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
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
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
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
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