



This area is crucial for helping children to learn about and make sense of the world around them. The starting point for a vast range of holistic activities, the development of knowledge and understanding in the early years forms the foundations for later work in science, design and technology, history, geography and information and communication technology.

***“The process by which children turn experience into knowledge is exactly the same, point for point, as the process by which those whom we call scientists make scientific knowledge.”***

(J. Holt, *Learning All The Time*, 1995)

When observing a young child at play we can see them noticing, contemplating, practising, experimenting with solutions and making adaptations as their understanding grows. It is imperative that we nurture this process without over-directing it, and facilitate wonder and excitement in our provision of resources and carefully planned experiences.

Practitioners need to provide positive role models for children to support the development of skills which enable them to investigate, ask questions, experiment and solve problems. When an adult joins in enthusiastically with a mini-beast hunt, the children will learn how to be curious and enthusiastic. Children will see the value of using books to find information if an adult does this alongside them. The further challenge within the adult’s role is to provide for children according to their individual capabilities and interests and to consider a range of approaches that will encourage children to communicate what they have found out and to speculate about future findings. This helps them to reflect on their own learning.

In addition, the use of appropriate language and open-ended questions is essential. While investigating materials the practitioner might say, “This is very rough and this one is smooth.” Carefully planned questions are also important to allow children to develop their thinking. Questions such as, “What would happen if...?”, “How can we...?” and “Can you find a way to...?” will prompt children to think about things for themselves and try them out.

**Context for learning: Heuristic play**

**Thomas: 13 months**



**What did Thomas do?**

Thomas's key person, Teresa, has noticed that Thomas shows high levels of involvement when exploring selections of materials in a treasure basket. Now Thomas is increasingly mobile she realises that he is ready for something new. She sets up an exploratory play session based upon the heuristic play approach. Teresa sets out an attractive square of fabric and arranges a variety of baskets, containers, boxes with lids and cylindrical tubes. Alongside these she places ample collections of spoons, scourers, pegs, ribbons, bangles and beads. Teresa checks to ensure the materials are safe.

Thomas enters the room with two friends. While they watch tentatively, Thomas heads straight for the spoons. He explores each one diligently and mimics raising the spoon to his mouth. He continues to study the spoons, placing each one into a basket. When it is full he turns towards Teresa, who acknowledges his communication with a nod and a smile.

Teresa motions with her arms to make Thomas aware of the other resources available but does not influence his selection. Thomas turns to look and selects some long strings of beads. He drops them into a tin and shows surprise at the noise they make. Intrigued by this he repeats the same action several times.

**How did the adult support Thomas's learning?**

- § By observing carefully to identify and build upon experiences that interest Thomas.
- § By encouraging Thomas without influencing the choices he makes.

**Links to Early Years Foundation Stage**

**Personal, Social and Emotional Development**

**Dispositions and Attitudes**

- § Have a strong exploratory impulse.

**Knowledge and Understanding of the World**

**Exploration and Investigation**

- § Sometimes they focus their enquires on particular features or processes.

**Physical Development**

**Using Equipment and Materials**

- § Become absorbed in putting objects in and out of containers.

**Next steps:**

- § Add further resources to maintain interest levels.
- § Introduce shakers and simple instruments which make a noise when shaken.
- § Record Thomas's interest and experience as part of a learning journey to be shared with his parents.

**Context for learning:**  
**Exploring filling and emptying**  
**Keeley: 2 years**



### **What did Keeley do?**

Sarah has many resources for heuristic play, including nesting tins. After observing Keeley's interest in filling and emptying at a recent childminder network group, Sarah sets out some of these resources in a corner of the playroom for children to investigate. As Keeley comes in from the garden she immediately goes to the resources and stands looking at them. "Do you want to play with those things?" Sarah asks. Keeley and Sarah smile and Keeley sits down. Sarah remains close and notes some observations. Keeley spends ten minutes filling the boxes with resources. She attempts to put fir cones into the middle sized box and looks puzzled. She then puts the cones into the largest box and puts on the lid. Keeley is then able to put appropriate sized resources into each box. She shows the baskets to Sarah. "Look in here!" she says excitedly. "Oh, what a surprise!" says Sarah. "You did well to fit those things into the boxes." Keeley then picks up a tin. She removes a lid and is delighted to find another tin and then another inside. Keeley fills the largest tin with feathers before selecting some bangles. She is unable to fit them into any tin and puts them down. Sarah puts a bangle around the smallest tin. Keeley laughs and then repeats this with all of the other bangles.

### **How did the adult support Keeley's learning?**

- § By providing resources in response to Keeley's interest.
- § By providing reassurance and encouragement for Keeley to begin her exploration.
- § By modelling ideas for the development of Keeley's play while maintaining an open-ended approach.

### **Links to Early Years Foundation Stage**

#### **Personal, Social and Emotional Development**

##### **Dispositions and Attitudes; Self-care**

- § Show willingness to tackle problems and to enjoy self chosen challenges.

#### **Problem Solving, Reasoning and Numeracy**

##### **Shape, Space and Measures**

- § Are beginning to understand variations in size.

#### **Knowledge and Understanding of the World**

##### **Exploration and Investigation**

- § Explore, play and seek meaning in their experiences.

### **Next steps**

- § Incorporate the use of stacking boxes into other experiences across the environment.
- § Develop heuristic play experiences with additional resources available.
- § Use simple vocabulary related to size in play activities.

**Context for learning: Child-initiated outdoor learning, exploring with drain pipes and water**

**Bradley: 4 years**



### **What did Bradley do?**

Children have free access to the outdoor classroom. Bradley often chooses to work outside and has been investigating different lengths of drainpipe placed in the 'builder's yard'. Practitioners have observed him pouring water into the top of a pipe and watching for it to come out at the bottom.

Marie, Bradley's key person, observes as he attempts to attach a piece of drainpipe to a pillar located next to a drain. She intervenes to help him by holding the pipe as he attaches it with some string. Bradley moves away and returns with a small watering can he has filled from the outside tap. "Watch," he says, and smiles as the water runs down the pipe on to the ground. "It's coming out fast," he comments.

Bradley stops and rearranges the pipe so that it touches the drain. He fills the watering can again and repeats the pouring action. Bradley watches intently, turns to Marie and says, "It comes down the pipe and goes in the hole, then it's gone!" "I wonder where it has gone to?" asks Marie. Several children come to watch and Marie encourages Bradley to explain what he did and what he found out. The children look down into the drain and suggest where the water might have disappeared to. Marie asks, "How could you collect the water?"

### **How did the adult support Bradley's learning?**

- § By providing materials and opportunities for children to follow their own ideas.
- § Through sensitive intervention to extend learning.
- § By encouraging Bradley to verbalise what he experienced.

### **Links to Early Years Foundation Stage**

#### **Knowledge and Understanding of the World.**

#### **Exploration and Investigation**

- § Describe and talk about what they see.
- § Show curiosity about why things happen and how things work.

#### **Designing and Making**

- § Investigate various construction materials.

### **Next steps**

- § Provide opportunities for Bradley to talk about his investigations, raising questions such as, "What will happen if?" and "What else could we try?"
- § Set up further investigations around transporting and transferring water.



**Context for learning: A new apron for Cinderella**  
**Saba: 5 years**



### **What did Saba do?**

The children are testing a range of materials to see which would be the best to make a new apron for Cinderella. Saba looks carefully at the materials provided. She says, "Wood won't be any good because it's too hard." A range of foodstuffs is available for the children to investigate on each of the materials, including ketchup, water, honey and juice.

Saba picks up a piece of plastic and places it on the dress. She pours some water on, stands back and looks at it for a moment and says, "The water is just staying on top of this so it would keep her dress dry." Saba then smears some of the food on too. "This plastic would really keep her dress clean." The practitioner asks her if she would like to test any more materials and she chooses the fabric. She places this on the dress and pours some water on it. She looks at it and then lifts up the fabric and feels the dress. "Oh no, that's made the dress wet so that won't be any good." Saba and her friends spend some time exploring the materials and food available. At the end of the session the practitioner asks Saba which material she thinks would make the best apron and she says: "The plastic is better because it won't make her dress all wet and dirty."

### **How did the adult support Saba's learning?**

- § By providing the opportunity for Saba to engage in a practical, investigative activity.
- § By providing a range of appropriate resources.
- § By giving the activity a purpose.

### **Links to Early Years Foundation Stage**

#### **Knowledge and Understanding of the World**

#### **Exploration and Investigation**

- § Describe and talk about what they see.
- § Investigate objects and materials by using all of their senses as appropriate.
- § Find out about and identify some features of objects they observe.

### **Next steps**

- § Give Saba the opportunity to record what she has found out, for example by drawing a picture, writing or taking a photograph.
- § Provide further investigations for Saba to take part in, which explore the concepts of wet and dry.
- § Use open-ended questions to extend Saba's thinking in this area.



**Context for learning:**  
**Exploring how sounds are made with a range of instruments**  
**Miles: 6 years**

**What did Miles do?**

Miles and a friend are invited to explore a range of different musical instruments, bells, rattles, wooden blocks, a tambourine, drums and chime bars. They are asked to identify all those which they need to shake to make a noise. The children experiment with each instrument for several minutes before making their decisions confidently. The teacher asks if they can sort the instruments in a different way. Miles looks at the instruments and thinks before selecting the drum and banging it with his hand. "I have to hit this," he says. Next he picks out the chime bars and a beater. Looking at his teacher he says: "You hit this one too, but not with your hand." Miles correctly selects several other instruments which make a sound upon being hit rather than shaken. He pauses at the tambourine, picks it up, then comments, "This one is both, and you can shake it to make it rattle and hit it." Miles and his friend continue to explore the instruments and are then able to use a data-handling program on the interactive whiteboard to record their selections.

**Links to Early Years Foundation Stage**

**Knowledge and Understanding of the World**

**Exploration and Investigation**

- § Investigate objects and materials by using all of their senses as appropriate.
- § Look closely at similarities, differences, patterns and change.
- § Ask questions about how things happen and how things work.

**Links to National Strategy:**

- § Sound and hearing unit 1F.

**How did the adult support Miles's learning?**

- § By providing a range of instruments.
- § By allowed children time to explore the different sounds.
- § Through questioning to extend his thinking.

**Next steps**

- § Encourage the children to talk about what their recording shows. Ask them to explore the sounds made by musical instruments.
- § Encourage the children to identify sounds that they like and dislike.
- § Use a CD-ROM to find out about other musical instruments and how they make their sounds.