

## User-Centered Program Development of the *Koshland Youth Research Lab*



Summary findings from Koshland Science Museum workshops at the Hispanic Youth Summer Institutes  
Front-end Evaluation Report, September 2011

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Acknowledgements  
Thanks to Jeffrey DiScala of the University of Maryland (<http://www.mendeley.com/profiles/jeffrey-discala/>) for qualitative analysis support and rubric development. Also to Cheryl Kessler of Blue Scarf Consulting (<http://bluescarfconsulting.com/>) for instrument development support and draft reviews.

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If you use materials from this report, please cite it accordingly:

Koepfler, J. A. (2011). User-centered program development of the *Koshland Youth Research Lab*.  
[Technical Report]. UXR Consulting, Philadelphia, PA. Available at:  
<http://uxrconsulting.com/about/jes/publications>

## BACKGROUND

As part of its ongoing community outreach efforts, the Koshland Science Museum (KSM) has partnered with the Hispanic College Fund (HCF) to develop and test a pilot program, called the *Koshland Youth Research Lab*, for engaging pre-college teens in science and social issues. KSM contracted User Experience Research Consulting (UXR), a research and evaluation group based in Philadelphia, PA to provide front-end evaluation services assessing students' current knowledge, attitudes, and interests with regard to selected science topics and baseline knowledge and skills with regard to research methods and research design. UXR worked closely with KSM staff to develop research instruments and facilitate workshops in order to gather data in line with these evaluation and research goals.

KSM worked with HCF to connect with students at two Hispanic Youth Institutes (HYI). Prior to the Institutes, KSM and HCF met to generate a list of potential science topics that aligned with the Issues to Actions workshops. Issues to Actions workshops are a key component of the HYI events, intended to stimulate Hispanic youth to solve problems in their communities and address barriers to academic advancement.<sup>1</sup> In line with the Issues to Action topics, KSM sought topics that would also be supported by a body of work from the National Research Council and Institutes of Medicine. Four topics were selected for feedback from the students: adolescent sleep needs (referred to as sleep throughout this report), teen sexuality and risky behaviors (referred to as sexuality), water quality in your community (referred to as water quality), and adolescent health and nutrition (referred to as nutrition). The final decision on the topic was given to students (10<sup>th</sup> graders), *familia* leaders (RAs), and junior leaders (junior RAs) during the Institutes to ensure the program topic would be as relevant and engaging to the participants as possible. The first Institute was held in Towson, MD at Towson University in June 2011, and the second was held in Petersburg, VA at Virginia State University in July 2011.

This summary report is based on observations by the three workshop team members – Jes Koepfler (UXR), Amy Shaw (KSM), and Jeanne Troy (KSM); field notes from Amy Shaw; digital audio recordings of the workshops; and data collected from participants on sticky notes and worksheets from both sets of workshops. As a prerequisite to participating in the HYI program, parents and legal guardians signed waivers of consent for students to participate in these activities.

This report is in three sections. The “Summary” section below provides a description of the two workshops, highlights key findings, and lists a series of opportunities and recommendations for the development of the *Koshland Youth Research Lab* (pgs. 3-5). Following this section are the detailed and descriptive quantitative and qualitative findings for the Maryland workshop (pgs. 6-12) and the Virginia workshop (pgs. 12-19). The moderator guides that were used at each event and worksheets used in Virginia are provided in Appendices at the end of the report (pgs. 20-38).

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<sup>1</sup>See <http://www.hispanicfund.org/programs/hyi/about-the-program/action> for more details.

## SUMMARY

### *Workshop Descriptions*

The participants for both HYI events were incoming 10<sup>th</sup> grade students of Hispanic or minority origin along with their *familia* leaders (RAs) and junior leaders (junior RAs). The Maryland HYI workshop took place on June 22, 2011, the second day of the HYI symposium, at Towson University in four, 45-minute increments from 3:00 PM to 6:00 PM. All students had participated in an “Issues to Actions” workshop earlier that day and topics described in that workshop were used as a jumping point for discussion in the KSM workshops. The KSM workshop included a focus-group-like discussion format along with some individual sticky note-based activities. The primary research and evaluation objectives for the focus groups conducted in MD were to better understand workshop participants’ attitudes, awareness, and skills with regard to information and research. More specifically, KSM was interested in understanding how participants accessed and verified information to assess information literacy and critical thinking skills. Another goal of the workshop was to gauge student interest in the science topics that might be used in the museum’s fall program.

The Virginia HYI workshop took place on the second to last day of the HYI symposium at Virginia State University on July 22, 2011 in an auditorium setting from 4:30 PM to 5:15 PM. All of the students participated in the KSM workshop at one time. The KSM workshop included both individual- and group-guided worksheet activities. The goal of the workshop in Virginia was to further narrow the topic selection that might be used in the museum’s fall program and to better understand students’ knowledge and skills with regard to designing and conducting research. Table 1 below provides a summary of the demographics of each group of students.

*Table 1: Demographics*

Total participants (# of individuals who turned in interest sheets or proposals)	Maryland	Virginia
	K=4 groups N=132 participants roundtable discussion setting	K=1 group N=121 auditorium setting
Type		
Students	83% (n=109)	92% (n=106)
Junior RAs	5% (n=7)	4% (n=4)
RAs	11% (n=15)	5% (n=5)
Gender		
Females	58% (n=76)	55% (n=64)
Males	42% (n=56)	45% (n=52)
Indicated interest in fall program	82% (n=108)	52% (n=58)

NOTE: Percentages in the table may not always add up to 100% due to missing data.

The students at both workshops were well-behaved, mature, and genuinely enjoyable to work with, as well as active in discussion and written activities. Most of the students clearly respected their RAs as mentors and most of the RAs took their roles seriously during the workshops. In addition, students displayed an awareness of many concepts related to research methods and design and showed a range of ability to apply those concepts.

### *Key Findings MD*

The MD workshop participants, in general, showed that they were media savvy, listing a variety of resources for accessing information. Google, family members, newspapers, friends, television news, and school were the most-frequently mentioned responses (see “MD Findings Question 1” for more details). Participants had more difficulty articulating how they knew whether or not to trust information, but still showed a strong foundation of information literacy. Six themes emerged from the responses about how to trust information: 1) the perceived credibility of the source (a trustworthy friend or family member, professional, etc.); 2) the identified credibility of the source (citations, credentials, etc.); 3) checking multiple sites and sources for confirmation of information; 4) information that comes from a primary resource (first-hand accounts and/or eye witnesses); 5) evidence-based information (associated with data, experiments, and/or statistics); and 6) using your instincts (see “MD Findings Question 2” below for more details).

During the rest of the MD workshops, the moderator led a group discussion on how data were represented in the media and what different data types represented (e.g., statistics). Participants were able to articulate various research concepts such as sample size and representativeness (e.g., “We need to know, how did they get the people who participated in the study?” “If they only studied 6 people—we need more proof.”), the need for evaluation of evidence (e.g., “Need to evaluate the evidence—whether it’s been tested by other scientists.”, “Maybe they didn’t give you all of the information.”), and other concepts that suggested the students have a foundation in the language of research that can be leveraged in the future museum program.

The majority of MD participants (82%) indicated that they would like to learn more about a fall program with the museum. This number was very encouraging. Participants showed interest in three of the four topics presented – sleep, sexuality, and water quality (in order of interest) – and provided a number of different ideas for how they could research these different topics focusing more often on experiments that could be conducted rather than other methods of scientific inquiry (see “MD Findings from Topics Worksheets” below for more details).

### *Key Findings VA*

The VA workshop participants showed that they had a broad range of knowledge and skills related to research design and implementation from minimal to moderate skill levels. Observations during the workshop showed varied levels of student interest/engagement with the worksheet activity. Participants worked well both individually and in small groups of 2-4 people.

Participants seemed to have the most difficulty in comprehending the research process across each of the following areas, though there was a range of strong to weak examples:

- Choosing appropriate methods of research for a chosen research question
- Understanding the types of background information that would be helpful in answering a chosen research question (there was confusion about whether background information came from the literature or from original research)
- The number of participants needed and their recruitment (e.g., only including 4 participants in a quantitative survey study or 50 participants in a qualitative in-depth interview study)
- Including advocacy and action goals throughout the research process (e.g., discussing river and pollution cleanup as a goal of studying how rivers and pollution affect humans)

Slightly more than half of the VA participants (52%, n=64) indicated that they would like to learn more about a potential program with the museum. Though this number was considerably lower than the interest numbers from the MD workshops, the time of day, day of week, high student to facilitator ratio (approx. 40:1), and the worksheet activity may have all been factors contributing to lack of interest.

### *Opportunities & Recommendations*

- The role that the RAs and junior RAs play in the overall *familia* structure of the HYI is one of many advantages that the museum will have to tap into when developing the Koshland Youth Research Lab. Consider working with RAs and junior RAs as team leaders or advisors to younger students if there is enough interest from these individuals.
- The Koshland Youth Research Lab is poised to take students from a breadth of awareness about research into a deep research experience that will help the students translate knowledge into skill (critical thinking, decision-making, and problem solving).
- The museum is in a good position to connect research directly to students' everyday lives through the topics that they showed the most interest in – sleep and sexuality.
- Connecting students with a research-oriented program at the museum in the fall has the potential to increase student awareness of museums as sources for reliable information alongside Google, Wikipedia, libraries, and other sources mentioned in the workshops.
- As the Koshland Youth Research Lab is developed, the museum should continue to work with interested students in a user-centered design process to solicit ideas and feedback, and to determine the best format and structure for the program given students' busy school schedules.
- To the extent possible, the museum should create a program that supports a range of student skill levels. Some students will need more challenge and opportunities for creativity, while others will need more structure and tutorial components.
- The museum should draw clear connections between data from National Academy reports and other museum resources for the students in order to maximize the benefits of a museum program and differentiate it from standard classroom or after-school activities.
- The museum should also consider how the research or work that the students do in the Koshland Youth Research Lab will be shared with the public through the museum. Consider opportunities for the students to “give back” to forge an even stronger relationship with the museum as well as deeper connections to science and social issues.

## MD HYI WORKSHOP DETAILED FINDINGS



Figure 1. Koshland Workshop at the Hispanic Youth Institute at Towson University in Maryland

Below is a more detailed summary of the responses to the topic worksheets and to the open-ended questions that were asked during the MD HYI workshops. Permission to participate in the workshops with audio recording and photography was obtained from parents as part of the initial HYI registration process and is retained by the HCF.

NOTE: Please see the workshop moderator guide in Appendix A for details on the research methods used and questions asked during the 40-minute sessions.

### ***MD Findings Question 1: Where do you get your information?***

Explanation to participants: “We already mentioned some of these for your issues to action topic. But thinking more generally, write down where you typically go for information about personal or community issues. Who you talk to, what websites you might go to, what TV shows or magazines you might look at. The topics could be related to your health, to the environment, anything....Think for a few moments and write down answers to the question: ‘Where do you get your information?’”

Participants were given two minutes to respond to the question using sticky notes to record their responses (the fourth session wrote directly onto a large piece of paper in the middle of the table). Responses to this question were typically one or two words in length and ranged from people to media outlets, websites and other sources. A list with frequencies of occurrences includes: Google (79 occurrences), family members (67), newspapers (43), friends (34), news (34), and school (29) were the top responses. Similar response types were given across all four sessions. Though the library appears as an institution where students get their information (13), museums did not appear in the list of open-ended responses.



Total of 636 responses

- Session 1 - 126
- Session 2 - 156
- Session 3 - 163
- Session 4 - 191

Adults (general) 9

- Relative (aunt, uncle, cousin, dad, sister, brother – half of the responses were for “mom”) 67
- Teacher 31
- Counselor 17
- Mentors 9
- Elders 3
- Experts/professionals 3
- Doctor 2
- Therapist 2
- Community leaders 1
- Principal 1
- Rappers 1

Peers/friends 34

Neighbors 4

TV (general) 33

- News – ABC, NBC, CNN, C-Span 34
- Hispanic television (Telemundo, Univision, Primer Impacto) 13
- Fox 5 10
- History Channel, Discovery Channel 6
- Commercials/Ads 3
- Pregnant Teens 1

Internet (general) 24

- Google 79
- Wikipedia 10
- Yahoo 9
- Question search sites (ask.com, answers.com, askjeeves.com, etc.) 5
- Bing 4
- Maryland County Public Schools website 3
- Other (always.org, thegazette.com, Maryland.com, history.com) 4

Print Materials

- Books 17
- Magazines (Seventeen, Hyperbeat, Vogue) 11
- Encyclopedia 4

Radio 12

Media (general) 4

Institution

- School 29
- Library 13
- Community center 5
- Clinic/hospital 1
- Help center 1
- Kaiser Permanente 1
- Planned Parenthood 1

Newspaper (general) 43

- Sites and papers: Baltimore Sun, Washington Post, MSN, therealnews.com, Wall Street Journal 15

Social Media (general) 2

- Facebook 16
- Twitter 5
- YouTube 4

Political

- Elected official 2
- President 1
- City council meetings 1
- Government 1
- Polls 1

Academic

- Journals/scholarly articles 5
- Databases 5

Other/Miscellaneous

- Word of mouth 2
- Play Station 2
- Meetings 1
- Mobile phone 1
- Interest groups 1
- Brochures 1
- Bulletin board 1
- Bus station 1
- Emails 1
- Personal experience 1
- Hotlines 1



- Information sheets 1

**MD Findings Question 2: How do you know what information to trust?**

Explanation to participants: “Think about all the different types of information you hear from your friends, family, TV, or the Internet. How do you know if that information is true? What factors do you consider when evaluating different types of information?”

Participants were given 2 minutes to respond to the question using sticky notes to record their responses (the fourth session wrote directly onto a large piece of paper in the middle of the table). On average, participants provided fewer responses to this question than the first question, and generated phrases and sentences to explain their answers. A total of six themes emerged from the data: 1) perceived credibility of the source, 2) identified credibility of the source, 3) checking multiple sources, 4) information from a primary resource or being an eye witness, 5) evidence-based information, and 6) using your instincts.

Total of 376 responses

- Session 1 – 65
- Session 2 – 92
- Session 3 – 121
- Session 4 – 98

Due to the variety of responses, the themes that emerged with representative examples are listed below rather than a frequency analysis.

**Theme 1: Perceived Credibility of Source**

- “information from encyclopedia”
- “information told by teachers”
- “People who have experience”
- “teachers”
- “school”
- “Google”
- “where it comes from”
- “I would hope actual news outlets are reliable. If they aren’t they get ‘unfollowed’ in a heartbeat.”
- “if the website has .org, .net, or .edu”
- “books”
- “family wouldn’t lie to me”
- “written by professionals”
- “my mom always tells the truth”
- “websites from government (trusted)”

**Theme 2: Identified Credibility of Source**

- “If it has a citation I might trust it!”
- “Information that has copyright”
- “when was it written”
- “dates and info, copyrights”
- “it gives you dates and other sources to check out”

“see their background and knowledge”  
“has sources listed”

### Theme 3: Checking Multiple Sources

“Look for credentials and compare and contrast other sources”  
“researching to confirm validity”  
“I always look up for others’ opinions, and then I make my own decision”  
“ask other peers”  
“ask someone else reliable about it”  
“many different sources say the same thing”  
“check in more than one website”  
“compare to other information”

### Theme 4: Getting Information from a Primary Resource (or being the primary source)

“Look for the actual person”  
“People’s diaries and journals”  
“victim’s stories”  
“the ones that have quotes, reliable sources”

### Theme 5: Evidence-based Information

“proven is best”  
“if there are facts that support the information”  
“have real facts with support”  
“if they’re from databases”  
“first-hand experience”  
“statistics”  
“scholarly research”  
“quantitative data”

### Theme 6: Using your Instincts

“if it sounds reasonable”  
“looks right”  
“common sense”  
“might look real”  
“gut feeling”  
“grammar”

### **MD Findings from Topics Worksheets**

Groups 1 & 3 chose between the topics of sleep and nutrition.

- Of the 59 students that provided a response, 81% (n=48) preferred the topic of sleep.
- There was no significant difference based on gender.
- Of the 45 students who also indicated interest in a follow-on activity, 78% (n=35) preferred the topic of sleep.

Groups 2 & 4 chose between the topics of water quality and sexuality.

- Of the 61 students that provided a response, 62% preferred the topic of sexuality.
- Males were more likely to select water quality than females ( $\chi^2(1)=4.13$ ,  $p<0.05$ ).

- Of the 54 students who indicated interest in a follow-on activity, 61% (n=33) preferred the topic of sexuality.

### *Sleep*

Why they like it:

- “I chose sleeping because it has more effects and more choices.”
- “I personally have trouble falling asleep at night, but I know I need it.”
- “I don’t think people take advantage of sleep as much as they should.”

What they would study about it:

- “I would have someone watch me while I slept and have them observe data.”
- “I would test my sleep times and see how I function at school the next day.” [i.e., test the variable either among one person, a control group, or two different people]
- “I am interested in learning whether there are natural things you can do to sleep, like melatonin.” [versus sleep aids and medication]
- “We could work to reduce homework so that we can have more time for sleep.”
- “We could observe someone who has slept for 10 hours versus someone who has not had enough sleep.”
- “Check the chemicals that are released during their sleep.”

### *Sexuality*

Why they like it:

- “It’s awesome.”
- “Want to study health effects.”
- “I chose it because there are examples in my school.”
- “I can’t use information about water quality, but I can use information about sexuality”
- “Study how many people have AIDS and how many people are having safe sex.”
- “Risk of STDs”
- “Rate of teen pregnancy”
- “DC has a high AIDS rate” [note: This comment came from an RA.]
- “You see it every day.”
- “People are having sex at younger ages more and more, and they’re uneducated about it.”

What they would study about it:

- “Look at the different ways gender are portrayed in the media”

### *Water Quality*

Why they like it:

- “I knew more about it, so it was easier to choose.”
- “My school has lead in their water” [i.e., this was a local and personal issue for the respondent]

What they would study about it:

- “You could study with toxicologists.”
- “Local lakes”
- “You could study the effects on animals and us.”

- “How to keep it safe from being polluted”
- “How to identify what has been polluted and what to do about it”
- “We could go on field trips to study my local environment”
- “Test the water.”
- “With water quality, you can do experiments to keep the water clean.”

### *Nutrition*

Why they like it:

- “If you don’t eat healthy throughout the day, you will have low energy. You also need to watch what you eat so that you stay healthy longer.”

What they would study about it:

- “I would want to know what to eat and what is nutritious.”
- “How do calories affect your body?”
- “Are there different times of day when we eat that affect our energy levels?”
- “See if milk and cookies makes you sleep”
- “Have a healthy person and one who is not, and have two people with similar attributes, like fitness or athleticism, eat different foods and see if they perform better” [i.e., a controlled study]

## **VA HYI WORKSHOP DETAILED FINDINGS**



*Figure 2. Koshland Workshop at the Hispanic Youth Institute at Virginia State University in Virginia*

Below is a more detailed summary of the responses to the worksheet packets that students completed during the VA HYI workshops. Permission to participate in the workshops with audio recording and photography was obtained from parents as part of the initial HYI registration process and is retained by the HCF.

NOTE: Please see the workshop moderator guide for details on the research methods used and worksheets that were completed during the 45-minute session.

### ***VA Findings from Topic Worksheets***

After the workshop moderators read the topic descriptions for water quality, sexuality, and sleep aloud, students were then asked to read the descriptions to themselves and rank the topics in order of preference for a topic they might study in a fall program. Sleep was selected as a first choice by over half of the students followed by sexuality as the second choice.

Topic (n=110, missing data=11)

- First choice: Sleep=59% (n=65), Sexuality=41% (n=45), Water quality=<1% (n=1)
- Second choice: Sexuality=36% (n=39), Sleep=32% (n=35), Water quality=32% (n=35)
- Third choice: Water quality=67% (n=73), Sexuality=24% (n=26), Sleep=9% (n=10)

### ***VA Findings from Research Proposals***

A total of 38 research proposals representing 110 students, junior RAs, and RAs were turned in at the end of the workshop. An additional, eleven packets from individuals were turned in with interest data (selection of topic and/or interest in the fall program) filled out, but these students' names did not appear on one of the proposals resulting in a 91% participation rate for the activity.

Students were given little instruction on what was expected of them with regard to the research proposal. In this way, these research proposals help to establish a baseline assessment of student knowledge and skills with regard to research design, terminology, and implementation. Students were able to choose among the three science topics in their groups on which to develop a research proposal. Following a similar distribution pattern to the ranking of the topics, sleep was the most often selected topic on which to write a research proposal.

Proposal topics (n=37, missing data=1):

- Sleep=65%, n=24
- Sexuality=30%, n=11
- Water quality=5%, n=2

Once the group had chosen their topic, they were then asked to read a brief article related to that topic pulled from the Washington Post over the last few years. The purpose of the newspaper article was to provide context around each topic so that students could connect the topic to issues in real life. This context would be helpful to the students as they designed the research study and thought creatively about different resources that might be useful in a particular study.

### ***Completeness***

Due to the short workshop session, students were allotted just 15 minutes to work in their small groups and were given 5 minutes to ask for help from the RAs and workshop moderators (though based on the worksheets, there is no indication that students asked for, or received help from, RAs during the 5-minute period). Given the difficulty of the task and the compressed time period, the completion rates for the research proposals are low to moderate. Less than half of the groups were able to complete all 7 of the questions outlined in the research proposal. Nearly every group was able to complete at least half

of the proposal questions. These rates reflect both student motivations for completing the worksheets as well as their overall ability to comprehend the research proposal tasks quickly and efficiently.

Average number of sections completed: mean=5.65, median=6, mode=7, SD=1.40

- 41%, k=15 groups completed all 7 proposal questions
- 16%, k=6 groups completed 6 out of 7 questions
- 22%, k=8 groups completed 5 out of 7 questions
- 11%, k=4 groups completed 4 out of 7 questions
- 11%, k=4 groups completed 3 out of 7 questions

### *Appropriateness, Realistic Application, and Creativity*

As an incentive to complete the research proposals and give it their best effort, students were told that members of the teams who produced the top three proposals would each receive a \$10 Amazon.com gift certificate. The scoring criteria for the contest was described out loud and in the worksheet packets in this way:

*Scoring Criteria for Contest: appropriateness of research design to the research question (3 points), the study is realistic and doable (3 points), the study is creative (e.g., unique methods or combination of methods, unique resources, or data gathering techniques (4 points).*

A rubric was created based on these criteria. A score of zero indicated that the participant did not complete a section of the proposal. A full score of three on “appropriateness” or “realistic application” and a four on “creativity” indicated that the proposal fully met the criteria and was well explained by the group. Participants could receive up to ten points.

Only one proposal received an “appropriateness” score of three (3%, k=1), and fifteen (39%, k=15) received a score of two (the remainder received ones and zeroes), pointing to the need for additional discussion and tutorials regarding scientific inquiry and methods of “knowing”. Similarly, one proposal received a “realistic application” score of three (3%, k=1), and fifteen (39%, k=15) received a score of two (the remainder received ones and zeroes), suggesting that less than half of the student groups were able to put together research proposals that were “doable”. Finally, two proposals received a “creativity” score of four (5%, k=2), two proposals received a three (5%, k=2), and twelve (32%, k=12) received a score of two. The average aggregate score (appropriateness + realistic application + creativity) for all proposals was 4.3 out of 10 (median=4, SD=1.64, min=1, max=8). Student groups as well as RA groups received scores across the scale. These low scores are not surprising since this is likely one of the first research proposals students have generated outside of science fair projects at this point in their education and they were asked to complete it in a very short period of time. From a program development standpoint, student proposals can be used as inspiration, but museum staff will have to help students carefully scope their projects, apply rigorous and appropriate research methods, and conceptualize each stage of the research design process carefully in an in-depth, interactive experience.

The most influential category in the ranking of proposals to determine the winners of the contest was “creativity”. While some participants had proposals that were both appropriate and could be realistically applied, the proposals that stood out from others were those that either addressed the chosen topic with a creative research question or that addressed a research question with a creative research method. Three student proposals and one RA team proposal with top scores of sevens or eights on the

ten-point scale were selected as winners of the competition and sent Amazon.com gift cards in recognition for their hard work. Examples of strong proposal elements are highlighted in the paragraphs that follow in the discussion of task comprehension.

### *Comprehension*

Participants were also given a score (0-3) for overall comprehension of the research process vis-à-vis a written research proposal. The components of the research proposal (i.e., research question, methods, gathering data, hypothesis, and materials) were not evaluated individually. There was not enough differentiation between most proposals at the comprehension level to provide an objective quantitative score for each individual section of the proposal. For this reason, the comprehension score was based on a reading of the proposal as a whole. A score of zero indicated little to no comprehension of the research process and proposal writing task. A score of three indicated full comprehension of the research process and was represented by a proposal that could be readily applied in the real world.

Seven proposals (18%, k=7) received a comprehension score of three and fourteen (37%, k=14) received a score of two suggesting that more than half of the students generally understood the concepts described in the proposal packets, but varied in their ability to apply those concepts in practice. Of the remaining proposals, fifteen (39%, k=15) received a score of one and two (5%, k=2) received a score of zero. These proposals typically left many sections of the proposal blank and were therefore unable to be evaluated fully. The proposals from RA groups were evenly distributed across the scoring rubric amongst the student groups with one RA group receiving a three, two RA groups a two, and two RA groups a score of one.

The paragraphs that follow provide a qualitative description and assessment of the proposals by component (i.e., research question, methods, gathering data, hypothesis, and materials).

### *Research question*

Students were asked to select a research question for which they would then design a research study. Students could choose from the research questions and ideas presented in the topic selection worksheet; they could adapt a research question from the newspaper articles they read on their topic; or they could develop a new question altogether.

Completeness: 87% (k=33 groups) completed this task

Strong example(s): Only a few of the proposals incorporated new research questions generated by the students themselves. Some examples of these include: “How does school starting later in the morning affect grades, mood, and energy level of high school students?”, “How do sleeping habits affect teenagers in their environments and what factors play a role?”, “Does race have a factor in the age an individual engages in high risk behaviors?”, “How could we approach minorities about sexual intercourse and consequences?” These questions indicated an understanding of cause and effect (i.e. independent and dependent variables) and both qualitative and quantitative research approaches.

Average example(s): Several students were able to extract and rephrase questions from the scientific articles that they read. Examples of questions pulled from the scientific articles are: “How does sleep deprivation affect teens?” and “Why do teens need more sleep than adults?”



Weak example(s): Many students selected questions from the topic worksheets provided in their packets which was one of the ways that students were told they could develop their research questions. An example from the sleep topic description chosen by many student groups was, “How should schools and other organizations change to meet the sleep needs of teens?”

#### *Methods*

- Q1. *What research methods will you use? (e.g., interview, experiment, survey, observation, etc.)*
- Q2. *Justify your methods: Why are these the best methods for answering the research question you selected?*

Based on the research question they selected, students were asked to describe the research methods that they would use to collect data in order to answer that research question. They were also asked to justify their choice of methods.

Completeness: All student groups completed both methods questions of the proposal.

Strong example(s): Approximately half of the proposals showed a strong grasp on research methods and justification for those methods. Methods that showed a clear connection to the research question were the strongest examples. In some cases, students described methods not provided on the worksheet, e.g., “sleep analysis and video diaries of day” were selected by one group to address the question of “How does the amount of REM sleep affect your day?” Other students selected methods listed in the worksheet (i.e. interviews, observations, surveys), but were specific and accurate for how they might apply the method(s). For example, one group provided sample survey questions to explain their thinking, e.g., “We’ll do a survey asking the minorities specific questions about their sexual activities, ex: If they have thoughts of having sex? Yes or no; What influences you the most? A) friends b) parents c) boys.” Some groups even included mixed-methods approaches such as: “A survey is anonymous so people are more willing to tell the truth and people could volunteer to interviews for more detailed views on the subject”; “We will interview the students and ask how they feel with the added sleep and also observe how tired they look. We will observe the differences between those with extra sleep and those without”; and “We will interview and survey different students about their sleep schedule and how it affects them. We could also experiment with people by adjusting sleep schedules and test how their performance in school is affected.”

Average example(s): Average responses provided less specific descriptions, like “we will use a survey and observation for the research methods. Surveys and observations are the best methods to use because we will be able to actually see how sleep deprivation affects a person”; and “survey, observation; can see what people think about the topic and also see their own opinion.” Some were detailed, but inaccurate or vague. This example shows how the group confused the meaning of primary and secondary source data: “observing the media-first person interviews, interviews-secondary; interviews will be effective because there will be clear communication with the adolescents about the issue.” This example highlights vague responses and points to a lack of understanding for choosing and justifying research methods: “We would initiate a survey involving teens. This is the best method because it answers the question accurately.”

Weak example(s): Weaker examples of methods sections provided minimal or no description and justification of the chosen methods. For example: “surveys, interviewing doctors on what they think &

students. Interviewing – its direct, feel appreciated (teens).” Other groups showed a lack of understanding of what it means to justify a research method selection: “Home room teachers will pass out a survey asking teens what time they go to bed on a daily basis and if they take afternoon naps. If teachers know how late teens slept in or how many naps they took, they can suggest things like doing something productive after school or sleeping earlier.”

#### *Gathering Data*

- Q3. *What sources would you use to gather background information on your topic? (be specific)*
- Q4. *When you conduct your study, who or what will be your data? (human and non-human data sources)*

After selecting their research methods, student groups were asked to describe where they would look for background information on the topic. This is the phase of research typically referred to as the literature review. The purpose of this section was to see if students could connect their information literacy skills with concepts found in research. They were then asked to describe any human or non-human subjects that they might include in their data gathering process and to describe how many data points they would need, where and how they would recruit participants for their study, and what type of data they intended to collect from those sources. This section was designed to help the team determine to what extent students connected concepts of sample size and primary and secondary source data to research, if at all.

Completeness: 95% (k=36) of the proposals completed Q3 and 84% (k=32) completed Q4 of the Gathering Data section.

Strong example(s): Strong examples in the first part of this section connected information literacy skills to the task: “We will use books on sleep and [the] Internet using specific research – no .com , etc.” This notion of credible websites based on the domain extension of .edu, .org, and .gov instead of .com was a common response received from students in the MD workshops as well.

Strong examples in the second part of this section showed a connection between the research methods and appropriate sample sizes that were appropriate to the scope and relevant to the goals of the research project. For example, “Q1: ...Using the surveys, we would discover when the teens sleeping patterns is [sic]. Q4: a hundred [people]; [recruited from] high schools; [collecting] the times that they sleep and wake up.” A few strong responses showed a grasp of stratified sampling to support group comparisons: “Q3: We would give a survey to people from different ethnic backgrounds and how they were raised upon learning about sexual education. In addition, we would ask how they grew up. Q4: [we would recruit] 25 people per ethnic group (4 ethnic groups), Hispanics, blacks, Asians, white, we’ll go to different high schools around the county, they will take a survey and give us feedback.”

Average example(s): For the first part of the section, many students interpreted “background information” as information about the research participants rather than the research question or topic. This resulted in confusion between primary data collection and secondary source background research: “[gather information from] representatives from every high school in every county”, “One of the sources we would use as background information for our survey is students and school staff. Also, ourselves to experiment and observe concrete facts.”

For the second question of the Gathering Data section, students typically provided detailed responses but were less able to connect their sample approximations with the methods they had chosen, such as: “Q1: observation. Q4: will collect how the river pollution effects their lives.” In other examples, students showed an awareness of the terminology, but provided over- or under-estimated numbers. An example of an over-estimated sample is shown in this quote: “Q1: we will use experiments, observation, and survey; Q4: we need 2,000 people [to participate], we would send invitations to participate, we would collect numbers, observations, percentages, and samples.” A very small number of students decided that they would work with non-human data. A non-human subjects example is: “[collect] average grades, [measure it with a] calculator, [how many data points will you need] the more the merrier”

Weak example(s): Weak examples provided little or no justification for the sample size, chose a sample size that did not relate to the methods chosen, or simply did not complete the section, e.g., “Q1: interview and survey. Q4: 50 people and Q1: interview and survey, Q4: 12 [people needed for the study], [recruited from] college campuses”

### *Hypothesis*

- *Q5. A hypothesis is a best guess about what will happen in the research study. What the outcome might be. What do you think you'll find from your research study?*

After thinking through their methods and data gathering strategy, students were then asked to consider what a possible outcome of their study might be, called a hypothesis.

Completeness: 61% (k=23) groups completed this section of the proposal.

For the students who completed this section, many of the responses showed a clear understanding of hypothesis testing including concepts like cause and effect for more research-driven questions and impact for more evaluative or advocacy-related questions. Many students were able to connect back to their initial research question, showing that, in general, they both understood and could apply their knowledge of the hypothesis research. The responses did vary in quality across the groups and examples are presented in the paragraphs that follow.

Strong example(s): The majority of the hypotheses presented in the proposals were quite strong showing an understanding of cause and effect and connecting the hypothesis to the original research question. The following are examples of strong hypothesis statements written by student groups:

- “I believe that a teenager’s body will be affected by lack of sleep, and getting up too early for school.”
- “I think we will find that if teens get less than 8 hours of sleep, then they will be most likely to not pay attention in class and fail exams.”
- “If you don’t protect yourself, you are more likely to get infected by diseases such as STDs.”
- “If students have more sleep, then their education levels and grades would increase.”
- “If students get an extra day to sleep then they will be better rested and more alert during school.”

Average example(s): Weaker examples showed an understanding of cause and effect but confused the goals of basic research with practice: “If we study river pollution, then we will have a better picture of what we need to do.”

Weak example(s): There were no particularly weak hypotheses. For the most part, the hypotheses students created showed an understanding of the main concept. It is unclear whether the 15 groups that did not complete this section ran out of time or if they did not fully understand the task.

#### *Materials*

- *Q6. What materials, tools, or assistance will you need for your study? (people, tools, software)*

Finally, students were asked to think about the different materials they would need to conduct their research study. They were asked to think about people (e.g., mentors, scientific specialists), tools (e.g., chemistry testing kits, clip boards, video cameras), and software (e.g., web survey software, file-sharing software).

Completeness: 42% (k=16) of the groups were able to complete the final section on materials. The large number of blank responses to this questions suggests that time was an issue for many groups.

There were no particularly strong or weak examples to this section of the worksheets. Students who filled something out provided minimal information, such as:

- “People: teens, Tools: video camera, paper to collect data, Software: computer to keep data in the records”
- “People: friends, professionals, mentors, etc., Tools: a computer, paper, Software: Google, Yahoo”

Overall, the proposals showed the range of student knowledge, skills, and interest in the research process. Despite the short time frame and crowded conditions in the auditorium on the day of the workshop, many students performed well on this task, demonstrating a strong foundation in concepts that can be translated into practice during a fall program at the museum. After both workshops were completed, a follow-up web-based questionnaire was sent to students who indicated interest in the fall program. The survey focused on logistical questions such as access to technology and broadband Internet, preferred working styles, and the most convenient times of day and week to work on a project.

# Appendix A: Maryland Moderator Guide

## MD Focus Group Moderator Guide

For Marian Koshland Science Museum Outreach Pilot Project

In partnership with the Hispanic College Foundation

Prepared by Jes A. Koepfler, Principal and User Experience Research Specialist, UXR Consulting  
[www.uxrconsulting.com](http://www.uxrconsulting.com)

June 2011

### Research objectives

The primary research and evaluation objectives of the focus groups<sup>2</sup> are to help team members from User Experience Research Consulting (UXR) and the Marian Koshland Science Museum (KSM) to better understand HYI workshop participants' attitudes, awareness, and skills with regard to research methodology, specifically in how information is used to support critical thinking for informed decision making, and to gauge student interest in a series of topics that may be used in the museum-created follow-on activity. Once the focus groups have all been completed (K=4, 40-person groups plus K=1, 150-person group), UXR will conduct a thematic analysis of the qualitative data and descriptive analysis of any quantitative data and work with KSM and the Hispanic College Foundation (HCF) to determine next steps for the pilot project.

By participating in the focus groups and thinking about the different ways in which they gather and validate various types of data and information, focus group participants will have the opportunity to practice the critical thinking and decision-making skills they already have. Though it is not the intention of the focus group to measure directly the impact of the workshop on the participants, we hope that participants will have the opportunity to:

DM1: Effectively analyze and evaluate evidence, arguments, claims, and beliefs

DM5: Reflect critically on learning experiences and processes

DM2: Analyze and evaluate major alternative points of view

Permission to participate in the workshops with audio recording and photography was obtained from parents as part of the initial HYI registration process and is retained by the HCF.

### About this Moderator Guide

This guide is meant to support UXR and KSM team members in preparation for, and in delivery of, the focus groups. It is, however, only a guide and the team should feel comfortable making mid-way adjustments if necessary. The team should also remain flexible to the needs and interests of the focus-group participants.

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<sup>2</sup> We are using the term "focus group" here loosely to mean a moderated discussion in a semi-structured format.

The questions listed in this guide are intended to flow from general, unaided questions to specific, aided questions (using probes) in each section in order to prevent the introduction of researcher bias into the results.

Due to the short length of the focus group sessions and the large number of students who will participate in each one, the use of sticky notes will be employed to gather data from the group for the general, unaided questions. More specific, probing questions will be carried out as a conversation, with the goal of eliciting responses and questions from as many students as time allows. This strategy is outlined in more detail in the sections that follow.

## Brief respondent profile

The participants for the focus groups are incoming 10<sup>th</sup> grade students, who are of Hispanic or minority origin. There will also be familia leaders (RAs) and junior leaders (Junior RAs). They will have already participated in several days of the HYI summer program by the time we conduct the focus groups. In particular, participants will have participated in an “Issues to Actions” workshop prior to coming to the focus group, which will serve as a bridging mechanism for the focus group conversation.

## Where and when interviews take place

UXR will moderate K=4, 40-person focus groups and K=1, 150-person focus group at two different HYI summer program locations.

The first set of focus groups will take place in Towson, MD, on June 22, 2011, 3 p.m. – 6:30 p.m. (set up between 2:30-3:00 p.m.)

Location: Towson University, 8000 York Rd, Towson, MD 21252

Est'd 30 students plus 10 RAs and junior RAs per 40-minute focus group; K=4 focus groups will be conducted at this site

The second workshop will take place near Richmond, VA, on July 22, 2011, 4:30 p.m. – 5:15 p.m. (set up between 3:30-4:30 p.m.)

Location: Virginia State University, 1 Hayden Drive, Petersburg, VA 23806

Est'd 120 students plus RAs and junior RAs for the single focus group; K=1 focus group will be conducted at this site in an auditorium setting

## Materials

For each focus group, the following materials are needed:

- Super sticky notes (one pack per table)
- Large sheets of paper to place sticky notes on (one page per table)
- Writing utensils (one per seat)
- Audio recording device
- Camera for taking pictures
- Printed sheets of paper with topic ideas

## Roles

Three team members will work together to conduct the focus group and collect the data:

- Jes (UXR) – Workshop facilitator

- Jeanne (KSM) – Observer/writing big ideas on a white board or easel/signaling follow-up questions
- Amy (KSM) – Note-taker

## Introduction (3 +/- 1 minutes)

Amy:

[brief explanation of what KSM is and why we're here – Amy to ad lib]

Now, let me introduce you to Jes. She is from the University of Maryland and is also an independent consultant who is helping the museum work with students like you to create new and interesting programs and experiences with the museum. Jes is going to engage with you all in a conversation today about the role of research in our everyday lives. My colleague Jeanne and I are going to take notes while you guys have that conversation, so just ignore us and don't be shy!

And now I'll turn it over to you, Jes.

Jes:

[addressing Amy] Thanks for that introduction, Amy!

[addressing students] Like Amy mentioned, my job is to help the museum talk with students just like you, and to think about new and interesting ways to create museum program experiences. I'm going to ask you about all sorts of things today, about doing research and figuring out what information to trust. There are no right or wrong answers to any of the questions, and nothing you say will leave this room, so feel free to be open and honest. We're hoping that by having this conversation with you, we can get a better sense for how you feel about these different things and what might excite you about research. At the end, you'll have the opportunity to help us figure out which topics you think would be the most interesting to explore if you were to participate in one of these programs with the museum. We especially want to hear from the students in the room, but we want the RAs and junior RAs to participate in some of the activities that we'll be doing and we may call on you from time to time.

Are there any questions before we begin? Great. Let's get started.

## Questions and activities (30 +/- 1 minutes)

*Discussion of Issues (5 minutes)*

OK. Raise your hand if you participated in an Issues to Action workshop today? [everyone should raise their hand]

Can someone briefly tell me what issue you discussed? Did you prepare a plan to solve this issue? What were they? What other issues were discussed?

Very interesting. Before today, had any of you thought about that issue before? [see if students nod – point to a student]

You have? Great. Can you tell me about that? Where else have you thought about [this issue] before?

Excellent. Now let's think about this a bit more. Before today, how did you hear or learn about this issue?



Additional probes:

What do your friends/family say about [this issue]? Why do they think that? How do they know about that?

Is this a topic of concern to you or your family? Why? Why not?

*Research Methodology (15 minutes)*

### **STICKY NOTE ACTIVITY**

Now let's think more broadly. Everyone grab a stack of sticky notes and something to write with. I'm going to ask you a question, and on each sticky note I want you to write down exactly one idea or answer to that question. You can use as many sticky notes as you want to write down answers, but write only one answer per sticky note. Does that make sense?

OK, the question is:

Where do you get your information?  
[Jeanne: write this down on a board or easel]

[Explanation] We already mentioned some of these for your issues to action topic. But thinking more generally, write down where you typically go for information about personal or community issues. Who you talk to, what websites you might go to, what TV shows or magazines you might look at. The topics could be related to your health, to the environment, anything....

Think for a few moments and write down answers to the question: "Where do you get your information?"

I'll give you exactly 2 minutes. Any questions before we start? Ready? Go!

[2 minutes pass]

And STOP! Everyone, place your sticky notes on the white sheet of paper on your table. Take a quick look at all the different ideas from your table/group.

Let's try another one. Grab your sticky notes again, and now answer this question:

How do you know what information to trust?  
[Jeanne: write this down on a board or easel]

[Explanation] Think about all the different types of information you hear from your friends, family, TV, or the Internet. How do you know if that information is true? What factors do you consider when evaluating different types of information?

I'll give you another 2 minutes. Ready? Go!

And STOP! Flip the large sheet of paper on your table over, and place these sticky notes on the backside of this white sheet. Take a quick look at all the different ideas from your table/group.

### **RETURN TO DISCUSSION FORMAT**

Now let's talk about what we came up with to our two questions: "Where do you get your information?" And, "How do you know what information to trust?"

If you have a question that you don't know the answer to, or you hear someone talk about an issue that you want to find out more about (e.g., gang violence or how much exercise teens need):

- Where do you go for that information?
- Who do you talk to about that information?
- How do you know that what you're hearing or reading is true?
- How do you confirm that information?

What about data or statistics? If you heard someone say "50% of all teenagers have x-ray vision," what would you think?

- What would you do to verify the accuracy of that statement?

Now, let's say you looked that up on Google, and found out that a Washington Post (or El Pregonero or on Univision) headline reported that "50% of all teenagers have x-ray vision." Would you believe that was true? Why? Why not?

Where does the data point 50% come from? What does it mean?

What if the story talked about 50% of teens surveyed said they had x-ray vision, but then read more and found out that only 6 people were in the study?

## Topics and Formats (10 minutes)

### VOTING ACTIVITY

Awesome! That was a really great discussion about the role of information and research in our daily lives. Thanks everyone for participating. Now, for the time we have left, we want you to help us think about the types of things you would like to research using all of the ideas we just discussed.

In front of you, each person should have a sheet of paper with two topics on it. These are just some different topics that the museum would like your input on for year-round activities this fall. We'll read each topic description out loud and then I want you to pick which one you like the best.

Read (or have a volunteer read) topic description 1.

Read (or have a volunteer read) topic description 2.

So the two topics are [topic 1] and [topic 2]. Now circle the one you would most like to do more research on if you could. Which of these two topics would you be more interested in studying?

[pause]

Everyone circled one of the topics, right?

Great. Can you also check whether you are a student, RA, or junior RA, and check whether you are male or female for the questions at the bottom of the sheet? We're going to collect these after you leave and it will help us think through the responses.

All right, now raise your hand if you selected topic 1.

Raise your hand if you selected topic 2.

Very interesting! It seems like most of you liked [topic X].

### RETURN TO DISCUSSION FORMAT

For those of you who liked [that topic] best, what was most interesting to you?

For those of you who liked the other topic, what about it was most interesting to you?

Now, let's pretend your favorite topic was selected, and you had the chance to participate in an activity with the museum doing some research on that topic.

What would be some really interesting ways to think about that topic more?

What would be an interesting way to collect some data on that topic?

What activities can you think of that we could do related to that topic?

Conclusion question: What would motivate you to participate in additional opportunities with the museum this fall?

*[With any remaining time continue to probe for more specific questions with Jeanne's list below – these questions will also be used to develop a small survey for students who indicate interest in the program]*

### **Close (4 +/- 1 minutes)**

Unfortunately, we are now about out of time. Before you go, if you think you might be interested in learning more about these topics or to participate in a program with the museum, like we discussed today, flip your topic sheet over and answer the question on the back. Please write clearly!

Next, I need to make sure that all the sheets of paper are stacked up in the center of the table.

Finally, is there anything we missed that you would like to mention quickly? Or anything you didn't get to say earlier that you want to say now? If anyone would like to come up to the front and ask a few questions before you go to your next session, please feel free to do so.

Thank you all so, so much for your time and good energy! Keep it up! We look forward to talking with you again soon!

### **Post**

Immediately following each focus group, the moderator will stop the audio recorder and collect and organize all data elements from the tables. The observer will follow the moderator and reset the tables with new materials. The note-taker will review her notes and jot down any last minutes thoughts and save her work in two places (hard drive and USB key).

The team will identify any changes that need to be made before the next focus group begins. Once all focus groups have been completed at a site, the team will schedule a debriefing phone call. At the completion of all 8 focus groups, UXR will produce a memo report of thematic findings from the study and work with KSM and HCF on identifying next steps for the pilot program.

## Appendix B: Virginia Moderator Guide

### VA HYI Workshop Moderator Guide

For Marian Koshland Science Museum Outreach Pilot Project

In partnership with the Hispanic College Foundation

Prepared by Jes A. Koepfler, Principal and User Experience Research Specialist, UXR Consulting

[www.uxrconsulting.com](http://www.uxrconsulting.com)

July 2011

FINAL

### Research objectives

The primary research and evaluation objectives for the workshop in Virginia are to help team members from User Experience Research Consulting (UXR) and the Marian Koshland Science Museum (KSM) to confirm findings from the Maryland workshop regarding participants' attitudes, awareness, and skills concerning research and information literacy, and, more importantly to gauge student knowledge and interest towards three topics (sleep, sexuality, and water quality) that may be used in the museum-created follow-on program. Once the focus groups in Maryland and the workshop in Virginia have all been completed (K=4, 40-person groups plus K=1, 200-person group), UXR will conduct a thematic analysis of the qualitative data and descriptive analysis of any quantitative data and work with KSM and the Hispanic College Foundation (HCF) to determine next steps for the pilot project.

By participating in the focus groups and thinking about the different ways in which they gather and validate various types of data and information, participants will have the opportunity to practice the critical thinking and decision-making skills they already have. Though it is not the intention of the research team to measure directly the impact of the workshop on the participants, we hope that participants will have the opportunity to:

DM1: Effectively analyze and evaluate evidence, arguments, claims, and beliefs

DM5: Reflect critically on learning experiences and processes

DM2: Analyze and evaluate major alternative points of view

Permission to participate in the workshops with audio recording and photography was obtained from parents as part of the initial HYI registration process and is retained by the HCF.

### About this Moderator Guide

This guide is meant to support UXR and KSM team members in preparation for, and in delivery of, the workshop in Virginia. It is, however, only a guide and the team should feel comfortable making mid-way adjustments if necessary. The team should also remain flexible to the needs and interests of the focus-group participants.

Due to the short length of the workshop and the large number of students who will participate, the use of individual and small-group activities will be used to gather data. This strategy is outlined in more detail in the sections that follow.

### **Brief respondent profile**

The participants for the workshop are incoming 10<sup>th</sup> grade students, who are of Hispanic or minority origin. There will also be familia leaders (RAs) and junior leaders (Junior RAs). They will have already participated in a full week of HYI summer program workshops and activities by the time we facilitate our workshop.

### **Where and when interviews take place**

UXR will moderate the 200-person workshop with support from KSM staff members at Virginia State University in Petersburg, VA.

July 22, 2011, 4:30 p.m. – 5:15 p.m. (set up between 3:30-4:30 p.m.)  
Virginia State University, 1 Hayden Drive, Petersburg, VA 23806  
auditorium setting

### **Materials**

For the workshop, the following materials are needed:

- Worksheets
- Audio recorders
- Large white pieces of paper/poster board
- Writing utensils – pencils (sharpened) or pens (200+)

### **Roles**

Three team members will work together to conduct the focus group and collect the data:

- Jes (UXR) – workshop facilitator
- Jeanne (KSM) – facilitation support
- Amy (KSM) – facilitation support

### **Preparation (3:30-4:30pm)**

The team will meet in the auditorium at 3:30pm to do a final run-through of the workshop and set up staging for any materials or props. The team needs to:

- Identify where students and RAs will sit
- Place workbooks under student seats
- Test the microphone volume and settings
- Identify possible Internet access or computer access in the room
- Consider music options as students file in

### **Introduction (4:30-4:40pm)**

Ask RAs to stand along the walls and in the aisle near their familias and encourage them to support crowd control, noise, and help with handing things out. They can then be easily corralled in the back for their activity when the students break into groups.

Once everyone is seated, Jes, Amy, and Jeanne will be on stage.

Amy:

[vigorous and excited explanation of what KSM is and why we're here – Amy to ad lib]

Who we are and how research affects our daily lives and jobs

Where the museum is located, it's affiliation with NAS

What the follow-on program might be and why their input is so important

Now, let me introduce you to Jes. She is getting her PhD from the University of Maryland and is helping the museum work with students like you to create new and interesting programs and experiences with the us. Jes is going to lead us through a series of activities about research in our everyday lives.

And now I'll turn it over to you, Jes.

*Brief description of agenda (5 minutes)*

Jes:

[Very excited] How's everyone doing today? [wait for response]

That was weak. I'm going to need more energy from you all if we're going to make it to 5:15pm.

I said, How's everyone doing today?! [wait for response]

Excellent! That's what I'm talking about. I know you are all nearing the end of your HYI week, but I promise that if you keep the energy and motivation up for the next hour, it will fly by and we'll all be that much closer to dinner.

Does that sound good to everyone?

OK, great! Today we're going to do two things. First, we're going to start off with an individual activity. During the individual activity we need everyone's cooperation to stay quiet while everyone does their work.

After the individual activity, we're going to break out into small groups and have a little research competition. Definitely stay motivated for that because winners will receive prize money.

## **Individual Portion (4:40-4:50pm)**

OK, let's get started. Under your chairs is a small packet of paper. Reach down and pick that up quickly and quietly.

Jeanne, Amy, and the RAs are going to pass out pencils. Take one and pass the rest down so that everyone can get one as quickly as possible.

For the first activity, we're going to work as individuals, but I'm going to walk you through it as a group that way no one has questions and we all finish at the same time. So, please don't get ahead of me, because you won't know how to answer the questions we're asking.

### *Gathering Basic Demographics*

[Jeanne and Amy float around showing people where to write things down and helping out anyone who is confused. Jes is on stage moderating.]

Let's start off by writing your name as legibly as possible on the line where it says "Name" [hold up packet and point to location for name]

Next please indicate whether you are a student, RA, or junior RA and whether you are female or male by checking the appropriate box [hold up packet and point to location of check boxes]

### *Ranking Topics*

Now open the packet to the first page. There are three topics on the page. We're going to read through the description of each topic out loud first.

[Amy and Jeanne come back on stage, so we can each read a topic out loud. Jeanne reads water quality, then Jes reads sexuality, then Amy reads sleep]

Now think about the different topics we just read. Any one of these topics could be used for a follow-on activity that you might participate in with the museum in this program we're creating in for the Fall semester. Based on these three descriptions, I want you to rank them in order of preference for which type of topic you might want to develop a research study for. In the boxes to the left of each topic heading, please write a 1 for the topic you would most like to research, a 2 for your second choice of topic to research, and a 3 for your third choice of topic to research. I'll give you 2 minutes to rank the topics. Ready? Go!

[Amy and Jeanne float through the auditorium again, helping anyone who looks confused while Jes times 2 minutes for students to rank things]

## **Research Proposals in Small Groups (4:50-5:10)**

OK, real quick, just by show of hands, how many of you picked water quality as your first choice? Raise 'em high! What about sexuality? Ok, now sleep? Great!

Now we're going to do a little research competition. You're all going to work in groups of 3. There's a lot of you in here, so unfortunately we can't let you choose your groups – we'll have to do them from where we're sitting. Starting from the left side of each row every three people counts as a group. So, for example, for the folks sitting in the front row here, you three will be a group, then you three, then you three and so on...

Is everyone clear on who is in their group? Does anyone still need a group to join? [If some groups need to have four people that's fine.] Within your group of 3, I need you to designate a writer – this person is the only one who needs to write down your groups answers in your workbook.

Now, open to the next set of pages in your workbook. You'll see news articles about the topics that you just considered. With your group members, you need to select the topic that is most appealing to you as a group.

Each page has a different scientific article with some research questions. Each team of three will read through the article, then choose 1, just one, of the research questions provided to write up a research proposal. The workbook pages that come after the articles are the research proposal that you will fill out.



[Pause for questions or confusion] Does everyone see the different articles and the associated research questions? Raise your hand if not, and Jeanne or Amy can show it to you. I want to make sure we are all on the same page.

### *Explaining the contest*

Before you get started in your groups, let me tell you about the contest too. At the end of today we are going to collect everyone's workbooks. We're going to read through all of the different proposals in the next week or so.

We'll select the top three proposals as winners of the research contest. Each member of the winning groups will receive a \$10 Amazon.com gift card by email. We'll announce the winners on Wednesday, August 3rd!

Does that sound good to you guys?

Great! Open to the next page of your packet and you'll see the criteria that we'll use to judge your research ideas:

Scoring Criteria for Contest: appropriateness of research design to the research question (3 points), the study is realistic and doable (3 points), the study is creative (e.g., unique methods or combination of methods, unique resources, or data gathering techniques) (4 points).

### *Explaining when the RAs can help out*

Some of the questions will be tough, but we want you all to try your best and see how much you can do on your own at first.

When we're nearing the end of our time, you'll have a chance to get help from the RAs. So if you feel really stuck or unsure, save your questions for when I call time and then RAs are going to be able to float around the room and help you. Anything that they give you help with, they will write on your worksheets or initial next to it with a different colored pen. It's absolutely OK to ask for help. Using resources is a key part of doing research. We just need to know who did what for the research proposals.

We have an activity for the RAs as well, so they'll be working on their own research proposals in the back of the room until we call time.

### *Identifying a writer and getting names and email addresses*

OK, in your groups of three, pick the person who will be your writer, and have him or her write their names on this top line. [show packet – Amy and Jeanne float]. Next, write all three of your names down on the worksheet along with your personal emails so that everyone in your group will get credit for working on the proposal and so we'll have a place to send the Amazon.com gift cards if you win. [show packet – Amy and Jeanne float].

Do that now.

### *Final instructions before they get started*

All right, now I'm going to turn you loose. Take your time and start to go through the worksheets and develop your research proposals. Pick your group topic, read through your research scenario, pick a research question, and then write up a proposal for conducting a small research study.

The worksheet asks you to pick your research methods, data collection procedures, background materials, resources you'll need, and a hypothesis for what might happen. If your science skills are rusty, that's OK. Just do your best! We're not looking for right or wrong, we're looking for your best effort. You only have 15 minutes so work quickly and efficiently in your groups, and let's try to keep it down to a dull roar in here.

Jeanne will be in the back with your RAs. Amy and I will float around to help. Raise your hand if you have a question. Everybody get started!

#### *Sending RAs to work with Jeanne*

If all the RAs could head to the back of the room, Jeanne will explain to you what she wants from you. [When Jeanne is done with the RAs she'll signal to Jes who will call time and give the students a chance to get help from their mentors. Jeanne will ask RAs to complete the research proposals (individually). Once finished, Jeanne will explain to them how to help out the students and mark that they helped. Jeanne will give them a colored pen or pencil to write with and let them go help students. They can help any group, not just the students in their familia.]

#### *Giving RAs a chance to help the students*

OK, at this time you may now raise your hands to get help on your proposals from RAs who are going to start floating around the room. We only have 5 minutes left!

#### *At the end of 5 minutes:*

OK, we're out of time. It's OK if you didn't finish. Just double check that everyone's names are on the research proposal so we can follow up when we've determined a winner from each section.

### **Close (5:10-5:15)**

#### *Gathering student interest*

Excellent work everyone! Before you go, I'd like you all to flip to the last page of your packet. If you think you might be interested in learning more about these topics or to participate in a research project with the museum, like some of the ideas we discussed today, answer the questions on this page, writing as neatly as possible. You're not signing yourself up for anything, you're just indicating your interest. It's not a full commitment yet.

We'll follow-up with an email in a week or so to get a little bit more information to you about how you can help us continue to brainstorm what this program might look like.

Now I need the RAs to stand by their familias and I'm going to excuse you all one row at a time. As you leave, please hand your packets and pencils to Jeanne and Amy at the door. We're all going to go out one way, so that we don't miss any of your packets.

Thank you all so, so much for your time and good energy! Keep it up! We look forward to talking with you again soon! [Initiate a round of applause – thanks to the RAs for helping us out, thanks to you all for

your great ideas, etc.] Have a wonderful weekend! The front row can now stand up and file quietly out the doors where Jeanne and Amy are standing.

## Post

Once the auditorium has emptied, clean up any remaining items that might be strewn about. Brief reflection on the workshop: How did it go? How engaged were the participants? What would we have done differently if we had a second chance? Write down as many observational notes as possible immediately.

**Appendix C: Virginia Research Proposal Worksheet Packet**

**KOSHLAND** Virginia Hispanic Youth Institute  
**SCIENCE** Research & You Workshop  
**MUSEUM** Anderson Turner Auditorium  
**koshland-dc.org** July 22, 2011, 4:30 PM-5:15 PM

Your name (first and last):

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**Please check the box next to the response that best represents you for each question below.**

Are you a:

- Student
- Junior RA
- RA

Are you:

- Female
- Male

## Research Topics

Read through each of the following research topics carefully then rank them by placing the numbers 1-3 in the boxes next to each topic. Please, write a 1 in the box next to the topic you would most like to research, a 2 for your second choice of topic to research, and a 3 for your third choice of topic to research.

### Water Quality

Data shows that fertilizers and land use decisions can lead to increased nitrogen and other pollutant levels in water. These fertilizers are used in agriculture and residential areas.

- Have you observed any changes in water quality in your community?
- What are the environmental impacts of fertilizers and other chemicals on your local area?
- How do these factors impact the Chesapeake Bay, Potomac River, and other water systems?

### Sexuality

There is evidence that teens may be more willing to engage in risky sexual behavior than adults, leading to related health problems in the future.

- What types of sexual behavior do you and your friends consider risky?
- How do your perceptions of risky behavior differ from your friends or family members?
- What are some public health concerns about risky sexual behavior?
- What role do peer pressure, the media, and other factors play in influencing your decisions about sexual health?

### Sleep Habits

Experts have found that teenagers need up to 2 more hours of sleep per night than adults.

What factors affect the amount of sleep you get each night?

- What role do your own biological factors play in determining how much sleep you need?
- How should schools and other organizations change to meet the sleep needs of teens?

## Research Proposal

The research proposal you create can use quantitative data collection techniques, qualitative data collection techniques, or a mix of both. The research methods you choose (experiment, interviews, surveys, observation, measurement, etc.) are up to you, but should be chosen to best answer the research question your team has picked.

Scoring Criteria for Contest: appropriateness of research design to the research question (3 points), the study is realistic and doable (3 points), the study is creative (e.g., unique methods or combination of methods, unique resources, or data gathering techniques) (4 points).

We only need one person in the group to write down the research proposal for your team. If your packet is not the one used for the team, what is the name of the person in your group, whose packet we should look for with your proposal written on it?

What the person's name whose proposal we should look at for your group?

---

If this is the packet that has the proposal in it, write down the names and email addresses of the people in your group:

Group Member 1: \_\_\_\_\_ Email 1: \_\_\_\_\_

Group Member 2: \_\_\_\_\_ Email 2: \_\_\_\_\_

Group Member 3: \_\_\_\_\_ Email 3: \_\_\_\_\_

Which topic worksheet did your team get (select only one):

- Sleep
- Water Quality
- Sexuality

Choose a research question and write it down here:

Research Question: \_\_\_\_\_

## **Research Design:**

*Describe a research study that you could conduct to answer the research question you selected. It doesn't have to be a study you do alone, but it does need to be something you could reasonably do in a small group and with some resources and help from mentors. Use this worksheet to answer the following questions: What methods will you use? Who will you gather data from? How many data points will you collect? What resources will you need? What do you think will happen?*

**Use the back of this paper if you run out of room with the space that is provided.**

### Research methods

1. What research methods will you use? (e.g., interview, experiment, survey, observation, etc.)

2. Justify your methods: Why are these the best methods for answering the research question you selected?

### Gathering Data

3. What sources would you use to gather background information on your topic? (be specific)

### Gathering data (cont'd)

4. When you conduct your study, who or what will be your data?

Human subjects: If you plan to collect data from people

- How many people do you need for your study?
- Where and how will you recruit people for your study?
- What type of data will you collect from them?

Non-human subjects

- If you're collecting data from non-human sources, what will you collect?
- How will you measure it?
- How many data points will you need?

### Hypothesis

5. A hypothesis is a best guess about what will happen in the research study.

What the outcome might be. What do you think you'll find from your research study?

### Materials and Resources Needed

What materials, tools, or assistance will you need for your study?

- People (e.g., mentors, scientific specialists):
- Tools (e.g., chemistry testing kits, clip boards, video cameras):
- Software (e.g., web survey software, file-sharing software):



## Follow Up

If you think you might be interested in learning more about these topics or to participate in a research project with the museum, like some of the ideas we discussed today, answer the questions on this page, writing as neatly as possible. We'll follow-up with an email to get a little bit more information to you about how you can help us continue to brainstorm what this program might look like.

**Check this box, if you're interested in hearing more:**

Yes, I'm interested in learning more about this program!

**Provide an email address so we can contact you:**

Email address for follow-up contact:

\_\_\_\_\_ (e.g., juan.perez@gmail.com)

**Provide the zip code where you currently live:**

\_\_\_\_ \_ (e.g., 22602)

**~Thank you!~**

Please hand your packet to an RA or workshop leader before you leave today.