Visiting a Science Centre or Museum? Make it a REAL Educational Experience!

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People visit science centres, museums, zoos, botanical gardens and aquaria for many reasons. When teachers take their class for a visit, there is usually an educational reason, if only so that the visit can obtain the official stamp of approval! But it takes time and effort to organise the visit, so how can teachers be sure the visit is worth the effort? In the following, we present some guidelines we have distilled from an extensive review of research evidence. Most of the guidelines are common sense, but it is surprising how few teachers seem to realise that they really do make a difference. The best educational outcomes are a result of good preparation, a focused but flexible visit experience, and some follow-up activity back at school.

Before the Visit

Why Are You Going?

This is not a trivial question! The reasons why teachers take their classes to science centres or museums determine how they should prepare themselves and their students to maximise the educational outcomes. If the purpose of the visit is to stimulate or motivate students, then the aim is to arouse interest and curiosity about concepts or ideas that the students might be finding rather mundane at school. The choice of exhibits will relate to school work, but provide new (and perhaps extra-curricular) perspectives on those concepts. Alternatively, pre-visit discussion at school can help students to come up with a list of questions to be investigated at the museum during the visit. If the purpose of the visit is to introduce a new topic, then exhibits will be selected to demonstrate a variety of concepts to be covered in the topic. Thus, students will leave the centre with a range of unanswered questions to pursue back at school. If the visit is to revise and consolidate the learning of concepts, exhibits should be chosen which provide new demonstrations of related phenomena and applications of associated properties. The overall aim is to transfer the enjoyment and enthusiasm aroused by the students' visit to the achievement of science objectives back at school.

How long should the visit be?

Depending on the age of the students, a visit might be between one and three hours. If they have not visited before, students need time to get their bearings, time to do serious exhibit-oriented work, and time to do the things they want to do, such as visit the shop and look at other galleries not on the teacher's list. But working with exhibits requires concentration and "museum fatigue" will set in. The length of the visit needs to strike a balance between these things.

Teacher Preparation

Know what you are going to find when you get there. The best way is to visit yourself. When you know what exhibits are there, you can work out what concepts or phenomena they demonstrate, what level of thought processes they require to be understood, and whether there are worksheets or other cues, like labels, available to help understand the exhibits. When you have this information, you can make the visit fit into your teaching programme. Most science centres and museums have education officers who can help in planning a visit. Often there are informative materials and related activities designed to make the teacher's job easier. Make use of them.

Student Preparation

Find out whether students have visited the science centre or museum before. If they have not, then novelty may be a distracting factor in the visit. You can help with some advance information about basic things, like a map of the centre, showing where to meet, lunch areas, toilets and the shop. Students will probably be more concerned about whether they will be able to visit the museum shop than the teachers' plans for the visit! Get their help in planning the visit. If you have a specific set of science concepts in mind, they need to have the necessary background knowledge and skills to use and understand how the exhibits work. This might require some pre-visit instruction. If your objectives are more general, you can encourage students to ask their own questions and to find out the answers through their own research during the visit. Make sure they do not have too many questions, and that finding the answers to them is a realistic task for the science centre or museum. The important point is that if students know what learning is expected of them, they can be more self-directed in achieving it.

During the Visit

Getting Started

If this is their first visit, students will need some time to settle down. Expect some playing and exploration with the exhibits which might look more like fun than work, even when students are seriously working!

Working with Exhibits

Teachers can help students to keep track of time and their learning objectives, as well as being on hand to make suggestions to extend their thinking and understanding. Obviously, students with different levels of skills or preferred styles of working, may need different kinds of help. Attendants and parents, or others who chaperone school groups, are other important sources of cues to help students understand the exhibits. Make sure helpers know that the purpose is to open-up students' thinking rather than tell them to the right answer.

Working Together

Students enjoy the social interaction with their friends that visits afford. Make the most of it. Encourage students to work in small groups and share the responsibilities associated with learning. Research shows that a great deal of peer teaching occurs during visits, with children asking each other questions, reading labels aloud, and showing each other how the exhibits work.

Keeping a Record

It is beneficial for students to keep a record of what they discover, so think about the best way to do this. If there are open ended-questions for students to find answers to, then an open-ended kind of record is needed. Digital cameras allow students to take images back to the classroom to incorporate in reports or other displays. A word on worksheets: Don't let them become "treasure hunts", with students dashing about looking for an exhibit to find out some fact or other. Good worksheets relate directly to the exhibits themselves, not to their labels, and promote opportunities for meaningful, cooperative group learning. This means that one worksheet per group can be effective, rather than one each, which encourages trading answers. Some teachers help students to prepare their own worksheets for visits to zoos and museums.

Finishing Off

Check how students are progressing near the end of the visit, so the remainder of their time can be structured effectively. Do not forget that students have their own things they want to do, so let them have at least 20 minutes to explore the exhibits that interest them.

Back at School

Common sense suggests that post-visit activities should reflect the varied nature of the experiences students had at the science centre or museum. Young children, in particular, should be given the opportunity to share their experiences and findings with their peers through class presentations, group reports or posters. Students can plan further research or experiments based on

what they have found out. In subsequent lessons every opportunity should be taken to refer back to exhibits and activities experienced during the visit, thus reinforcing and extending the learning which occurred.

Visits to science centres and museums can promote students' engagement in school science. They may find the visits more interesting and enjoyable than effective class lessons and this is a strong reason to capitalise on their interest when back at school. The best way is to integrate those visits into the teaching programme in ways that complement the learning activities at school.

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