

FY 2009 REPORT TEMPLATE FOR NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: October 22-23, 2009	
Program/Cluster/Section: DR K-12	
Division: Division on Research on Learning in Formal and Informal Settings (DRL)	
Directorate: Education and Human Resources (EHR)	
Number of actions reviewed: 68	
Awards:	32
Declinations:	36
Other:	0
Total number of actions within Program/Cluster/Division during period under review: 1,045	
Awards:	188
Declinations:	771
Other:	86
Manner in which reviewed actions were selected:	
<p>A DR K-12 program staff member rolled a 20-sided die that yielded a six (6). All awards ending in six (6) were selected, and every fourth declination ending in six (6) was selected (or their respective collaborative, if appropriate). Additionally, the DR K-12 Program Officers identified a small number of awards (10) that they wished the COV members to consider. Proposals were removed if COV members were PIs or Co-PIs. The COV members were informed as to which proposals were selected randomly and which proposals DR K-12 Program Officers identified.</p>	

PART A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

A.1 Questions about the quality and effectiveness of the program's use of merit review process. Provide comments in the space below the question. Discuss areas of concern in the space provided.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE ¹
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: The majority of DR K-12 proposals under consideration for funding were managed through the panel review process. In examining the panel deliberations, the COV found there to be clear and consistent program officer correspondence, thoughtful reviews, and well-constructed summaries that accurately reflected the individual and blended panel viewpoints about the proposals.</p> <p>Source: Jackets and the EIS. Select the "Type of Review" module.</p>	<p>YES</p>
<p>2. Are both merit review criteria addressed</p> <p>a) In individual reviews? Yes b) In panel summaries? Yes c) In Program Officer review analyses? Yes</p> <p>Comments: The Dr K-12 panel review process reasonably addressed both the intellectual merit and broader impacts review criteria across three levels of the proposal review process – individual reviews, panel summaries, and program officer review analyses. Individual reviews were complete and reflected the expertise and experience of the panelists. Generally speaking, the panel summaries were more comprehensive and coherent than the individual reviews. Moreover, the summaries provided synthesis that clearly demonstrated key highlights of the panel discussions. The COV noted that panelists tend to respond in greater detail to the intellectual merits of proposals, especially those that are Research-focused, because panelists have a frame of reference.</p>	<p>YES</p>

¹ If "Not Applicable" please explain why in the "Comments" section.

<p>Assessments about broader impacts tend to be more speculative in nature. This holds true for both funded and declined DR K-12 proposals across the board.</p> <p>The COV recommends that DR K-12 program staff give thought about how to appropriately weight broader impacts for non-Research based projects as well as provide guidance to PIs and panelists on how to assess and discuss the broader impacts potential of projects.</p> <p>Source: Jackets</p>	
<p>3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: As mentioned in the COV's response to question A.1. 2., individual reviewer comments are sufficiently detailed to enable the Committee to infer that reviewers are speaking from their own knowledge bases and experiences. The academic, geographical, and institutional diversity of the reviewers strengthened the overall proposal assessment process.</p> <p>Source: Jackets</p>	YES
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments: The analysis of the jackets examined during the COV's review showed that panel summaries captured the strengths and weaknesses of the individual DR K-12 proposals. Panel summaries generally provided PIs with sufficient information to understand the basis for the panel's recommendation and reflected a consensus view consistent with the summary report.</p> <p>Source: Jackets</p>	YES
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>Comments: The eJacket system is terrific and enabled the COV to conduct a more comprehensive review of the DR K-12 award process. Overall the COV found that the jackets under review were well organized and contained multi-source documentation that supported award/decline decisions. Additionally, the information in the correspondence and budget analysis, as appropriate, reflected thoughtful due diligence by the program officers.</p> <p>Source: Jackets</p>	YES
<p>6. Does the documentation to PI provide the rationale for the award/decline decision?</p> <p>(Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if</p>	YES

<p>not otherwise provided in the panel summary, an explanation from the program officer (written or telephoned with diary note in jacket) of the basis for a declination.)</p> <p>Comments: The COV determined that all PIs received sufficient documentation – including individual reviews and panel summaries – to understand the rationale for the award/decline decisions. When appropriate, diary notes were also included in some of the jackets examined.</p> <p>Source: Jackets</p>	
<p>7. Is the time to decision appropriate?</p> <p>Note: Time to Decision --NSF Annual Performance Goal: For 70 percent of proposals, inform applicants about funding decisions within six months of proposal receipt or deadline or target date, whichever is later. The date of Division Director concurrence is used in determining the time to decision. Once the Division Director concurs, applicants may be informed that their proposals have been declined or recommended for funding. The NSF-wide goal of 70 percent recognizes that the time to decision is appropriately greater than six months for some programs or some individual proposals.</p> <p>Comments: During the past three years, DR K-12 consistently achieved the NSF-wide goal of notifying 70% of applicants/proposals of funding decisions within six months: eighty-three point one percent (83.1%) in FY2007, eighty-five point two percent (85.2%) in FY2008, and seventy-nine point one percent (79.1%) in FY2009.</p> <p>For FY2009, the COV noted a six point one percent (6.1%) increase in the number of proposals requiring a time-to-decision of greater than six (6) months from FY2008. Is this increase attributable to the complexity of the proposals, resource constraints on the program staff, or other factors? What actions could the program staff take to further improve on the overall dwell time of DR K-12 proposals?</p> <p>Source: Jackets and EIS-Web COV module. Select “Report View”, then select “Average Dwell Time,” and select any combination of programs or program solicitations that apply.</p>	<p>YES</p>
<p>8. Additional comments on the quality and effectiveness of the program’s use of merit review process:</p> <p>The COV commends the DR K-12 program staff for overseeing a merit review process that works in design and in practice, and which appears to be fair, generally transparent, and highly efficient.</p>	

A.2 Questions concerning the selection of reviewers. Provide comments in the space below the question. Discuss areas of concern in the space provided.

SELECTION OF REVIEWERS	YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE²
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: The DR K-12 panel development and selection process appears to follow a standard set of established best practices comparable to other NSF programs. The COV finds that the quality of DR K-12 projects indicate that panels are generally comprised of reviewers with appropriate expertise and qualifications, In particular, the program did a relatively good job of matching the subject matter content and focus of proposals with the expertise of reviewers. School system practitioners – curriculum coordinators, Presidential awardees, and exemplary K-12 teachers – are not always included on panels where they have specific expertise. Increasing the participation of reviewers from these groups would serve to strengthen DR K-12 panels.</p> <p>Going forward, the Committee also recommends that NSF provide future COVs with a matrix of information that highlights the areas of expertise and qualifications by proposals and reviewers. This would allow the COV to better ascertain the appropriateness of panel composition.</p> <p>Source: Jackets</p>	YES
<p>2. Did the program use reviewers balanced with respect to characteristics such as geography, type of institution, and underrepresented groups?</p> <p>Note: Demographic data is self-reported, with only about 25% of reviewers reporting this information.</p> <p>Comments: The COV acknowledges the challenges facing DR K-12 to diversify the program’s reviewer pool with respect to geography, institution types and underrepresented groups. Six hundred twenty three (623) individuals from forty-eight (48) out of fifty (50) states served on DR K-12 panels between FY2007-FY2009. Within this group, a total of four hundred (400) or sixty-four point two percent (64.2%) of panelists came from eighteen (18) states having fifteen (15) or more panelists: California (51), New York (33), Massachusetts (32), Michigan (32), Minnesota (32), Illinois (31), Virginia (29), Georgia (28), District of Columbia (26), Washington (25), Texas (24), North Carolina (20), Maryland (19), Ohio (19), Wisconsin (18), Colorado (16), Indiana (16), and Florida (15). Over the same period, eighteen (18) panelists or two point eight nine percent (2.89%) of panelists did not self-identify their state affiliation. While there appears to be</p>	YES

² If “Not Applicable” please explain why in the “Comments” section.

reasonable geographic representation of states within the reviewer pool, the COV recommends that the program step up efforts to better balance the distribution of reviewers across a greater number of states.

The COV's review of sample proposals and DR K-12 reviewers by institution type data demonstrated that reviewers represented a broad range of institutions from Research intensive Ph.D. organizations to two-year or community colleges. While the COV commends DR K-12 current efforts to bring in scholars, researchers, and practitioners, there is significant opportunity to do more. Between FY2007-FY2009, one hundred thirty-seven (137) or twenty-one point nine nine percent (21.99%) of reviewers came from the Top 100 Research institutions, one hundred fifty-three (153) or twenty-four point five six percent (24.56%) from Ph.D. institutions, fifty-eight (58) or nine point three one percent (9.31%) from Masters programs, twenty-five (25) or four point zero one percent (4.01%) from four-year colleges, and five (5) or point eight zero percent (.80%) from two-year or community colleges. Seventy-eight (78) or twelve point five two percent (12.52%) of reviewers came from business, state and local, foreign, or other organizations. Additionally, one hundred sixty-seven (167) reviewers or twenty-six point eight one percent (26.81%) were classified as unknown. The COV encourages DR K-12 to target reviewer participation from underrepresented institutions including small universities and four (4) year colleges along with two (2) year or community colleges.

In terms of gender, the DR K-12 reviewer pool between FY2007-FY2009 comprised one hundred eighty (180) females or twenty-nine point eight nine (28.89%) and one hundred eighty-three (183) males or twenty-nine point three seven percent (29.37%). Two hundred fifty-nine (259) reviewers or forty-one point five seven percent (41.57%) did not identify their gender. The gender of one (1) reviewer was classified as unknown rather than not reported. Based on available data, it would appear that there is gender balance in the DR K-12 reviewer pool.

Data on minority participation as DR K-12 reviewers between FY2007-FY2009 was sketchier. Out of six hundred twenty-three (623) reviewers, there were ninety-nine (99) individuals or fifteen point eight nine percent (15.89%) self-reported as minorities. Two hundred sixty-five (265) or forty-two point five four percent (42.54%) were non-minorities, and two hundred fifty-nine (259) or forty-one point five seven percent (41.57%) did not report race/ethnicity status.

The COV would find it helpful to know the DR K-12 program goal for minority participation on panels in order to assess the balance of reviewers in this area. The large number of reviewers who did not self-report gender, minority status, institution types, and geography (to a lesser extent) troubled the group. The COV recommends that DR K-12 consider an alternate, systematic method for assessing and tracking panel diversity.

In addition, the COV recommends that DR K-12 establish a category for reviewers from the K-12 system as well as non-governmental agencies including EDC, Horizon, and CAST.

Finally, a matrix that shows the participation of institution types and underrepresented groups by proposal and reviewer would benefit future COVs.

<p>Source: Jackets and EIS-Web COV module. The “Report View” has reviewers by state, institution type, minority status, disability status, and gender</p>	
<p>3. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: Yes, based on the COV’s assessment of the individual panelist reviews and program officer review analyses, it appears that conflicts of interest-related issues are resolved appropriately and in a timely manner.</p> <p>Source: Jackets</p>	<p>YES</p>
<p>4. Additional comments on reviewer selection:</p> <p>Generally speaking, it appears that the DR K-12 reviewer pool is reasonably balanced across geography, institution types, and gender. Minority participation at almost sixteen percent (16%) seems reasonable to the COV however the group would benefit from knowing the program goal in this area. The COV recommends that DR K-12 look for opportunities to broaden its impact on non-Research based institutions.</p>	

A.3 Questions concerning the resulting portfolio of awards under review. Provide comments in the space below the question. Discuss areas of concern in the space provided.

<p style="text-align: center;">RESULTING PORTFOLIO OF AWARDS</p>	<p style="text-align: center;">APPROPRIATE, NOT APPROPRIATE³, OR DATA NOT AVAILABLE</p>
<p>1. Overall quality of the research and/or education projects supported by the program.</p> <p>Comments: The DR K-12 portfolio includes one hundred forty-seven (147) unique projects; eighty-seven (87) of which were funded in cohort 1, sixty (60) in cohort 2, and twenty-nine (29) of these projects were co-funded from both DR K-12 and another NSF program.</p> <p>The COV finds that the research and educations projects funded by DR K-12 address a wide range of themes and topics that reflect the program’s mission as well as NSF funding priorities. It is the COV’s position that in practice, the overall quality of research is high in terms of intellectual merit, but relatively low in terms of broader impact. Given DR K-12’s emphasis on research, these findings are not surprising.</p> <p>Source: Jackets and program information</p>	<p style="text-align: center;">APPROPRIATE</p>
<p>2. Does the program portfolio promote the integration of research and education?</p> <p>Comments: The DR K-12 program description and review criteria place appropriate emphasis on the integration of research and education that is central to the DR K-12 mission. The COV’s review of jackets and program information shows that in reality, the focus is more on research and development than on implementation and scale up successful programs and practices.</p> <p>Source: Jackets and program information</p>	<p style="text-align: center;">APPROPRIATE</p>
<p>3. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: The DR K-12 program portfolio between FY2007-FY2009 shows that the size and duration of awards are in synch with those stated in the annual DR K-12 solicitation for the same period. The majority of awards are for multiyear projects and most projects receive funding for four (4) to five (5) years. The COV finds that this is sufficient time to carry out the proposed work. Additionally, a small number of projects – mainly conference proposals</p>	<p style="text-align: center;">APPROPRIATE</p>

³ If “Not Appropriate” please explain why in the “Comments” section.

<p>– are funded for approximately one (1) to two (2) years.</p> <p>Source: Jackets and EIS-Web COV module has a “Report View” that gives average award size and duration for any set of programs or program solicitations you specify.</p>	
<p>4. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Innovative/potentially transformative projects? <p>Comments:</p> <p>The DR K-12 program portfolio appears to have a balance of projects that represent mainstream to cutting edge or innovative ideas as well as potentially transformative projects. Given the relative newness of projects under the DR K-12 program, it is too soon for results and findings and therefore impossible to determine those projects that are transformational and those that are not.</p> <p>Source: Jackets and program information.</p>	<p>APPROPRIATE</p>
<p>5. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Inter- and Multi- disciplinary projects? <p>Comments: Program officers require PIs to establish inter- or multi-disciplinary collaborations as a condition for awards. Some COV members think that DR K-12 projects tend to be isolated in institutions and within disciplines and question whether these projects are truly interdisciplinary. Even so, the COV would not necessarily consider a lack of multi- or interdisciplinary projects in the DR K-12 portfolio to be a negative.</p> <p>Source: Jackets, program information, and some people use as a proxy data on jointly funded projects. See EIS-Web COV module, “Report Review” and select “co-funding from” and “co-funding contributed to” to find jointly supported awards.</p>	<p>APPROPRIATE</p>
<p>6. Does the program portfolio have an appropriate balance considering, for example, award size, single and multiple investigator awards, or other characteristics as appropriate for the program?</p> <p>Comments: The DR K-12 portfolio reflects projects that are consistent with the program solicitation. The COV considers this balance a program strength, attributable in part, to NSF’s efforts. The group’s assessment shows that there were very few single investigator awards in cohorts one (1) and two (2). The award size was appropriate to the scope of the proposed work.</p> <p>Source: Jackets, program information, and EIS-Web COV module for information on award size.</p>	<p>APPROPRIATE</p>

<p>7. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Awards to new investigators? <p>NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant.</p> <p>Comments: The current DR K-12 portfolio includes new and experienced investigators. According to the <i>DR K-12 Descriptive Summary of Portfolio Analysis</i> conducted by Abt Associates, approximately nineteen point one percent (19.1%) of DR K-12 awards were granted to new investigators and seventy-one percent (71%) went to experienced investigators. An additional twelve point two percent (12.2%) of awards were not attributed to either first time or experienced PIs.</p> <p>New PI funding data provided to the COV in Table 5 of the <i>DR K-12 Processing Statistics</i> document are somewhat lower, with fourteen percent (14%) of awards going to first time investigators and declinations totaling eighty-six percent (86%) to first time proposers during the period FY2007-FY2009.</p> <p>While the number of awards to new investigators seems reasonably appropriate, the COV recommends that DR K-12 make serious effort to increase the number of first time awardees. The COV heartily supports the reinstatement of NSF outreach workshops that acquaint prospective NSF applicants with important information on grant writing. Programs such as the proposal development workshop recently conducted at Spellman College are encouraged.</p> <p>The COV also recommends that including individuals who have not received an NSF grant on panels is an excellent strategy and should be continued.</p> <p>Source: EIS-Web COV module on “Funding Rate,” filtered by PI Characteristic (use the pop-up filter).</p>	<p>APPROPRIATE</p>
<p>8. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Geographical distribution of Principal Investigators? <p>Comments: Based on data in the <i>DR K-12 Descriptive Summary of Portfolio Analysis</i> conducted by Abt Associates, DR K-12 principal investigators are distributed geographically across thirty-two states (32) and the District of Columbia. In the first three (3) cohorts, sixty-two (62) projects or forty-two point two percent (42.2%) of the DR K-12 portfolio are housed in three states: Massachusetts (25), California (24), and New York (13). Indiana has six (6) awards and the remaining twenty-eight (28) states and the District of Columbia have between one (1) and five (5) awards. Fourteen (14) DR K-12 projects are located in EPSCoR states. Finally, sixteen (16) states have not received any DR K-12 awards.</p> <p>As in the case of awards to new PIs, the Status of Proposals data by State (Table 6) in the <i>DR K-12 Processing Statistics</i> document differs somewhat</p>	<p>NOT APPROPRIATE</p>

<p>from the Portfolio Analysis report. For example, Massachusetts, California, and New York are home to thirty-six (36), twenty-nine (29), and eighteen (18) awards respectively for a total of eighty-three (83) awards.</p> <p>It is the COV’s position that the geographical distribution of awards is not an appropriate balance in the DR K-12 portfolio. The Committee acknowledges the reality that associations and experience in proposal development advantage some institutions and regions, however it finds there is a serious need for capacity building for proposal development in specific states and regions of the country.</p> <p>Source: EIS-Web COV module, using “Proposals by State”</p>	
<p>9. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Institutional types? <p>Comments: The COV felt that it lacked sufficient data to accurately and sufficiently assess whether or not the DR K-12 portfolio includes an appropriate balance of institutional types.</p> <p>According to the <i>Descriptive Summary of Portfolio Analysis</i>, sixty-eight point seven percent (68.7%) of projects were awarded to colleges and universities and thirty-one point two percent (31.2) of projects have been awarded to non-academic institutions. The Committee would like more information on the impact the shift toward an emphasis in Research within DR K-12 has had on institutional involvement or types of institutions receiving awards. The COV’s review of the limited institutional types information suggests that a significant majority of funded projects appear to be coming largely from Top 100 Research institutions and nonprofit organizations. Masters and Ph.D.-focused institutions are receiving awards but to a much lesser degree – approximately twenty-five percent (25%). One (1) award was granted to four (4) year and two (2) year institutions.</p> <p>The COV asserts that there are significant opportunities to strengthen DR K-12’s impact by stepping up outreach efforts and increasing visibility among other institution types. Such efforts might include institutional capacity building activities in the area of proposal development that would serve to increase the knowledge and expertise of potential proposers.</p> <p>Additionally, given that the K-12 system is a major focus of DR K-12, the COV recommends that DR K-12 target institutions that address pre service and in service education for teachers as well as consortia. The vast majority of institutions involved in teacher preparation do not come from the Top 100 Research institutions so the potential to have interesting research projects from these institutions are not as great. Finally, the COV encourages DR K-12 to look for opportunities to encourage collaborations with two (2) and four (4) year institutions.</p> <p>Source : EIS-Web COV module, using “ Proposals by Institution Type”</p>	<p>DATA NOT AVAILABLE</p>

<p>10. Does the program portfolio have an appropriate balance:</p> <ul style="list-style-type: none"> • Across disciplines and subdisciplines of the activity? <p>Comments: The DR K-12 portfolio encompasses a variety of projects across STEM disciplines. In reviewing the sample jackets and other program information, the COV determined that both science and mathematics are well represented among the projects. Science-related projects account for sixty-seven point three percent (67,3%) of the one hundred and forty-seven (147) projects funded and mathematics projects make up forty-nine percent (49%) of DR K-12 awards. Technology and engineering projects make up thirteen point six percent (13.6%) and twelve point two percent (12.2) of DR K-12 awards respectively.</p> <p>In the absence of a clear definition of what an appropriate balance of projects across disciplines would be, the COV finds a reasonable balance of projects across disciplines based on the aforementioned breakdown of projects. Additionally, while there was general information on the disciplines addressed by DR K-12, there was no readily available information on sub-disciplines.</p> <p>The COV highly recommends that within the DR K -12 listing of awards, there should be a field that clearly identifies the disciplines and subdisciplines in which the project is focused. For example, science subdisciplines would be biology, physics, chemistry, earth science, interdisciplinary, and so on; mathematics subdisciplines would be number, algebra, geometry, statistics, and data analysis. The subdisciplines for engineering and technology should also be identified.</p> <p>Source: Jackets and program information</p>	<p>APPROPRIATE (DISCIPLINES ONLY)</p>
<p>11. Does the program portfolio have appropriate participation of underrepresented groups?</p> <p>Comments: The COV assumes that this question is specific to minority and female PIs, Co-PIs, and other project personnel. In this context, the COV finds that the DR K-12 program portfolio has appropriate participation from underrepresented groups including minorities and women. Between FY2007-FY2009, minority involvement accounted for twenty-nine (29) out of 142 applicants or approximately twenty percent (20%). Female involvement during the same time period totaled one hundred twenty eight (128) out of six hundred forty (640) applicants or twenty percent (20%).</p> <p>The COV also noted that the number of minorities and females involved in DR K-12 proposals increased steadily each year between FY2007 and FY2009, a positive development. More specifically, the COV recommends that DR K-12 continue its efforts to increase the representation and participation of individuals from underrepresented populations into the program. Inclusivity related to these populations would ideally include capacity building.</p>	<p>APPROPRIATE</p>

<p>Source: EIS-Web COV module, using “Funding Rate” with the pop-up filter (this allows you to see female and minority involvement, where involvement means being PI or co-PI).</p>	
<p>12. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports.</p> <p>Comments: National priorities and agency mission focus on achieving STEM literacy of the public, increasing the number of students pursuing advanced STEM education and careers, and broadening the participation of traditionally underrepresented groups (<i>Rising Above the Gathering Storm</i>, NRC 2007). The DRK-12 program’s primary areas of emphasis are: assessment of student knowledge and skills; opportunity for all students to learn significant STEM content; enhancement of the ability of teachers to provide STEM education; and implementation, scale-up, and sustainability of effective innovations in schools and districts. The COV finds that the DR K-12 program is highly relevant to national priorities and agency mission.</p> <p>Source: Program information</p>	<p>APPROPRIATE</p>
<p>13. Additional comments on the quality of the projects or the balance of the portfolio:</p> <p>The COV strongly recommends that DR K-12 aim to increase the number of awards to community colleges and four-year institutions by funding projects related to teacher preparation. The balance in the portfolio would also benefit from broader geographical distribution of project awards. Stepped up outreach efforts such as proposal development workshops in institutions and/or states underrepresented in the portfolio would serve to strengthen the quality of proposals and ultimately positively impact the quality of the portfolio.</p>	

A.4 Management of the program under review. Please comment on:

1. Management of the program.

Comments: The COV commends the program staff for its effective and efficient management of DR K-12. Program management shares a level of overall quality that is comparable to other well-managed programs at the NSF. The COV was particularly impressed with the quality of DR K-12's award process and solicitation and guidelines for solicitation that serve to advance the goals of the program. Information to potential investigators and panelists is clearly presented. The Committee noted the high level of professional judgment exercised by the program officer in all phases of the award process. Program officer review analyses were very thorough; guidance/input helped potential investigators craft better proposals. FastLane, the electronic support system that facilitates proposal submission and declination process, speeds up the notification process and enables funding decisions to be communicated in a timely manner. Post award, the annual PI meeting is an effective mechanism for sharing common experiences across the DR K-12 community.

The COV recommends that DR K-12 focus attention on the following:

- Make better use of the annual PI meetings to develop and refine best practices critical to increasing DR K-12 program impact and sustainability over time.
- Explore new and more effective ways to foster partnerships among projects that have similar themes and foci. Cluster projects with similar goals, categories, subcategories, and components. Set aside funding to facilitate collaboration in conjunction with awareness.
- Think beyond advisory guidelines and stimulate PIs to think creatively about how they evaluate their projects. Raise the bar on the quality of the annual project reports. Encourage PIs to focus on results and findings rather than inputs and activities.
- Look for opportunities to improve the portfolio analysis system for DR K-12.

2. Responsiveness of the program to emerging research and education opportunities.

Comments: The COV supports and encourages program management's use of workshops and other field engaging activities such as surveys or annual PI meetings to stay plugged into the big ideas/questions, pressing problems in the field, and other issues in STEM. Debriefing sessions at the end of panels, although not as systematic as workshops, also provide opportunities to obtain insight/feedback on emerging research and education topics and issues.

The Committee agreed that the added emphasis on Research within DR K-12 strengthens proposals and has the potential to enrich the knowledge base of the community.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments: The DR K-12 program is responsive to funding and national priorities set by the administration, the NSF mission, and emerging fields. The evolution of the third DR K-12 solicitation (NSF09-602) over the period is commendable and accurately reflects important challenges in the STEM field. Developing program challenges using knowledge from the field, professional bodies of expertise, and discussions among members of the NSF program staff are an effective approach to help plan the program and set priorities.

4. Responsiveness of program to previous COV comments and recommendations.

Comments: Does not apply – this is the first COV for the Discovery Research K-12 (DR K-12) Program.

5. Additional comments on program management:

The COV highly encourages DR K-12 efforts to develop and implement a program evaluation strategy and plan to track the program's process in meeting overall goals.

PART B. RESULTS OF NSF INVESTMENTS

The NSF mission is to promote the progress of science; advance national health, prosperity, and welfare; and secure the national defense (NSF Act of 1950).

In this Section, the COV is asked to comment on (1) noteworthy achievements based on NSF awards in the portfolio under discussion; (2) ways in which funded projects have collectively affected progress toward NSF's mission and the strategic outcome goals of Discovery, Learning, and Research Infrastructure; and (3) expectations for future performance based on the current set of awards.

NSF investments produce results that appear over time. Consequently, the COV review may include consideration of significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when the investments were made.

In addition to identifying particularly noteworthy accomplishments or "highlights," the COV is encouraged to comment on the impact of NSF supported contributions to the field. For example, the COV report may include comments on NSF supported work in context of contributions to advance a field, impact of NSF investments to stimulate emerging new areas, and potential for transformative impact in research or education.

To assist the COV, NSF staff will provide award "highlights" as well as information about the program and its award portfolio. The COV is asked to use this information, members' own knowledge of the field, and other appropriate information to develop its comments for this section.

B. Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes ("highlights") as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 OUTCOME GOAL for Discovery: *"Foster research that will advance the frontier of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering."*

This category includes NSF's disciplinary and interdisciplinary research in science and engineering, education research, and centers.

Comments: Among the current portfolio of DR K-12 awards, there are several that have the potential to be transformational in science. The COV finds the following projects particularly noteworthy:

NSF Award Number: 0732186

Award Title: Improving Teacher Preparation and Student Learning through Physics Education Research

PI Name(s): Lillian McDermott

Institution Name(s): University of Washington

NSF Award Number: 0628272

Award Title: Seeds of Science/Roots of Reading: Developing a New Generation of Researched-

based Elementary Science Instructional Materials

PI Name(s): Jacqueline Barber

Institution Name(s): University of California – Berkeley

Findings are limited given the newness of the DR K-12 program. Most of the projects have only submitted one or two annual reports. Consequently, the COV finds that it is not possible to judge the full impact of their work at this time.

B.2 OUTCOME GOAL for Learning: “*Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.*”

This category includes K-12, undergraduate, graduate, and postdoctoral education and training; public understanding of science; and lifelong learning.

Comments: As with the outcome goal for Discovery, there is significant potential in the DR K-12 portfolio to enhance the outcome goal for Learning. In analyzing thirteen (13) DR K-12 proposals, the following patterns emerged: 0929816 and 0918836 supported urban minority STEM teaching and learning; 0822296 addressed students with learning disabilities; 0844556 focused on English language learners in STEM; 0918223 addressed rural students and teachers (life long learning); 0746936 examined workplace environmental factors that affect teacher learning opportunities and improve student learning; and 0918339 developed a new kind of digital text. These wide-ranging projects indicate a broad and systematic effort to expand the scientific literacy and abilities of all people. Projects of note include:

NSF Award Number: 0929816

Award Title: CAREER: Helping Teachers Become Cultural Relevant Teachers: Developing New Tools for a New Generation

PI Name(s): Martin Johnson

Institution Name(s): University of Maryland – College Park

NSF Award Number: 0918836

Award Title: Community Oriented Science Education

PI Name(s): Herbert Thier

Institution Name(s): University of California – Berkeley

NSF Award Number: 0822296

Award Title: R&D: Nurturing Multiplicative Reasoning in Students with Learning Disabilities in a Computerized Conceptual Modeling Environment (NMRSD-CCME)

PI Name(s): Yan Ping Xin

Institution Name(s): Purdue University

NSF Award Number: 0844556

Award Title: CAREER: A Study of Strategies and Social Processes that Facilitate Participation of Latino English Language Learners in Elementary Mathematics Curriculum Use

PI Name(s): Kathryn Chval

Institution Name(s): University of Missouri – Columbia

NSF Award Number: 0918223

Award Title: Researching the Expansion of K-5 Mathematics Specialist Program into Rural School Systems

PI Name(s): Reuben Farley

Institution Name(s): Virginia Commonwealth University

NSF Award Number: 0746936

Award Title: CAREER: Work Contexts, Teacher Learning Opportunities, Etc.

PI Name(s): Motoko Akiba

Institution Name(s): University of Missouri – Columbia

NSF Award Number: 0918339

Award Title: A Digital Resource for Developing Mathematics Teachers “TPCK”

PI Name(s): Jeremy Roschelle

Institution Name(s): SRI International

B.3 OUTCOME GOAL for Research Infrastructure: “*Build the nation’s research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.*”

This category includes facilities, research instrumentation, and cyberinfrastructure.

Comments: The COV determined that only the DR K-12 FY2007 Program Solicitation highlighted cyberlearning as one area of emphasis. Cyberlearning was not mentioned in either the FY2008 or FY2009 solicitation. Technology focused proposals were funded under each solicitation. These projects focused on research on student learning, rather than building cyberinfrastructure in classrooms, schools, or districts. Two projects with potential to advance the outcome goal for Research Infrastructure include:

NSF Award Number: 0918216

Award Title: Integrating Computing Across the Curriculum (ICAC): Incorporating Technology into STEM Education Using XO Computers

PI Name(s): Sheila Cotten

Institution Name(s): University of Alabama – Birmingham

NSF Award Number: 0821006

Award Title: Advancing Cyber-Enabled STEM Teaching and Learning through a Research-Informed, District-Wide Community of Practice (CoP)

PI Name(s): Dianne Benjamin

Institution Name(s): Area Resources for Community and Human Services

Another issue noted by the COV is the lack of validated research instruments developed in DR K-12 projects. The community is not using research instruments that have been tested. Instead, projects tend to develop their own instruments specific to the individual projects. It is the COV’s position that this phenomenon hinders the advancement of the field.

PART C. OTHER TOPICS

C.1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

The COV strongly recommends that the program support a project to synthesize legacy outcomes and impacts from previous NSF programs that are viewed as transformative. The Committee believes that such an effort would increase the likelihood of creating potentially transformative projects within DR K-12.

To fill another important gap in the program, the COV suggests that DR K-12 expand the portfolio to include projects that explore the learning of underrepresented groups of students with themes that range from individual cognition to system-wide issues.

In Part A.4.3 of this report, the COV acknowledged that the third and most recent program solicitation appropriately addresses current challenges in the STEM field. While the challenges seem to be appropriate, the COV would like to know the extent to which the program is receiving proposals in these areas. How does NSF monitor the community's response to the specific challenges in the solicitation? What happens if there is a general lack of interest from the field in a particular challenge, or if the field isn't ready for it, or there is a lack of capacity in the field to respond?

As the program evolves, the COV recommends that DR K-12 continue its emphasis on Challenge 1 (Assessment) and Challenge #4 (Scaling Up/Systems). The COV feels challenge 4 is critical to systemic reform in K-12. Moreover, it is the COV's position that DR K-12 should be broadened to include research on pre-service, teacher prep, continuing education, learning continuum, and staff development at the university level. K-12 and Higher Ed are inextricably intertwined and DR K-12 should be extended and renamed DR K-20.

With respect to capacity building, the Committee strongly urges the DR K-12 program staff to continue outreach programs that help DR K-12 achieve specific program targets by familiarizing geographic regions, institutions, and underrepresented groups with NSF proposal writing submission guidelines and procedures.

C.2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

The COV encourages DR K-12 to develop a more effective, impactful approach to documenting project successes within the program portfolio. "Highlights" are not enough. Encourage more rigorous thinking about broader impacts as prospective PIs develop proposals and beyond project initiation.

C.3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

In DR K-12, as with other programs in the NSF, there is not a clear distinction between research and education. Look for opportunities to sharpen the distinctions between the two.

C.4. Please provide comments on any other issues the COV feels are relevant.

The COV recommends that DR K-12 program staff evaluate the effectiveness of its dissemination efforts to determine if the program is getting the most "bang for its buck" where dissemination is

concerned. Identify which dissemination efforts are successful and which are not. Build on the strengths and look to eliminate or retool strategies that aren't working.

C.5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

The COV commends the NSF and DR K-12 staff for the overall quality of resources provided to support the review process. Program staff was responsive to questions and concerns during the onsite meeting. The Committee was particularly impressed with the eJacket online system and found it very useful to be able to access information in advance of the onsite meeting. The structured format of the COV and involvement of a technical writer who also acted as facilitator, enabled the team to stay focused and on track to complete the COV Initial Draft at the conclusion of Day 2.

In terms of improvements to the process, the COV recommends that NSF program staff provide information to participants earlier in the process. It would also help if there were a way to easily identify or isolate the jackets assigned to each COV panelist. The Committee found that some of the questions in the template were ambiguous with respect to the DR K-12 program. There was also some mild frustration among COV members resulting from incomplete data that prevented the team from thoroughly responding to specific questions in the Part A.3. Review of Portfolio and Part B. Results of NSF Investments. Additionally, the Committee did not have access to certain files (e.g., *DR K-12 Program Logic Model*, *NSF Highlights*, and *Insights* handouts) on the *list of documents supplied to the COV*.

NOTE: The following questions (C.6 – C.11) were provided by the REESE and DR K-12 Program Officers and reviewed and approved of Dr. Joan Ferrini-Mundy, DRL Division Director, and Dr. Wanda Ward, EHR Acting Assistant Director.

- C.6. How do (or should) the REESE and DR K-12 programs complement each other?**
- C.7. How do (or should) the REESE and DR K-12 programs accommodate emerging concepts in research and/or development?**
- C.8. How do (or should) the REESE and DR K-12 programs attract or promote potentially transformative research?**
- C.9. How do (or should) the REESE and DR K-12 programs support cyber-infrastructure for learning, and what are the potential risks in this area?**
- C.10. How do (or should) the REESE and DR K-12 programs engage a broad spectrum of researchers and developers?**
- C.11. How well do the program solicitations and funding decisions reflect important issues in the field?**

DR K-12/REESE Joint Considerations Narrative

The portfolio analysis approach to understanding the characteristics of projects and people is essential and helps to frame thinking about how the DR K-12 and REESE programs complement each other. While the respective COV teams found flaws and ambiguities in the individual analysis of each program's portfolio, this should not be construed as a negative finding. Similarly, the idea of having two different organizations perform independent analyses of REESE (by ARC) and DR K-12 (by Abt Associates, Inc.) is good. This approach served to illustrate that self-reporting as categories can lead to a remarkably different statistical characterization than one based on coding information in proposals as well as to different definitions or interpretations of them. To ensure more effective joint consideration of DR K-12 and REESE in the future, the COV recommends that program management look for opportunities to standardize (where possible) and improve on the portfolio analysis process for both DR K-12 and REESE.

In terms of the complementarity between the programs, the subcommittees found that there are real ambiguities in the field about the distinctions between DR K-12 and REESE. The extremes are clear – basic versus applied – however the overlap between the programs seems substantial enough to justify giving serious thought to options that will improve understanding and/or mitigate confusion in the field. Accordingly, the subcommittees highly recommend that the NSF think about three potential options: sharpening the distinctions between the programs, consolidating the programs into one, or looking at some combination of the two.

This issue of “overlap” of course, relates to Pasteur’s Quadrant – the notion that research is often an interaction between the basic and the applied (lab and field) rather than a linear progression. The matter invites one to think about a portfolio diagram that augments the cycle of innovation diagram that the NSF currently uses. The new joint portfolio diagram would look more like a Venn diagram (basic, applied, overlap) or quadrants, as in Pasteur’s model.

Both DR K-12 and REESE use formal and informal methods (e.g., panel debriefings, annual PI meetings, workshops, etc.) to identify emerging concepts in research and/or development as well as sow the seeds for potentially transformative projects. The subcommittees encourage the continued use of these approaches. We also recommend that program staff for both DR K-12 and REESE seek to further leverage future COVs as an additional source of ideas about emerging concepts. Given the in-depth review of the portfolio by the COV team members, big ideas, such as thematic research on cognition and minorities, are just as likely to come from a COV as from other external sources.

With respect to the DR K-12 and REESE programs support for cyberlearning, the subcommittees determined that approximately 20-30% of the projects in each portfolio comprised cyberlearning-related projects. The subcommittees agreed that this was both an appropriate and reasonable balance in each program’s portfolio. In the discussion that followed the presentations by the COVs to the NSF on October 23, it came to light that there was some disparity in the number of cyberlearning projects in the REESE portfolio. This ambiguity further supports the subcommittee’s aforementioned recommendation to standardize and fine-tune the portfolio analysis process.

The DR K-12 and REESE subcommittees were uncertain about the meaning of the “potential risks” with regard to investments in cyberlearning as referenced in question C-9. Consequently, the group did not give much consideration to this aspect of the question. If this is an area that the respective program staffs would like future COVs to consider, the group suggests rewording the question to ensure clarity.

Finally, DR K-12 and REESE engage a broad spectrum of researchers and developers across a range of disciplines as evidenced by each subcommittee’s responses to many of the questions in Parts A1, A2, and A3 in the COV report. Specific information about where these researchers are based (e.g., Education Department of a university) was more detailed for DR K-12 than for REESE. Some subcommittee members took the position that question C.10 was ambiguous and therefore difficult to answer because there was no agreed upon definition of “researchers” and “developers” and the distinction between the two was unclear.

SIGNATURE BLOCK:

For the Discovery Research K-12 (DR K-12) Program
Robert F. Boruch
Chair