GK12 Transforming Experiences

University of Colorado Denver

2011-2012

Participant Handbook

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INTRODUCTION

This handbook is for your use throughout the year. The dynamic nature of the UCD GK-12 Transforming Experiences Project lends to some adjustments as we continue our journey. Please understand that this is meant as a general guideline, but may not be all-inclusive. You can expect to receive supplemental information in the coming months as we mold the program to fit our goals and your needs.

1. Introduction to GK-12 Transforming Experiences Project

1.1 History & Mission

The Graduate Teaching Fellows in K-12 Education (GK-12) Program, managed by NSF's Division of Graduate Education (DGE), provides funding to graduate students in science, technology, engineering and mathematics (STEM) disciplines to acquire additional skills that will broadly prepare them for professional and scientific careers in the 21st century. Through interactions with teachers and students in K-12 schools and with other graduate fellows and faculty from STEM disciplines, graduate students can improve communication, teaching, collaboration, and team building skills while enriching STEM learning and instruction in K-12 schools. Through this experience, graduate students can gain a deeper understanding of their own STEM research. In addition, the GK-12 program provides institutions of higher education with an opportunity to make a permanent change in their graduate programs by incorporating GK-12 like activities in the training of their STEM graduate students. Expected outcomes include improved communication, teaching, collaboration, and team building skills for the fellows; professional development opportunities for K-12 teachers; enriched learning for K-12 students; and strengthened and sustained partnerships in STEM between institutions of higher education and local school districts.

Although the program resides in the Directorate for Education and Human Resources (EHR), GK-12 is an NSF-wide activity supported by EHR as well as the Directorates for Biological Sciences (BIO), Computer and Information Science and Engineering (CISE), Engineering (ENG), Geosciences (GEO), Mathematical and Physical Sciences (MPS), Social Behavioral and Economic Sciences (SBE), Office of International Science and Engineering (OISE) and the Office of Polar Programs (OPP).

NSF developed the GK-12 program recognizing that, in addition to being competent researchers, STEM graduate students must be able to communicate science and research to a variety of audiences. As the graduate students bring their cutting-edge research and practice into the K-12 classroom, they gain these skills which enable them to explain science to people of all ages, ranging from students to teachers. The graduate students also inspire transformation in the K-12 formal and informal learning environments and stimulate interest in science and engineering among students and teachers. NSF understands that STEM graduate students can contribute to the national effort to advance scientific knowledge through partnerships with K-12 communities.

Through the GK-12 program, institutions of higher education have had an opportunity to make a significant change in STEM graduate and K-12 education programs by creating strong and enduring partnerships.

Since its inception in 1999, the GK-12 Program has funded over 200 projects in more than 140 different universities throughout the United States and Puerto Rico.

(As cited from the NSF GK-12 website: www.gk12.org)

1.2 GK-12 Transforming Experiences Project Goals

- **Goal 1**: Improve the communication skills of the GK-12 Residents by having them assume an active role as content and instructional resources with middle school teachers in the classroom and as mathematics and science role models with middle school students.

- **Goal 2**: Improve team building in science and mathematics for GK-12 Residents in order to prepare them for collaborative, interdisciplinary, multicultural research, teaching, and service within a global community.

- **Goal 3**: Enhance the quality of science and mathematics education in middle schools, particularly those within the programs' partner districts, by providing an opportunity for middle school mathematics and science teachers to increase their content knowledge and explore best practices.

- **Goal 4**: Foster ongoing, mutually beneficial partnerships between the university and area school districts to continually enhance science and mathematics education.

- **Goal 5**: Provide training and mentoring for graduate Residents, including experience in middle school classrooms, and avenues for them to develop their ability as future mathematics and science higher education professionals.

1.3 International Component: China

The forces of globalization have shaped a world that is organized and operates much differently than it did fifteen years ago. Global interdependence is a fact of life, with broad implications for civic, political and economic matters. The GK-12 Transforming Experiences Project provides GK-12 graduate students, K-12 teachers, and UCD faculty mentors the opportunity to broaden their understanding of effective mathematics and science teaching through exploration of China's framework of P-20 education. Through interaction with Chinese University faculty and K-12 educators, participants will have an opportunity to increase their understanding of and evaluate the international and cross-cultural context in order to examine the economic, social, and political influences on the teaching and learning of science and mathematics. Select GK-12 participant will travel to China during the following year of his/her/their participation to collaborate with Chinese University Research Faculty in specified areas of research, talk with Chinese educators, and experience first-hand the K-12 Chinese education system. Through these visits, the GK-12 Project will work toward establishing and maintaining future international STEM research collaborations.

2. General Information

2.1 GK-12 Office & Management Team Contact Information

Mike Jacobson, Principle Investigator Professor & Chair, Mathematical & Statistical Sciences email: Michael.jacobson@ucdenver.edu phone: 303-556-6270	Mark Anderson, Co-PI Professor & Chair, Chemistry email: Mark.anderson@ucdenver.edu Phone: 303-352-3530
Bryan Wee, Co-PI Assistant Professor, Curriculum & Pedagogy and Geography & Environmental Sciences Email: Bryan.wee@ucdenver.edu Phone: 303-315-4992	Julie Rodriguez, Project Manager Email: Julie.Rodriguez@ucdenver.edu Phone: 303-556-3336 Fax: 303-556-8550
Project Website: http://gk12.ucdenver.edu NSF Website: www.gk12.org	GK-12 Project Mailing: Attn: Julie Rodriguez P.O. Box 173364, Campus Box 170 Denver, CO 80217-3364 GK-12 Physical Office: 1250 14th Street. Suite 610 Denver, CO 80202

2.2 Ordering Supplies & Materials

The project has a small budget for purchasing supplies and materials for use in the classrooms. Keep in mind that you may be able to borrow expensive equipment from the University, or your school may already have access to some things. Check to see if it is already available before you submit a request. To request supplies/materials, email the project manager with the following information: 1) description of materials, 2) quantity needed, 3) website or vendor to purchase item from, 4) date materials are needed by, and 5) justification of how your materials will be used. Please feel free to request anything and in any amount – each request will be considered individually, and you will be notified if we are unable to honor your request. Allow as much time as possible for purchase and pickup or delivery of your items*. Be sure to indicate your deadline for receiving items*.

If you find yourself in a situation where you need items at the last minute, you may buy them yourself and submit the original receipt for reimbursement as long as the total is under $100 and you have received pre-purchase approval from the Project Manager. Reimbursement typically takes 2-4 weeks. (See 2.3- *Purchase Reimbursement*)

Any leftover supplies & materials may be kept in your classroom for future use during the current year of participation, or returned to the GK-12 office for use by another Resident or classroom. At the end of your GK-12 appointment, you must return all unused or reusable materials to the GK-12 office.

2.3 Purchase Reimbursement

If you are unable to obtain items through standard purchasing procedures (see 2.2 *Ordering Supplies & Materials),* you can buy small eligible items yourself and be reimbursed (<u>must be pre-approved via email from Project Manager</u>). You must submit an original receipt to the Project Manager with a brief explanation of the purpose of the purchase (i.e. "supplies for food web project") and the date(s) the materials will be used. Please allow 2-4 weeks for processing. If you have direct deposit, your reimbursement will be automatically deposited into your checking account.

2.4 Donations

Keep track of any donations of items or in-kind services (from businesses, UCD staff & faculty, community members, etc.) and report all donations to the Project Manager. UCD GK-12 would like to acknowledge individuals or businesses that provide donations to the program.

2.5 Conferences

2.5.1 National Science Foundation GK-12 Annual Meeting

Each February/March, the NSF GK-12 Program holds an annual meeting in Washington DC. A GK-12 Transforming Experiences team may be selected to participate in the meeting. If you or members of your TELC are interested in attending the Annual Meeting, let the PI or Project Manager know by December 1st. The decision will be made by the Project Management Team and will be based on partnership dynamics, meeting topic(s), and other criteria. Announcement of the selected participants will occur in January.

2.5.2 Other Conferences

A limited amount of funding is available for Residents and LTs to attend conferences to present a paper, workshop, or poster about the GK-12 Transforming Experiences Project. The requirements to receive funding are:

- You must be presenting a paper, poster or workshop about GK-12 Transforming Experiences. Abstracts or papers must be reviewed by the GK-12 Project Management Team prior to conference submission. Please allow at least one-week lead-time.
- You must contact the Project Manager or PI at least 30 days prior to travel. We will decide how much the project will cover for your trip, and what expenses will need to be reported. A Travel Authorization (TA) must be on file prior to travel. Conference registrations and airfare must be charged directly to the grant and not purchased by personal means (i.e. credit card, cash, check, etc.).
- You must file an expense report within three weeks of your return to be reimbursed. Receipts are mandatory for hotels, taxis, rental cars and any other large expenses. Receipts are not required for meals, but you must to keep track of the amount and report actual costs. Each city has a maximum meal cost that can be reimbursed (per diem rate). The Project Manager can provide this information upon request.
- You must provide a one-to-two page summary of the conference and your activities there, including the title of your poster, paper or workshop, the names of others involved, the number of people attending your workshop, etc. no later than two weeks after you return. No reimbursements will be approved until this is received.

2.6 International Travel

2.6.1 Application

If interested in participating in the International component of the GK-12 project, participants will be asked to complete an electronic application during the fall semester. Link to application forms will be emailed to participants once opened. Questions may include but not limited to (some questions may not pertain to LTs or Faculty Advisors):

- Name and contact information of Faculty you will be working with in China
- Letter of invitation
- Proposed dates of travel (for research portion)
- Estimated budget (for research portion of the trip)
- Research proposal

Award recipients will be announced early January. Once awarded, the Project Manager will email an information packet on how to obtain a visa and book travel arrangements.

2.6.2 Eligibility

Residents: Must be invited to conduct some level of collaborative research at a Chinese University. A letter of invitation from a Chinese University faculty member must be obtained and submitted with application (note: Faculty Mentors are *the* main form of contract for assisting the Residents in making the international contacts). The Resident must be making satisfactory progress on his/her degree and travel must not interfere with coursework and/or studies.

2.6.3 Finances

- A Travel Authorization (TA) must be on file prior to purchase of airline tickets and travel. Airfare must be charged directly to the grant via Travel Voucher (TV).
- The grant does not pay for Travel Insurance, medication or immunizations.
- You must file an expense report within three weeks of your return to be reimbursed. Receipts are mandatory for hotels, taxis, rental cars and any other large expenses. Receipts are not required for meals, but you must to keep track of the amount and report actual costs. Domestic & International travel have a maximum meal cost that can be reimbursed (per diem rate). The Project Manager can provide this information upon request.
- You must provide a one-to-two page summary of your research and/or activities there no later than two weeks after you return. No reimbursements will be approved until this is received.
- While the grant does not pay for Travel insurance, HTH Travel Health Insurance for GK-12 participants can be purchased at a discounted rate through a consulting organization (ECI) partnered with UCD. The cost averages $2.25/day for people less than 49 years of age. For a brochure and application, contact the Project Manager.

2.6.4 Health & Safety Issues

All health information for travelers to China can be found at: http://wwwn.cdc.gov/travel/destinations/china.aspx

Additional travel and safety information can be obtained through the UCD Office of International Affairs (OIA).

3. RESIDENTS

3.1 Terminology

All of the graduate students participating in the project are called either Resident Mathematicians (RM) or Resident Scientists (RS). It is important not to refer to yourself (or to let others refer to you) as a student teacher or intern.

3.2 The Resident's Role

3.2.1 Eligibility

The following requirements must be met in order to accept and retain Resident appointment:

- You must be a full-time graduate student entering at least your 2nd year of graduate study and pursuing a PhD or MS in mathematics/statistics, science, engineering, biostatistics, or computer science. You must notify us if anything changes in terms of number of classes taken, your standing in your degree program, etc. Residents cannot be paid if they are not registered as full-time students. If you graduate in May and opt to not participate in the summer research program, we cannot pay your summer stipend.
- NSF requires you to be a citizen, national or permanent resident of the United States. Student visas are not considered adequate. Proof of citizenship must be submitted upon request.
- You may not hold other employment during your appointment (including summer months). Being a GK-12 Resident - which includes taking courses and doing research - is a full time job.
- You must make satisfactory progress in your academic program of study.

3.2.2 What Residents ARE:

Residents are full-time graduate students pursuing degrees in STEM (science, technology, engineering or math). They are taking a full-time load of graduate courses, doing research, or a combination of these things. Residents are selected in part because of their potential to be future leaders in their fields: they are not planning to become K-12 teachers nor is it our intent to encourage them to do so. In ten years, they will ideally be university faculty, who will know how to communicate their research to all levels of audience, work effectively with teachers, are interested in doing so, and encourage others to join them.

Residents work with an assigned TELC (See 6.1 *What is the role of TELC?*), Lead Teacher (See 4.1 *The Lead Teacher's (LT) Role)* and the LT's students. In addition, Residents should be school-wide resources so that they can impact as many students and teachers as possible (See *Appendix 2- School-wide Resource Survey* for aid in learning all areas of potential service). Residents bring real-life experience in STEM disciplines, problem solving skills and excitement about math and science to the classroom.

***Note for LTs**: Resident stipends cover more than just the time they spend in schools. Most graduate students easily average 50 hours per week on course work and many grad students work more than that. Although the GK-12 workload is approximately 15 hours per week, part of the GK-12 graduate 'Residentship' is for making progress toward graduate degrees in the form of coursework or research. It is standard for STEM disciplines to support future mathematicians and scientists through assistantships.*

In most disciplines (for Ph.D. study), the first 1-3 years consist of 9-12 hours of coursework. In some disciplines, students start research while they are taking courses. Almost all disciplines have comprehensive exams, although the name differs discipline to discipline (i.e. 'comps', 'prelims', 'qualifiers', etc.). All have the following in common: students have a fixed number of attempts to pass each exam. If they do not pass the exam, they must leave the department.

Because of the consequences, your Resident probably will be more stressed than usual if he or she is taking these exams. Some departments have more than one set of exams. This is followed by a comprehensive exam during which they have one to two weeks to develop a research proposal on a topic assigned by their supervisor. Finally, *there is a thesis defense. Studying to pass these exams is part of what we pay graduate students to do. These hoops are critical, stressful times in the lives of STEM graduate students and your patience is much appreciated.*

3.2.3 What Residents are NOT:

- Residents are NOT student teachers or interns. Most Residents have no formal training for teaching or working with children - nor is it a goal of this program to make them teachers.
- Residents are not just an extra set of hands in the classroom.
- Residents are not supposed to 'take over' a class; they must be partners with the teachers in planning *and* execution of activities.
- Residents are not expected to be experts in <u>every</u> STEM subject. For example, a biology Resident will not be an expert in computers and technology because that is not their field. However, they do have resources to help them learn or assist in different areas.
- Residents are not certified by the state and they cannot be left with children unless there is a state-certified teacher present. The potential for legal action in case of injury or accusations of harassment is enormous. Violation of this rule may be cause for removal of the Resident from your classroom.

3.2.4 What do Residents do?

Residents must work with students on STEM disciplines: **Science, Technology, Engineering or Math.** They should not be expected to be involved in spelling, social studies or anything else unless the class is integrated with science and/or math. For example, a social studies unit on Lewis and Clark in which the Resident introduced contour maps, the geology of the area, and navigation by the stars would be an acceptable project.

Residents work with their TELC and other Residents, to create lesson plans to present in the middle school classroom (See *9. Lesson Development*). These lesson plans must be collaborative (with LTs) in order to ensure that they meet curriculum requirements and are age-appropriate. In order to accomplish this, LTs are the primary mentor in working with the Resident(s) to develop lesson plans appropriate for the classroom, engaging, and a written lesson plan that can be replicated by another teacher or grad student. The Resident and LT may 'team-teach' on any lessons as appropriate.

Residents also may be involved in other teachers' math/science classes at their school, other schools, family math and science activities, after-school math/science clubs, and math/science fairs. With the consultation of your LT, we encourage you to find ways to work with students and their parents on these types of efforts. Residents may not count going on field trips as time "logged" UNLESS there is a substantial STEM component to the field trip (that the RM/RS helped to originate or execute). Do not forget that any activity involving students <u>must</u> include the LT. There are no exceptions!

3.2.5 What do returning Residents do?

Second year Residents can be invaluable in helping to orient new Residents. They can provide a unique perspective to our program by passing on wisdom. Residents are encouraged to meet as a group outside of official GK-12 meetings – this is great for team building, and is a good opportunity to share ideas.

Returning Residents are expected to complete the same steps and program as first-year Residents. It is expected that they will be able to share their previous year experience with all participants in preparation for the year and activities. Returning Residents must be open to changes in the project, if differing than previous year, as well as ideas and suggestions of new Residents.

3.3 Time Commitment

3.3.1 Academic School Year

Residents are required by the conditions of the grant to ***average*** 10 hours per week in a middle school working directly with either the students or the LTs. ***Note that this is an average and you may work more hours one week and fewer hours the next week***. Here is what a Resident's schedule *might* look like:

- Approximately 10 hours (<u>must be over 2 school days</u>) of direct interaction in the middle schools, including:
  - interacting with Students
  - planning with Lead Teachers
  - attending middle school department, staff, & curriculum meetings (some, NOT all)
- 5 additional hours of Related Activities:
  - completion of weekly on-line journal & activity log
  - development of activity lesson plans, demos, etc.
  - out-of-class lesson planning with teachers
  - monthly Resident Meetings (2 hour; 2x/month)
  - IRP Meeting with PI 1x/month
  - Communication Mentor meetings 1x/month
  - TELC meetings 2x/semester
  - Preparation and implementation of communication assignments

<u>YOU ARE RESPONSIBLE FOR ENSURING THAT YOU MEET THESE REQUIREMENTS. FAILURE TO BE ON TRACK MAY RESULT IN TERMINATION OF YOUR RESIDENTSHIP.</u>

- ***Residents should be close to meeting half of their time requirements after the first semester***. Do not get behind and expect to be able to make up a significant amount of time during the second semester or summer.
- ***Let us know***! There will be a lot going on this year, and it may be more than you're used to. Try to use your time wisely, and whatever you do, DON'T PROCRASTINATE! If you're having difficulty fitting in all your responsibilities, let us know so we can help you before things get out of hand.
- ***Residents should be available whenever the Middle Schools are in session.*** A calendar with Jeffco School District, Englewood School District, and UCD holidays is available on the GK-12 Project website (also, See *Appendix A*). Each school will have deviations from their normal schedules due to field trips, assemblies, testing, etc. The LT is responsible for letting the Resident know as far in advance as possible when these occurrences will be. NOTE: Residents are still required to fulfill their obligations in the middle schools during UCD holidays, unless another understanding is arranged with the Lead Teacher and time is made up during other weeks.
- Residents occasionally must be out of town for conferences or fieldwork, or unavailable due to exams. ***It is the Resident's responsibility to plan absences with the LT***. The LT should be notified as much in advance as possible.

- ***Resident's will be required to visit another school once each semester.*** This time should be counted in the weekly student contact hours. Residents should ensure that visits to other schools are reciprocated: your school should still have a Resident working with students for an average of 10 hours per week. The exchange visits do not have to take place during the same week or time.
- *Resident's are encouraged to hold monthly or semesterly* ***"Lunch with a Resident Mathematician/Scientist"***.

3.3.2 Summer Work

Residents will be assigned to work with the 2011 RM-MSMSP RET (Research Experience for Teachers). Dates, location, and times TBD. More detailed information can be found at the RM-MSMSP website: http://rmmsmsp.ucdenver.edu.

3.4 Scheduling & Planning

3.4.1 Scheduling

Lead Teachers and Residents build their own schedules for direct contact and planning time in the classroom. Keep in mind that schools often have set schedules that are not up to the teachers, and Residents often have required coursework and research that is not flexible. Be realistic about the hours each person will be available and work out something that is manageable for all parties. Unfortunately, sometimes it's not easy. Teams who are having trouble finding workable solutions to scheduling should bring it to the attention of GK-12 staff right away. Don't let the year get away from you!

3.4.2 Planning

It is easy to get busy and neglect planning time. *Do not underestimate the importance of planning.* When you are working with more than one Resident or LT, make sure that everyone is involved in planning. A recommended time amount is ½ hour to 1 hour per week.

3.5 Weekly Reporting

Each week, Residents will submit a *Weekly Activity Report* online. Reports will consist of time-log, summary of activities completed in the classroom, materials used, progress made, questions and concerns, and other questions (at the discretion of the GK-12 Management Team) that are pertinent to the success of the project. GK-12 staff and communication mentors will regularly review your weekly reports. However, if you have a problem or comment that requires immediate attention, please email the Project Manager directly.

For reporting purposes, GK-12 weeks end on Sundays at Midnight. The *Weekly Activity Report* electronic form link can be accessed on the project website under "Resources>For Current Residents". A weekly question will change and be sent by email. Use that question to answer the "weekly question" box on the form. Complete the form and click "submit" at the bottom of the page. Once the report has been successfully submitted, you will receive a confirmation email. Residents will be emailed at the end of each month with all outstanding reports listed. Weekly reports are not due during the middle school holidays. If you are out of town due to conferences or other professional development activities, you must still submit a report and just write that you were out of town and the reason why. ***IMPORTANT! We suggest that you save your reports in Word (or other) format for your own records, then copy and paste into the text boxes on the form website so as not to lose your work due to IT glitches.***

3.6 Lesson Reflections

For each lesson presented (See 9.2 *Lesson Requirements*), the Resident and Lead Teacher will complete a *Lesson Reflection* entry pertaining to the lesson that s/he has developed and presented. The "Lesson Reflection Form" template can be found on the project website under "Resources>For current Residents". The entry will answer some basic questions, such as (but not limited to):

- What happened? Summarize how teaching the lesson went. (1-2 paragraphs)
- Why did these things happen? Analyze the outcome. (1-2 paragraphs)
- What did I learn? Reflect on the outcome and/or ideas for improvement. (1-2 paragraphs)

The LT must give constructive feedback comments on the lesson presentation and the *Lesson Reflection Form* and return to the Resident via email (cc: Project Manager & Communication Mentor) <u>no later than 2 weeks after the presentation date</u>.

3.7 Meetings

3.7.1 Resident Meetings

Resident meetings, held twice a month, will focus on various goals of the project. This is an informal meeting with other Residents and GK-12 staff member(s). One meeting a month will focus on a) improvement of communication skills, 2) preparation for upcoming communication assignments, and 3) discussion of the project, activities and events at the middle schools. The second meeting will provide opportunities for residents to a) reflect on their experiences in the middle school, b) connect these experiences to educational discourse (particularly concepts covered in the summer workshop), and c) establish meaningful links to Residents' current and future positions in higher education. Resident Meetings will largely focus on professional development through the use of discussions, inquiry activities, guest speakers and scholarly reflections that center on science and mathematics education. These meetings, therefore, are intended to support the year-long development of Residents as *educators* (broadly defined) in the context of the NSF GK-12 program.

Residents will provide schedules to the Project Manager at the beginning of *each* semester so that a collective meeting time may be scheduled. Meetings will last 2 hours and are mandatory. No make-ups will be provided and absences will be noted in Residents' mid-year and final evaluations.

3.7.2 Meetings with Communication Mentors

Residents will meet once a semester with their respective communication mentor to review a videotaped lesson implemented in the middle school classroom. During this time, mentors will provide feedback and ways to improve the present communication skills and future lessons.

3.7.3 Meetings with Project PI

Residents meet one a month with the Project PI to discuss the GK-12 experience in relation to their own graduate studies and research, including (but not limited to):

- graduate studies issues or challenges
- progress at the middle school
- concerns and questions

3.7.4 TELC Meetings

See *6.2 Meetings*

3.8 Classroom Behavior and Appearance

Each school has its own rules, but the following simple guidelines will help begin and maintain a happy relationship within the school community. Remember that you represent the University and GK-12 to the middle school and the school district, so it is important that you be professional.

- Residents are expected to be punctual to all GK-12 activities and to provide as much advance notice as possible when unexpected circumstances require a change of plans.
- Dress in a professional manner at all times:
    - No hats may be worn in the building.
    - Clean jeans may be worn as long as they are not ragged or torn. Sagging jeans and jeans that allow underwear to be seen should not be worn.
    - T -shirts must be clean, may not have a commercial logo or advertise a product and should not promote unacceptable behavior.
    - No clothing that shows skin on backs, stomachs, or midriffs is allowed. Short shorts and short skirts are not permitted.
    - Your dress is independent of what teachers at your school wear. You are representing the University and the Project.
    - Shorts are permitted when it is very warm in the classroom, but they should be clean and not overly short.
- Cell phones, pagers, etc. should be turned off and out of view at <u>all</u> times. Personal electronic devices are not to be used during instructional time.
- Do not eat in front of students unless you are joining them for a meal, snack, etc. (i.e. Lunch with a Resident)
- Follow the 5 P's:

<u>The 5 P's - Tips for a Successful Experience for Residents</u>

1. **BE <u>P</u>ROMPT** – If you are ill and cannot attend, call the school and leave a message for the teacher as early as possible. Arrive early! Treat this as you would a job where you are expected to be on the job at the designated time. You may NOT decide that you "have something better to do" and use that as an excuse not to show up when expected.

2. **BE <u>P</u>LEASANT** – Smile. Show that you are happy and enthusiastic. Practice good etiquette. Remember that you are a role model for the students and that you are a representative of UCD, NSF, and the GK-12 Transforming Experiences Project.

3. **BE <u>P</u>ROFESSIONAL** – Respect mandated confidentiality of student and teacher information. Dress appropriately. For tattoos, t-shirts with writing, etc., make sure that the message is appropriate for middle school classroom. Ladies should avoid too-tight clothing or clothing that exposes too much. What you wear should not detract from your purpose for being in the classroom. Exemplary personal hygiene and grooming are required. Be clean and neat. Present yourself as a teacher in attitude, actions, and appearance. Do NOT correct your LT in front of the classroom, but if necessary, inform the LT in a private setting. PROOF anything that you write!

4. **BE <u>P</u>OSITIVE** – Respond to teacher instructions and requests in a positive and timely manner. Keep a smile on your face!

5. **<u>P</u>ROFIT** from the experience – You are a guest in the classroom, but it is hoped that you will be a welcome guest. The Residentship is expected to be a "Win-Win" situation for the teacher, students, and you!

3.9 Absences

Please be respectful of others' time. Plan and communicate absences to your team as far in advance as possible. While it is not always feasible, do your best to contact your LT and/or team BEFORE your absence. ***It is your***

responsibility to plan absences with your LT in advance, or to notify the LT as soon as possible.

- *Illness or other emergency situations*: let the other person(s) know right away so that alternate arrangements can be made. If you are unable to contact your LT, call the school office (leave a message if necessary) BEFORE you are scheduled to be in the classroom.
- *Non-emergency situations:* Residents will be required to submit all requests for leave (vacations, conferences, field work, etc.) in writing to the GK-12 Project Manager for approval well in advance. LTs should also arrange with their respective Resident as far in advance as possible.

3.10 Serious Offenses

While we will work with each participant to make the GK-12 Project as workable and enjoyable as possible, critical obligations must be met for the program to be successful. Residents can be dismissed for any of the following:

- Failure to fulfill scheduled commitments or inform LT (or acceptable alternative) of absences ahead of time.
- Repeated failure to turn in documentation materials on time (weekly activity log, monthly journal, lesson plans & reflections). Written documentation is an important part of our grant obligations.
- Bringing a weapon- or anything that could be used as a weapon – onto school property (includes the parking lot and grounds).
- Swearing or using abusive language with a teacher, student, staff member, or administrator.
- Showing up under the influence of drugs or alcohol, or bringing drugs, alcohol or tobacco onto school property.
- Residents MAY NOT UNDER ANY CIRCUMSTANCES be left alone with students. The potential for legal action in case of injury or accusations of harassment is enormous.

A Resident breaking these rules could lead to the entire program being thrown out of the partner school districts. Please consider the consequences of your actions and act appropriately at all times.

3.11 Compensation

3.11.1 Stipend

Each Resident will receive thirteen (13) installments starting July 15th, 2011, and ending July 14th, 2012, unless otherwise agreed upon. You will receive your first check at the end of July and your last check at the end of July. Each stipend check for the preceding month will be automatically deposited into your checking account on the last day of the month.

The GK-12 Residentship is taxable and you are responsible for payment of any taxes owed. Although federal income tax will NOT be withheld from your monthly Residentship payment, the stipend is taxable income to you and needs to be reported as income on your U.S. tax return. You are responsible for paying any federal withholding taxes that are due to the IRS. We suggest that you consult with a tax professional to help determine your tax liability and how to make estimated tax payments if needed. Please note that a 1099-MISC will not be issued to you.

3.11.2 Tuition/fee allowance for Residents

Residents receive a tuition and fee allowance (as part of your educational allowance, up to $10,500) to be used toward tuition expenses for courses required for the Residents' degree program. The tuition support will be applied to the cost of educational expenses and may reduce the amount of other financial aid or loans for which students are eligible. In the event that a student drops credit hours after the refund period, they will be required to repay the tuition support that was granted as a benefit of this award. Educational expenses covered by the allowance include fees required for the degree, including: course and lab fees, Health Insurance fee, Technology fee, Transportation fee, Student Life fee, required textbooks, and any other required fees.

As a general rule, GK-12 does not pay tuition or fees for summer courses. However, GK-12 Residents are welcome to submit requests for additional funds at any time. All requests will be reviewed by GK-12 staff and determination will be made on an individual basis. If you have any questions regarding your pay, your appointment, health insurance, etc., please contact the Project Manager.

3.11.3 Textbook Purchases

GK-12 Transforming Experiences will cover textbook costs for courses required for the Resident's degree program, as well as books applicable to your area of study and professional development. There are a few ways you can obtain your textbooks:

1. Submit a purchase request to the project manager (See *2.2 Ordering Supplies & Materials*)
2. In the event that you have already purchased your textbooks, submit an original dated receipt(s) to the Project Manager for reimbursement. (See *2.3 Purchase Reimbursement*)

3.11.4 Computer Purchases

Computer purchases are allowed as part of your educational allowance of $10,500 and must be used for the enhancement of your academic studies. For approval, a delineated budget consisting of all completed and expected purchases must be submitted for justification of a computer for education expenses. All purchases must have prior approval by the Project Manager and reimbursement will follow distributed as an educational award through the financial aid system (check sent by mail).

3.12 Publications and Presentations

If publications or presentations result from your work completed during your tenure as a GK-12 Resident, you must include a footnote referencing support from "NSF #0742434 UCD GK-12 Transforming Experiences Project".

4. LEAD TEACHER

4.1 The Lead Teacher's (LT) Role

4.1.1 Eligibility

For the 2011-2012 school year, teachers in grades 6-8 are eligible and must adhere to the following:

- Hold Teaching Certification by the State of Colorado
- Must be US Citizens or Permanent Resident Alien
- Stated commitment to the employment of multi-disciplinary strategies in their content instruction
- Motivated to work with graduate students and content faculty in classrooms and in the development of classroom activities
- **Will NOT host a GK-12 Resident and student intern concurrently**

4.1.2 What do LTs do?

Every Resident is assigned to one LT. Lead Teachers are **mentors and facilitators**. They are the Resident's entryway into the school and can help the Resident work with other teachers. LTs are an extremely important part of the GK-12 Project.

LTs ARE MENTORS: LTs work directly with his/her Resident to plan, create, and implement lesson plans for his/her students. They will help the Resident integrate teaching pedagogy with STEM concepts. The lesson plans need to be collaborative in order to ensure that they meet curriculum requirements and are age-appropriate. The Resident and LT may 'team-teach' on any lessons as appropriate.

LTs ARE FACILITATORS: The LT is a primary resource in determining how the Resident can best aid the classroom. They can also be valuable in helping the Resident reach out to other teachers in your school. The Resident and LT must plan together to make the best use of resources. We encourage LTs to help their Resident become involved in other classes at your school, other schools, family math and science activities, after-school math/science clubs, math/science fairs, and talk with parents (See Appendix 2- *School-wide Resource Survey*).

4.1.3 What is it like to be a middle school teacher?

Teachers have far more responsibilities than just teaching. Their many "hats" include instructor, counselor, nurse, referee, mentor, facilitator, warden, director, and coordinator to name a few. In a city like Denver, teachers must deal with great diversity - non-English speaking students, students with abusive parents, high mobility rates, and latchkey children. Many students have learning disabilities, behavior problems, and other special needs. Some of the GK-12 LTs have additional leadership responsibilities with their respective school districts, such as math/science liaison or team leader. Some may also be working on advanced degrees or taking classes to meet state and federal professional growth requirements to renew their teaching certificates.

A teacher's workweek is similar to a college student in that it stretches to include all the things that have to be done. This may include daily or weekly after-school building meetings, monthly district meetings, and meetings with parents. Many teachers must handle lunch duty, playground duty, or early morning duties such as bus supervision or supervising breakfast time. Time is the most precious commodity for a classroom teacher.

Teachers are responsible for documenting that they have worked with each student as a group or an individual, which means that there is a lot of paperwork. Teachers must maintain a discipline plan and/or special plan for students who are unable to operate within a regular school day because of behavior or educational problems. Many schools require that a yearly pacing plan showing approximate dates for completion of units be handed in and approved by the principal. Teachers are required to make daily lesson plans identifying which standard(s) they are teaching and submit these plans to their principals to prove that every student is getting an opportunity to learn. These lesson plans are kept on record.

The federal "No Child Left Behind" act (aka 'NCLB' or 'nickle-bee') places great pressure on teachers due to its emphasis on high-stakes testing. Testing stresses students and their teachers. All schools must publish their student body's test scores in reading, math, writing, and science. There are serious consequences for schools that do not meet federal standards, which can include firing teachers and principals, and allowing students in that area to switch to other schools.

4.2 Important Guidelines for working with your Resident

4.2.1 Teacher presence in the classroom

Residents are NOT to be left alone during any activity involving students. A teacher <u>must</u> be present at all times. There are no exceptions!

4.2.2 Communication

We depend on LTs to tell us how things are going in their classes. If there is ANY problem or concern regarding the Resident or the program in general, PLEASE, PLEASE let us know as soon as possible. We do not want you to feel uncomfortable or put out because of your participation in the program. Please tell us while we have the chance to do something about it. Feel free to contact the Project Manager at <u>any</u> time.

4.3 Time Commitment

You will have a Resident in your classroom participating in GK-12-related activities for an *average* 10 hours per week (over 2 school days), working with both the students and the teacher. The average hours per week are mandated by NSF and must be fulfilled. ***Note that this requirement is an average and Residents may work more hours one week and fewer hours the next week.*** LTs should set aside about an hour per week to plan with their Resident and to review upcoming lesson plans (when appropriate) that have been created by the Resident and LT. This is important for everyone. Remember that your Resident has little or no formal teacher training, and will be counting on you for guidance. We suggest that you set aside time during a planning period or arrange another time that is convenient to meet with the Resident to plan a week or two in advance. During these planning sessions, the team should share lesson plans, long-range plans, and class management techniques so that the Resident can enhance classroom instruction with appropriate experimental/inquiry activities.

Once per semester, LTs will attend a brief meeting for teachers only. This meeting will be approximately 1 hour after school time. There will also be an All-Participant (TELC) meeting twice a semester. This meeting will be approximately 3-4 hours held on a Saturday. (See 4.6- *Meetings*)

4.4 Scheduling & Planning

Lead Teachers and Residents build their own schedules for direct contact and planning time in the classroom. Keep in mind that schools often have set schedules that are not up to the teachers, and Residents often have required coursework and research that is not flexible. Be realistic about the hours each person will be available and work out something that is manageable for all parties.

4.5 Journals

4.5.1 Monthly Journals

LTs will maintain a monthly journal of GK-12 activities and reflections and submit via the *LT Monthly Journal* form, link found on the project website under “Resources>For current Lead Teachers”. A monthly reflection prompt will be sent by the Project manager via email and should be responded to in the section titled “monthly reflection question”.

4.5.2 Lesson Reflection Journals

For each lesson presented (See *9.2 Lesson Requirements*), the Resident will complete a *Lesson Reflection* entry pertaining to the lesson that s/he has organized and presented. The electronic form link can be found on the project website under “Resources>For Current Residents”. The entry will answer some basic questions, such as (but not limited to):

- What happened? Summarize how teaching the lesson went. (1-2 paragraphs)
- Why did these things happen? Analyze the outcome. (1-2 paragraphs)
- What did I learn? Reflect on the outcome and/or ideas for improvement. (1-2 paragraphs)

Lesson Reflections will be sent to the Resident's LT, Communication Mentor, and Project Manager. The LT should give constructive pedagogy and communication feedback on the lesson presentation and the *Lesson Reflection* and return to the Resident via email (cc: Project Manager & Communication Mentor) no later than 2 weeks after the presentation date.

4.6 Meetings

4.6.1 LTs Meetings

Lead Teachers will meet once a semester to discuss the project, activities and events at their schools. This is an informal meeting with other teachers and GK-12 staff member(s). This is the place to talk about successes & frustrations, pose questions, and talk about future projects. Teacher meetings will last about one hour and will be held on a weekday after school hours (date and location TBD).

4.6.2 TELC Meetings

All GK-12 participants will meet twice a semester to work collaboratively as interdisciplinary teams. During this time, TELCs will have time for discussion about GK-12 project activities, planning time for creation of lessons, and time to socialize with other TELCs. Additionally, the TELC meetings are a great opportunity to share perspectives and suggestions for improvements in the classroom as well as of the program.

4.7 Absences

Please be respectful of others' time. Plan and communicate absences to your team and GK-12 staff as far in advance as possible. While it is not always feasible, do your best to contact your Resident BEFORE your absence. ***It is your responsibility to plan absences with your Resident in advance, or to notify the Resident as soon as possible.***

- *illness or other emergency situations*: let the other person(s) know right away so that alternate arrangements can be made.
- *non-emergency situations:* Teachers should arrange absences with their respective Resident as far in advance as possible.

4.8 Compensation

4.8.1 Stipend

Each LT will receive a $3000 stipend, to be paid in 3 installments at the end of each of the following months: August, December, May. Stipends will be sent in the mail and should be received 1-2 weeks after the end of the designated month. This stipend is used to support your professional contributions to various GK-12 planning and implementation activities. These activities may include participation in summer orientation, travel support for professional meetings, involvement in weekend and evening workshops, and mentoring of Residents throughout the project.

4.8.2 Travel

Each LT is considered eligible for travel support to: NSF Annual Conference (See *2.5.1 National Science Foundation GK-12 Annual Conference*), China (See *2.6 International Travel*), and other conferences (see *2.5.2 Other Conferences*).

5. COMMUNICATION MENTORS (CM)

5.1 What is the CM role?

Faculty Mentors are selected based on many factors, including the relationship of research advisor to the Resident, academic accomplishments and experience in teaching. Each Faculty Mentor is paired with a Resident for a full year unless extenuating circumstances require that the partnership be terminated.

The Faculty Mentor's primary responsibility is to serve as a resource person within their discipline for the assigned GK-12 Resident and LT, as well as to their TELC & the broader GK-12 project. This may include, but is not limited to, providing direction on lesson topics, helping the Resident locate materials and supplies on campus, connecting the Resident with community professionals, or personally visiting the school for presentations if appropriate. Mentors should make themselves accessible to the Resident that they have been paired with (either in person, phone, email or webcam) in order to support the Resident's personal and professional growth, and to help achieve broader program outcomes. The success of a Mentor-Resident relationship is dependent upon open communication, trust, as well as a commitment to building community in both research and teaching.

Mentors are a great mediator and asset to a positive GK-12 experience. Please notify your Discipline Leader (Math: Mike Jacobson/ Science: Mark Anderson) ASAP if there are any issues that arise for your Resident or TELC during the semester.

NSF requires that Residents maintain adequate academic progress on his/her degree. Notify the Project Manager or Discipline Leader immediately if there is an issue.

5.*2 Time Commitment & Meetings*

5.2.1 CM/Resident Meetings

CMs will meet with their Resident once a semester to review a videotaped lesson that has been implemented in the middle school classroom. Additionally, they will discuss the middle school experience and the integration of the Resident's graduate research into the middle school classroom. The Mentor may provide guidance on good teaching practices, math or science inquiry, scheduling, organization, etc. In addition, the Mentor will observe the Resident implementing a lesson in the classroom setting once a semester at a pre-arranged time. During this time, mentors will provide feedback and ways to improve the present communication skills and future lessons.

5.2.2 TELC Meetings

All GK-12 participants will meet twice a semester to work collaboratively as interdisciplinary teams along with their CM. During this time, TELCs will have time for discussion about GK-12 project activities, planning time for creation of lessons, and time to socialize with other TELCs. Additionally, the TELC meetings are a great opportunity to share perspectives and suggestions for improvements in the classroom as well as of the program.

6. TELCs: Transforming Experiences Learning Communities

6.1 What is the role of TELC?

GK-12 participants work in their TELC for the full academic year. The TELC is made up of all GK-12 participants - Residents, LTs, and the Communication Mentor. This team concept allows for the development of interdisciplinary work and many perspectives, in addition to providing on-campus resources and access to other community professionals.

6.2 Meetings

Aside from each participant's individual responsibilities, all GK-12 participants will meet twice a semester to work collaboratively as interdisciplinary teams. During this time, TELCs will have time for discussion about GK-12 project activities, planning time for creation of lessons, and time to socialize with other TELCs. Additionally, the TELC meetings are a great opportunity to share perspectives and suggestions for improvements in the classroom as well as of the program. Dates and times are posted on the GK-12 calendar located on the project website.

6.3 Planning

It is easy to get busy and neglect plan time. *Do not underestimate the importance of planning.* If you are working with more than one Resident or LT, make sure that everyone is involved in planning. While planning time is set-aside during the TELC meetings held twice a semester, most TELCs will need more time to plan and work together. It is up to each TELC to set up the times and locations for this to be done. Unfortunately, sometimes it's not easy. Teams who are having trouble finding workable solutions to scheduling should bring it to the attention of GK-12 staff right away. Don't let the year get away from you!

6.4 Communication

Communication is paramount to becoming a successful team. Please be courteous and thoughtful towards your team and the rest of the GK-12 participants. Decide which method of communication will work most effectively for your team.

As you will hear over and over (and over), there are significant differences between teachers and mathematicians/scientists. These differences can lead to misunderstandings that, if not confronted, will cause problems. Keep the differences in mind and make sure that you are communicating well. Do not be afraid to ask if you are not sure what your Resident, LT, or Mentor means.

You will receive a lot of emails from the Project Manager because the GK-12 program is very dynamic and changes often. Email is how we keep you informed. Please check and read your emails regularly so you'll be up to date on the latest information.

6.5 First Steps

LTs at each school will help the Residents determine how they can best assist in the classroom. Planning is a very critical part of the process. Our experience shows that the level and degree of planning can make or break the efficacy of the Resident. **Mentors**, please ensure each of these steps is happening for your Resident.

The first quarter is a time of adjustment. The Resident and the LT will be getting used to each other: learning each other's work style, learning how to communicate, and finding the strengths and resources each brings to the partnership. It is common during the first quarter for the participants to wonder what they were thinking when they agreed to participate in this project. We suggest the following:

- **Residents**- get to know your school, ask questions! (See *Appendix 2- School Profile Form* to help get you started).
- Get to know each other personally. Find time to meet for lunch outside of school. Talk about your background, where you come from, and where you are going. Everyone is busy, but this step can greatly enhance your long-term communication and make working together much easier.
- Establish some ground rules. How much notice should the LT give the Resident when he/she needs something from the Resident? Should the Resident feel free to interrupt the teacher during a lesson, or wait until he/she is asked to contribute? These details will vary depending on the teacher and the Resident. Do not ignore them in the hopes that they will go away - they will not. The best strategy is to get everything out in the open and to maintain an open line of communication throughout the year

Monthly guideline steps for First Semester:

- September- Observations, familiarize with the middle school and students, and reflection
- October- Development and implementation of 1st inquiry-based lesson
- November- Development of 2nd inquiry-based lesson
- December- Implementations of 2nd inquiry-based lesson and planning for interdisciplinary lessons

Monthly guideline steps for Second semester:

- January-February – Development & Implementation of 1st interdisciplinary inquiry-based lesson
- February-May - Development & Implementation of 2nd interdisciplinary inquiry-based lessons

Depending on school curriculum and content areas needing enhancement, the dates for implementation of lessons are flexible and may vary from school to school. Please note that middle school schedules tend to get busy before, during and after CSAP testing in the spring so plan accordingly to ensure that you have adequate time to develop and implement your lessons.

6.6.1 LTs : Introduce the Resident to Everyone at Your School

Teachers, librarians, office staff and your principal should know that there are GK-12 Residents working in your classrooms, and what their role is. The Resident can be a resource for the entire school; this cannot happen if teachers don't know the resource is there. In this day of heightened security, it is especially important that school faculty and staff know the identity of all adults in the building.

We advise having a formal meeting between the Principal, the LTs and the Residents shortly after the Residents start working in the school.

6.6.2 LTs : Introduce the Resident to Your Students and Their Circumstances

Talk to the Resident about the home life of your students, what the students are likely to know or not know, even what kids at that grade level think is important. Allow time for the Resident to get to know the students.

6.6.3 Inform & Involve Parents

During the first couple weeks of school, the *Parent Informative Letter/Media Release Form (See Appendix 2* and project website*)* should be sent home with each middle school student that will be interacting with the Resident. The letter contains information about the GK-12 project and the Resident's role in the classroom. Additionally, make sure students' parents have opportunities to interact with the Resident in their child's environment. This may include having parents visit the classroom, and it could occur during open houses and parent-teacher conferences, or other similar family event.

6.7 Things to remember

6.7.1 Use Everyone Else as Resources

Get to know the other Residents, LTs, and CM. There is untold wealth of experience, information, and resources out there, but you will not know about it if you do not talk to people. Previous Residents have found that a social gathering with other Residents - something informal that allows you to talk about what you do, what you're doing at school, etc. – is helpful (and fun). Lead Teachers should attend and be active in the semester LTs meetings.

Make sure you look over all the resources available on the GK-12 web site - activities and experiences are collected there. Do not reinvent things that someone else already has created.

6.7.2 Don't Make Assumptions

<u>*Residents*</u>*:* Do not assume as a Resident that you can or cannot do something - ask. If it does not fit in with the goals of the teacher, he or she will let you know. Your experience is very different, so you will have ideas that the teacher might never suggest. Planning is a partnership and you both should feel free to make suggestions.
<u>*LTs*</u>*:* Remember that your Resident likely has no teaching experience, and it took you many years of schooling and practice to become the teacher you are today. Be patient and give the Resident plenty of information to work with so they will be the most helpful to you.

6.7.3 Be Flexible!

Remember that things don't always go as planned, and adapt accordingly.

6.7.4 Communicate Your Enthusiasm

A large part of a teacher's job is to show students and teachers that learning is exciting. Students need to see enthusiasm and interest in learning. A GK-12 Resident can convey to the students how much they enjoy their field. Students and teachers need to also see the interdisciplinary nature of STEM. *This means that Residents and LTs must NEVER dismiss another subject as boring, unrelated, or useless.*

6.8 Common Problems

6.8.1 Common Problems for Residents

- Promising too much and delivering too little. Residents want to be as much help as possible and sometimes they promise more than they can deliver. Be careful when you make a promise and, once made, follow through.
- Talking down to teachers. The way mathematicians and scientists communicate with each other is different from the way people in schools communicate with each other. It is possible to be condescending without meaning to be. Be respectful of others' opinions and remember that you are a guest in the teachers' classroom.
- Not paying attention to common courtesies. This means using proper language (no swearing), dressing properly (no t-shirts, no ripped jeans, no dirty clothes), and following all of the rules that the students must follow. Above all, no gossiping about your teacher, other teachers or students in the school or GK-12. NEVER criticize your LT in front of his or her students, colleagues or bosses.
- Not treating GK-12 as a job. GK-12 is a job and it should be your first priority because GK-12 pays your salary.

You are a representative of the university, of your department and of this program. Because you are working outside the university, the standards are higher than they might be in the comfort of your own department. Just because your professors do something is not a justification for you to do it. We expect you to be professionals in every way. This includes the way you talk about the GK-12 Project in and outside of the classroom. Negative thoughts and venting are not allowed outside of the Resident and Participant meetings. If you have an issue, contact the Project Manager immediately.

- Not turning in journals, activity logs, etc. on time. We have a system for collecting data. Every time we have to treat an individual case, it takes a disproportionate amount of time because it has to be tracked by hand. Data collection is a large part of the requirements for our grant.
- Taking over the classroom. Be sensitive to your LT's plans. Do not spend more time on something than your LT has allotted. Teachers must plan very tightly if they are to do everything they are asked to do.
- Getting off on tangents. Sure, it would be great to teach fourth graders about imaginary numbers, but imaginary numbers are not in the fourth-grade math standards and are probably way above the heads of most of the kids.
- Forgetting that you are teaching *all* the students. Do not teach to just the smartest or the most interested kids. <u>Everyone</u> has to learn. This may be frustrating for you at times when you feel you are explaining things as clearly as possible and some of the kids just are not getting it. You will have to adjust how you communicate according to the level of the kids and their abilities.
- Not establishing a solid communication base with your LT. You will need to ask for help and your LT may need to correct you. Be open to suggestions and comments, and be willing to communicate openly with your LT.

6.8.2 Common Problems for Lead Teachers

- Waiting until a problem gets unbearable before telling GK-12 management about it. We want you to be happy and satisfied with your experience. If there is ANYTHING **at all** that is bothering you, contact the Project Manager or one of the PIs and tell us. The worst thing is to have something festering for a long time so that when it comes to our attention, it is a mess. We want to help.
- Letting the Resident become a student teacher or intern. Your Resident should be doing more than just being an extra pair of hands. It doesn't benefit either of you if he or she is just an assistant on your normal activities.
- Expecting your Resident to develop lessons and teach them by him or herself without guidance. They don't have the training to do that, and it doesn't make the best use of their talents.
- Assuming that the Resident is an expert in every STEM subject. Just because your Resident is a college student, and is considered an expert in a science, they may not necessarily be an expert in computers/ technology. They may need time to learn, or time to find someone who can help them.
- Having your Resident in the classroom when there isn't a role for him or her that week. Only have them come in when he or she will really make a difference.
- Not planning. Grad-student obligations can vary greatly from week to week. If they have an especially heavy week coming up, they may not be able to respond to a brand new idea that needs lots of researching. Give them time.
- Relinquishing your classroom. If your Resident is dressing inappropriately, you must say something. If he or she is constantly running off on tangents and getting your class off track, the Resident has to be told. Sometimes, the GK-12 Residents get excited and forget that it is not about them - they need to be reminded sometimes. Develop a system or code so your Resident will know when the discussion of special relativity is taking you a little further past the forces and motion unit than you care to go.
- Not checking e-mail frequently. If you do not read your e-mail for days at a time, you are likely to miss opportunities and frustrate your Resident if he or she is trying to get information from you. Please check at least once a day and more if you can. If email is not a good option, be sure your Resident is aware of that, and use another communication method that works for both of you.

7. Classroom & School Culture

Please take some time in addition to Orientation to talk about your classroom and school culture. Do teachers regularly share materials or lesson plans? Does one teacher teach science for the entire grade, or does each teacher teach his or her own class? Are parents involved in activities like math or science nights? Can media, computer, or resource people be called upon to assist in activities? Talk about the types of students in your school. Are they primarily affluent? Do you empower students to check themselves out of the classroom? What grades are being tested in your school this year, and on what subjects?

LTs: The disconnect between Residents and the students with whom they work is one of the biggest challenges cited by the Residents. Remember that most of the Residents were the students who paid attention, were in advanced classes, and were engaged most of the time. The Residents do not always understand why your students do not just sit down and work. *Please spend time talking about this!*

7.1 School Policies

7.1.1 Your School's Building Map/Emergency Procedures

During the Resident's tour of the middle school s/he will be serving in, the first thing a Resident should do is ask the LT for a school map and list of emergency procedures. Residents and LTs should discuss the school's emergency procedures in case of a fire, tornado, lock down, or other emergency.

7.1.2 Visitors

Different schools have different policies for visitors. Find out whether each school will want the Resident to sign-in each day, wear a specific type of nametag, etc.

7.1.3 Prohibited Items

There are a number of items that MAY NOT be brought onto the property of any Englewood or Jeffco school. Included in these items are pocketknives, cellular phones and drugs of any kind, including over-the-counter drugs. Follow the same rules as students: no weapons, alcohol, tobacco, or drugs on campus.

Use your own judgment about what is professional and always err on the side of being overdressed rather than underdressed (See *3.8 Classroom Behavior and Appearance*). Residents should review the school's policies with their LT. Each day before leaving for school, do a mental check that you have not accidentally left an item in your pocket or are wearing inappropriate clothing.

7.2 Photography in the classroom

Take photos of classroom activities (include teacher, students, Residents) as often as possible. The Project Manager may also come to your classroom to take photos. Digital is preferred, but we will take any format available. **Please use a high resolution when taking digital photos**. Please send photos in on a regular basis, with a short description of what's going on in the picture, names of all students & school staff/teachers, and name of photographer. Do not send us any pictures unless you are sure we have permission to use them.

Pictures, audio, etc. can be used for publication only with the consent of the students' parents. Some parents do not want their children to participate in research projects or to have their children's pictures on the web or in a newsletter. A *Parent Informative Letter/Media Permission Form* is provided in *Appendix 2*. The LT should send this home to parents of all students the Resident will interact with, and upon return keep in the student files at school.

7.3 Working with substitute teachers

LTs, if you know a substitute teacher is coming in advance, please provide him or her with written instructions about the role of the Resident in your class. The LT may ask the Resident not to come in when there is a sub. If this is the case, the LT should contact the Resident as soon as possible. **It is not appropriate for a Resident to work in a classroom with a *long-term* substitute.**

7.4 Parent-Teacher Conferences

Parents meet with teachers periodically through the year. Residents may be asked to attend these conferences to meet parents and tell them what GK-12 is doing in their school. However, because of confidentiality issues, Residents should NOT be involved in these discussions between the teacher and the parent(s). One role that Residents may play is to bring activities to involve students and their siblings while their parents are busy.

7.5 Important things for residents to know about schools in general

7.5.1 Schools and Teachers are not autonomous

Federal and state mandate certain competencies for students at each grade level and in each subject area. Each school district imposes additional requirements. The principal and teachers do not always agree with the requirements, but they are accountable for meeting each of them. This is especially emphasized with standardized testing, and teachers often feel that the limited time available means that they are teaching to the test. The main goal of every day should be to help students master these basic competencies.

7.5.2 Teachers feel pressure from all sides

In addition to the principal, the school district and the state and national requirements, teachers often have hundreds of parents and special interest groups that presume to be their bosses. They can be faced with a wide range of competing demands, expectations, and objections from people and groups, each of whom is convinced that their own point of view is correct. Residents are there to help, not to add to this problem.

7.5.3 Schools have limited funding for equipment

On the positive side, teachers are exceptionally resourceful in finding inexpensive and/or free equipment and supplies. Residents must be inventive as well. Residents may be able to help the teacher figure out how to fix a piece of equipment that doesn't work, or identify an alternative, such as a giant tub that's been sitting in the back room for so long that no one remembers what it is. GK-12 also has limited funds to purchase some of the items teams may need for the Residents' lessons if the Resident is unable to borrow them from someone on campus.

7.5.4 Teachers do not have a lot of time

Teachers are pulled in many different directions and are very busy. The GK-12 project is designed to make their lives simpler, not more complex. Residents should seek to enhance their efforts without imposing extra demands on their already hectic schedules. We want to avoid becoming viewed as a time sink or just another person competing for their attention. *GK-12 aims to be part of the solution, not part of the problem.*

7.5.5 K-12 schools have politics

The same kinds of cliques, power struggles, and honest differences of opinion that we find in most work settings also exist in school staffs. Residents should try to get along with everyone and avoid becoming identified with one group or point of view. Learn the "do's and don't's" at your school. Do your best to comply with the school's written and unwritten rules.

Residents should not get involved in school politics but at the same time, they should be aware that politics are an inevitable part of communities that influence personal/group decisions and actions. With this in mind, residents should do their best to *contextualize* their experiences in their respective schools and classrooms. Do not gossip, repeat anything you heard at your school, or get too personally involved with the teachers with whom you work. It is better to leave business relationships as business relationships. Do not criticize or critique teachers, especially in front of their students, their principal or their colleagues.

8. Assessment

8.1 Why?

Statistics and data are an integral part of the program. We are required to collect this information as a condition of our funding. We use these data to determine whether the project is meeting its goals. The information we learn not only helps improve the program, it is disseminated to other GK-12 projects throughout the country so that we can come up with a collective model for how to best utilize mathematicians and scientists in the classroom.

8.2 External Evaluator (RMC)

Informed Consent: You will be asked to sign an informed consent form that details the care with which the data will be handled. These statistics and data are not used to evaluate *you* - they are for evaluating the program as a whole. Results are reported as a group, with no individual identification of people or schools.

Interviews: GK-12's external evaluator (RMC) will interview a selected group of participants (Residents, LTs, faculty mentors, and K-12 students) at the end of the school year and report on progress. The external evaluator uses pre- and post-assessments, personal interviews and data collected by assessments taken throughout the year as a basis for the annual review.

Questionnaires: You will complete a pre- and a post assessment- questionnaire evaluating your ideas about and attitudes toward the program. The pre-assessment will establish your preliminary ideas of what this program is about, your role in the program, etc. This data will be compared to data from a similar post-survey given at the end of the project so that we can compare your expectations with what actually took place.

Classroom observations: Sometime during the fall and spring semesters, each Resident will be observed to determine the integration of the Resident into the classroom activities, the engagement of students, the collaboration between the Resident and the Lead Teacher, and the interdisciplinary nature of the TELC.

8.3 Internal Evaluations

8.3.1 Communication Mentors (CM)

Once a semester, an experienced STEM faculty teacher (CM) will visit the classroom during a lesson implementation by the Resident. After the observation, the CM will provide constructive feedback and will discuss his/her observations with the Resident and LT. *This is primarily for your improvement and not something to be worried about*. The first evaluation will focus on the Resident's ability to communicate content and research to the students. This may include topic areas, such as: organization, accuracy, relevance, logic, language, equity, delivery, audiovisual aids, use of time, questions, and presence.

8.3.2 Workshops & Project Feedback Questionnaires

In order to improve the project and experiences of the participants, you will be asked to complete feedback questionnaires after workshops & orientation, mid-year of the project, and at the end of the year.

8.3.3 Mid-Year Participant Evaluation

Residents and LTs will be evaluated mid-year by the GK-12 Staff regarding their participation in the program and fulfillment of requirements.

8.4 National Science Foundation GK-12 Online Data Collection System

The National Science Foundation requires us to provide demographic information on project participants, including racial and ethnic, socio-economic and English Language Learner data. This information is used in aggregate by the National Science Foundation to justify the funding of this program. They are interested in the number of teachers we affect, the number of Residents we affect, and the number of minorities and women we affect. NSF has been known to ask for data on short notice, so please help us when we have to scramble to collect information at the last minute.

Additionally, the NSF GK-12 Online Data Collection System is used to collect additional data about the effectiveness of the project. You will be given instruction on this facet of our reporting during the spring semester.

8.5 NSF Annual Report

Each year, GK-12 is required to write an annual report that includes:

- Who worked on the grant and what their roles were.
- Information on who was affected by the grant.
- The primary activities of the grant.
- The primary findings of the grant.

9. Lesson Development

9.1 Why?

Each Resident/TELC is required to develop and implement several lessons in the middle school classroom. While the GK-12 Project has no intent of creating K-12 teachers, graduate students who are pursing a career in higher education must be able to communicate their research and content knowledge to a variety of audiences. Through the GK-12 experience, Residents will learn not only where their college students are coming from and what they are learning, but the Residents will also gain a better understanding of how to engage and really teach their college students so that the knowledge the students have learned continues with them outside the classroom doors and into the real world.

9.2 Lesson Requirements

Each Resident is required to collaborate with the TELC to create 4 lesson plans and execute them in multiple classrooms, across a couple of grade levels.

Suggestions include:

- General STEM Area (Science, Technology, Engineering, & Math)
- Resident Concentration Area (ex: environmental science, optimization, etc.)
- Interdisciplinary Concentration

Together with input from the LTs and CMs, the Residents must ensure that the subject matter is appropriate for the grade level, that these lessons will be presented on a date/schedule agreed upon by the TELC, and must fit in with required school units, related materials and subject areas. ***Each lesson must be developed to enhance the current curriculum and not an addendum***.

9.3 Inquiry-Based Lesson Planning Model

Residents will be exposed to the 5 E Lesson Planning Model during the Summer Workshop and Orientation. It is not the only Inquiry-based lesson style that is available and the Resident/LT may decide together to use a different inquiry-based learning format. The *5 E Lesson Planning PowerPoint* is located on the project website for reference: "Resources>Curriculum Resources".

9.3.1 Inquiry Resources

Teaching for Understanding: Utilize the materials and information learned during the Summer Workshop and Orientation as well as your TELC to develop each lesson. *How People Learn* by the National Research Council is a great resource to use and should be consulted on a frequent basis.

Additional information on inquiry and the National Science Education standards can be found at: http://cires.colorado.edu/education/k12/rescipe/collection/inquirystandards.html

9.4 Lesson Template & Lesson Template Description

A *Lesson Template* and *Template Description* (located on project website under "Resources>For current Residents") must be completed for each of the required lessons. The *Lesson Template* should be completed by the Resident and LT and submitted to the Project Manager at least 1 week before the lesson implementation.

9.5 Lesson Plan Examples

Lesson plan examples are located on the GK-12 Project website: "Resources>Curriculum Resources".

10. Resources

Access to Knowledge

- Anderson, J. L. (2004, fall). What is Democracy? *Kappa Delta Pi Record, 41*(1), 4-6.
- Goodlad, J. I. (2004, fall). Visitors from the American Past. *Kappa Delta Pi Record, 41*(1), 12-16.
- Mantle-Bromley, C. (2004, fall). Jazz at the Improv. *Kappa Delta Pi Record, 41*(1), 21-25.
- Narum, J. (2008, spring). Transforming Undergraduate programs in Science, Technology, Engineering, & Mathematics: Looking Back and Looking Ahead. *Liberal Education, 94*(2), 12-19.
- Trefil, J. (2008, spring). Science Education for Everyone: Why and What? *Liberal Education, 94*(1), 6-11.

Learning

- National Research Council (2000). *How People Learn: Brain, Mind, Experience, and School* (Expanded ed.). Washington, D.C.: National Academy Press.

Learning Styles

- Carter, C. Bishop, J. & Kravits, S. L. (2009). *Keys to success: building analytical, creative, and practical skills* (6^{th} ed.). Upper Saddle River, NJ: Pearson.
  - Personality Spectrum Inventory (pp.76-78)

- Intelligence Style Inventory (pp.72-74)

Language & Cultural Impact on the Learner

- Velarde, J. Always Moving. *Voices from the Fields: Children of Migrant Farmworkers Tell Their Stories.* (pp.20-25). New York: Scholastic, Inc.

Learners with Special Needs, Differentiation, Accommodation

- Acrey, A., Johnston, C., & Milligan, C. (2005, Nov/Dec). Using Universal Design to Unlock the Potential for Academic Achievement of At-Risk Learners. *Teaching Exceptional Children. 38* (2), 22-38.
- Sobel, D.M. (2010). *Responding with Equity & Support: Responsive Planning Efforts* [PowerPoint slides].
- Responsive Teaching Practices Note-catcher. Sobel, D.M. & Taylor, S.V. (2006). Blueprint for the responsive classroom. *TEACHING Exceptional Children, 38*(5), 28-35.
- Villa, R. & Thousand, J. (2005). *Creating an inclusive school 2nd edition*. Association of Supervision and Curriculum Development; Alexandria, Virginia, p. 138-140.
- Udvari-Solner, A., Villa, R. A., & Thousand, J. S. (2005). Access to the General Education Curriculum for All: The Universal Design Process. In R. A. Villa & J. S. Thousand (Eds.), *Creating an Inclusive School* (2nd ed.) (pp. 134-155). Alexandria, VA: Association for Supervision and Curriculum Development.

Equity & Diversity

- Johnson, A. G. (2006). Privilege, Oppression, and Difference. *Privilege, Power, and Difference* (2nd ed.) (pp.12-40). New York: McGraw-Hill.

Issues in Math & Science

- Ferry, T.R., Fouad, N.A., & Smith, P.L. (2000). The Role of Family Context in a Social Cognitive Model for Career-Related Choice Behavior: A Math and Science Perspective. *Journal of Vocational Behavior*, *57*, 348-364.
- Harding, S. (1991). What is Feminist Science? *Whose Science? Whose knowledge? Thinking from women's lives* (pp.296-312). Ithaca, NY: Cornell University Press.
- Johnson, C. & Kritsonis, W.A. (2006). A National Dilemma: African American Students Underrepresented in Advanced Mathematics Courses. *Doctoral Forum National Journal for Publishing and Mentoring Doctoral Student Research, 3*(1), 1-8.
- Lee, O. (2005, winter). Science Education With English Language Learners: Synthesis and Research Agenda. *Review of Educational Research*, *75*(4), 491-530.
- Linn, M.C. & Hyde, J.S. (1989). Gender, Mathematics, and Science. *Educational Researcher, 18*(8), 17-19, 22-27.
- Semali, L.M. & Kincheloe, J.L. (1999). Introduction: What is Indigenous Knowledge and Why Should We Study it?. In L.M. Semali & J.L. Kincheloe (Eds.), *What Is Indigenous Knowledge? Voices from the Academy* (pp.11-57). New York: Falmer Press.
- Smith, F.M. & Hausafus, C.O. (1997). Relationship of Family Support and Ethnic Minority Students' Achievement in Science and Mathematics. *Science Education,* 82(1), 111-125.
- Wang, D. B. (2004). Family background factors and mathematics success: A comparison of Chinese and US students. *International Journal of Educational Research, 41*, 40-54.

Inquiry-Based Lesson Development (5 E's)

- *The 5 E Instructional Model: A Framework for Inquiry-Based Instruction*. STEM Earth Central, University of Massachusetts, Retrieved December, 2008 from http://umassk12.net/earth/

Classroom Environment & Classroom Culture

- Ryan, A.M. & Patrick, H. (2001, Summer). The Classroom Social Environment and Changes in Adolescents' Motivation and Engagement During Middle School. *American Educational Research Journal, 38*, (2), 437-460.

10.2 Agencies & Websites

A collection of useful agencies and websites for STEM education will be compiled over the next year and placed on the project website under "Resources". If you have any information, contacts, or websites that you think would be useful for other GK-12 participants, please email the information to the Project Manager.

***Special Thanks**:*

This manual and forms have been adopted from the University of Alaska Fairbanks TASK GK-12 Program Training Manual (2007) and the University of Nebraska Project Fulcrum 2006-2007 Handbook.