1. Describe the practice proposed for recognition, and list its objectives. Detail how the practice is innovative, how it promotes high student achievement and how it can be replicated.

Girls' Adventures in Math and Science (GAIMS) is an after-school program for third and fourth grade girls. It is an opportunity for girls to expand their awareness of the applications of math and science technologies and to see women working at careers in these technologies. The girls meet once a week for six weeks to gain hands-on experiences in math and science. Each session begins with openers (short investigative puzzles designed to foster problem-solving and to stimulate divergent thinking). At the end of each session, time is spent discussing reactions, scientific principles gleaned from the activity and possible career opportunities utilizing the skills learned that day. Biographies of female scientists and mathematicians and literature related to the activity are displayed and shared with the participants. Connections have been made with girls in the high school science club. These young scientists attend one of the meetings to share their experiences in science as well as to discuss the opportunities for careers in science for females. Field trips have been taken to observe female scientists at work or women scientists from Merck have visited and developed experiments for the girls.

The objectives of the program include:

* To work in a non-threatening, cooperative environment on hands-on science and math activities.
* To break down stereotypes about who practices science and math.
* To foster an interest in future science careers.
* To perform hands-on experiments in math and science.

The practice is innovative in its approach since it allows girls the opportunity to directly participate in experiments without the competition from the boys. The girls bring this experience back to the general science class and are less likely to let the boys take over. Having prior experience with the materials and having female scientists as role models make them feel more comfortable and confident with the science and math activities.

Developing confidence and familiarity with the materials and problem-solving in cooperative groups promote high student achievement. Observation of female scientists at work, listening to the high school students' experiences and reading about female scientists and mathematicians provide positive role models. These activities motivate the girls to actively participate in science and math classes.

The program can easily be adapted and modified for various grade levels. Most of the materials used can be found in a food or drug store. Teachers need to be familiar not only with hands-on science activities but also with techniques that encourage females to participate (wait time, cooperative groups, coaching). Both teachers involved in this program have been trained in Family Science and also received a fellowship from the AAUW which they used to develop this program.

2. Describe the educational needs of students that the practice addresses and how they were identified. List the Core Curriculum Content and Cross-Content Workplace Readiness Standards addressed by the practice and describe how the practice addresses the standards.

Gilligan's research has demonstrated that a major change occurs in the female's sense of self esteem roughly at age ten or eleven. Her research also indicates that this is an ideal time for intervention programs. It was also noted by Sadker and Sadker that in traditional classroom settings, teachers tend to ignore girls and favor boys with their attention and time. Several studies denote the low number of females in the math and science fields. Upon closer scrutiny using a teacher survey, these national studies were reflected in our local classroom . Boys were indeed receiving a great deal more attention and girls did not seem interested in science and math activities at the third and fourth grade levels. When the program first began, neither the science nor math curricula were using hands-on experiments or manipulatives. Based on the research of Gender / Ethnic Expectations and Student Achievement (GESA), the activities in this

program were developed and implemented. Since that time the curricula have been rewritten and these factors have been incorporated.

This practice addresses all of the Cross-Content Workplace Readiness Standards as well as several math and science standards:

1. All students will develop career planning and workplace readiness skills.
   Math 4.3: All students will connect mathematics to other learning by understanding the interrelationships of mathematical ideas and the roles mathematics and mathematical role modeling play in other disciplines and in life.
   Science 5.3: All students will develop an understanding of how people of various cultures have contributed to the advancement of science and technology, and how major discoveries and events have advanced science and technology.
   * By meeting with the high school students and sharing experiences.
   * By observing female scientists at work and visiting work sites.
   * By reading about famous female scientists and mathematicians.

2. All students will use technology, information and other tools.
   Math 4.5: All students will regularly and routinely use calculators, computers and manipulatives and other mathematical tools to enhance mathematical thinking, understanding and power.
   Science 5.4: All students will develop an understanding of technology as an application of scientific principles.
   * By using calculators for "This and That" activity.
   * By using alternative measurement tools for "Flying Pennies" activity.
   * By using manipulatives to complete science experiments.

3. All students will use critical thinking, decision-making and problem-solving skills.
   Math 4.9: All students will develop an understanding of and will use measurement to describe and analyze phenomena.
   Science 5.2: All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.
   * By working in cooperative groups in all science and math activities.
   * By performing hands-on open-ended experiments.

4. All students will demonstrate self-management skills.
   Math 4.4: All students will develop reasoning ability and will become self-reliant, independent, mathematical thinkers.
   * By writing in a reflection journal at the end of each session.
   * By coming prepared for each session with needed materials and "lab" coat.
   * By disseminating and collecting needed materials for each experiment.

5. All students will apply safety principles.
   * By learning and practicing safety procedures when performing experiments (wearing goggles, listening to directions, cleaning up after activity).

3. Document the assessment measures used to determine the extent to which the objectives of the practice have been met.

Alternative as well as traditional assessment measures are used to determine the extent to which the objectives of the practice are used.

* pre-post questionnaires are administered related to girls' knowledge of female scientists and mathematicians.
* portfolios are developed with each student's work and photographs taken of work in progress.
* checklist completed by teachers about girls' attitudes and participation in the general science class.
* reflection journals are kept to document each individual's experience and feelings about the activities.
* standardized test data is collected and analyzed in comparison to girls who did not participate in the program.

All in all, anecdotal records have been the best documentation for the program. Each year the program begins with the girls drawing a scientist. Over the years, the results have evolved from wild-haired men in lab coats to women working together in labs. Each year not only do more and more students apply but many students want to join again even when they are told that some of the activities will be repeated. As one student stated, "I don't care. It's fun!"