Exhibit Design Guidelines

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CONCEPT

1. Observe visitors before designing
2. Relatedness to everyday life
3. Capacity to promote group interaction
4. Appeals to range of appropriate ages

EDUCATIONAL ASPECTS

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8. Communication of science content
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14. Cost
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16. Can a prototype be built to test the concept?
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23. Relatedness to other exhibits

DISCUSSION OF
SCIENCENTER EXHIBIT DESIGN GUIDELINES

CONCEPT

1. Observing visitors before designing. Before conceptualizing an exhibit, we encourage everyone involved in a potential exhibit project to observe actual visitors using real exhibits during a busy period at the museum *for a minimum of one hour*. We have found that this time is well spent: it grounds the entire team in how visitors really use exhibits, and it prevents many common exhibit design issues later on.

2. Relatedness to everyday life. The more an exhibit is related to everyday life, the more successful it is apt to be. If an exhibit reminds a visitor of something that he or she has experienced or observed, it has a better chance of arousing the visitor's curiosity and encouraging experimentation. Opportunities to make exhibits related to everyday life should not be missed.

3. Capacity to promote group interaction. Many visitors learn in museums through social interactions that occur during their visits. Visitors may spend time teaching each other through conversation (e.g., parent to child) or by interacting with others as they proceed through the exhibit-related tasks. Exhibit designers and builders should be sensitive to ways to encourage such social interaction. However, at the same time, each exhibit should provide some activity to satisfy a visitor who is alone.

4. Range of appropriate ages. We consider an exhibit to be more successful the greater the age range that it can interest. If an exhibit can be made to appear to a wider range of ages by a minor adaptation, then we want to encourage the designer to include that adaptation. Breadth of age is not a requirement, but rather a consideration.

EDUCATIONAL ASPECTS

5. Science content. Each exhibit should have science content -- each exhibit should be based on scientific principles that are valuable and important for a person to experience and understand. Each exhibit should be able to lead visitors to discover principles and should provide opportunities for guides and teachers to illustrate principles. Success in conveying these principles to visitors is treated separately.

6. Open-endedness. Each exhibit should encourage experimentation by allowing visitors to try new configurations, new combinations, etc. At the same time, each exhibit should guarantee success. In other words, each exhibit should have something interesting to offer at the first encounter but should lead visitors to try experimentation. Exhibits should avoid pre-defined outcomes and be as open-ended

as possible. Such open-endedness can lead a person to return to an exhibit many times, finding something new each time.

7. Interactiveness. In general, exhibits should be designed to: 1) allow visitors to vary their actions or vary something about an exhibit to make something happen; 2) enable visitors to see clear and immediate effects of their actions, 3) produce some interesting or rewarding result, perhaps different for different visitors.

8. Communication of science content. The process or principles that an exhibit demonstrates should be clearly conveyed by observations and experience, with adequate labeling to explain and guide further inquiry.

9. Process of science. Science is not a collection of facts, but rather an activity that can help visitors become more conscious of how they learn and think about the world around them. An important part of the process of science is learning to evaluate information and ideas about the world that are presented to us.

   How do we find out about our world? Wanting to find out about things is the beginning of "science." Our first ideas about the world come through our senses, and we ask questions and make guesses. The we test our guesses, look at our results, and ask new questions.

   Our exhibits should illustrate and encourage this approach. Although our exhibits illustrate many ideas and principles that are already known, they should also prod a visitor to ask his or her own questions and then pursue answers to them. In this way, visitors will be drawn into the activities of science: discovering, imagining, sensing, modeling, and testing.

DESIGN AND CONSTRUCTION

10. Buildability. Buildability is one part of feasibility. To be feasible a design must lie within the capability of the builder. Feasibility cannot be tested in a design without knowing something about the builder and the facilities available to the builder. The designer must take into consideration the process of construction and have some idea of materials and methods of fabrication.

11. Reparability. The designer and the builder both must keep reparability in mind. It is usually the case that relatively minor design and construction details can make a very big difference to the individuals who will eventually need to maintain an exhibit. For instance, panels should be screwed on for easy access to the inner parts of an exhibit to promote easy repair.

12. Maintainability. The designer and builder both must keep maintainability in mind. By recognizing needs for periodic adjustment and care, such as lubrication, they can provide easy access and thereby reduce repairs resulting from inadequate or

improper maintenance. Finishes should be durable; hardware should be strong; plastic windows should be thick enough; etc.

13. Survivability. The design and construction of each exhibit must be rugged and foolproof to minimize breakage. In most cases, this involves a learning process based on experience gained in the museum. Prototypes should be built and tested on the floor before a finished exhibit is built.

14. Cost. The cost must be estimated before proceeding with development of an exhibit. If a significant cost is involved, it must be estimated in detail and measured against the available funds before proceeding.

15. Can the designer guide the exhibit through construction? It is most desirable if the designer can work closely with the builder or be the builder. That way, problems can be dealt with as they arise. If the designer cannot be the builder or work with the builder, then the plans must be very specific and detailed. In such cases, prototyping may be especially important.

16. Can a prototype be built to test the concept? If an exhibit idea is new and has not been tried in other science centers, then prototyping becomes especially important. It is difficult to anticipate every detail and every problem in most exhibits. Sometimes a prototype in which C-clamps or duct tape are used instead of screws can provide important information about the concept and functioning of the exhibit and save many hours of re-build. The prototype may exist only in the shop, or it may be put out on the floor for testing. Some prototypes may even remain on the floor if they are especially well construction and functional.

17. Has a similar exhibit been built before? All designers and builders are encouraged to look for examples of useful exhibit features at other science centers and to look among the publications distributed by other science centers. "Reinventing the wheel" is costly.

OTHER CONSIDERATIONS

18. Safety. Safety should be considered at every step of design and construction. Designers should assume that someone will eventually find a way to do almost anything with an exhibit (finding wires to touch and pull, inserting objects in open holes or slots, pulling, banging, climbing, etc.)

19. Labels and signage. Short, inviting labels placed conveniently front of the visitor’s field of view maximize the probability of being read. Text may be layered in both type-size and content so that the most important information is most easily read (placed first, large letters). Use graphics and cartoons where appropriate.

20. Handicapped accessibility. Every exhibit should be accessible to a person with a physical disability, unless not possible. Table tops should be at a height so that a wheelchair can be rolled up to them. This may require a movable bench for younger children.

21. Expendables. Where expendables will be consumed (water, paper towels, small parts), they need to be estimated and characterized as accurately as possible before proceeding with development of the exhibit.

22. Special requirements (power, lighting, drainage, etc.) Every exhibit design should take it consideration the availability of utilities and other special requirements. The designer should discuss special requirements with the director of exhibits before proceeding with design development.

23. Relatedness to other exhibits. An exhibit that complements another exhibit and augments the message imparted by the other exhibit can enhance the effectiveness of both exhibits. This relatedness, which not a requirement, should nevertheless be recognized where it exists and used to advantage.

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