

Foundation Phase Cross-curricular mathematics and numeracy examples

Playing out

Children explore how they move and turn by taking part in a series of games and activities based in the school playground and the 'adventure' area. They use a large clock face drawn on the tarmac to recognise whole, half and quarter turns and of finding halves and quarters in practical situations. Children begin exploring the idea of 'o'clock', 'half past', 'quarter past' and 'quarter to'. This scenario also provides an opportunity to introduce the terms 'clockwise' and 'anti-clockwise' to the children. They use and explore the adventure area to think about the direction and how far they move and turn. Children use the context of playground games to explore their understanding of whole, half and quarter turns and finding halves and quarters in practical situations. To consolidate their understanding children are encouraged to programme a 'floor turtle' or 'beebot' to make full, half and quarter turns, both to the left and to the right.

During this task, children can participate in pairs and sometimes as individuals. There will also be aspects of the task that lead to whole-class participation.

Each section of the task has a number of bulleted suggested questions that can be posed to children to try and elicit their understanding and reasoning. These can be used either directly by the teacher or can be given to a group or pair of children to structure their thoughts.

Resources provided by the teacher

- Outdoor play environment - adventure area, large clock face painted on ground and other games painted on the playground, such as hopscotch, snakes and ladders, etc.

What to do

Prior to the task

Explain to the children that they are going to explore how they move and turn by taking part in a series of games and activities based in the school playground and the 'adventure' area that contains apparatus like climbing walls and rope bridges.

During the task

Ask the children to think about and discuss the games and activities they play in the playground and the 'adventure' area. Encourage them to share their ideas and to consider what they think and talk about when taking part in these games and activities.

Using a clock face

Explain to the children that they are going to use a clock face drawn on the tarmac to begin to physically explore how the hands of a clock move and to read 'o'clock' times. You might

ask children to walk along the path a clock hand follows and encourage them to recognise when they have walked around the whole circle and to consider when they walked half way and a quarter of the way around the circle.

This provides children with opportunities to recognise whole, half and quarter turns and of finding halves and quarters in practical situations. Moving from the '12' to the '6' or 'halfway' around the clock face will allow them to explore the idea of 'half past'. Similarly, moving from the '12' to the '3', the '3' to the '6', the '6' to the '9' and the '9' to the '12' or a 'quarter' of the way around the clock face will allow children to begin exploring the idea of 'quarter past' and 'quarter to'. This scenario also provides an opportunity to introduce the terms 'clockwise' and 'anti-clockwise' and children might be encouraged to use them when moving around the clock face in different directions. Small groups of children might then be given more practical opportunities to use the large clock face in the playground and lay down to show 'o'clock' times before drawing 'o'clock' times. When confident with these they might begin to explore 'half past', 'quarter past' and 'quarter to' times in a similar manner.

- How do you know when you have completed a whole circle?
- How do you know when you are half or a quarter of the way around?
- How does a clock look when it shows 'half past'?
- How does it look when it shows 'quarter past' or 'quarter to'? How do you know?
- How could you show these times on the large clock face?
- What does 'clockwise' mean? Why do you think that?

Using the adventure area

Ask the children to use and explore the adventure area and to think about the directions they move in and turn. Encourage them to consider whether they are moving up, down, forwards, left, etc. Also, ask the children to consider the direction in which they turn and how far they are turning, e.g. half, quarter or full turns. Children might be provided with instructions about how to move by an adult or their peers, e.g. 'When you reach the end of the bridge, turn a quarter to your right', etc.

Prompt the children to consider their actions by asking questions such as the following:

- How will you know when you have made a whole turn?
- How will you know when you have made a half or a quarter turn? How did you learn this?
- How do you know which way is left and which is right?
- In what different directions can you move when on the climbing frame?

Using the playground games

Explain to the children that they are going to use the context of playground games to explore their understanding of whole, half and quarter turns and finding halves and quarters in practical situations. Ask them to play traditional playground games like 'snakes and

ladders' and 'hopscotch' that might be painted on the tarmac. Encourage them to consider whether they make whole, half or quarter turns and also to look at the different grids they are using and to use this practical situation to find halves and quarters. Playing these games will also provide opportunities for children to consider the directions in which they are moving, to read and write numbers, count on, and add or subtract larger numbers.

- How will you know when you have made a whole turn?
- How will you know when you have made a half or a quarter turn?
- How could you find half of this grid? Why would you do it that way?
- How would you find a quarter? How do you know that is a quarter?
- In what different directions can you move in this game?
- How many squares do you need to move? How will you know when you have moved the correct number of squares?

As an extension to this task, children might be provided with further opportunities to recognise halves and quarters in a range of familiar practical situations and gradually be prompted to find halves and quarters in less familiar and more abstract practical situations. They might also be encouraged to continue exploring whole, half and quarter turns in practical situations and encouraged to use the terms 'half' and 'quarter' whenever possible.

To consolidate their understanding they might use a 'floor turtle' or 'beebot' in class and be encouraged to programme it to make full, half and quarter turns, both to the left and to the right.

Taken from: Interactive Literacy and Numeracy Framework, classroom resources

Moving Toys

Overview

Children consider and explore a range of toys that either move or have moving parts. They photograph a toy and label and annotate their photograph to show the moving parts of the toy and their ideas. Children work together to set up a 'track' and investigate how far a range of toy cars travel, measuring distances in footprints. They consider stories about toys coming to life and develop scenarios about their own toys coming to life. Keeping with this theme, children explore and express imaginative ideas through creative movement.

During the task, children can participate in pairs, small groups and sometimes as individuals. There will also be aspects of the task that lead to whole-class participation.

Each section of the task has a number of bulleted suggested questions that can be posed to children to try and elicit their understanding and reasoning. These can be used either directly by the teacher or can be given to a group or pair of children to structure their thoughts.

This task consists of a series of activities that the children undertake in a carousel. Consequently, you may wish to spread the activity over a number of sessions. Children will explore a variety of toys, consider the moving parts and apply forces to the toys to help them move. They will make and discuss their observations and record their ideas.

Resources provided by the teacher

- Selection of moving toys.
- Digital camera.
- Chart for recording.
- Twenty paper footprints.
- Five toy cars.

What to do

Prior to the task

Cut out 20 child-sized footprints from sugar paper. Create a chart for recording the distance the toy cars travel. Collect and set out the other resources required (paper, pens, etc.).

During the task

How do toys move?

Ask the children to sit in a circle and provide them with a selection of toys that either move or have moving parts. Encourage children to explore each toy and the ways in which it can move and to discuss their ideas as the toy is passed around the circle. Invite each child to choose one of the toys and to take a photograph of the toy. After printing the photographs, ask the children to label and annotate their photograph to show the moving parts of the toy and their ideas. Provide support to help children record their ideas. If possible, record the children's discussions - maybe on a video camera.

- How do you think this toy moves? Why do you think that?
- What parts of the toy move? How do you know that?
- How does each part move? Why do you think it moves like that?
- What makes it move? How do you know that?

How far can a toy car travel?

Ask the children to work together to set up a 'track' with a clear starting line. Invite children to choose one car each and taking turns, to push their car to see how far it travels. (Each child must only push and release their car once.)

Ask each child to measure the distance their car has travelled using the paper footprints. An adult could record each measurement on a chart. The task could be repeated with children changing their car each time.

- Why do the cars move when you push them? How do you know this?
- Why do you think the cars slow down and stop?

- Why do you think you have changed cars each time?
- Have the cars travelled the same distance each time? Why do you think this has happened?
- What does the chart show? How do you know that?
- How could you show this in a different way?

How do my toys move?

Ask the children to think about and discuss what they know about stories when toys come to life. Encourage them to share their ideas and discuss some examples with them. (There are numerous examples in literature, comic books, video games, film, etc.) Invite the children to consider where they keep their toys and where they put them at night when they go to bed. Then, ask them to imagine what might happen if their toys came to life when they were asleep.

- What do you know about stories where toys come alive? How do you know about these things?
- What stories have you seen/heard? Where did you see/hear them?
- Where do you put your toys when you go to bed? Why do you put them there?
- Imagine your toys came alive when you were sleeping. What do you think they would do? What would they say? Where would they go?
- Would they always be back in the same place in the morning? Why?

What might happen in school if the toys came alive?

Following this introduction, children might engage in a variety of tasks where they explore the idea of their toys at home or in class coming to life. Children might use some of the class toys and act out a scene when the toys come to life after the school has closed in the evening. They could create a short scene for the toys and be encouraged to write some words that the toys might say. Alternatively, children might create a role play and act out a scene where they each play the part of a toy.

- What do you think the toys in class would do if they came alive after school was closed? Why do you think they would do these things?
- Where do you think they would go? Why?
- Would they go into the headteacher's room? Why do you think that?
- What do you think they would say to each other? Why do you think that?
- Which toy do you think would be the bossiest? Why?
- Who would say the most and the least? Why do you think that?

Moving like my favourite toy

Children might be asked to explore and express their ideas through creative movement. Ask children to imagine being their favourite toy. They might pretend to have been put away for the night and be asleep. The lights go off, slowly they begin to move and suddenly they leap into life. Ask children to link movements to create changing body shapes and pathways. They might explore how being in a different mood might change their movement and behaviour. Children could work on their own, in pairs or in groups and be encouraged to improvise and use their imaginations.

- Which toy is your favourite? Why?
- What is it called? Why did you give it this name?
- What do you think it would do if it came to life? Why would it do this?
- What would your toy be like?
- Would it be happy or sad, kind or unkind, funny or serious? Why would it be like this?
- How do you think the toy would move? Why do you think it would move like this?
- Would it move in different ways when it was in different moods? Why do you think that?
- How would the way it moved be different?

Taken from: Interactive Literacy and Numeracy Framework, classroom resources

Teddy Bears Picnic

Overview

Working collaboratively, children plan a Welsh Teddy Bears' picnic. They use a simple voting system to generate data on the food and drink they should offer and use this to generate a 'shopping list' of items. They may also represent the outcome of the vote to generate simple block graphs or pictograms. Children decide on the quantity of food and drink to be provided at the picnic. In making the food, they discuss and use the language of shape to describe the food items. They subsequently develop the ideas of fractions in discussing how best to cut sandwiches and cakes to be served to ensure food is shared equally and to appropriate sizes for the guests.

During this task, children can participate in pairs, small groups and sometimes as individuals. There will also be aspects of the task that lead to whole-class participation. Due to the diverse nature of the task, it is envisaged that it will take several sessions for children to explore it fully.

Within the task there are a number of bulleted suggested questions that can be posed to children to try and elicit their understanding and reasoning. These can be used either directly by the teacher or can be given to a group or pair of children to structure their thoughts.

Resources provided by the teacher

- Blank paper.
- Sticky notes.
- Clocks.
- Bread.
- Butter/spread.
- Variety of fillings as suggested by children, e.g. jam, honey, ham, chicken.
- Ready-made cupcakes or ingredients and equipment to make cupcakes.
- Plastic knives.
- Measuring jugs.
- Weighing scales.

- Paper plates and cups for picnic.

What to do

Prior to the task

Undertake a risk assessment to consider possible allergies and the use of equipment to cook and cut foods.

During the task

Who and when?

Explain to children that they are going to plan a Welsh Teddy Bears picnic' for the class and that each person can bring their favourite teddy bear along. Using different techniques to record their strategies, ask children how they might find out how many people, how many bears and how many bears and people altogether may go to the picnic. Place the pairs in groups of four and ask children to compare the strategies used, any calculations made and their decisions. Take random feedback with children leading to show how and why they used their strategies.

Working in their original pairs, ask children how they might decide the best time of day to hold the picnic. (You may wish to allow children to choose a day also although it is suggested that the picnic itself is held as the final part of the activity so that the planning process is purposeful to children.) Ask children to discuss the time of day they think the picnic should be held and show when the picnic would start and finish (if appropriate). Invite children to record this on their whiteboards, asking them to justify the formats used. Take random feedback, inviting children to share their ideas and show the times on a clock (if appropriate).

It is suggested that this part of the activity should take no less than 15 minutes to allow children to discuss their strategies.

What food and drink shall we serve?

Working collaboratively with children, generate success criteria for the party food and drink that should be served. Examples could include: it should represent something linked to Wales, small pieces of food, things that can be eaten with your fingers, food which doesn't make too much mess or crumbs, etc. Children then work in groups of four to suggest specific items of food and drink that could be served at the picnic. Depending on the abilities of children, they may record ideas on sticky notes in the form of pictures and/or text. From their discussions, ask groups to nominate a spokesperson to feedback their combined response. Children should review their group decisions against the developed success criteria and amend as required. Ensure that sufficient time is given for this and ask

children to justify any amendments made and how well the food and drink meets the success criteria.

Using the items they have suggested, children work in fours to sort the items into two groups – things they need to buy ‘ready made’ and things they can make themselves. Ask children to justify their decisions. If appropriate, you may wish to include a budget, e.g. a maximum value of £1 per item. Children could be asked to estimate how much their ‘wish list’ of items would cost individually and as a total, allowing children to show their strategies and reasoning accordingly. You may wish to ask children to work individually or in pairs to show combinations of coins that could be used to pay for various items and how much change could be expected from £1. Children could also consider the ‘value for money’ between ‘ready made’ items and homemade if appropriate, carrying out internet research to survey prices of items. This could be used purposefully by children to review their group decisions on items to buy.

Once groups have developed and refined their ‘wish list’ of items against the success criteria, you could take feedback from all groups to make a class decision using a simple voting system regarding food and drink for the picnic. You might use this for shared writing to develop a shopping list. Children may also show the outcomes of the ‘survey’ and voting system using block graphs or pictograms.

Depending on the direction taken in this part of the activity, this planning phase could extend between 30 minutes to two hours. As mentioned previously, it is essential that children are given sufficient time to communicate their ideas and show and justify their numerical reasoning and the strategies used throughout.

Making the party food and drink

Depending on the time available for the activity and your personal choices, children could either work with bought items (e.g. small cakes, biscuits) or you might wish to take this opportunity for children to look at, and use, simple recipes and develop their measuring skills to bake items. In using recipes, children need to locate, select and use the information given and respond to what has been read.

Children should make simple sandwiches and show how they used halves and quarters practically. This could be repeated with different food items of different shapes (e.g. round cakes) to compare the effect of halving and quartering different shapes.

Children should be asked to describe the food in terms of numbers, shape and colour, providing opportunities to develop their Welsh language also.

In making and preparing the food for the picnic, children could be asked how they are monitoring if the food is suitable in size and quantity.

Suggested questions could include the following:

- How can you check that the food is the right size for the bears and the people to eat?
- How can you be sure that there is enough food for everyone to share?
- What might happen if there is not enough food?
- What can we do if there is too much food? How will you know?
- How many plates will we need to use? How do you know?

Depending on the direction taken for this part of the activity and the considerable time required for reflection on strategies and reasoning, timings are likely to be no less than one hour for this phase.

Once all preparation is complete, children and bears can enjoy their picnic!

Taken from: Interactive Literacy and Numeracy Framework, classroom resources