

Standards Unit

Linking theory to practice: observation

Teacher and trainer handbook 7b:
graphs and charts

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Success for All website:
www.successforall.gov.uk

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Foreword

The Standards Unit

We are committed to the following principles which underpin all our work:

- We will recognise and celebrate excellence in the post-16 sector.
- We will recognise and celebrate diversity.
- We will be open and participative in our approaches to development.
- We will recognise barriers to excellence and be supportive of those working in challenging contexts.
- We will challenge underperformance.

Success for All is a partnership between the DfES Standards Unit and the Learning and Skills Council (LSC). The Standards Unit leads on Themes 2 and 3 and the LSC on Themes 1 and 4:

- Theme 1 – meeting needs, improving choice
- Theme 2 – putting teaching, training and learning at the heart of what we do
- Theme 3 – developing the leaders, teachers, training and support staff of the future
- Theme 4 – developing a framework for quality and success.

The Standards Unit was set up in January 2003 to embed excellence in teaching, training and learning and to modernise and upgrade the sector's workforce. It acts as a catalyst, selecting priority curriculum areas for action and harnessing the work of partners to improve quality in the post-16 learning and skills sector – in FE and sixth form colleges, sixth forms in schools, work-based learning, adult and community learning and the prison service.

The Unit's staff includes officials and expert practitioners seconded from colleges and other providers and the inspectorates. This core team is supported by call-off consultants, whose expert knowledge enables delivery in a range of areas. The work of the central team is supported by nine regional offices who are crucial to the national dissemination of the teaching and learning resources and the delivery of step improvements across the country. The Unit selects curriculum areas because of their importance to the economy and social inclusion and because inspection outcomes show there is room for improvement

To support the improvements required, the Standards Unit is also providing national free training in coaching for teachers and trainers who have been nominated as Subject Learning Coaches by their managers. The programme is designed to provide professional training for Subject Learning Coaches so that they can work confidently with colleagues to further improve teaching, training and learning in their subject area. It is a new and exciting programme which is being embedded through subject networks, where Subject

Learning Coaches from different backgrounds meet to share best practice and develop their coaching skills. If you would like to know more about becoming a Subject Learning Coach, why don't you speak to your Standards Unit Regional Director or look at www.successforall.gov.uk.



This health and social care resource will be a valuable reference in network meetings when Subject Learning Coaches are discussing the health and social care curriculum. We hope you will find this a useful resource and we look forward to receiving your comments and feedback.

Jane Williams
Director of Teaching and Learning
Head of Standards Unit

Introduction

The seven teacher and trainer handbooks are linked to the seven learner observation booklets. The booklets are designed for learners undertaking a level 3 qualification in early years. On completion of the first six booklets, the learners will have developed the skills and understanding essential to complete an observation to professional standards. The seventh booklet is an extension of Booklet 3 – methods of observation. Three of the methods are dealt with in more depth and detail.

Working as an early years practitioner is a very important profession. It is a privilege to be responsible for supporting children as they become confident and well balanced individuals, able to take their place in society. It takes many skills to provide a firm foundation for the future of a child. The most important are the ability to make objective observations, draw appropriate conclusions and prepare plans to encourage each child to achieve his or her full potential. Encourage your learners to be unobtrusive observers of children and they will learn much that will help them to develop these essential skills.

Effective observation is a sophisticated skill essential for working in a variety of early years health and social care settings. Observation skills are applicable through all vocational sectors and work-based learning environments. Rigorous observation processes demand many high level skills including recording, reviewing, monitoring, interpretation and evaluation.

The teacher and trainer handbooks provide ideas, resources and guidance to assist you in planning and organising learning. The handbooks aim to stimulate ideas to help you to improve teaching and learning but are not definitive guides. The seven teacher and trainer handbooks link to the learner observation booklets and may be used flexibly to meet the needs of individual learners. You may decide to use individual sessions for other programmes. For example, Handbook 6 would work well as part of an induction programme for most courses.

Throughout this handbook we refer to the following publications: *Foundation Stage Profile Handbook* and *Birth to Three Matters* – both DfES publications, produced by Sure Start.

NOTE

Guidance notes for teachers and trainers and a specimen scheme of work may be found in Handbook 1. The Teacher and trainer key skills handbook shows key skills mapped to the activities in Booklets 1–7c.

The seven teacher and trainer handbooks support each of the following learner observation booklets:

Handbook 1

How to develop good observation skills

Handbook 2

How to plan and record observations

Handbook 3

How to choose methods of observation

Handbook 4a

How to make sense of your observations.

Part 1: Interpreting your observations – milestones and norms.

Handbook 4b

How to make sense of your observations.

Part 1: Interpreting your observations – theorists and expert opinion

Handbook 5

How to make sense of your observations

Part 2: Conclusions and recommendations

Handbook 6

How to use references and bibliographies

Handbook 7a

Supplement to Booklet 3: methods – checklists

Handbook 7b

Supplement to Booklet 3: methods – graphs and charts

Handbook 7c

Supplement to Booklet 3: methods – time and event sampling

Each handbook is subdivided into three sections:

1. Session plan.
2. Activities.
3. Resources.

Graphs and charts

Session plan methods

What you will need to do for this session:

- Read this handbook.
- Read learner observation Booklet 7b.
- Photocopy enough copies of Booklet 7b for your learners.
- Remember to identify any potential barriers to individual learning. Build in plans to support each learner to achieve success. Where possible work with a colleague specialising in language, literacy and number (LLN) ensuring learners are able to **acquire** the skills (LLN) or **apply** the skills (key skills) to meet individual need.

The resources you will need for this session:

- Booklet 7b.
- Teacher and trainer handbook 7b for instructions for activities.
- The Observation key skills teacher and trainer handbook.
- Resources (handouts and OHTs) from the back of the teacher and trainer handbook.
- Access to ILT if appropriate.

The session:

- Introduction;
- Activity 1 – bar chart;
- Activity 2 – centile charts;
- Activity 3 – line graphs (weight);
- Activity 4 – pie charts;
- Tracking charts;
- Activity 5 – activity charts;
- Activity 6 – advantages and disadvantages of graphs and charts;
- Review and consolidation and **How did I do?**
- Teacher or trainer evaluation.

Programme	Teacher or trainer:
Unit: Observation	Length of session: 120 minutes
Topic: Using graphs and charts	Room:
Date:	Number on register:

Aim: Practise using charts and graphs to record or represent observation data.

Objectives

By the end of the session, learners will be able to record results from observations using:

- bar charts
- line graphs
- pie charts
- tracking charts
- activity charts

Learners will be able to identify the advantages and disadvantages of using the various kind of charts and graphs.

Task	Teacher or trainer activity	Learner activity	Resources	Learner outcomes
5 minutes	<p>Introduction to the session: To practise using charts and graphs to record or represent observation data.</p> <p>Introduce aims and objectives of the session.</p> <p>Recap on previous sessions and booklets using a range of methods to include all learners, for instance quizzes, charts and focused questions.</p>	<p>Discuss content of session.</p> <p>Discuss previous session and recap on booklets.</p> <p>Read Booklet 7b, pp. 2–3.</p> <p>Discuss experiences of using graphs and charts.</p>	Booklet 7b.	Learners understand the aims and objectives of the session.

Task	Teacher or trainer activity	Learner activity	Resources	Learner outcomes
	<p>Give out Booklet 7b and give learners a few minutes to look through the booklet.</p> <p>Ask learners to read Booklet 7b, pp. 2–3.</p> <p>Discuss previous experiences of using charts and graphs and when to use in a variety of situations.</p>	<p>Look through Booklet 7b.</p>		
20 minutes	<p>Activity 1 – bar chart.</p> <p>Ask learners to read Booklet 7b, p. 4.</p> <p>In pairs learners are to complete Activity 1 – bar chart.</p> <p>Feedback and discuss.</p> <p>Give out Handout 1, pp. 18–20, example of observation interpretation using bar charts.</p> <p>Discuss.</p>	<p>Learners read Booklet 7b, p. 4.</p> <p>Learners complete the bar chart on p. 5 using the data on p. 4.</p> <p>Discussion.</p> <p>Read example observation.</p> <p>Discuss.</p>	<p>Booklet 7b.</p> <p>Handout 1.</p>	<p>Learners demonstrate how to use data to produce a bar chart either manually or through the use of ILT.</p>

Task	Teacher or trainer activity	Learner activity	Resources	Learner outcomes
20 minutes	<p>Activity 2 – centile charts</p> <p>Explain use of centile charts.</p> <p>Show the learners how to read the centile charts and draw the average height onto their chart on p. 5. If available allow the learners to download a printable centile chart from the internet.</p> <p>Be clear about your instructions.</p> <p>Interpretation and assessment of centile charts</p> <p>Ask learners to complete the interpretation and assessment in Booklet 7b, p7 and discuss the terms used when talking about 'average'.</p> <p>Listen and ask questions.</p>	<p>Obtain a copy of the centile charts.</p> <p>Read the centile charts.</p> <p>Draw the average height onto the chart in the booklet on p.5.</p> <p>Discuss.</p>	<p>Centile charts (computers with access to the internet and printers or purchased copies of centile charts for boys and girls).</p> <p>www.cdc.gov/growthcharts</p> <p>Handout 1.</p>	<p>Learners understand how to use ILT to access websites and download centile charts for boys and girls.</p> <p>Learners are able to show how to use data from bar charts and transfer this to centile charts.</p> <p>Learners are able to demonstrate their understanding by interpreting data transferred to the centile charts.</p>
20 minutes	<p>Activity 3 – line graphs (weight)</p> <p>Explain that an alternative way of recording heights and weights is by using a line graph.</p> <p>Complete the line graph on p.8 from data in Booklet 7b, p. 9.</p> <p>Demonstrate how to draw the graph either manually or through the use of ILT.</p> <p>Give out Handout 2, p. 21, as an additional activity if required.</p> <p>Discuss and feedback.</p>	<p>Complete the line graph on p.8 from data in Booklet 7b, p. 9.</p> <p>Discuss and feedback.</p>	<p>Booklet 7b.</p> <p>Graph paper.</p> <p>Internet access.</p> <p>Ruler.</p> <p>Handout 2.</p>	<p>Learners understand how to use data to produce a line graph either manually or through the use of ILT.</p>

Task	Teacher or trainer activity	Learner activity	Resources	Learner outcomes
10 minutes	<p>Activity 4 – pie charts</p> <p>Introduce pie charts as a different visual representation of data. Ask learners to recall any previous experience of using pie charts. Help learners with calculating the angles/segments of the circle. You will need to explain how to calculate angle sizes and to use protractors to measure (see Handout 3, pp.22–23 of this handbook). Alternatively explain the use of spreadsheets on the computer. Help individuals.</p> <p>Interpretation of pie chart.</p> <p>Lead a discussion about what the pie chart is showing. Ask learners to give their reasons for why the child spent most time on an activity.</p>	<p>Read p. 11 of Booklet 7b</p> <p>Complete Handout 4, p.24, devise a pie chart and a key.</p>	<p>Booklet 7b.</p> <p>Handouts 3 and 4.</p> <p>Protractors.</p> <p>Rulers.</p> <p>Optional access to computers and interactive whiteboard.</p>	<p>Learners are able to use data to produce a pie chart either manually or through the use of ILT.</p>
15 minutes.	<p>Activity 5: tracking charts</p> <p>Ask learners to read the paragraph on p. 13 about tracking charts. Turn to p. 14 and show learners how to follow the arrows. Show OHT 1, p.25. Discuss.</p>	<p>Read p. 13 of Booklet 7b</p> <p>Study the tracking chart.</p>	<p>Booklet 7b.</p> <p>OHT 1.</p>	<p>Learners understand the purpose of using a tracking chart when observing.</p>

Task	Teacher or trainer activity	Learner activity	Resources	Learner outcomes
15 minutes	<p>Activity 6 – activity charts Explain that the activity chart shows all the areas in a nursery but not in any particular order. Ask learners to write each separate part of the information given previously for the tracking chart in Booklet 7b on p. 14 in the appropriate areas on the activity chart in Booklet 7b, p. 15.</p>	<p>Study the activity chart. Transfer information from the tracking chart onto the activity chart. Compare answers with another learner.</p>	Booklet 7b.	Learners understand how to use information to produce an activity chart.
5 minutes	<p>Review and consolidation Glossary – learners fill in new words or terms and discuss their meaning. Complete Activity 7, p. 15. Discuss. How did I do? Ask learners to complete Activity 8, p. 18, to check learning. Recap and evaluation Check that aims and objectives of session have been met</p>	<p>Complete Booklet 7b, pp. 14–15 Any questions?</p>	Booklet 7b.	Learners identify what they have learnt so far and areas needing further development.
After the session	<p>Complete teacher or trainer evaluation on p. 15.</p>			

Teacher or trainer evaluation

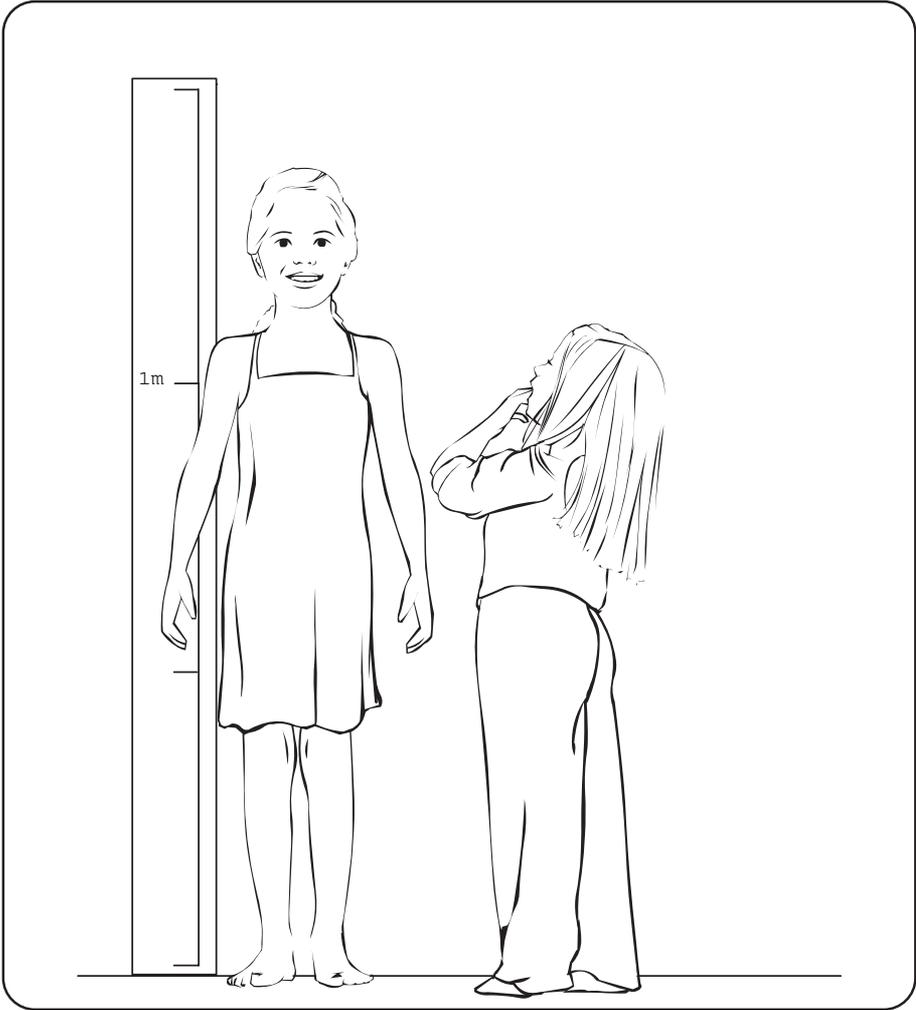
Identifying the needs of all learners (differentiation)	How the needs of all learners will be met (achieving differentiation)
<p>The following range of particular needs exist (these will have been identified during the learners' initial assessment):</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>The needs of particular learners will be met in the following ways:</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Review of:</p> <p>a) what went well</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>Review of:</p> <p>b) what went less well and how to improve it</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Review of:</p> <p>c) were the needs of all learners met?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	

Resources



Booklet 7b

Graphs and charts



Original example of a learner's interpretation and assessment of an observation using a height chart

I have noticed that in this observation there is a range of heights within the group. The minority of the children are just below the average height but most of them are above the average height. There is quite a big age difference between the oldest and the youngest. Therefore that shows that there is a variation in growth of young children within a similar age band. Not many of the children are at the average height for their age, according to the centile charts.

T. is just above the 25th centile for his age. He is just over 5 years old. J. on the other hand is below the average for a 5 year old. He is nearly 6 years old and is quite small for his age. M. is very tall for her age. She is above average for a 6 year old. F. and A. are also above the average for their age. They are both on the 75th centile line on the chart. A. and E. are about the average height for their age. E. is a bit taller, but she is a month older than A. K. is a bit below average for a 6 year old.

There are many different factors that can affect growth in children. One factor is the height of the parents because genetics play a part in growth. If you have tall parents, then the child is likely to be tall. Everyone inherits genes from their parents which 'will decide the maximum height to which a child will grow' (Beaver *et al*, 1994, p. 11).

Antenatal factors

Smoking and drugs can have a very big impact on a child's growth. If you have a healthy diet, then your child is getting all the nutrients that it needs to grow. If you have good health, the child is likely to have good

health too and therefore will grow appropriately. Some people who are going to have a baby may develop difficulties or illnesses. One illness that may affect the growth of the child is rubella (German measles). If a woman has more than two babies growing in the uterus, they may be lighter than the average birth weight. Therefore this may affect the child's height when she or he is older.

Perinatal factors

This relates to difficulties during the actual birth. Anoxia may occur. This is where the baby has a lack of oxygen. This could cause 'cerebral palsy or learning difficulties' (Tassoni *et al*, 2002, p. 174).

Another factor is low birth weight. This can have an effect on the child's future development. There are many reasons why a baby may have a low birth weight:

- prematurity;
- failing placenta;
- poor nutrition;
- multiple births (Tassoni *et al*, 2002, p.174).

Babies may show a low birth weight which could be a sign of developmental delay. This happens a lot with premature babies.

Postnatal factors

This is after the baby is born – any of these factors could cause lack of growth:

- A child needs a healthy diet so that all the child's nutritional needs are met.

- Abuse and neglect – children who are abused or neglected are less likely to be at the average height for their age. They may be under strain, as they don't get all the nutrition they need.
- Poverty plays a big part in growth. Families who don't have much money have a higher incidence of ill health. They don't have money to buy all the things they need.
- Illness is also a factor. A child may have a lack of growth hormone which is released from the pituitary gland. The child may have a congenital condition such as achondroplasia.
- Children may be born with a disability which may affect their growth.

It is important to consider the child as a whole. Children are individuals and growth needs to be considered along with other things. Their height should develop in proportion to their weight.

In the majority of cases where a child's height falls below the average for his or her age this is just because of their growth pattern and should not be considered abnormal.

Also their birth measurements are very relevant, as this shows the beginning of their growth pattern. Some people who come from different cultures are smaller than average. Again other factors play a part, such as genetics.

Recommendations

Health is essential to growth and depends on:

- diet – a child needs a good balanced diet to increase their growth and cognitive development. They need:
 - fats;
 - carbohydrates;
 - proteins;
 - mineral elements;
 - vitamins.
- fresh air – helps the child to sleep. Children grow during their sleep and the fresh air also helps to stimulate the brain
- exercise - a child needs to have plenty of this during the day.

Schools need to encourage healthy eating. One of the classes in my school placement is doing different activities on healthy eating. 'What foods are healthy' is the theme. The children in this class could do this activity. They could do different food tasting of fruits. They would have to find out if any of the children have allergies; if so then this activity may need to be changed.

Also schools need to encourage physical activities and lots of games. During their PE lessons the teacher could teach children different games that they could do in the playground. This may have to be changed for a child with a disability. The teacher could teach them a different game to play, which would increase their physical development.

Handout 1

Personal learning

After doing this observation I have learnt that there are many different things that can affect growth. Before I did this observation I thought the main thing affecting growth was your parent's height. I now know that everyone has an individual growth phase. I did not realise that your diet has an effect on your growth. This has helped me for the future. I will encourage children to eat healthy food, have lots of fresh air and exercise and encourage plenty of physical activities. As an early years practitioner I would make sure I promoted all these things.

The method that I used for this observation was very good as I could demonstrate my results clearly and I could measure the children accurately. All the charts are accurate so I can compare my results and get reliable results. Using this method I have managed to meet all my aims. It would have been easier to compare my results if all the children had been exactly the same age.

Every child is individual and will grow at different heights and speeds. From using centile charts and graphs I can clearly see how the children compare with the norm. But from using this method I have only measured them once and may have read the reading wrong. I should measure more than once next time. Also another effect that may have an impact on my results is the time of day. The children may have felt tired and not have been standing upright when I was measuring them. The floor may also not be flat which

would also affect the results. I hope that I used and read the centile charts the correct way, otherwise I would have got the wrong results.

After doing this observation I would use all that I know to promote the child's growth and development. I would plan and implement activities which would promote physical development and healthy eating. If I was a manager of a nursery I would make sure that the children get regular exercise and a healthy balanced diet. These activities would need to be changed for children with different abilities, for instance if a child isn't physically mobile.

Handout 2

Line graphs: more practice

Draw a line graph to show the information below. Put the age of the baby on the horizontal axis and mark the weight on the vertical axis. Where the age and weight lines intersect mark a small cross. When you have plotted all the crosses, join these up with a line.

Age	Weight
Birth	3 kg
1 month	3.6 kg
3 months	6.8 kg
6 months	8.6 kg
18 months	13.2 kg
2 years	15 kg

You need to find a growth 'centile' chart to compare your findings with the 'norm'.

Your teacher or trainer may give you a centile chart or you may need to supply one yourself. These charts can be downloaded, free of charge, from the following website:
www.cdc.gov/nchs/data/nhanes/growthcharts/set2/all.pdf

Instructions for drawing a pie chart

Calculate the angles of the sectors in a pie chart

The length of time taken for each observed activity will be represented by a sector whose angle will be proportional to the number of minutes. For example:

- The time taken for the jigsaw activity is 2 minutes out of a total of 20 minutes. This can be written as a fraction $2/20$ or simplified to $1/10$
- The angle of the whole circle is 360° at the centre. This represents the whole 20 minutes of the observation. To work out the angle needed for the jigsaw activity you must find $1/10$ of 360° . This can be written as:

$$\begin{aligned} \text{angle} &= 1/10 \text{ of } 360^\circ \\ \text{so angle} &= 36^\circ \end{aligned}$$

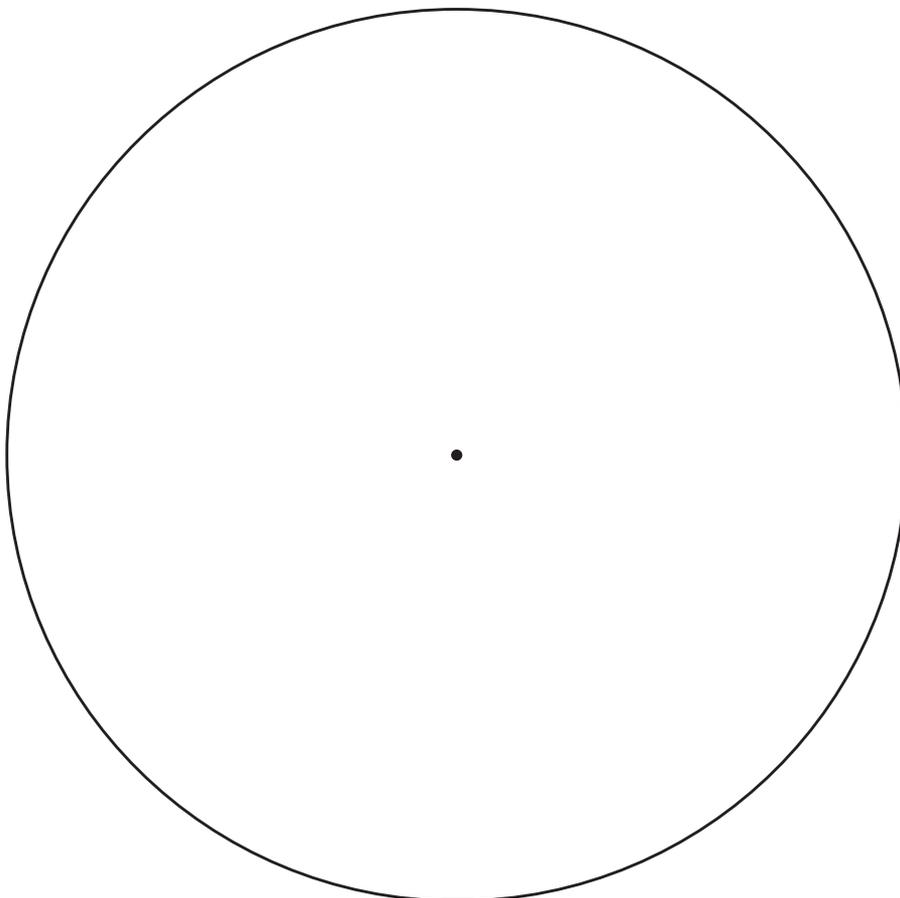
Now you can work out the other angles using the same formula and record them in a chart as follows:

Activity	Time taken	Fraction	Angle

You can check if your angles are correct because they should all add up to 360° .

Draw the sectors of a pie chart

1. Draw a circle of any diameter using a compass.
2. Draw a radius from the point at the center of the circle to the circumference using a ruler.
3. Line up your protractor so that the 0 in the center sits on the radius with the center of the protractor on the center of the circle.



4. Mark the angle of the degrees you are measuring at the edge of the protractor.
5. Draw a radius from the center of the circle to the circumference on the spot you have marked.
6. Measure your next angle from this radius and continue in the same way.
7. Remember to label or colour the sectors and add a key underneath.

Handout 4

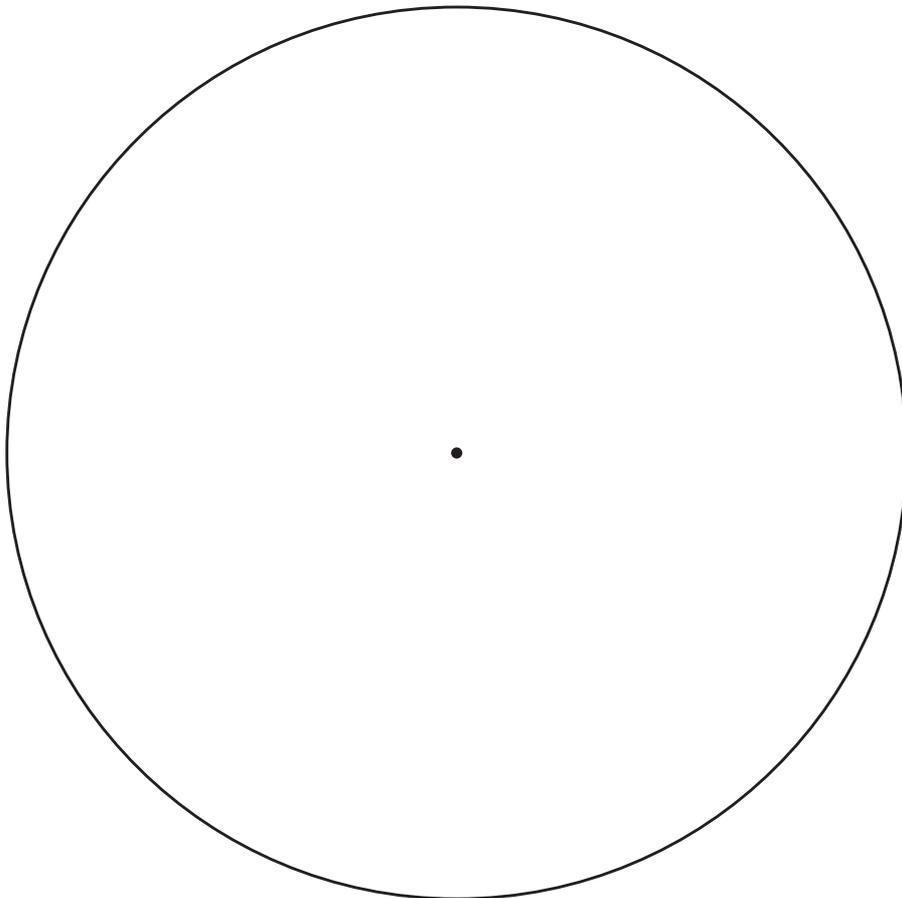
Pie charts: more practice

Imagine you have observed a group of six year olds in the playground throwing and catching a ball. Each child has five turns at catching the ball. These are the results:

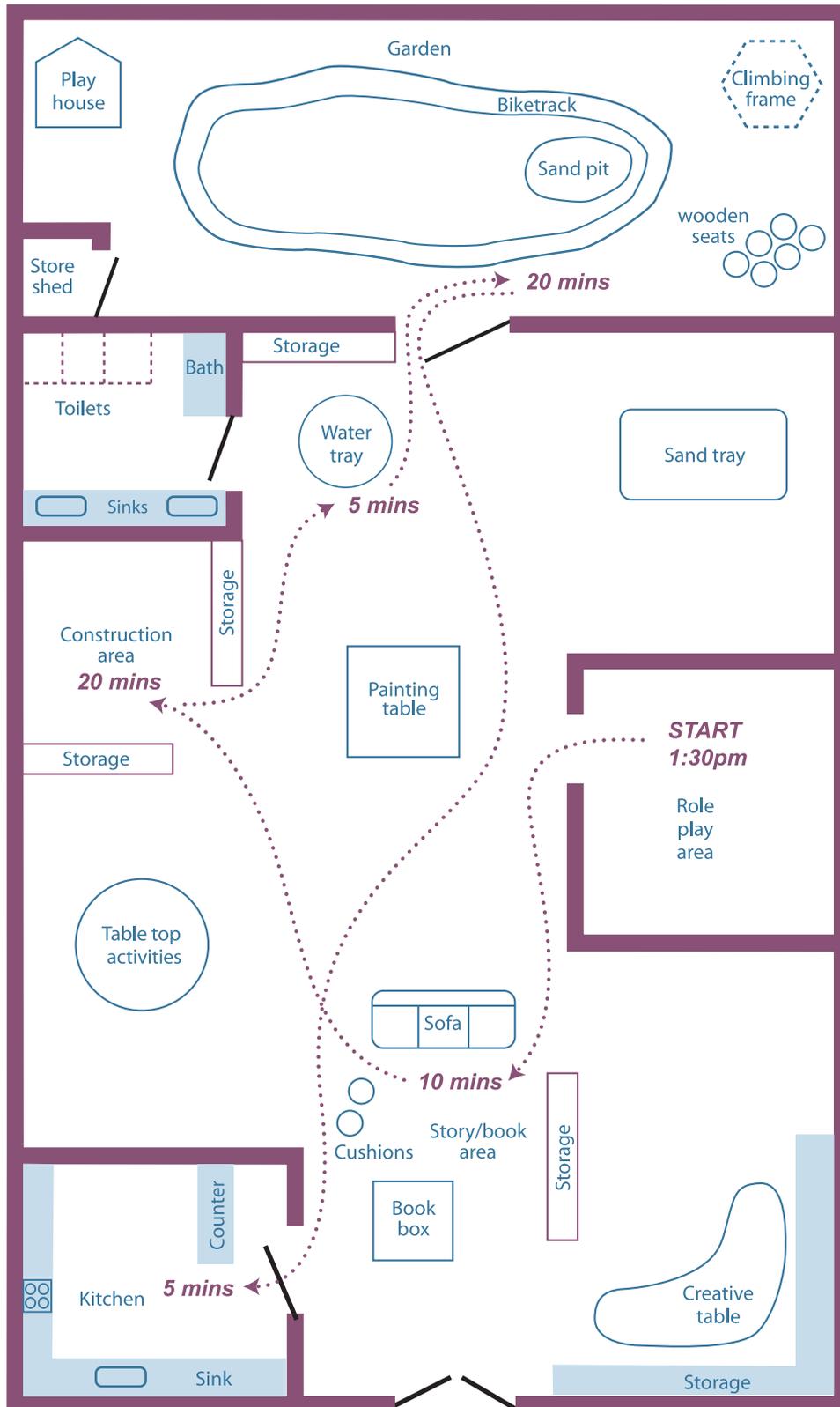
- six children catch the ball all five times;
- ten children catch the ball four times;
- four children catch the ball three times;
- eight children catch the ball twice;
- two children catch the ball once.

Draw a pie chart to show how many times children caught the ball. Remember to use a key to show what the colours represent.

Pie chart showing number of catches



Tracking chart



Advantages and disadvantages of graphs and charts

Graphs and charts are quick and easy to collate, but they can only provide general information.

Advantages:

- quick and easy to collate;
- easy to read;
- helpful in planning the use of equipment.

Disadvantages:

- most charts only provide information about groups of children;
- they do not give much information about individual children.

Welcome to the observation booklet

REMEMBER

This booklet is not designed as a distance learning resource. The work of the learners should be discussed with the teacher or trainer and appropriate feedback should be provided.

This booklet is designed for you and your learners to use in one or all of the following ways:

- As part of a taught session.
- For learners to complete in their own time.
- As part of a taught session and as part of learners' private or independent study time.

The booklets are designed to have the covers colour-coded as follows:

- Booklet 1: red
- Booklet 2: orange
- Booklet 3: yellow
- Booklets 4a and 4b: green
- Booklet 5: blue
- Booklet 6: purple
- Booklets 7a, 7b and 7c: pink

Instructions

- Photocopy the cover on A4 paper of the correct colour.
- Photocopy the booklet pages on A4 paper in the order they are provided here.
- Collate the cover and the pages, staple them using a long arm stapler and fold in the middle to produce your A5 booklet.