



Middle School Youth Answer the Question: “What Do You Want to be When You Grow Up?”

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INTRODUCTION

The FunWorks is a digital library of career information funded through the National Science Foundation's National Science Digital Library (NSDL) Program. Envisioned as a comprehensive resource for online exploration of science, technology, engineering, and mathematics (STEM) career information for all age groups, the site's initial core resources are for middle school-aged youth. In this first phase of its development, diverse young people from this target age bracket assisted with the digital library's design. This paper outlines some findings from a Career Survey conducted at the beginning of the project.

BACKGROUND

According to ITAA, the nation will require a STEM workforce of 18 million by 2006, and the demand will remain steady [ITAA, n.d.] Yet current research shows students have an overall lack of knowledge and interest in STEM careers, and that this disinterest is accentuated among certain groups. While girls, students of color, and students with disabilities may enjoy science and computers, few are choosing to pursue training for STEM careers [NCES, 1999; AAUW, 2000].

Middle school students (grades 6-9 or ages 11-15) were chosen as the target for the first phase of Funworks because of the dearth of existing career resources for this age group and because middle school is a developmental stage during which students formulate specific ideas about careers and adult worklife [Cole & Cole, 1996]. Career development education is crucial at this age because sex-role stereotypes about gender-appropriate occupations are formed early; students at risk, girls, and youth of color often limit their career choices early; and few middle-schoolers have realistic career plans or an awareness of the world of work [Kerka, 2000].

Sex-role stereotypes, especially with respect to STEM careers and the trades, emerge frequently in literature. In addition to making gendered career selections, Phipps found that young people—boys and girls—express interest in a limited number of highly visible careers (e.g. doctor, lawyer, nurse, athlete, beautician) [Kerka, 1994; Phipps, 1995]. A third issue informing adolescents' career aspirations is self-efficacy; students' career goals are based on they believe they are capable of doing [McDonald & Jessell, 1992; Sellers, Satcher, & Comas, 1999]. Lastly, studies suggest that popular career interest inventories may not be as effective for females or people of color as the instruments are for men or white jobseekers overall. Also, these instruments may be inappropriate for younger (i.e. middle school) audiences [Farmer, 1992; Leong, 1995].

In order for The Funworks to be successful at recruiting more girls and youth of color to STEM careers, the design of the site and its contents must be attractive to a diverse target audience. The goal of the Career Survey was to probe the career aspirations, attitudes, and values of middle school students. The survey questions were based on the points which emerged from a literature review and were designed to answer two questions:

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- 1) How do the career goals, attitudes, and values of contemporary middle school students compare with those reported in previous studies?
- 2) What do students' goals, attitudes, and values tell us about the structure and content of a STEM career digital library for this age group?

METHODOLOGY

The survey was administered on-line using SurveyMonkey.com and on paper between March and June of 2004. Paper survey responses were then entered into the on-line template by GDTI staff. See the appendix for a copy of the full Career Survey.

At the conclusion of the survey period, the data was exported into a Microsoft Excel file. Participants' spelling was edited so that the data could be sorted accurately. Survey responses to job preference and job values questions were then sorted and analyzed by participant gender, race/ethnicity, home language, and the intersections of gender with the latter categories.

PARTICIPATION

243 students took the Career Survey—128 girls, 113 boys, and two who chose not to reveal their gender. The students ranged in age from 9 to 15 years old, and were in grades was grade 5 through 9 (see Figure1). All of the participants lived in Massachusetts cities (Boston, Lowell, and New Bedford) at the time of the survey.

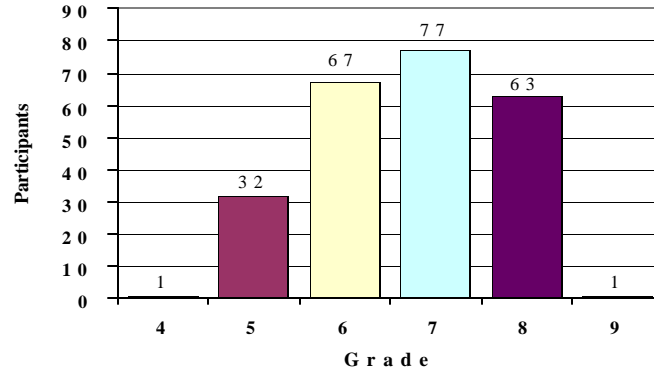
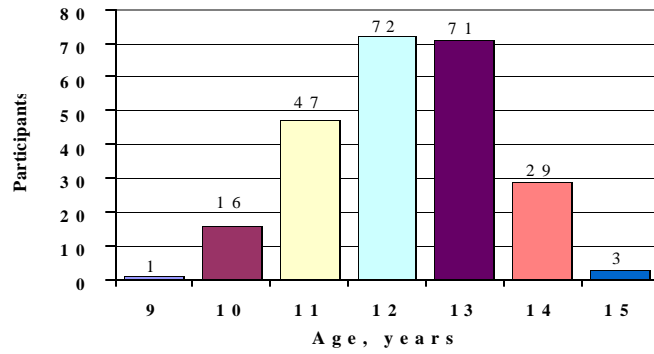
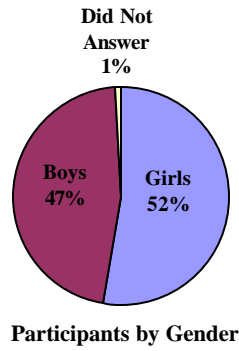


Figure 1: Gender, Age, and Grade-level of Survey Participants

Ninety three students (38%) were White, 31 students (13%) were Hispanic or Latino, 28 students (12%) were African American, 26 students (11%) were Multiracial, 24 students (10%) were Cape Verdean, 18 students (7%) were Portuguese, five students (2%) were Asian, two students (1%) were Native American, two students (1%) were Jamaican, and one student chose “Other.” Thirteen students (5%) did not specify their race.

For the majority of students (62%), English was their only home language. However, 17% spoke Spanish at home, 10% spoke Portuguese, 8% spoke Cape Verdean Creole, and 5% spoke another language, including French, Korean, Bengali, and Greek. Four students (2%) used American Sign Language (ASL) at home. Percents add to greater than 100 because some participants indicated that they spoke more than one language other than English at home. See Figure 2.

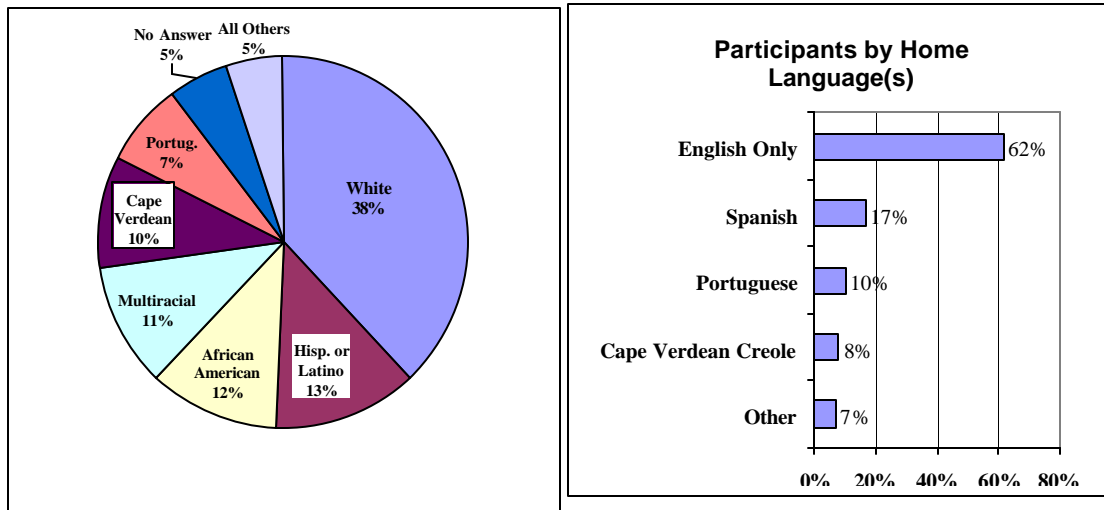


Figure 2: Race and Home Language of Participants

RESULTS

Job Preferences

The survey asked students what future jobs they might want. The five most popular jobs were

- 1) Lawyer (cited by 17% of girls and 9% of boys),
- 2) Teacher (17% of girls and 4% of boys), tied with
- 2) Doctor (15% of girls and 7% of boys),
- 4) Professional Basketball Player (2% of girls and 18% of boys), and
- 5) Hair Stylist (13% of girls, 0 boys).

As this list indicates, the middle school students who took the FunWorks Career Survey did indeed frequently choose highly visible professions as career goals. However, even the most popular occupations (lawyer for girls, basketball player for boys) didn't account for more than 20% of the girls' or boys' choices, respectively. On average, for every 10 survey takers, there were 8 different occupations listed as career goals.

There was some gender difference in the variety of career goals listed. Overall, boys named a wider variety of specific occupations than did the girls. This is one reason why the percentages of boys interested in becoming a Lawyer, Teacher, or Doctor are lower than the percentages of girls, despite these being popular choices for both genders. Boys cited nine different job titles for every 10 boys taking the survey. Girls, in comparison, listed seven distinct job titles for every 10 girls taking the survey.

Sports and Entertainment (Jobs by Category)

Boys may have listed a greater variety of individual job titles, but they were united in their interest in sports. Fully 46% of the 113 boys said they wanted to play a sport professionally (everything from basketball, football, and baseball to skateboarding, cycling, and dueling) or have a related occupation, such as coaching or being a scout. Five girls (4%) expressed a desire to play professional sports (two votes for basketball, and one vote each for boxing, soccer, and wrestling.)

While boys gravitated towards sports, 42 girls (33%) said their career goals lay in the entertainment field. The most popular entertainment occupations were Actor (11% of girls; 3% of boys), Singer/Rapper (9% of girls; 6% of boys), Dancer (5% of girls; 0 boys), and Model (5% of girls; 0 boys). (See Figure 3).

Science, Technology, Engineering, and Mathematics (Jobs by Category)

With the exception of Doctor, no single STEM career emerged as an overwhelming favorite. However, as a category, non-medical Science and Engineering careers were listed third, right behind Professional Sports and Entertainment. (See Figure 3). Fifty three students (22%) cited a science, engineering, or computer field as a career goal. If one includes Doctor (cited by 11% of survey takers), Nurse (cited by 6% of survey takers), and Veterinarian (cited by 6% of survey takers), then the percentage of students interested in a STEM career leaps above 40%, and takes the position of most popular category. Students listed a wide variety of STEM occupations, including Geologist, Zoologist, Nanotechnologist, and Physicist. Marine Biologist, Veterinarian, and Forensic Scientist were each mentioned several times by girls; several boys mentioned video game design. No one mentioned Mathematician as a career goal.

Undecided

Overall, 16% of girls and 14% of boys answered “I don’t know” to one or both questions about career aspirations. This response was significant among all demographic subgroups; regardless of race, gender, or home language, almost 10% of every subgroup answered “I don’t know” or left the question blank.

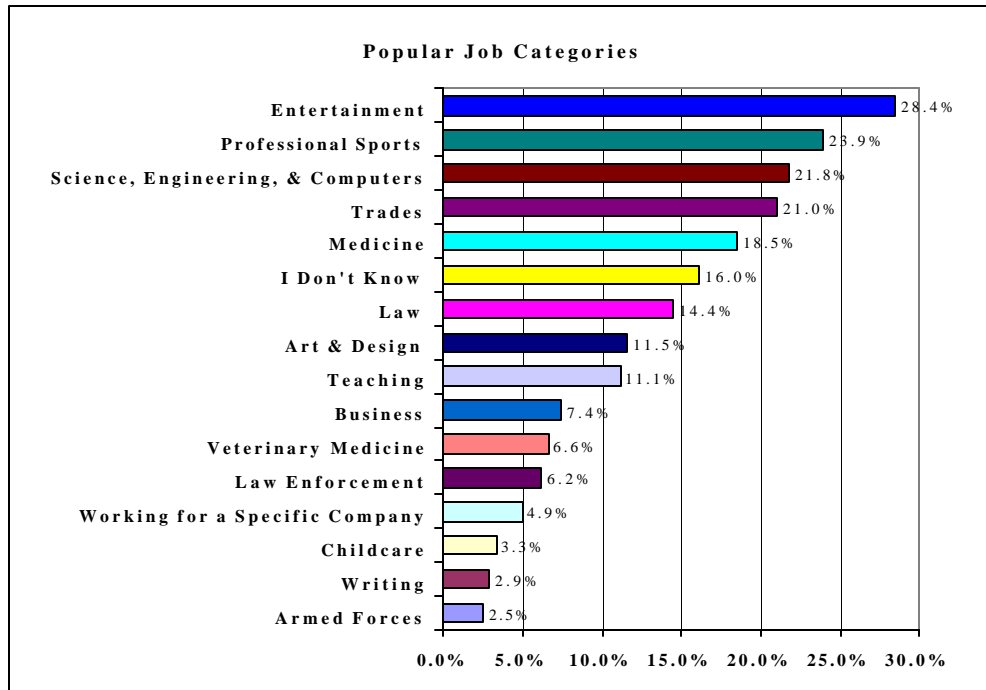


Figure 3: Popular Job Categories (Percents indicate the percentage of survey participants who cited a career goal falling within each category)

Career Values

In addition to asking students what jobs interested them, the survey asked them to indicate what they value about careers. Each italicized phrase or sentence is a question prompt from the Career Survey. The results for each question follow the prompts.

For my job, I would rather...

The Career Survey asked a series of either/or questions. Participants were presented with the following options: Move someplace new or Live near my hometown; Work outdoors or Work indoors; Travel for work or Not have to travel for work; Work by myself or Work with Groups of People; and Live in the city or Live in the country.



Figure 4: For my job, I would rather...

Move/Remain in Hometown Students generally preferred to move for their jobs (60% overall) rather than stay in their hometown (37%). This preference for moving was driven by the girls. African American girls and Cape Verdean girls indicated no preference (50/50 split), but Latina, Portuguese, and White girls all preferred to move. In fact, Portuguese girls exhibited the strongest preference, with 75% saying they would prefer to leave their hometowns. Portuguese-speaking boys, on the other hand, preferred to stay in their hometown (63%) but the sample was very small (8 respondents). All other subgroups of boys indicated no clear preference.

Indoors/Outdoors Overall student preferred working indoors (58%) to outdoors (28%). This trend was strongest among Cape Verdean boys (91%) and Latina girls (83%) saying they preferred to work indoors. Of all of the subgroups, only Portuguese boys indicated a preference for working outdoors (60%).

Travel/No Travel Overall students slightly preferred to travel for their jobs - 59% of all respondents indicated desire for travel. This preference persisted across gender, race/ethnicity, and language categories. Of all the survey participants, Latino boys and Cape Verdean boys had the greatest desire to travel, at 71% and 82%, respectively. The Portuguese-speaking respondents exhibited a discrepancy with respect to gender. Within this group, 67% of Portuguese-speaking girls preferred to travel for their work while only 13% of Portuguese-speaking boys wanted to travel.

Working in Groups/Alone Among our survey participants, there was a strong preference for working in groups rather than working “by myself.” 70% of respondents overall reported a preference for working in groups. This trend was particularly strong for some

groups: 89% for Spanish-speaking boys, 83% for African American girls and boys, 80% for Portuguese boys, 80% of Cape Verdean girls and boys, 76% for English speaking boys. In contrast, only 50% of Latina girls and 60% of White girls said they preferred to work in groups.

City/Country There was a strong preference for working in cities rather than in the country. 74% of respondents overall reported a preference for working in a city. This trend was particularly strong for girls who spoke home languages other than English: 88% of Cape Verdean Creole-speaking girls, 87% of Portuguese-speaking girls, 87% of Spanish-speaking girls (versus 72% of girls who speak only English at home.) It should be noted that virtually all of the survey participants lived in urban areas at the time of the survey.

I want people to think that I am very _____ in order to do my job.

Participants were given a list of 20 adjectives that could be used to complete the prompt, and asked to choose three. If participants had chosen adjectives randomly, each choice would have received 16% of the vote.

Across home languages and gender, students identified being Hardworking as the number one attribute that they wanted others to recognize as essential for their job. Between 44% and 67% of students listed Hardworking as number one with the exception of Cape Verdean Creole-speaking girls who listed Caring as the most important quality. (Hardworking tied several other attributes for third place within this group.)

Smart was also a top choice. 40% of participants overall chose Smart as one of their top three choices. After Hardworking and Smart, girls tended to choose adjectives like Organized and Caring across all racial and language subgroups, while boys chose Athletic. Helpful and Creative were popular with both boys and girls. Helpfulness was a recurring theme for survey participants, and showed up in responses to this question and to a later question about interest in various career categories.

Latino boys were an exception to the overall trend. While 43% of the boys chose “Hardworking”(just like 44% of Latina girls surveyed), Smart and/or Helpful were not priorities; each adjective was a top three pick by only 14% of the boys. At 39%, Latina girls were over two and a half times more likely than their male counterparts to want people to see them as “Helpful” or “Smart” in order to do their jobs. Latino boys opted for “Athletic” (29%) and “Strong” (29%) instead.

Across all demographic subgroups, participants did NOT choose Curious, Logical, or Good at Writing. Each of these three choices was a priority for 5% or fewer of the survey takers. In addition, most girls did not express interest in being considered Artistic (5%), Popular (5%), or Good at Fixing Things (3%), and only 4% of boys wished to be considered Musical. Interestingly, in a later question, 29% of boys reported that they would like to learn more about jobs related to Music.

To me, the most important things about a job are...

For this question, participants chose three job characteristics from a list of eight possible choices. Therefore, if participants had chosen randomly, each characteristic would have received 43% of the vote. Overall, students rated the choices in the following order:

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1. Liking the work I do (72%)
2. The money I make (61%)
3. Helping other people (40%)
4. Making my family proud (39%)
5. Liking the people I work with (35%)
6. Being my own boss (12%)
7. Where I work (office, outside) (11%)
8. Choosing my own work hours (7%)

Among our survey participants, the boys tended to put Money in the top spot more often than did girls, but this varied across the subgroups. Money was the top consideration (or tied for the top spot) for Cape Verdean girls (86%), Portuguese boys (80%), African American boys (77%, tied with “Liking the Work”), Portuguese girls (75%), Latino boys (71%), White boys (69%), and Cape Verdean boys (64%, tied with “Making my Family Proud”). Money was not a top priority for either African American girls (50%), Latina girls (44%), or White girls (42%). These three groups of girls placed far more value on “Liking the Work” giving this choice 81%, 78%, and 85% of their vote respectively.

The importance of “Helping People” broke along gender lines. African American girls, White girls, and Cape Verdean Creole-speaking girls chose Helping in their top three at least 50% of the time, but their male counterparts did not.

“Being My Own Boss” was not a high priority for most of the students taking the Career Survey. Overall, only 12% of participants chose it for their top three. Within this small group, boys were two times more likely to rate it as important. Being the boss was most popular among Latino boys; 21% voted this option as one of the most important.

Choosing My Work Hours was deemed least important by survey participants. Overall, only 7% said this choice was important.

I want to learn about jobs related to...

This survey question gave participants a list of 32 different job categories, and asked them to choose up to five. Random selection by participants would have given each category 17% of the vote.

The five most popular career categories (and the percentage of students who chose the category as one of their top five) were

1. Helping People (34%)
2. Music (29%)
3. Sports (27%)
4. Computers (26%)
5. Crime-Solving (23%)

However, this general list masks many differences in career interest among the demographic sub-groups of survey participants. There was a fair degree of variety in terms of students’ responses to what they were interested in learning about. The consistent favorite, across language and gender groups was Helping People but this only received 34% of the vote overall. There was more consensus when looking specifically at gender groups. Children showed up as a top five category of interest for girls in every language and race/ethnicity group (with the exception of African American and Cape Verdean girls who ranked it #6), drawing 36% of the girls’ vote overall. Portuguese girls

and Spanish-speaking girls were the most interested in careers relating to children, giving this category almost 50% of their votes. In contrast, children didn't appear as one of the top 5 topics of interest for any of the boys across language or race/ethnicity groups. In fact, Children received 0 votes from Cape Verdean Creole-speaking boys, Spanish-speaking boys, and Portuguese-speaking boys, and boys who identified themselves as Latino, regardless of home language.

Other popular areas of interest for girls were Helping People (42% of girls), Dance (32%), Music (30%), and Crime-Solving (25%). Law was popular with Latina girls (33%), and Medicine was popular with African American girls (31%) and Cape Verdean girls (31%). Out of all the female survey participants, only White girls ranked Computers among their top 5 choices, at 23%.

Computers appeared in the top 5 list for boys across subgroups with the exception of Cape Verdean boys. Computers got 40% of boys' votes overall, and 34% from English-speaking boys, 39% from Spanish-speaking boys and significantly, 88% from Portuguese-speaking boys. Sports was also a popular area of interest with 49% of boys overall expressing interest; fully 75% of Cape Verdean Creole-speaking boys indicated an interest in learning more about Sports-related careers.

There was more consistency in terms of what areas students were not very interested in learning about. At the bottom of the list for girls and boys across language groups was: Making Cars Safer (3%), Plants (1%), Earthquakes (1%), and Preventing Pollution (2%). Other unpopular categories were Transportation, Predicting Weather and Inventing.

DISCUSSION: Implications for Career Education and Technology Design for Youth

The FunWorks's Audience

In contrast to the career education literature, STEM careers and appearing smart do not seem to be automatic turnoffs for today's middle school students. Both girls and boys want their hard work and intelligence recognized. It is true that girls cited several traditionally female and traditionally low-status occupations, such as hair dresser and daycare worker, yet they still chose "Smart" as one of the top adjectives they'd like people to recognize in their future work.

Among this group of survey takers, the gender differences are not quite as stark as reported in other studies. Some girls had career goals in traditionally male fields as engineering and the building trades, and some boys had career goals in traditionally female fields as nursing and teaching. These instances were relatively low in number, but present. This leads us to believe that if career education resources present persuasive demonstrations of how careers match students' interests and values, then today's young people will consider these careers, despite perceived gender-appropriateness (or lack thereof). As shown by the ranking of job popularity by category, students are definitely willing to consider STEM careers (if the jobs in professional sports or singing don't work out, of course!)

Today's students want to find work that they enjoy. While roughly 10% of students expressed interest in topics like choosing work hours or being one's own boss, these categories do not seem to be primary hooks for increasing students' interest in STEM occupations. Furthermore, money vies with liking the work for the title of most important aspect of a job, particularly among boys of color.

It is too early to tell whether "liking the work" and "money" were popular choices because these are truly this young generation's top work values, or because, of the choices given, these are the two that middle school aged children are most familiar with. All students have some experience with money and with having to do schoolwork that is not to their liking. It is possible that "choosing own work hours" or "being my own boss" were selected by students who see family members struggle with work hours or supervisors, while other survey participants had less understanding of these issues. However, when asked what information they would like from current job holders, students indicated that they want to hear what makes a job interesting or fun on a day-to-day basis. Therefore, FunWorks must provide clear, persuasive information about the money one can make and the daily tasks one might do in various STEM careers.

Our survey results supported the claim that many career interest measurement tools that are used successfully with older students and adults are inappropriate for middle schoolers. Some of the specific wording of the survey was chosen to check career adjective preferences against career goal preferences. For example, the adjectives used in the Career Survey prompt "*I want people to think that I am very _____ in order to do my job*" were taken from tests that sort people based on Holland's Realistic, Investigative, Artistic, Social, Enterprising, Conventional (RIASEC) career model. The two adjectives least popular with our survey participants (Curious and Logical) map to Holland's Investigative and Realistic categories. However, careers that fit these categories (e.g. detective, scientist, doctor) were very popular. This is not to say that Holland's RIASEC model is inappropriate for this age group, but simply that the sorting tests commonly used for adults may not work for FunWorks' younger audience.

Organizing Career Information

Crime Solving, Sports, Music, Medicine, and Teaching, and Law are all categories that interest our target audience. However, in addition to career categories like these, The FunWorks must have an entry pathway for students who are completely undecided about their future career goals.

Students arrive at middle school with established (and often stereotypical) attitudes and expectations about the gender-appropriateness of careers. If a single digital library is to meet the needs of girls and boys at this age level, the collection must present STEM careers multiple ways in order to entice all visitors. One gender gap that was very pronounced among our survey participants is the discrepancy in interest in computer careers between boys and girls. Therefore, the site design must pay attention to how it presents computer-related jobs. For instance, placing computer career information in a distinct category called "Computers" or "Technology" might attract boys, but it could alienate girls, particularly girls of color. In order to make sure that girls get information on computer-related careers, the information must also be in other areas of the site. Since Helping People is a popular hook among girls, presenting the society-benefiting aspects of computer careers could be a possible solution.

Any program for middle school students should allow students to explore multiple careers and be deliberately structured to widen their concepts of future possibilities, to take them beyond lawyer, doctor, nurse, and teacher. Career education must help students see themselves in STEM careers; this is particularly important given our priority of reaching girls and students of color. Today's students are very willing to consider careers related in some way to science, technology, engineering, and mathematics. It is now the task of The FunWorks to provide them with career information that helps them see a possible future as smart, hard-working STEM professionals who enjoy their work, make money, and help people.

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Appendix

Career Survey

1. Two people I admire are _____ and _____
- I admire these people because

2. One person who has a job I might want is _____

- This person's job is _____
- I might want this job because

3. Another job that interests me is _____

- I am interested in this job because

- For this job, I would need to take high school classes in
Math / Science / Computers / None of these
- What special training or education after high school would you need for this job?

- **If you met someone with this job, what questions would you want to ask?**

4. Some jobs that my friends, family or neighbors have are

5. Some other jobs in my town are

6. I want a job that lets me *(For each pair, circle one choice)*

- Move someplace new / Live near my hometown
- Work outdoors / Work indoors
- Travel for work / Not have to travel for work
- Work by myself / Work with groups of people
- Live in the city / Live in the country

7. I want people to think that I am very _____ in order to do my job. *(Pick up to 3 words to go in the blank, or write in your own choices.)*

- | | | | |
|-----------------------|----------|--------------|-----------|
| Creative | Smart | Brave | Organized |
| Athletic | Artistic | Popular | Polite |
| Good at fixing things | Musical | Good-looking | Logical |
| Good at writing | Strong | Funny | Caring |
| Hard-working | Helpful | Friendly | Curious |

Other: _____

Other: _____

8. To me, the most important things about a job are *(Pick 2)*

- | | |
|-------------------------------|----------------------------|
| The money I'll make | Making my family proud |
| Liking the work I do | Choosing my own work hours |
| Liking the people I work with | Being my own boss |
| Helping other people | |

Other: _____

Other: _____

9. I want to learn about jobs related to *(Pick up to 5)*

- | | | | |
|--------------------|----------------------|-----------|----------|
| Environment | Movies | Sports | Animals |
| Crime-Solving | Building Things | Children | Dance |
| Predicting Weather | Preventing Pollution | Music | TV |
| Earthquakes | Stars and Planets | Health | Medicine |
| Computers | Designing Houses | Art | Oceans |
| Managing Money | Helping People | Inventing | Writing |
| Transportation | Making Cars Safer | Books | Law |
| Selling Things | Internet | Plants | Food |

Other: _____

Other: _____

10. I am in Grade 5 / 6 / 7 / 8 / 9 / Other: ____

11. Some things I like to do for fun are

12. My favorite Web site on the Internet is _____

▪ I like this site because

13. If you made a Web site to tell other kids about different jobs, what would you name your Web site?

The next questions are optional. If you don't want to answer them, you don't have to.

14. I am a GIRL / BOY (Circle One)

15. My race/ethnicity is

African American / Asian / Multi-racial / Hispanic / Latino / Native American / White / Other: _____

16. What language(s) do you speak at home?

Thank you for taking this survey!

Your answers will help design a Web site!