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- * Would pictograms (symbols) be appropriate for consolidating the tasks on the activity sheet?
- * Have you provided a summary of what the user has learned?

And overall...

- * Does the sheet appear interesting and attractive?
- * Will the user have fun learning from the activity sheet?

The education officers at The Natural History Museum, London, have developed this structure for designing and developing activity sheets so that a very large number of young visitors can benefit fully from an extensive range of adult-oriented exhibitions. We have found the sheets to be successful and popular and hope that our experiences may prove useful to readers wishing to develop their own activity sheets.

Activity sheets: reading list

The following references provide greater in-depth analysis of the cognitive processing that occurs when people use activity sheets to help interpret exhibits. Research-based justification for questioning skills and the influence of sheets on visitors' behaviour in exhibitions are also explored.

Durbin, G. (1989) Improving Worksheets, *Journal of Education in Museums* 10 pp: 25-30. [A clear and accessible article with an emphasis on questioning techniques].

Fry, H. (1987) Worksheets as museum learning devices, *Museums Journal* 86 (4), pp: 219-225. [A survey of changing attitudes to worksheets with a positive tone and a helpful bibliography].

Hall, N. (1984) *Children, Materials and Interpretation*. in Hall, N. (ed) *Writing and Designing Interpretive Materials for Children*, Design for Learning and Centre for Environmental Interpretation, Manchester Polytechnic. pp: 27-35. [A thought-provoking discussion of the way that written materials help or hinder a child's interpretation of a display and a view on the role of interpretation in the learning process].

Jones, L. and Ott, R. (1983) Self-study guides for school-age students, *Museum Studies Journal* 1 (1) [Emphasizes the value of learning from objects and focuses on types of questions. Looks at collaboration between museums and schools].

McManus, P. (1985) Worksheet-induced behaviour in the British Museum (Natural History) *Journal of Biological Education* 19 (3) pp: 237-242. [An example of how to assess the effects of the use of activity sheets in exhibitions. The sheets referred to are no longer in use at The Natural History Museum. This research shows that some techniques used to elicit a response on activity sheets can cause problems].

Wright, A. (1984) *Writing Interpretation Materials for Children* in Hall, N. (ed) *Writing and Designing Interpretive Materials for Children*, pp: 77-88. [Design for Learning and Centre for Environmental Interpretation, Manchester Polytechnic Concentrates on cognitive processing when children interact with objects].

Other useful references to activity sheets (worksheets) can be found in the following articles...

Davis, H.B. (1980) Kids have the answers: do you have the questions? pp: 64-68 in *Instructor* 90. [Looks at types of questions and their implications].

Durbin, G./Morris, S./Wilkinson S. (1990) *A Teacher's Guide to Learning from Objects*. English Heritage. ISBN 1-85074-259 6.

Durbin, G. (1989) Evaluating learning from historical objects pp 12-13 in Hooper-Greenhill, E. *Initiatives in Museum Education*, Department of Museum Studies, University of Leicester. ISBN 0 951005-0-3.

Grinder, A.L and McCoy, E.S (1985) *The good guide: a sourcebook for interpreters, docents and tour guides*. Ironwood Press, Arizona. ISBN 0-932541-00-3. [Looks at questioning strategies].

O'Connell, P.S (1984) Decentralizing interpretation: developing

museum education with and for schools. *Roundtable Reports* 9 (1) pp: 17-22. [Designing material in collaboration with teachers].

Reeve, J. (1981) Education in glass case museums *Journal of Education in Museums* 2 pp : 1-6. [Suggests ways of working with displays of material which cannot be handled].

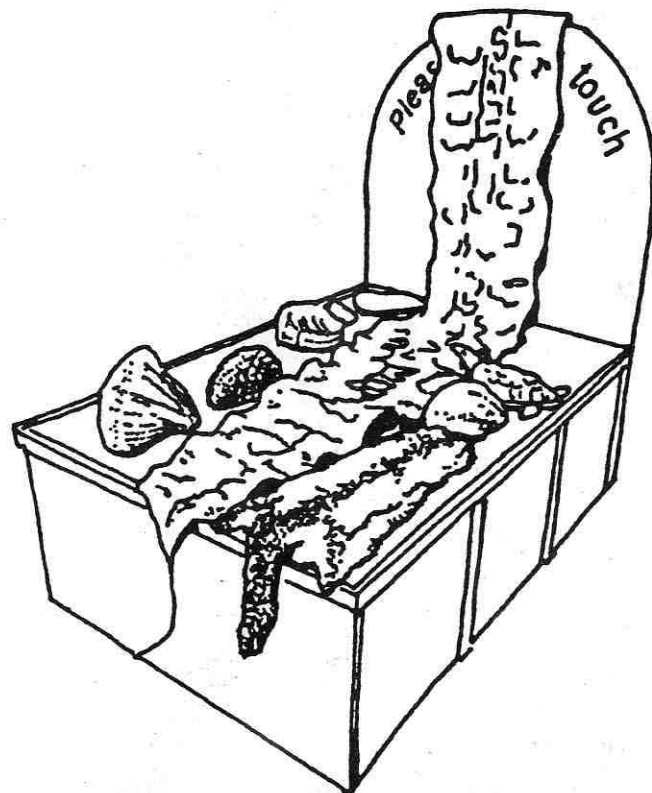
THE TRAVELLING DISCOVERY CENTRE (TDC): What we have discovered while it has travelled.

Amanda Pearson, *Travelling Discovery Centre, Natural History Museum, London, SW7 5BD*

The Natural History Museum's Travelling Discovery Centre (TDC) has been on the road for four years. Sponsorship from Marks and Spencer has enabled us to take it to a number of venues free of charge. These have included museums, countryside and environmental centres, and even a shopping mall.

If I were asked to identify one lesson I had learned from my journeying with it, it would be this – **never assume anything**. Bearing this in mind, let me begin by explaining what the TDC is and the service it offer.

Based on the permanent Discovery Centre at The Natural History Museum, London, the TDC aims to encourage first hand investigation of natural history. A series of hands-on activities are used; visitors can stroke a python skin, become a seashore detective, or hunt for fossils. The exhibitions philosophy is one of learning by doing...



Children aged 7-11 years can visit the centre in booked school groups during term time whilst at weekends and during holidays it is open to the general public.

The element that makes the TDC visitors experience particularly memorable is its explainers. These people have three important functions to fulfil. First, and most importantly, they are there to interact with visitors, and to enhance and extend their learning experience. Secondly they ensure the space functions smoothly (sharpened pencils, enough worksheets, correct specimens in appropriate boxes), and thirdly they can keep a keen eye out for wandering specimens!

To those of you concerned about taking your specimens out from behind their protective glass I should add that in 4 years of being on

the road we have only ever lost one specimen – a piece of granite. During its four year history the TDC has developed from a temporary exhibition visiting a temporary gallery into an event coming to town! We now offer a series of support activities ranging from story telling to art workshops to scientists corners!

For the BCG/GEM conference I was asked to summarise what I had learned whilst touring the exhibition. This produced a check list as follows. I hope it will be useful for anybody planning to tour an exhibition. The majority of my discoveries relate as much to touring exhibitions in general as to touring natural history in particular.

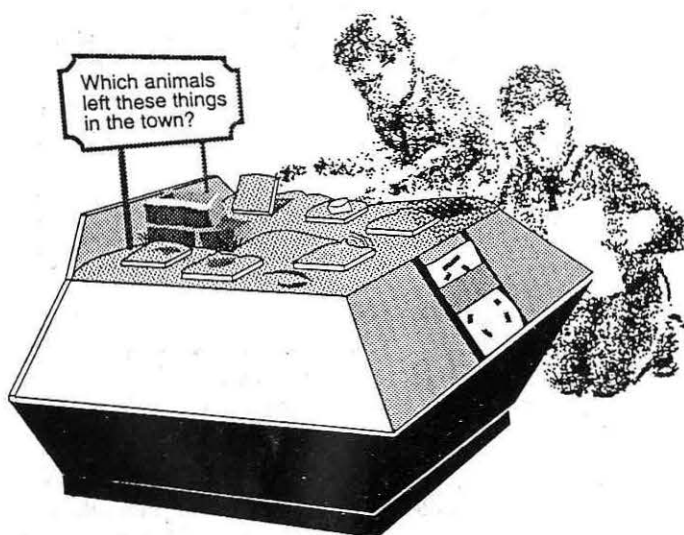
What criteria would you use to assess a venue?

Always visit a venue to vet the space. Your idea of 100m² and that of the venue's curator may be very different!

Consider...

Practical issues – what does the venue offer?

- * a suitable sized space
- * power source (if required)
- * storage (for crates etc)
- * access for installation purposes
- * access for disabled visitors



Plus/minus points

- * proximity of public transport
- * closeness of other potential venues (near enough to keep transport costs down, far enough away to have a different audience)
- * previous visits to area/venue

Political points

- * what is your policy on charging?
- * what is the attitude of venue staff to your exhibition – can you work with them?

How would you transport your exhibition?

This is not just a question of getting from A to B, but packing and unpacking, loading and unloading. A national carrier may be able to offer you transport at a cheaper rate – but will they give you peace of mind?

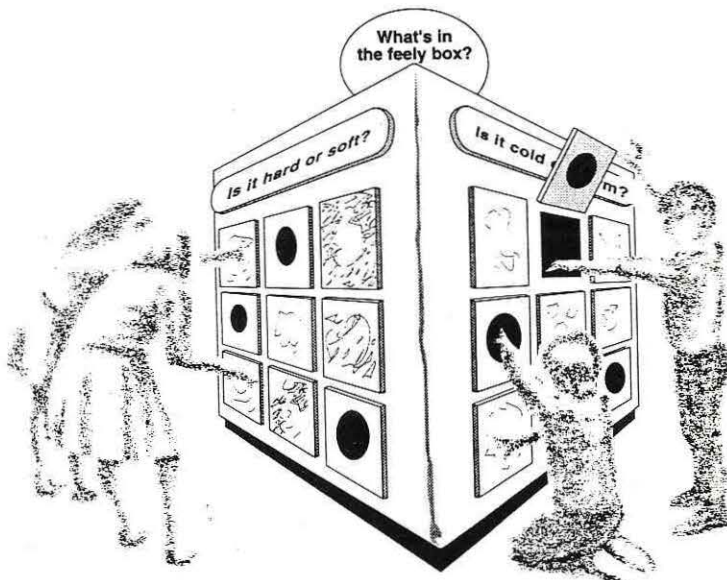
Consider... cost v reliability

Options include

- * staff and vehicle from host venue
- * local firm in area visited
- * local firm in place of exhibition origin – this is my preferred option. We work with the same people every time, and have thereby developed a good working rapport.

How would you staff the exhibition?

In the case of the TDC, volunteers have been recruited through



local volunteer bureaux, sixth form colleges, PGCE courses, The University of the Third Age and museum 'friends' associations. Two part time supervisors are also recruited, on a short term basis, from the area hosting the exhibition. We look for friendly approachable personalities rather than scientific experts – but if a candidate can offer both, so much the better! Training is provided in terms of the exhibition content and questioning skills.

Consider...

- * what staff cover does your exhibition require?
- * what qualities or skills should staff possess?
- * who can offer such skills or qualities?
- * what will you offer them?

How will you promote the exhibition to teachers?

Consider...

- * Teachers need to be given plenty of notice – Preliminary information should be sent out two terms in advance of a visit. Main promotional events should happen a term prior to the visit.
- * Teachers have to deliver the national curriculum – Make sure your exhibition will help them do this. TELL them how it will do this.
- * Teachers need to feel valued – Feed them – they'll remember you! Offer tea and cake or a buffet. Wine can double attendance figures!

How will you promote the exhibition to the general public?

As well as the usual posters and leaflets, try ...

- * AA signs – these can be arranged at a relatively low cost, compared to other forms of publicity and people trust them!
- * an official opening
- * a series of connected, themed events – as the press promote these, your exhibition continues to get a mention...

Any other considerations...?

Think about...

- * written terms and conditions
- * using a single liaison point/person
- * hidden administrative costs to exhibition originator
- * marketing opportunities
- * evaluation!

I hope this list can help anchor BC readers in the sea of developing and organising a touring exhibition!

After four years on the road I am still receiving approximately four enquiries a week, and have a waiting list of host venues 12 months long. This is partly because the exhibition hire is free, but also the reputation we have gained for delivering a complete package for staff training and additional events.

There are many hands-on centres dealing with physical sciences and chemistry in this country. By comparison natural history is

poorly represented. Some healthy competition out there would be welcomed! A pack of explanatory and activity sheets relating to the TDC is available on request from the Author.

SETTING UP AND TRIALLING A HANDS-ON NATURAL SCIENCE MUSEUM: Why Hands-on Natural Science in Hampshire Museums Service?

Ann Nicol (SEARCH Development Officer) & Isabel Hughes (Hants County Museums Education Officer), 'SEARCH' 50 Clarence Road, Gosport, Hants PO12 1BU

As a County Museums Service, Hampshire collects on a regional basis within agreed subject areas: Hampshire history (incorporating archaeology), Decorative arts and Natural Sciences. Yet the service has no 'County Museum'. Instead a series of small local museums in towns around the county are provided, many in partnership with the relevant district council. The County collections are displayed in these museums in so far as they are considered appropriate to what is largely a 'local story'.

Clearly this is limiting for natural sciences collections. Displays in many of these museums have also tended towards dioramas of local habitats using the most 'attractive' specimens for such displays – large mammals and birds. Providing further specimens for study has been considered but space for activities, particularly those involving microscopes and lenses, is limited in most of the museums in our care.

When a building became vacant at Gosport, adjacent to one of our museums, and available for the Museums' Service's use, this was quickly seen as an opportunity to set up a facility where natural sciences could be developed in their own right.

The building in question was an old school with a number of classroom spaces which could fairly easily be made into handling areas. The existence of three blocks of toilets was also an obvious asset!

A small working party, consisting of Keeper of Biology, Marketing Officer, Education Officer and the Curator of Gosport Museum, drew up a draft plan for the facility for our committee to approve. Some key issues were decided upon at this stage, including the need to appeal to schools and family audiences, with specialists to be planned for after these groups had been considered, and to provide interpreters on hand able to help visitors get the best out of specimens and exhibits. A Development Officer was appointed to work specifically on the scheme. Finally a name was found for the centre – SEARCH for Science.

Setting up SEARCH for Science

The next step was to consider the main ingredients necessary to set up the hands-on natural sciences centre. Several components were required right from the start to allow SEARCH for Science to develop: accommodation, money, time, an enthusiastic development team, and curators who don't mind specimens being used.

The design of SEARCH for Science facilities was to allow for use by groups of different ages, with provision for visitors to get close to specimens and handle them, plus equipment such as microscopes to look at the specimens, and a demonstrator to lead the group.

The physical layout of SEARCH for Science

The chosen decor is plain cream walls, grey worktops and green trim to fit in with the present decor of Gosport Museum. We used corded carpet tiles for flooring, and fixed worktops around the edge of the room providing tabletop space, which uses the space efficiently. Other tables in the room are arranged in small 'workstations', suitable for small groups of pupils to fit around – we feel eight is really the minimum number of workstations to provide for an average class size of 30+. We chose a standard height of 720mm for all of the worktop and table space in the centre and 760mm bench width. We did consider having some lower table heights for smaller children, but reckoned that they cope with these heights at home, and it is time-consuming to have to change around

the tables between one session and the next for groups of different ages. We used adjustable racking and bracket shelving for display space, and decided on recessed louvred strip lights to cut down the problems with reflection in some of the glass-fronted display cases.

Storage space was necessary both within the room and in another area, for equipment and specimens. Several cupboards were built under the fixed benches, and there are some additional free standing cabinets including three Hill's type cabinets for storage of small biological and geological reference collections.

All of the activities in SEARCH for Science would be to do with observing the collections and being 'scientists'. It therefore seemed most appropriate to concentrate on providing ways of helping people look, especially at the smaller specimens, so we chose a variety of magnifying devices. We now have a number of illuminated magnifiers (x2 to x4), conventional microscopes (x10 to x20) and two video microscopes. The video microscopes consist of a Monozoom7 high power lens, Panasonic CCTV video camera, a 21" scientific monitor, and a Schott fibre optic light source. This arrangement gives magnification on the monitor of from x16 to over x300.

Some functional aspects of the facility

The physical layout and equipment generally work well when groups visit SEARCH, but a couple of points have become obvious over a period of time. For activities involving hands-on contact with biological specimens, teachers agreed that it is important to ensure proper hygiene procedures (hand washing). We found that this could be a time consuming part of each session unless very tightly organised.

The chosen table heights seem fine, even for the youngest visitors (age 5). The only height problem is in the use of the conventional microscopes – boxes of different heights for the children to stand on would help.

Preparation equipment

It is essential to have access to a specimen conservation service of some kind, or at least supplies of materials like paint, insect setting equipment, cleaning materials, and specimen repair materials.

Access to a good library and/or budget for a selection of good general reference books, children's reference and story books, has been a great help when planning sessions. Amongst the most useful pieces of equipment behind the scenes are: word processor, laser printer, photocopier, laminator and all the usual office equipment. These have enabled us to produce quick, professionally finished written materials for school sessions.

Specimen choice

Basically, many specimens specifically prepared for display are fine. Standards of taxidermy should be high – it is counter-productive to put bad specimens out for educational work – they may only succeed in putting potential adult visitors to museums off for life! However, specimens may have to be displayed or treated in a way that makes them more 'handle-able'. We have tackled this by putting small and fragile specimens in glass-topped boxes, and are looking into the feasibility of embedding specimens in clear acrylic. It has to be remembered that some specimens have a high 'yuck' factor (e.g. spirit material), and it is a problem to find a good way of displaying them. There are also problems with herbarium material in that very often it doesn't look much like the living thing! Examples of economic botany (wood, seeds and other plant products) are usually better for handling activities.

The two main considerations when choosing specimens are safety of specimens and safety of visitors.

Thinking about the safety of specimens, robust specimens on open display are usually fine, but a limited amount of damage will occur. This can usually be limited with an explanation to each group at the start of their visit, and also making sure the teacher and helpers are briefed on the nature of the activities before the session.

Thinking about the safety of visitors, it must be explained to the teacher that the session involves contact with fur and feathers, so

that they can inform parents before the visit takes place. Care must be taken also to avoid any old specimens which may have been treated with arsenic soap or any other toxic chemicals, or which may have bits of wire sticking out. Mounted specimens should be on solid, bottom-heavy bases, but not too large to be moved around. Geological specimens to be picked up and handled by young children should be large enough to see the key features but small enough not to cause injury if dropped.

The trialling process

With a relatively long lead-in time before SEARCH for Science opened (Sept 1995) it seemed important to test out our facilities and the types of learning programmes we wanted to offer, through trial schemes. To do this we needed to recruit a 'client group', willing not only to undertake these trials, but also form a partnership with staff at SEARCH for Science.

From the start we felt we needed to develop particular education programmes for schools rather than have them "graze" through the facility in a totally self-directed way as happens in many hands-on facilities. This was partly because we saw this as the best way to address directly the needs of the National Curriculum.

We decided our first client group would be Key Stage 1 and 2 children and their teachers, and proceeded to contact directly all the infant and junior schools in the Gosport area. Being near SEARCH we felt it would be easier for us to build up an informal relationship with these schools – it would be easier for either side to meet up at short notice. We enjoy a good relationship with Hampshire Science inspectors and advisers and they have provided advice and encouragement for the scheme.

Of the twenty nine schools we contacted, nineteen agreed to an interview. Of these, six schools subsequently made a total of 28 trial visit bookings. We made appointments with the Science co-ordinator, and in some cases the Head teacher also attended. Meetings took place in the individual schools at a time that suited the teachers – invariably after school. It was important to show that you were putting yourself out for them. Postal surveys and letters are notorious for going astray – teachers are inundated with them, and often don't reply even though they may be interested in what you are doing if you talk to them. We were also convinced that making personal contact would encourage teachers to 'stick with it' – possibly out of a sense of guilt!

At these meetings we showed some prepared visuals to explain

what we intended to do at SEARCH for Science. It was important to explain that this was not a 'museum' as they might know it. To keep up the pace of the meeting, and make sure that similar areas were covered with each school we used an agreed format of questions. We were careful, however, not to be too rigid with this, and used the questions as a prompt for conversation, although we did record the answers.

Based on these discussions we have since commissioned a postal survey for the whole of Hampshire and the adjacent areas – 1,200 schools would have been too many to contact personally! The survey asked detailed questions about pricing, distances schools are prepared to travel, and what are seen as the most relevant visits for developing National Curriculum Science work.

Another decision based on these client group discussions was the first three topics to be developed for Key Stage 1 and 2 audiences: Food chains, Materials, and Diversity of Life. These topics were worked up and lesson plans were presented to teachers at an after school meeting. 30 teachers attended, and they were given the opportunity there to make bookings for a session on any one of these topics.

Those booking in were expected to enter a 'contract' with us. We would provide the session free of charge – we intend to make a charge for the interpreter's time when we are fully open. In return the teacher would be prepared to come to a pre- and post-visit meeting and to provide a written or oral evaluation of their session according to a format developed by us.

At the time of writing six schools have taken part in 17 trials. The kind of things we have actually been doing with schools so far have been themed sessions using a selection of appropriate specimens. The typical structure has been an introduction followed by activities using equipment and specimens.

The feed-back about these sessions has so far been positive, but not nearly as bland as typical teachers' evaluations. Too often teachers can be grateful for anything you do for them, and are keen not to offend you and make much comment other than the extremely positive. Specific problems and issues are talked about. However, we still feel that teachers are being 'polite' with us, and next year we will be working with the South East Museums Education Unit (a wing of SEMS) with them perhaps carrying out the evaluation for us, as a third party. We will also be working with them to look at the issue of training our interpreters.

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