STAR-LITE: An Innovative Method of Delivering Laboratory Safety Training to Students

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The Research Question

- How can we *effectively train students* in *laboratory safety principles*?

Why Focus on *Students*?

- OSHA and NIOSH recognize the unique qualities of this population, focus attention on student workers

- Risks
  - 77,000 emergency room visits/year (under age 18) [1]
  - 67 fatalities/year (under age 18) [1]
  - Injury rate (adjusted for time) = 4.9/100 FTE [2]

Why Focus on *Students*?

- Hazards [1]
  - Sharp objects
  - Heat sources
  - Slips, trips, falls
  - Energized sources
  - Dusts and fumes
  - Biological and chemical hazards

How to *Effectively Train* Our Audience?

First, we need to keep in mind our audience

- Students remember 90% of what they learn if they do the job themselves, even if only as a simulation [3]
- On average, students (up to age 18) spend ~50 min/day playing video games [3]

How to *Effectively Train* Our Audience?

Then, we need to consider features that would interest our audience

Educational Features

- ✓ Information synthesis
- ✓ Problem assessment
- ✓ Strategic thinking
- ✓ Decision-making
- ✓ Self-direction

How to *Effectively Train* Our Audience?

Additional features…

Video Game Features

- ✓ Engaging, interactive environment
- ✓ Consequence-driven tasks
- ✓ Goal-oriented direction
- ✓ Immediate feedback to the user
- ✓ Personalized characters

What *Laboratory Safety Principles* Should We Include in this Training?

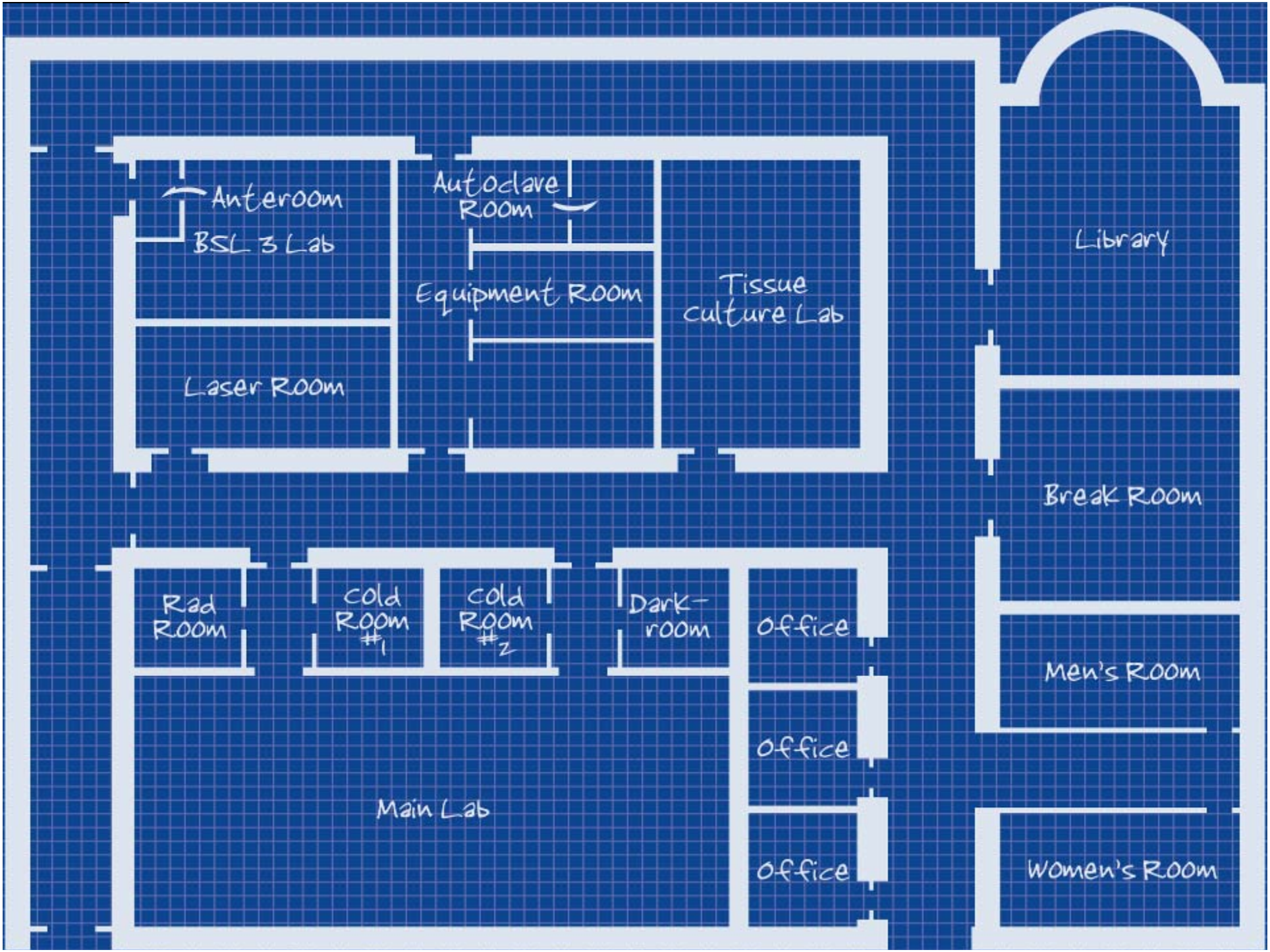
- Potential biological, chemical, and physical hazards
- Routes of exposure
- Safety reference materials
- Emergency preparedness and response basics
- Measures of protection

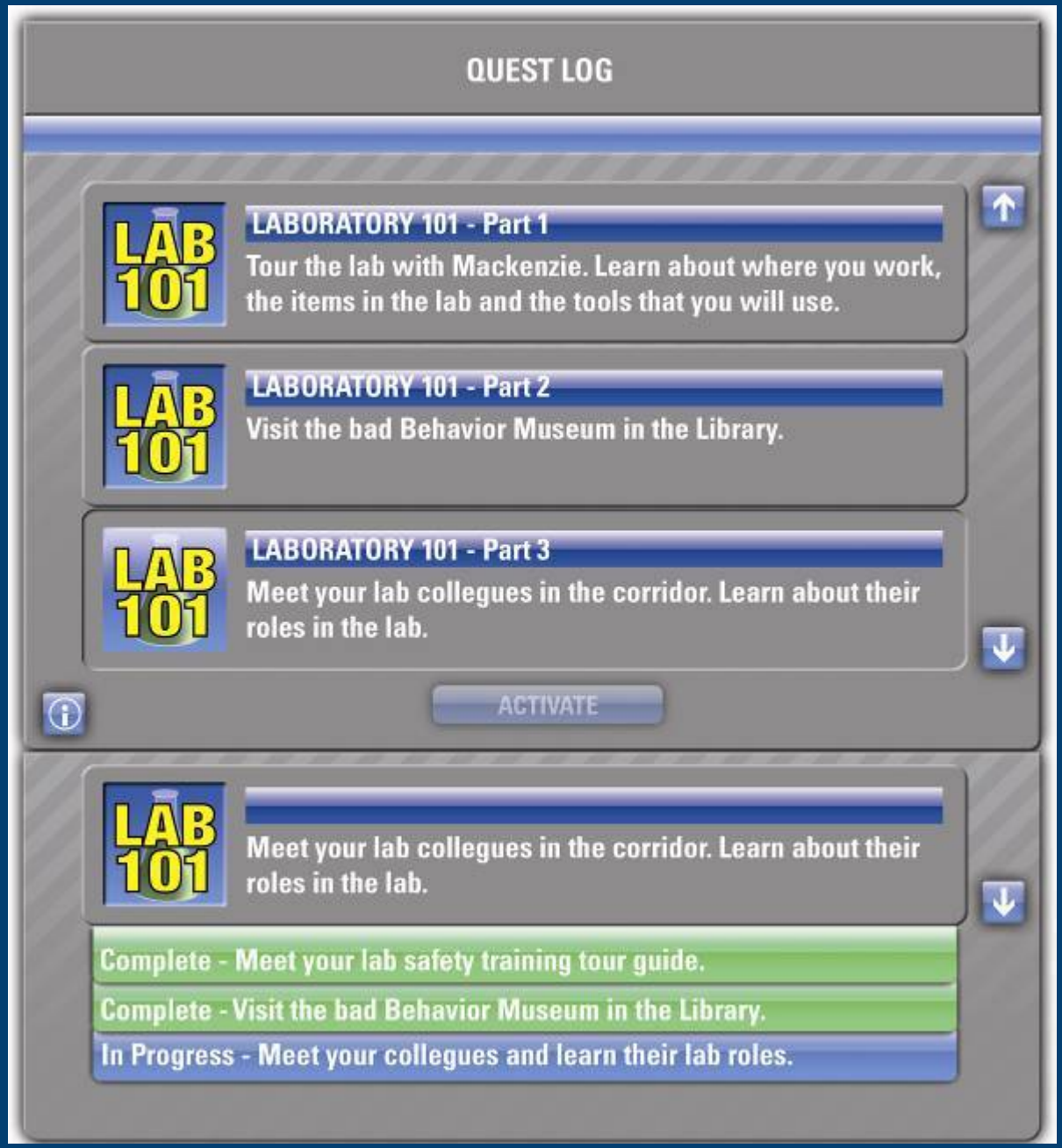
How can we *effectively train students* in *laboratory safety principles*?

- Combine the educational content with gaming art/programming to create an interactive, engaging, educational computer-based training with video game-type qualities and features

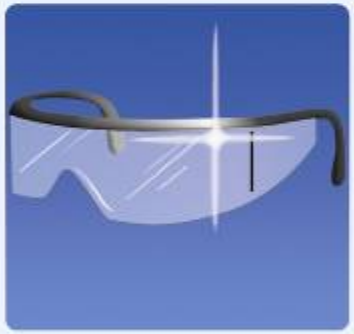
The Training Interface

- Features of the display are engaging and educational



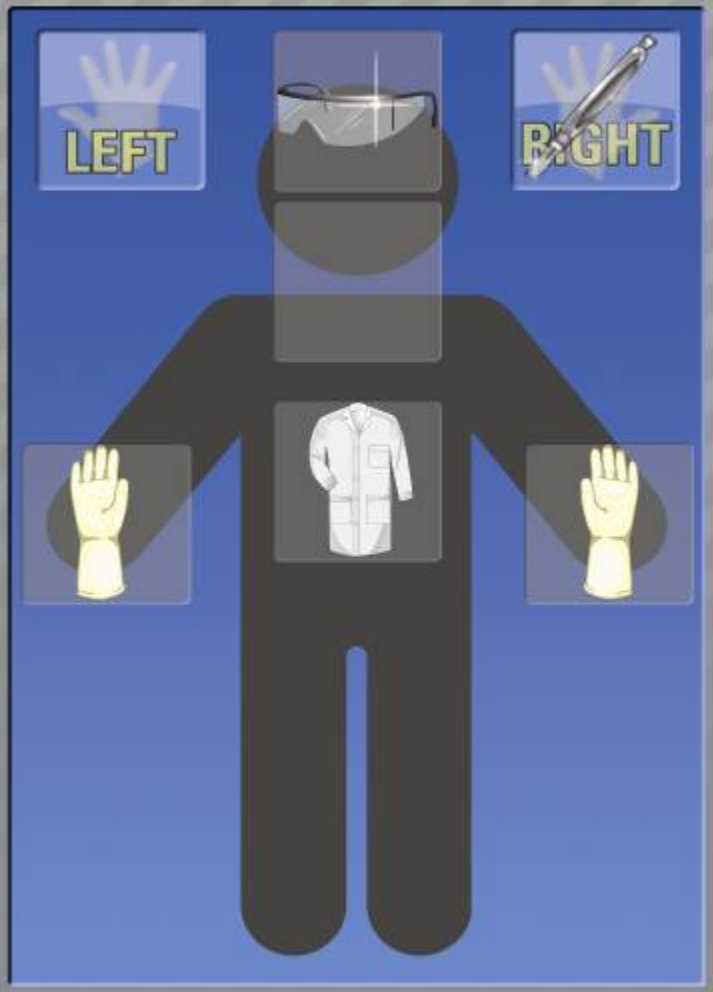


INVENTORY



IMPACT GLASSES

Personal protective equipment (PPE) that shields the eyes from projectile objects, but not from liquid splashes. The lenses of impact glasses are typically made from polycarbonate plastic and provide some protection from ultraviolet light.



CLOSE

LAB NOTEBOOK

LEXICON | POTENTIAL LABORATORY HAZARDS | LAB SAFETY REFERENCE MATERIALS | PROTECTIVE MEASURES

- Engineering Controls
- Exposure Control Plan (ECP)
- Laboratory Waste Managment

ENGINEERING CONTROLS

Equipment that removes the hazard from the laboratory environment or places a barrier between the worker and the hazard (e.g., a chemical fume hood, a biosafety cabinet, or a centrifuge safety cup).

The Thinkers: Critical Thinking Skills

- "What am I working with?"

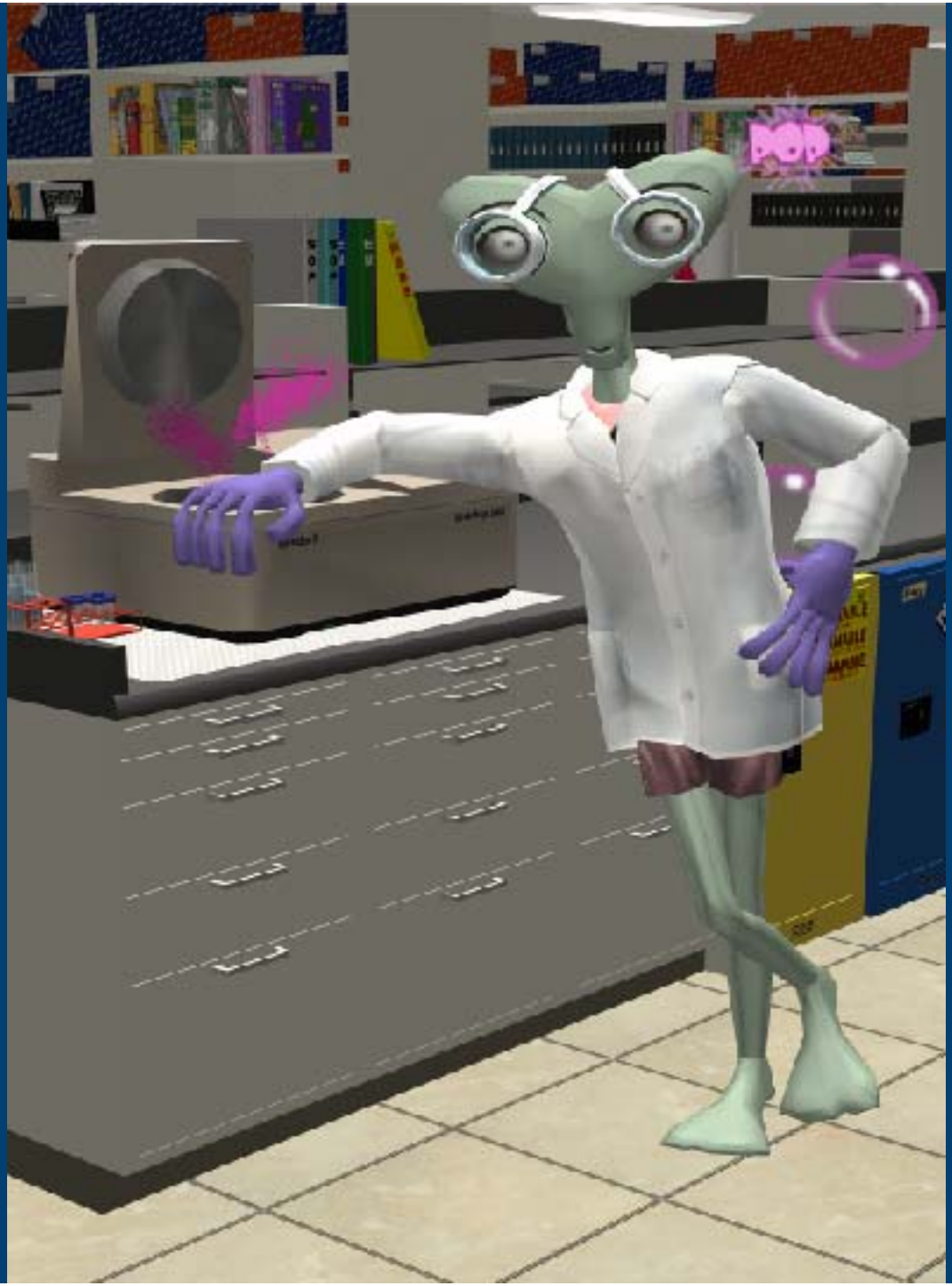
- "What are the potential hazards?"

- "How can I prevent potential harm to myself, others, and the environment?"

- "How can I protect myself, others, and the environment from potential hazards in the lab?"

Training Content Flow

- Avatar Creator
- Lab 101
- Quests
  - Quests as the primary delivery method of laboratory safety knowledge and skills
  - Expect: 13 Quests that cover biological, chemical, and physical hazards



Beta Testing

- Who
  - ~70 students and teachers
- What
  - Bug finding and product testing with feedback
- When
  - June through November 2007

References

[1] NIOSH Alert: Preventing deaths, injuries, and illnesses of young workers. Publication No. 2003-128. July 2003.

[2] Wegman DH, Davis LK. Protecting youth at work. Am Jrnl Ind Med. 1999; 36:579-583.

[3] Harnessing the power of video games for learning. Proceedings of the Summit on Educational Games; 2005 Oct 25; Washington, DC.

Thank You