that formal endorsement has not been sought in other instances (Religion, Latin American Studies). CC, CEPP and FEC concluded that existing policy does not require a faculty vote for the creation of a minor. Rather, the responsibility for this vetting and approval rests with CC, and a change in that policy would require a vote by the faculty. Irrespective of whether a change in policy is deemed ultimately appropriate, there was consensus among the three committee chairs about the value of adding clarifying language to the Faculty Handbook concerning the creation of new minors.

The *Transitions and Transformations* initiative

The College's role in fostering transition and transformation of and by the students has received new attention. Although this challenge is not limited to the academic setting, it has elicited discussions about the roles of the faculty and the curriculum in preparing students for post-baccalaureate life, as well as the importance of maintaining vigorous and independent "faculty voices" within the context of any initiative. To explore and articulate the concerns *of the faculty to the faculty*, CEPP formed a *Transitions and Transformations* sub-committee composed of faculty members and a student representative on CEPP. One faculty member (Janet Casey) resigned from the sub-committee upon assuming the responsibilities of Program Director for the civic engagement-themed Arthur Vining Davis grant (see below). The sub-committee evaluated patterns in student enrollment, participation in various activities (summer collaborative research, internships), evidence of student-reported learning outcomes, and, with great help of Institutional Resources, created and analyzed an online survey wherein participating faculty asses value of civic engagement, but are not themselves curricular initiatives. CEPP and the grant's Program Director expressed a mutual desire for open lines of communication and to be kept abreast of one another's work, and CEPP will revisit the issue of civic engagement within the curriculum at a time deemed more appropriate.

Revision to the Dean's Cards student ratings instrument

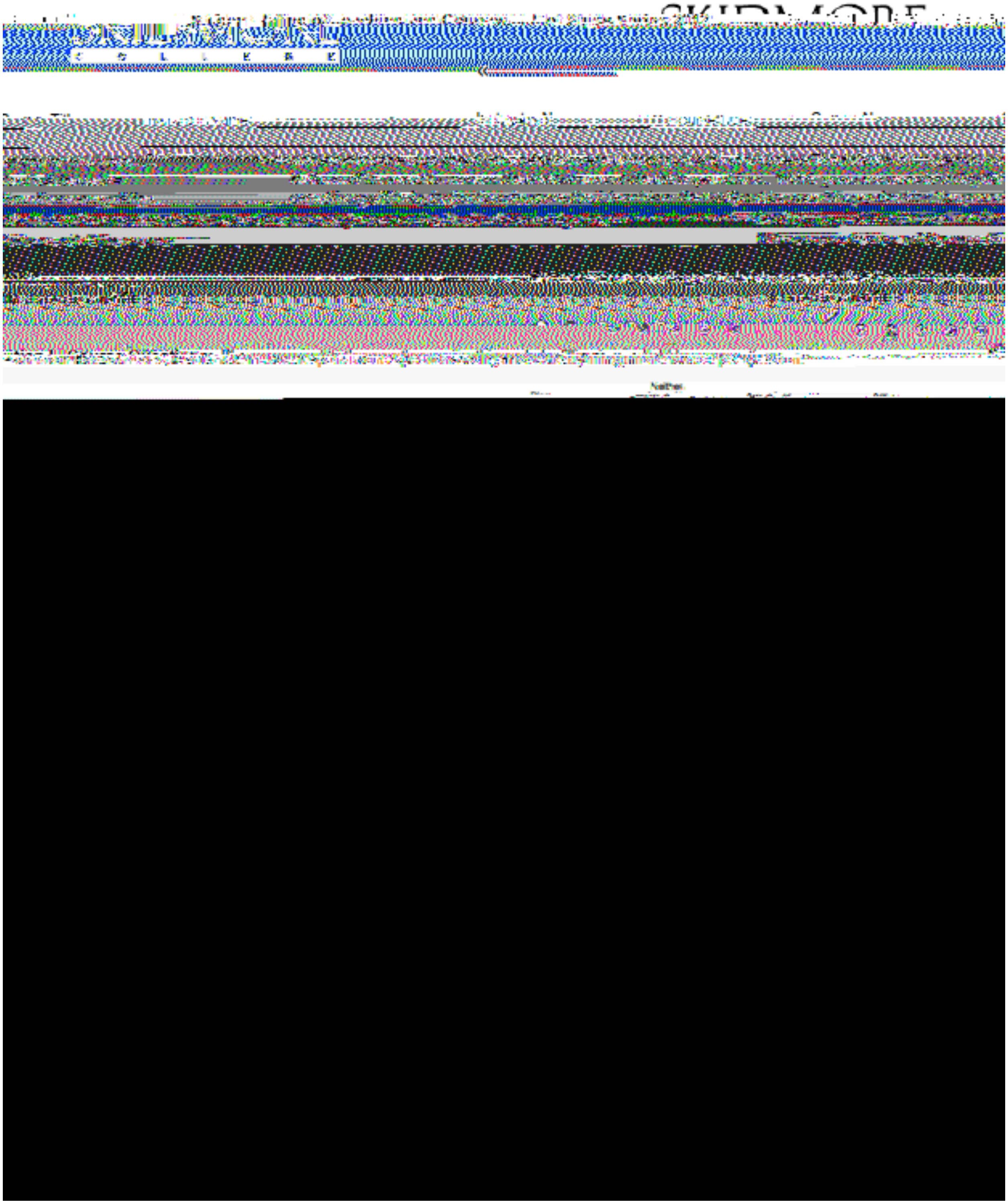
In response to a 2010 *Report to CEPP on Quantitative Student Ratings of Faculty*, in 2011 CEPP and CAPT formed a joint subcommittee to evaluate and potentially revise the existing Student Rating Instruments known as the Dean's Card. The 2011 subcommittee drafted a ratings instrument that could act as an alternative to the existing Dean's Card, and piloted the instrument in 56 courses (~1,200 students) at the conclusion of the spring 2011 semester. The 2011-12 incarnation of the joint sub-committee, composed of Carolyn Anderson (CAPT), Chris Kopec (CEPP), Josh Ness (CEPP), Greg Pfitzer (CAPT), Paty Rubio (DOF) and Bob Turner (former chair of the committee), built on this work in several ways. First, in collaboration with the Office of Institutional Research and Kate Berheide, the sub-committee used statistical methods to demonstrate the validity and reliability of the pilot study questions. Second, in collaboration with the Faculty Network Coordinator, the sub-committee hosted two Faculty Interest Group sessions to solicit the input of faculty regarding the usefulness of data generated by the pilot, and also twice sought feedback at Academic Staff meetings. We also met with representatives of the National Science Foundation, in conjunction with the NSF ADVANCE grant to Support Women Faculty in STEM Disciplines at Skidmore and Union Colleges (C. Berheide, Sociology Dept., P.I.), to discuss ways the revision might engender more accurate, and gender-neutral, evaluations of faculty. Third, the sub-committee explored the effectiveness (and cost-effectiveness) of alternative presentation formats of the results for formative and summative purposes. This work produced a modestly revised student ratings instrument (included as Appendix 1 in this annual report), and an electronic copy of this document was provided to the at-large faculty in spring 2012 in the event that any individuals desired to use the form in their classes at that time (e.g., to explore what different types of feedback might be received or talk to students independently regarding how they perceived the form).

The expectation of the joint sub-committee is that the faculty will be asked in 2012-13 to formally evaluate the value of the instrument, as well as decide whether it should replace the existing Dean's Card. That process may also include broader discussions regarding which individuals on campus would have the access to the results of the student ratings, and instances where access might be limited to particular sections of the ratings instrument. For example, the existing three Dean's Card questions are retained in the revised instrument, and continuity in that reporting seems particularly valuable.

Culture-Centered Inquiry

CEPP devoted much time in AY 2010-11 and 2011-12 to evaluating the College's Culture-Centered Inquiry requirement within the context of educational aspirations articulated by the Goals for Student Learning and Development and the College's Strategic Plan, exit interviews by students, longitudinal data regarding the College and its peer and aspirants, and a 2009 report by the Director of Intercultural Studies. Based on this evidence, CEPP concluded that the requirement needed revision. CEPP and CC formed a subcommittee to draft a revision in spring 2011 (see CEPP annual report 2010-11), and CEPP ultimately brought a motion to vote on the faculty floor in May 2012. This motion was the product of serial consultation with stakeholders (individuals, departments, Academic Staff, faculty forums) and serial revision by the 2011-12 CEPP. The motion sought the replacement of the existing Culture-Centered Inquiry requirement with a "Culture Difference" requirement. The existing requirement charges that students "acquire the perspective available through the study unfamiliar cultural systems" by completing a course designated as including sufficient content designated as "non-western" and CEPP's motion sought to widen the possible focus of the accredited courses to include social identity variables such as class, disability, ethnicity, gender, gender expression, nationality, race, formed in spring 2012, and the members are Hugh Foley, Bob Jones, Eric Morser (CC), Josh

Appendix 1.
Student Ratings Instrument designed and revised by CEPP-CAPT joint subcommittee.



Section III. Student Information Questions:

21. Which best describes this course	22. Your desire to take this course was:	23. On average, how many hours a

Much more than most courses

More than most courses

Less than most courses

Much less than most courses

27. Are you:

Appendix 2
Report of the Science Literacy sub-committee

Report of the Science Literacy sub-committee
Sub-committee members: Logan Brenner (student representative, class of 2012), Deb Hall (Art), Mark Hofmann (Math and Computer Science), Heather Hurst (Anthropology), Josh Ness (Biology, Environmental Studies, CEPP), William Lewis (Philosophy), and Kelly Sheppard (Chemistry). Charge for the group is included in Appendix A.

I. Introduction

We are routinely confronted by scientific claims, innovations and interpretations that collectively challenge our sense of identity (e.g., new ways to understand our origins, development, cognition, genetic predispositions, and addictions), terrify us (e.g., claims regarding our environment, our capacity to destroy, an apocalypse), help us perceive worlds hitherto unimagined (e.g., the nature of the cosmos, our precise position on earth *as seen from space*, molecular imaging, lives extended by decades due to modern medicene), and act as the foundations for our experiences as social organisms in the modern world (e.g., network structure, paternity analysis). We infer pattern, evaluate the causative links between phenomena (chance or cause and effect?), draw conclusions regarding the future (e.g., calculate probability, acceptable risk, and compounded interest), and have access to a magnitude of quantitative information regarding virtually any topic that is unprecedented within human history. Furthermore, we ourselves create this quantitative information – in many instances, we are the data being explored and described.

Nevertheless, many undergraduates do not appreciate the relevance of science and mathematics to their own lives. Some doubtlessly perceive contemporary scientists as keepers of vast stores of factual knowledge, rather than as seekers and guides to a clearer understanding of how the world around us works (Meinwald and Hildebrand 2010). The disciplines are understood to be overly specific or overly abstract, to the point that the applications of any learning are unclear. As a result, students may be less willing and less able to participate in the dialogues that profoundly affect them. *Literacies*, whether scientific or quantitative, are intellectual integrity, humility and courage", "Foster habits of mind and body that enable a person to live deliberately and well", "Develop and enduring passion for learning").

A Scientific Literacy that includes these elements is not a discipline. It is a habit of mind, reinforced and supported by content and context. A conventional modular curriculum and conventional all-college requirements may be ill suited, in some respects, for cultivating that literacy. Who is responsible for cultivating this literacy? What is the role of collaboration and synthesis in this work? How can learning be assessed, and how can evidence derived from assessment be applied towards remedying perceived deficiencies? Below, we introduce a definition for scientific literacy, identify the congruence between the elements in this definition and the existing all-college requirements for Quantitative Reasoning and proficiencies in the Natural Sciences, evaluate the evidence that literacy (as defined) needs to be differently supported at the College, and offer recommendations for that support.

II. A Description of Scientific Literacy

We believe that *all* Skidmore students should possess basic scientific literacy, which we see as having <u>three</u> primary components. All Skidmore students should:

- Have knowledge and understanding of scientific methodologies, concepts, and processes inasmuch as these are relevant to personal decision-making, participation in civic and cultural affairs, economic productivity, and to developing effective responses to our rapidly changing natural and cultural environments.

- Have the ability to ask, find, determine, and communicate answers to questions about everyday experience using scientific methodologies appropriate to the phenomenon that is desired to be understood.

- Have the ability to make appropriate use of as well as critique scientific information as presented to the general public. More specifically, scientific literacy entails being able to understand articles about science in the popular press and to effectively engage in conversation about the validity and relevancy of the conclusions. A literate citizen should be able to evaluate the quality of scientific information on the basis of its source and the methods used to generate it. Scientific literacy also implies the capacity to pose and evaluate arguments based on evidence and to apply conclusions from such arguments appropriately.

This definition directly incorporates language from the text *National Science Education Standards: observe, interact, change, learn* (National Research Council, 1995; pp 22).

III. The relationship between science literacy and the existing all-college Quantitative Reasoning and Natural Science requirements.

Natural Science Requirement - The natural science requirement (NR) is linked to Scientific Literacy (hereafter SL) but the two are not the same. Students satisfy the NR breadth requirement by exploring a discipline in the natural sciences in a course with an associated weekly laboratory module. Beyond the exploratory nature of the requirement, it is a means to help students experience the scientific method in action in a laboratory or field setting. The experience complements the desired SL learning outcomes but does not necessarily address those

IV. Evidence that scientific literacy needs to be supported differently at the College

Information from the National Study of Student Engagement (NSSE), the 2006 Middle States report, and Skidmore's Office of Institutional Research were used to infer the views and experiences (enrollment patterns for classes of 2009, 2010 and 2011) of Skidmore students. Further information and interpretation is included in Appendices B and D.

- When asked to "identify the extent to which experiences at their institution contributed to their knowledge, skills and personal development in *analyzing quantitative problems*" (Source: NSSE), Skidmore students are consistently less likely to detect or endorse contributions in quantitative literacy made in their first year, relative students from peer institutions. Further, **a smaller fraction of Skidmore seniors in 2003, 2007 and 2010 reported that their college experiences contributed "very much" to their ability to analyze quantitative problems, relative to our peers**. One explanation is that more than 80% of current students demonstrate the rudimentary proficiency identified in the QR1 requirement by "testing out" of the requirement (i.e., they do not enroll in a course to fulfill the QR1 requirement).
- Based on results in the 2006 Middle States report, **only a narrow majority of Skidmore students consider science a form of creative thought and found it easy to make connections between science course and other work. A mere 16% agreed with the assertion that an understanding of science is essential for an engaged citizen**.
- **The experiences in gateway courses in the sciences are unlike those in other disciplines.** Some of these differences, such as an associated 1-credit laboratory experience that meets for 2-3 hours per week and typically includes less than 16 students per section, doubtlessly strengthen the courses. However, the typical student experience in a 100-level natural science or mathematics course also involves a common lecture with many students. Specifically, 50% of the student enrollments at the 100-level occur in courses with more than 34 students in the common lecture (duration: 2009-2011), a number substantially greater than that experienced in 100-level courses in the Humanities, Visual and Performing Arts, and the Social Sciences (16, 19 and 27 students, respectively). A quarter of the total enrollments place students in 100-level courses with with 65 students or greater – a number largely unprecedented in the other three divisions. More than 70% of the non-scientists (i.e., students that go on to become majors or minors in other disciplines) satisfy the NR requirement in courses designed to support science majors in the department offering the course. Although NR-satisfying courses designed for the layperson are offered by some departments (see above), the courses are smaller and have capped enrollments, and hence often enroll to capacity. Hence, the typical

topics; d) an enhancement of the potential to voluntarily integrate perspectives/interests across disciplines among *both students and faculty*; and e) a potential to generate a new sense of campus community and civic engagement that arises by addressing science 'problems' of common interest and developing tools for decision making.

The following list identifies **potential areas to foster new science literacy activities** at the College. We position these strategies within four settings: the curriculum, programming, communications and facilities. The sub-committee concluded that science literacy can be a learning goal that is not predicated on proficiency in other disciplines. We also recognized that the College may be best positioned to effectively and creatively support science literacy in instances where it is linked to other disciplines. As a result, many practices that support science literacy also likely foster the integration the disciplines and likely vice versa. Bearing this in mind, the following list also identifies potential strategies to more fully integrate the sciences with the arts, humanities and social sciences. Appendix E provides a fuller description of possible models in the Curriculum, and Appendix F provides a fuller description of the components of the list below.

<u>In the curriculum</u>:

- Consider various models that address science literacy in either existing courses or through new course experiences. These might include:
  - Collaborative Problem Solving Across Disciplines
  - 1-2 credit add-on interdisciplinary experience
  - 1-2 credit add-on to NR course
  - Stand-alone science literacy
  - Traditional 3 or 4 credit course
  - Create a Science Literacy requirement
- Establish a timeslot during the week when classes are NOT scheduled to encourage and allow for interdisciplinary projects.

<u>In programs</u>:

- Using existing programs, consider ways to support more interdisciplinary collaboration surrounding science with an intent to foster a different appreciation for science literacy. These might include:
  - an option for teams of faculty to collaborate in summer student collaborative research;
  - targeting a Tang Mellon seminar to address science;
  - expanding study abroad and internships that focus on science, paired with regular student forums for presenting these experiences to other students.
- Establish a regular Scientific Literacy speaker event.
- Establish new faculty positions at the intersection of disciplines.

<u>In communications</u>:

- Recognize both students and alums working at the intersections of the sciences and the arts, humanities and social sciences.
- Recognize faculty achievements working at the intersections of the sciences and the arts, humanities and social sciences.
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In the facilities:

- Develop collaborative research spaces. Make spaces that support adjacencies for science in strategic locations, both in science buildings as well as in non-science buildings.
- Utilize existing spaces and, if necessary, create new spaces to address the relevance and communication of science literacy.

VI. Recommendations

Identify prospective scientific literacy "hotspots" in the curriculum. A definition of scientific literacy should be introduced to the faculty and staff of the College. Thereafter, the faculty should be surveyed to identify courses that are believed (by the instructors, as well as perhaps by a second "vetting" party) to satisfy at least one of the three criteria for science literacy. Such courses will be identified with a SL designation that will serve multiple purposes. The designation helps students and faculty advisors identify the learning goals or experiences of particular courses, and, in doing so, may help students find and re-enroll in a suite of SL would ideally be performed at the start and end of a student's career at Skidmore as well as at level of individual courses in some settings (*e.g.*, at the start and end of an NR, QR2 or SL-designated course). The assessment should also be tied to evaluation of the QR experience (see above). The change over the course of a class, as well as over the arc of the Skidmore experience, will better pinpoint when and how well we are preparing out students to be scientifically literate citizens.

- *College Assessment* – To assess scientific literacy across the College we propose to survey the faculty (broadly) and staff of programs that relate to SL. Although some programs and departments have conducted assessment relevant to this topic previously, it would be helpful to have campus-wide targeted, uniform data moving forward. The primary themes to assess should include:
  - attitudes towards scientific literacy;
  - resources that support scientific literacy;
  - locating where scientific literacy is addressed in the current curriculum;
  - the perceived outcome of any implemented changes.

Overall, these data would be used understand the current climate of scientific literacy at the College, and then evaluate change over time. As stated in the *2008-2018 Science Vision* document, pedagogical opportunities outside of the classroom may provide valuable scientific literacy engagement, such as collaborative research, interdisciplinary exhibitions at the Tang, and internships. Faculty interest and the perceived ability to participate in these types of opportunities would be assessed through this survey. The results would help identify new ways to foster scientific literacy at the College.

A word about Double Counting

Students are very adept at identifying courses that satisfy multiple requirements, and some faculty lament this phenomenon. Scientific Literacy might be most effectively enhanced if, in this particular context, we embrace the penchant for double dipping. We want students to intentionally link the content and modes of thinking cultivated in different disciplines. We want faculty (and clusters of faculty) to be cognizant of how they can help students develop these skills and to appreciate the relevancy of that interplay in other aspects of their lives and intellectual pursuits.

References

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Meinwald J. and J.G. Hildebrand. 2010. Introduction. Pp 1-8 in Science and the Educated American: A Core Component of Liberal Education (Meinwald, J and JC Hildebrand, eds). American Academy of Arts and Scientists. Cambridge, MA.

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Appendix A
CEPP CHARGE TO A SCIENCE LITERACY SUB-COMMITTEE

CEPP will create a sub-committee to explore science literacy as an emerging strategic theme for the College. In particular, the sub-committee shall identify the relationships among learning goals for science literacy articulated in the Strategic Plan, the Science Vision, and the learning goals the faculty has set forth for the students within the scope of their inclusive college education that include:

- Acquire knowledge of human cultures and the physical world through study in the arts, humanities, languages, mathematics, natural sciences, and social sciences;
- Demonstrate advanced learning and synthesis in both general and specialized studies;
- Gather, analyze, integrate, and apply varied forms of information; understand and use evidence;
- Develop practical competencies for managing a personal, professional, and community life;
- Integrate and apply knowledge and creative thought from multiple disciplines in new contexts.

CHARGE: CEPP charges this subcommittee with assessing the theme of Science Literacy in the following ways:

- Define *science literacy* in a manner that can be broadly understood and assessed;
- Evaluate the argument that science literacy needs to be enhanced within the College; and identify the outcomes expected to follow an encouragement of scientific literacy;
- If deemed necessary, identify new ways to foster and assess science literacy;
- Clarify the relationship between science literacy and the aspiration to foster a more substantive and distinctive integration of the sciences with the arts, humanities and social sciences;
- Identify the relationship between science literacy and the existing all-college Quantitative Reasoning and Natural Science requirements.

CEPP recommends that the sub-committee consult current scholarship, appropriate committees and other college bodies (e.g., Curriculum Committee, SGA), and colleagues with various perspectives and expertise on, and interest in, science literacy. The sub-committee will convene during the spring semester of 2012 and submit a final report with recommendations to CEPP by the end of the spring semester – the week of May 2nd.

Appendix B. Data that relate to the NR requirement in particular.

To describe when students enroll in these courses, and the relative enrollment in courses of the two types, we sought information from the Office of Institutional Research regarding the graduating classes of 2009, 2010 and 2011. As a whole, these three classes included 422 science majors, 20 science minors (i.e., science minors paired with a non-science major), and 1234 nonconsequence of, 87% of the enrollment

Appendix C. Guidelines for the existing Quantitative Reasoning Requirement.

Quantitative Reasoning 2. Courses designated as satisfying the second stage of the QR requirement build upon the skills that students have mastered in QR1 (i.e., arithmetic, consumer issues, practical geometry, linear equations and linear growth, compound interest and exponential growth, data presentation and description, and basic probability and statistics). This can be accomplished in two ways (or a combination). First, a QR2 course might expand upon the ideas from QR1 in an applied setting, permitting students to see, in more depth, how these tools are used to solve problems in a specific discipline (or disciplines). Second, a QR2 course might build upon the skills covered in QR1 by increasing the breadth of quantitative skills that a student has mastered. In either case, QR2 courses will include the study of quantitative skills as a central and indispensable aspect of the course. The breadth, and/or depth, and the level of sophistication in a QR2 course should be above that of QR1, requiring students to master quantitative skills that are truly at the college level. Such skills might include, for example, one or more of the following:

a. Study of rates of change in various systems with the aid of numerical methods, the calculus, and/or differential equations.

a. The study of forms and shapes with the aid of geometry.

a. The study of system behavior, competition, game strategies, and/or decision making, with the aid of probability theory.

a. The study of measurement, data collection, cause and effect relationships, and/or patterns with the aid of statistical methods.

a. The study of system properties that are expressed and evaluated with the aid of algebra.

a. The study of resource allocation, planning and scheduling with the aid of linear programming.

Courses that satisfy the QR2 requirement need not necessarily exhibit a computing component, but its inclusion can enrich the content of the course. For example, the use of computers is encouraged to automate computation, test algorithms, and build and assess the validity of models of complex quantitative systems.

Appendix D. Data that relate to student interest and perceptions

The National Study of Student Engagement (NSSE) asks students to "identify the extent to which experiences at their institution contributed to their knowledge, skills and personal development in *analyzing quantitative problems*". This question was posed to first-year and senior students in 2003, 2007 and 2010 at Skidmore and peer institutions. It is a challenging question to interpret (does it measure absolute proficiency or changes in proficiency? Real or perceived?). The data is organized below in a fashion meant to facilitate comparisons between incoming first-year students and the seniors they collectively become for the 2003-2007 and 2007-2010 increments (see table 1). One observation is that Skidmore students are consistently less likely to detect or endorse contributions made in their first year, relative students from peer institutions. Skidmore also seems to be making more "progress" over the four year span than are our peers, if progress is defined as decreasing the fraction of students that responded "very little" or "some" to this questions over the four year span (e.g., comparing the first year student in 2007 with the senior in 2010). One related issue involves the timing in which students satisfy their QR requirements. A first year student that tested out of QR1 (as do most students) and has yet to take a QR2 course might accurately conclude that the college has not yet contributed to their ability to analyze quantitative problems. Nonetheless, a smaller fraction of Skidmore seniors in 2003, 2007 and 2010 reported that their experiences contributed "very much" to their ability to analyze quantitative problems, relative to our peers. Irrespective of whether the question is interpreted as relating to absolute or relative changes in proficiency, that sustained difference is a concern.

The 2006 Middle States report includes responses to a survey administered in April 2005 to 378 first-year students and sophomores. The survey included queries related to the students' perception of the sciences, and the results are shown in Table 2. A concise summary is that a nafeurvey administered in April adequately captures the distinction between the “process of science” and scientific content (e.g.,

Appendix E. Curricular models for the cultivation of Science literacy.

1. Stand-alone science literacy course or courses offered by any professor with the competence to teach such a course

2. Traditional 3 or 4 credit offering that fulfills the goals of science literacy and is offered in the context of traditional and ID programs (on the model of NW or CD)

3. 1-2 credit add-on to NR course that compliments the subject being studied and that fulfills the goals of science literacy

    a. offered by scientist teaching NR course

    b. offered by another professor coordinating with scientist teaching NR course

4. 1-2 credit add-on to any NR that does not directly compliment the subject being studied but that pulls on the content of NR courses to understand scientific literacy in general.

5. Collaborative Problem Solving Across Disciplines model (pilot) wherein a group of science and non-science faculty work with a group of students to understand a problem using the methods of science and non-scientific methods.

6. Scientific Literacy in the Major model. Like WIM, each discipline or ID program develops a Scientific Literacy in the Major course or courses and requires students to take it as part of their major program.

7. Organic model: student is advised into courses that help her or him to gain scientific literacy and that fits with her or his personal learning goals and interests. For its part, the college develops an infrastructure of courses that allow students to fulfill these goals and interests and to achieve scientific literacy.

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