DESIGN PROJECT TASK SEQUENCE AND EXERCISES

WEEK 1

Day 1: (1 hr)

- *Ice Cream Sundae Social* - Girls create "specs" for their own sundae and then give them to another camper to make.

Day 2: Introduction to Design and Problem Solving (3 hrs with break)

- Girls find their teams using "jigsaw puzzle" approach. To form teams, we used information on experience with computers and comfort with oral presentation skills from self-evaluations campers returned with applications.
- Team building exercise
- *TEAMWORK. What makes a good team?*
  - General discussion on what's challenging about working in a team (PROBLEM DEFINITION)
  - Provide rules for BRAINSTORMING (IDEA GENERATION)
  - Brainstorm rules for good teams. Teachers moderate.
  - Each team agrees on its own rules
- *DESIGN A BIRTHDAY PARTY*
  - Teams are provided with requirements for the party (specifications and constraints) such as suitability for # of people and range in ages of guests, keeping cost low, providing a meal and a fun activity, etc.
  - Teams come up with alternative solutions.
- *DECISION MATRIX* - Each alternative solution is rated for each requirement using a (+= 1 pt) (o= 0 pt) (= -1 pt) scale, and points are totaled up.
- *PLANNING/SCHEDULING SKILLS* - Teams generate a task chart for the days preceding the birthday party.

REMINDER: For every task that is marked with asterisks (*), we developed some worksheets to guide the girls' activities. You are welcome to use them or adapt them for your own purposes. Just send us e-mail, and we will send you hard copies via U.S. Mail.

Day 3: Introduction to Design Projects (3 1/2 hrs with break)

- Describe projects
- Trips to customer sites
- Back on campus, teams write *PROBLEM STATEMENTS*
- *ROLES* explained and assigned. One pair of girls on each team was assigned a role from among the following five:
  - Structural Engineers
- Architectural Engineers
- Project Engineers
- Budget Managers
- Schedule Managers
- *ROLE PLAYING SKITS* were used to help girls understand their responsibilities.

Day 4: Information Gathering (4 hrs with break)

- Generate list of questions. Divide information gathering tasks according to roles where possible.
- *INTERVIEWING SKILLS AND PHONE MAIL/ EMAIL ETIQUETTE*
  Need to emphasize that it's different than talking to friends on the phone!
- On-campus *INFORMATION GATHERING*
  An official file box of resources was available for teams. Included were supply catalogs and contact information for "experts" with whom they could choose to consult. For example, the list included one of our librarians, the supplies/recycling coordinator in Worcester Public Schools, the office property manager at WPI, and some carpenters.

Day 5: Information Gathering (cont'd) (3 hrs with break)

- Off-campus information gathering (trips back to sites)
- *DEFINE SPECIFICATIONS* for the design. (What criteria will be used to evaluate alternative solutions?)
- *BRAINSTORM alternative solutions*

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Day 6: (4 hrs with break)

- Evaluate alternative solutions using *DECISION MATRIX*
- *ORAL PRESENTATION/ PUBLIC SPEAKING SKILLS WORKSHOP*
  - Provide overview of how to plan structure a presentation, use of visual aids, practicing delivery, dealing with nervousness.
  - Have pairs of girls within teams plan and deliver a very short presentation to her team, related to the design project. Examples: 1) problem definition; 2) information gathering; 3) design requirements/specifications; 4) brainstorming process and results; 5) decision matrix. Give each pair one transparency to make a visual aid. These presentations were used as starting point for upcoming interim presentation to customer.
Prepare materials for Monday presentation. Select 2-3 girls to make the presentation. Decide other supporting roles (i.e. some to take notes about questions, customer feedback).

WEEK 2

Day 1: (1 hr in evening)

- Practice interim presentation

Day 2: (4 hrs with break)

- Interim presentations to customers
- Debrief back at WPI: Evaluate customer input
- Go through problem solving cycle again considering customer input. It may be necessary to do slight problem redefinition, do some additional brainstorming, modify design, etc.
- Change/ reassign roles for remainder of week

Day 3: (3 hrs with break)

- Complete final design.
  Different role pairs work on different deliverables, such as:
  - "Parts" list for design
  - Approximate budget, as accurate as possible
  - Sketches/schematics of design. Information was provided on how to make "DRAWING PLANS" (scaling measurements, different views, etc.)
  - Schedule for ordering materials and building the actual product.
  - Prototype/model using foam board

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Day 4: (1 hr)

- Review guidelines for how to write a report.

Day 5: (3 hrs with break)

- Sub-groups working on:
  - Written reports
  - Final oral presentation
  - Prototype/model

Day 6: (3 hrs with break)
• Continue work on written and oral reports, prototypes/models.
• Prepare oral presentation materials.
• Practice oral presentation. All girls participated in final presentations. No questions from audience in order to keep time and anxiety levels down.

**Day 7: FINAL PRESENTATIONS**

• Final presentations to parents and customers at WPI