Day 1   Monday July 10, 2006

0900   Registration and Pictures (WC intro RM, SE pics)

0930   Workshop Objectives, Responsibilities and Introductions (BC, NG)

1000   Housekeeping – refreshments, breaks, restroom locations, phones, etc. (HD)

1015   Surveys (NG)
       Questionnaires
       Release Forms

1045   Break

1100   Pairing of participants (HD)
               Skill level (novice/experienced)
               Interests (grade level/math or science)

1130   Slide show - TekBot™ and CEEN (RDS)

1145   Curriculum content overview for workshop (HD)

1200   Lunch (Scott Conference Center)

1300   What teachers should know about the TekBot™?   (RDS)
               How does the TekBot™ work?
               What are the different parts of a TekBot™?
               What are the important characteristics of a TekBot™?

1330   Breakout (HD)
               What are your initial plans for the TekBot™?
               What will you need to learn from this workshop?

1400   Hands-On (AG and all hands starting in 252 and then to 305/311 labs and then
       back to 252 for the wrap up)
               Soldering 101 – Which end is hot? (show a short video from HD/KT,
               battery tester introduction)
               Solder a connection (PKI 305/311)
               Battery Tester Assembly and Experimentation
1500   Day 1 wrap up (PKI 252) (shirts)
1530   Adjourn (PKI 252) (assignment: explain how a battery tester works)

Day 2   Tuesday July 11, 2006

0900   Summary of Day 1 (HD) PKI 252 all morning
          Survey and questionnaire results
          Distribution of participant photos

0930   Distribution of materials and parts inventory (KT)
          TekBot kits
          Toolkits
          Literature notebooks (notes (schematics (RDS), assembly instructions
          (RDS), engr profession (HD), battery tester))
          Engineering logbooks

0945   Using an engineering logbook (HD)

1000   Break

1015   Introduction to Engineering (HD)
          Reflections: What is Engineering?
              Who cares?

1045   Breakout (Observations/Questions) (HD)
          What has engineering most incisively affected about your day so far
          today?
          How may computers have you used today?

1100   What teachers should know about the TekBot™ (RDS)
          Resistors, Capacitors
          Color Codes
          Using DMM
          Diodes, Transistors

1200   Lunch

1300   Hands-On (RDS/HD)(PKI 252)
          Measuring Resistance and Capacitance with the DMM
          Testing Diodes and Transistors with the DMM

1330   Assemble chassis (RDS HD KT) PKI 305/311

1500   Adjourn

Day 3   Wednesday July 12, 2006

0900   Summary of Day 2 (HD)

0915   The scientific method and the Engineering Process (HD) (PKI 252)
            Problem identification
            Problem definition
            Listing of constraints
            Brainstorming and solution alternatives
            Means/methods
            ITERATION

0945   Breakout – 20 Minutes of Rapid Brainstorming (NG etal)
            Engineering as a context for teaching basic mathematics and science in a
            middle school classroom what potential do we see?
            (Generating a two poster listing of activities and concepts)

1015   Break

1030   Film on engineering design (Da Vinci, Tom Edison or Ben Franklin) (PKI 252)

1115   DC Electric Motors (AG) (PKI 252)

1145   Basics of the charger board (RDS) (PKI 252)

1200   Lunch

1300   Assembly and installation of power board/battery charger (PKE 305/311)

1500   Adjourn

Day 4   Thursday July 13, 2006

0900   Summary of Day 3

0915   A Typical Day in Engineering: What do engineers do? (HD)
                The morning meeting: engineering work is teamwork.
                Brainstorming session
                Engineering logbook
                Estimation and hand calculations
                Computer usage

0945   Breakout (Observations/Questions) (HD)
                What are the characteristics of a middle school student that would be
                interested in engineering as a career?
                        Introverted/extroverted
                        Hands-on/reflective
                        Caring/objective

1030   Break

1045   Understanding and measuring DC motor parameters (HD)
                Torque
                Speed
                Power
                Energy
        Understanding and measuring battery parameters
                Chemistry
                Energy Density
                Voltage
                Capacity
                Internal Resistance
        Recharging
        Power regulation

1145   Presentation discussion (Observations/Questions) (HD)

1230   Lunch

1330   Simulation (RDS) (PKI 260)
                Series/Parallel

1430   Motor control board assembly and installation

1500 Adjourn

1515 SPIRIT Staff Meeting

Day 5   Friday July 14, 2006

0900   Summary of Day 4

0915   Engineering Design Tools (HD)
                Objectives and Constraints
                Scheduling
                Technical Writing

0945   Breakout (Observations/Questions) (HD?)
                How can students not described yesterday become more interested in
                engineering?
                Is engineering for everyone in the 21st century?

1000   Break

1015   What teachers should know about the TekBot™ (HD)
                The transistor as a switch
                H-bridges
                Switching inductive loads
                Power electronics

1045   Robotics in the media presentation (various movie/TV video segments? Great
       Robot Race?)

1145   Presentation discussion (Observations/Questions) (AG?)

1200   Lunch

1300   Hands-On
                Series Resistors, current measurements, diameter measurements (RDS?)

1400   Remote control assembly
       Testing the locomotion platform using the wired remote to navigate a maze

1500 Adjourn

(Revisions as of July 16, 2006, Red – Education, Blue – CEEN)

Day 6   Monday July 17, 2006

0900   Announcements (Neal/Herb)
         AIM for Stars Modification (Neal)
         Lesson Idea List distribution (Neal)

0930   Bill and Jim's Lesson Samples and Examples (Bill, Jim, Neal)

1015   Striving for a TekBot "Lesson Building Block" Format (Neal)

1030   Break

10:45   What teachers should know about the TekBot™ (HD)
             Sensors
                     Light
                     Force
1100   Sensors
                     Sound
                     Position

1130   Engineering Ethics and Professionalism (HD)
             Human Factors
             Just because we can, should we?

1200   Lunch

1300   Hands-On (RDS, HD, etc)
             Measuring motor voltage and current
             Controlling motor speed with series resistors
             Series Resistors, current measurements, diameter measurements. Inclined
             planes, etc.

1500   Adjourn

(Revisions as of July 16, 2006, Red – Education, Blue – CEEN)

Day 7   Tuesday July 18, 2006

0900   Announcements (Neal/Herb)

0915   "Ramping up" for TekBot Lessons (Neal)
          Teachers experiment with TekBot Ramp Lessons
          (Groups continue to contribute to ideas)

1045   Break

11:00   Modern Engineering Challenges (HD?)
          International Competitiveness
          Rebuilding the Infrastructure
          Air and Water Pollution
          Energy

1145   Breakout (Observations/Questions) (HD?)
          Where do you believe modern life and technology are taking us?
          Do you believe engineering activities will help lead us toward an
          improved world?

1200   Lunch

1300   Assembly and Test of Analog Brain Board

1430   Use one or more of the example exercises from Day 6 or 7

1500   Adjourn

(Revisions as of July 16, 2006, Red – Education, Blue – CEEN)

Day 8   Wednesday July 19, 2006

0900   Announcements (Neal/Herb)
       Signing Up for AIM for the Stars (Neal)

0915   "Popsicle Stick Electronics" (Elliott Ostler)
             Teachers experiment with supportive activities
             (Groups continue to contribute to ideas)

1015   Planning your Lesson Building Block (Neal)
             Brainstorming a TekBot lesson building block
             (Teachers complete a 1 page "draft")

10:45 Break

11:00 Modern Engineering Constraints (HD)
             Manufacturability
             Affordability
             Reliability
             Sustainability
             Quality

1145   Breakout (Observations/Questions) (HD)
             If you were to design a product for recyclability, how would you
             determine what that meant?

1230   Lunch

1330   Experimenting with your TekBot (Neal)
       (Focus on navigating mazes, continued ramp exercises, springs, etc.)

1500   Adjourn

(*Revisions as of July 16, 2006, Red – Education, Blue – CEEN***)**

Day 9   Thursday July 20, 2006

0900   Announcements (Neal/Herb)
           Lesson Building Block Due Date of August 4th
           Pay Procedures Explanation / PKI Forms (Neal)

0915   Cool Websites in Support of the SPIRIT Project (Elliott Ostler)
           (Group participants also share websites and resources)

10:15   Peer Review of Lesson Building Blocks
           (Post it note activity giving peer suggestions)

10:45   Break

1100   Engineering Disciplines (HD)
                    Civil
                    Mechanical
                    Electrical
                    Chemical
                    Industrial
                    BioX

1145   Breakout (Observations/Questions) (HD)
                    Why do you think the aerospace industry employs so many electronics and
                    computer engineers?
                    Why is the knowledge of many fields of engineering required for the
                    successful completion of virtually any modern project?

1230   Lunch

1330   Hands-On (Trying Your TekBot Activity with a Peer)   Neal
           Try out your activity with a Peer

           (or individual technical assistance in lab as needed by some teachers)

           (or CEEN tour of PKI for those interested)

 1500   Adjourn

Day 10   **Friday July 21, 2006**

0900   Announcements (Neal/Herb)
       Format and Time Restriction Process for Teacher Presentations (Neal)

0915   Teacher 5 Minute Presentations on Their Lesson Ideas (Neal)
       (Group Written Feedback and Suggestions)

11:00 Break

1115   Teacher 5 Minute Presentations on Their Lesson Ideas Continued (Neal)
       (Group Written Feedback and Suggestions)

1230   Lunch (Sponsored by PKI)

1330   Teacher 5 Minute Presentations on Their Lesson Ideas Continued (Neal)
       (Group Written Feedback and Suggestions)

1430   Overview of SPIRIT Next Steps and Fall Activities (Neal)
       Completion of Final NSF Survey (Neal)
       Reminder of AIM for the Stars Check in Procedure (Neal)
       Reminder of Lesson Final Draft Submission Procedure (Neal)
       Closing Ceremonies (Neal, Herb, and all instructors)

1500   Adjourn