



Reform Support Unit
Education & Literacy Department
Government of Sindh

**Sindh Students Assessment Feedback
Report, 2009
Mathematics Grade 4**

**Provincial Education Assessment Centre (PEACE)
Bureau of Curriculum and Extension Wing, Jamshoro,
Sindh**

May 2010

What is Feedback?

Feedback is an information resource for teachers, based on the findings of the Provincial Education Assessment Centre (PEACE) survey of Grade 4 mathematics students in Sindh Province in 2009.

Read Feedback to discover:

- The aspects of the National Curriculum that were assessed.
- The key findings of the survey against which you can compare the achievement of your own students.
- Teaching issues based on the PEACE survey findings.

Use Feedback for:

- Personal study to reflect on the achievement of your own students and to review assessment of class work and assessment tasks.
- Teaching Staff meetings to review collectively or in groups what you teach in relation to the National Curriculum.
- Staff Development to consider effective teaching strategies for both existing teachers and for student teachers as part of their professional training.

1. Introduction

The improvement of the quality of education requires a multi directional approach in order to improve the effectiveness of the learning process by improving teaching techniques, supplying better learning aids, motivating students to attend school etc. Student assessments which are credible and objective play an important role in this process by providing critical feedback on what and how well students are learning¹.

PEACE, Sindh was initially developed as a unit to support the development of national assessments conducted by National Education Assessment System (NEAS). Between 2004 and 2008, four national assessment surveys were conducted in languages, mathematics, science and social studies. PEACE personnel obtained capacity building in item writing and test development, test administration and training of test administrators, verifying the NEAS sample, identifying policy issues for background questionnaire development, marking and scoring and statistical analysis and report writing and the dissemination of results through this development.

Further training and support has been provided to PEACE under the SERP by EU technical assistance. PEACE has now established its own role through the development of provincial assessments aimed at identifying in each district the strengths and weaknesses of the achievements of students in relation to the National Curriculum, and correspondingly the strengths and weaknesses of the teaching process and textbooks used in the classroom.

The differences between PEACE Provincial Assessments and the NEAS assessments are as follows:

- PEACE used a much larger sample than NEAS to obtain representation of every district in Sindh;
- PEACE assessments were based on four areas of the National Curriculum (number, fractions, measurement and geometry) while the national assessment was based on the whole of the Grade 4 National Curriculum;
- PEACE assessments covered the National Curriculum from Grade 1 – 4 in each of the areas tested to test the progression achievement of students while the national assessment was based on the Grade 4 curriculum only.

Mathematics, languages, science and social studies have been identified as subjects to be tested by PEACE. Mathematics was chosen to be tested first as mathematics provided concrete concepts and was easier to test than language. Through this assessment **of** mathematics learning (using assessment to make sound judgments about learning and school effectiveness) sound judgments can be made about learners' achievements. This assessment also supports assessment **for** learning (using assessment to support classroom teaching) and assessment **as** learning (using assessment to promote autonomy in learning) by ensuring that standards are understood and shared by teachers, the learners themselves, their parents and other adults who are either directly engaged in or are supporting the learning process.

¹ The World Bank Report, December 2008

2. The 2009 Grade 4 Mathematics Survey

The testing model used for the Sindh Provincial Assessment is based on the need to identify student achievement. This is different from the limiting psychometric model which emphasizes ranking and statistically derived distributions since it involves a shift away from a norm referenced approach towards one where what students can and cannot do is stated. This requires descriptions of performance as found in the Mathematics 2007 National Curriculum for Pakistan. The model also looks at the different levels of achievement of students according to the requirements of the Grades 1 – 4, National Curriculum.

A single overall figure is provided but this only gives us some notion of student achievement and qualitative descriptors what students can do according to the areas tested are given

3. What Our Students Achieved in General

On the 2009 Grade 4 mathematics tests students achieved a provincial percentage average score of 44.7% in mathematics. This was below the average score of 50% and is similar result to that of the national results produced by NEAS in 2008 where Sindh Province Grade 4 students (on items based on the whole of the National Curriculum) achieved an average score of 33.6%.

The students performed best on number and measurement test items obtaining the highest scores on procedural knowledge test items (57.7%), followed by conceptual understanding items (52.36%) and being weakest in their achievement on problem solving items (43.8%).

The items in the tests tested students' achievement on their mathematics content knowledge and mathematical skills (cognitive domain). From the analysis of the test data, students found all **fraction** test items used in the tests moderately difficult or difficult. None of the fraction test items, according to student achievement, could be classified as easy. This was reflected in the student overall mean score for fractions of 38.5%. In Geometry the majority of the test items were classified as moderately difficult or difficult. Only 14 test items out of 100 could be classified as easy according to student achievement. In Number, only four test items out of 100 could be classified as easy according to student achievement and in Measurement 10 items were classified as easy according to student achievement.

The results showed that, in general, students in rural areas achieved higher scores in mathematics than students in urban areas. Boys achieved higher scores than girls, boys in rural areas achieving higher scores than boys in urban areas and girls in rural areas achieving higher scores than girls in rural areas. Girls in rural areas also achieved higher scores than boys in urban areas. The students of the districts of Kashmore, T M Khan, Matiari, Ghotkhi, N Feroze, Jacobabad, Sanghar, Tharparkar, Mirpurkhas, and Dadu performed best in the province.

4. What Our Students Achieved f

4a Number

What was assessed on number and what were the results?

The following number competencies were assessed and the achievement of the students in these areas is given in the table below.

	Number Competencies	% Mean Score
1	Student is able to read natural and Roman numbers and convert natural to Roman numbers and vice versa	43.23
2	Student is able to demonstrate an understanding of prime, even and odd numbers	55.55
3	Student is able to demonstrate an understanding of the concept of a number line and how it's constructed	23.86
4.	Student is able to identify smallest and largest numbers	45.09
5	Student is able to sequence numbers from smaller to larger and larger to smaller	28.30
6	Student is able to identify the place value of numbers within a figure (units, tens, hundreds, thousands; tenths, hundredths)	41.16
7	Student is able to translate written numbers into digital forms and digital numbers into written form	49.82
8	Students is able to add together two numbers of three, four or five digits	74.07
9	Students is able to subtract two numbers of three, four or five digits	49.44
10	Students is able to multiply one, two, three digit number by a single digit number	48.68
11	Students is able to divide two numbers of three, four or five digits	59.97
12	The student will be able to estimate products and quotients	31.45
13	The student will be able to solve simple word problems involving addition, subtraction, multiplication and division	35.74

From the table and graph below it can be seen that students had greatest success in:

- adding together two numbers of three, four or five digits
- demonstrating an understanding of prime, even and odd numbers
- dividing two numbers of three, four or five digits

Students were least able to:

- demonstrate an understanding of the concept of a number line and how it's constructed
- sequence numbers from smaller to larger and larger to smaller
- estimate products and quotients
- solve simple word problems involving addition, subtraction, multiplication and division

Teaching Issues

Here is a number question written in both Urdu and Sindhi

Q1: Competency Assessed: Students will be able to solve simple problems

سوال نمبر 46 خلیق چار سوال هڪ منت پر حل ڪيا. هيٺين مان ان جو ڪهڙو جواب ڏيڻ لاءِ ايڪ منت ۾ پار سوال مل ڪي. ڏيڻ ۾ اس کائونما جواب غلط هجي؟

$$269 \times 27 = 7263 \quad \boxed{\text{الف}}$$

$$842 \times 7 = 5894 \quad \boxed{\text{ب}}$$

$$505 \times 62 = 3131 \quad \boxed{\text{ج}}$$

$$108 \times 45 = 4860 \quad \boxed{\text{د}}$$

غلط آهي؟

$$269 \times 27 = 7263 \quad \boxed{\text{الف}}$$

$$842 \times 7 = 5894 \quad \boxed{\text{ب}}$$

$$505 \times 62 = 3131 \quad \boxed{\text{ج}}$$

$$108 \times 45 = 4860 \quad \boxed{\text{د}}$$

The correct answer to this question is (c).

32.59 % of students got this question correct.

1. What do you think students should be able to do before they can answer this question?
2. Some students gave (a) as the correct answer. How did they decide on this answer?
3. What would you do to enable the student to understand the concept and process of multiplication and also to improve their understanding to enable them to get the correct answer?

When you have discussed your answers to these questions you will find some suggested answers at the back. Check and see if your answers match the suggested answers and discuss why you think you have either the same answers or different answer

Here is another number question written in both Urdu and Sindhi

Q2: Competency Assessed: Student is able to subtract two numbers of three, four or five digits

7000 - 1067 =

7000 - 1067 = سوال نمبر 10

6099 الف

5933 ب

5007 ج

5003 د

6099 الف

5933 ب

5007 ج

5003 د

The correct answer to this question is (b).

34.70% of students got this question correct.

1. What do you think students should be able to do before they can answer this question?
2. Some students gave (d) as the correct answer. How did they decide on this answer?
3. What would you do to enable the student to understand the concept and process of subtraction and also to improve their understanding to enable them to get the correct answer?

When you have discussed your answers to these questions you will find some suggested answers at the back. Check and see if your answers match the suggested answers and discuss why you think you have either the same answers or different answer

4b Fractions

What was assessed on fractions and what were the results?

The following fractions competencies were assessed and the achievement of the students in these areas is given in the table below.

	Fractions Competencies	Sindh % Average Score
1	Student is able to identify a fraction of a diagram that is shaded	55.76
2	Student is able to order fractions from smallest to largest	46.44
3	Student is able to order fractions from largest to smallest	29.10
4	Student is able to identify equivalent fractions	38.69
5	Student is able to identify proper improper and, mixed fractions and decimal fractions	39.41
6	Student is able to simplify fractions	46.30
7	Student is able to add fractions together	37.60
8	Student is able to subtract simple and mixed fractions	37.74
9	Student is able to find a fraction of a whole number	39.63
10	Student is able to multiply numbers both fractions of a whole number and mixed fractions	34.40
11	Student is able to divide numbers, fractions of a whole number and mixed fractions	27.83
12	Student is able to convert fractions to decimal fractions	39.57
13	Student is able to add decimal fractions	43.95
14	Student is able to divide decimal fractions by whole numbers	43.95
15	Student is able to solve simple word problems involving fractions of whole numbers	26.88
16	Student is able to solve simple word problems involving some combination of addition, subtraction, multiplication (fraction of a whole number) of fractions	26.34

From this is can be seen that students had greatest success in:

- identifying a fraction of a diagram that was shaded
- ordering fractions from smallest to largest
- simplifying fractions

Students were least able to:

- order fractions from largest to smallest
- divide numbers both fractions of a whole number, mixed fractions and decimal fractions
- solve simple word problems involving fractions of whole numbers
- solve simple word problems involving some combination of addition, subtraction, multiplication (fraction of a whole number) of fractions.

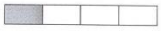
Teaching Issues

Here is a fractions question written in both Urdu and Sindhi

Q3: Competency Assessed: Student is able to identify a fraction of a diagram that is shaded

هدايت: هيٺ ڏنل شڪلين کي غور سان ڏسو ۽ هر شڪل جي رنگدار حصي جي مطابق صحيح اڻپور تي (✓) جو نشان لڳايو.

سوال نمبر 1



الف $\frac{1}{4}$


ب $\frac{1}{2}$

ج $\frac{3}{4}$

د $\frac{1}{3}$

هدايت: هيٺ ڏنل شڪلين کي غور سان ڏسو ۽ هر شڪل جي رنگدار حصي جي مطابق صحيح اڻپور تي (✓) جو نشان لڳايو.

سوال نمبر 1



الف $\frac{1}{4}$

ب $\frac{1}{2}$

ج $\frac{3}{4}$

د $\frac{1}{3}$

The correct answer to this question is (a).

66.17 % of students got this question correct.

1. What do you think students should be able to do before they can answer this question?
2. Some students gave (d) as the correct answer. How did they decide on this answer?
3. What would you do to enable the student to understand the concept of fractions and also to improve their understanding to enable them to get the correct answer?

When you have discussed your answers to these questions you will find some suggested answers at the back. Check and see if your answers match the suggested answers and discuss why you think you have either the same answers or different answers

Here is another fractions question written in both Urdu and Sindhi

Q4: Competency Assessed: Student is able to add fractions together

درست جواب پر (✓) کا نشان لگائیں۔
سوال نمبر 26 $\frac{1}{8} + \frac{3}{4} = \underline{\hspace{2cm}}$

- $\frac{7}{8}$ الف
 $\frac{4}{12}$ ب
 $\frac{4}{4}$ ج
 $\frac{3}{8}$ د

صحیح جواب تي (✓) جو نشان لڳايو.

سوال نمبر 26 $\frac{1}{8} + \frac{3}{4} = \underline{\hspace{2cm}}$

- $\frac{7}{8}$ الف
 $\frac{4}{12}$ ب
 $\frac{4}{4}$ ج
 $\frac{3}{8}$ د

The correct answer to this question is (a).

35.95% of students got this question correct.

1. What do you think students should be able to do before they can answer this question?
2. Some students gave (b) as the correct answer. How did they decide on this answer?
3. What would you do to enable the student to understand the concept of addition of fractions and also to improve their understanding to enable them to get the correct answer?

When you have discussed your answers to these questions you will find some suggested answers at the back. Check and see if your answers match the suggested answers and discuss why you think you have either the same answers or different answers

4c. Measurement

What was assessed on measurement and what were the results?

The following measurement competencies were assessed and the achievement of the students in these areas is given in the table below.

	Measurement Competencies	Sindh % Average Score
1	Student is able to identify different forms of currency	39.01
2	Student is able to convert notes to coins and coins to notes	69.20
3	Student is able to add units of money	70.32
4	Student is able to subtract units of money	57.16
5	Student is able to tell the time according to analogue presentation	57.75
6.	Student is able to convert minutes to hours and hours to minutes; days to hours and hours to minutes	58.91
7	Student is able to identify a.m. and p.m. in analogue time	67.73
8	Student is able to the meaning of fast and slow in relation to time	50.20
9	Student is able to translate 12 hour time to a 24 hour clock	44.83
10	Student is able to identify the number of days in a week, months in a year and the number of days in each month	51.86
11	Student is able to calculate the differences between times in simple problems	52.46
12	Student is able to estimate the length and height of an object	39.00
13	Student is able to choose correctly an appropriate unit for measurement of length	34.74
14	Student is able to conduct simple multiplications of measures	57.27
15	Student is able to identify the relationship between different forms of measurement	30.82
16	Student is able to convert lengths from millimetres to centimetres and from cm. to mm.	36.00
17	Student is able to add different lengths of the same measure	41.40
18	Student is able to subtract different lengths of the same measure	38.84
19	Student is able to convert millilitres to litres and vice versa	35.00
20	Student is able to add and subtract litres and millilitres	41.57
21	Student is able to add simple weights together	60.33

22	Student is able to convert km to grams and km to quintiles and choose appropriate procedure	31.45
23	Student is able to solve simple word problems involving money, time, length, weight, liquids	40.40

Teaching Issues

Here is a measurement question written in both Urdu and Sindhi

Q5: Competency Assessed: Student is able to tell the time according to analogue presentation

سائنس دی گئی گھڑی 15 منٹ پہلے ہے۔ تو صحیح وقت بتائیں۔



سوال نمبر 15 سامھون ڈنل گھڑیال 15 منٹ پویان آھی تہ صحیح وقت بتائیو۔



8:50 الف

8:35 ب

8:20 ج

8:05 د

8:50 الف

8:35 ب

8:20 ج

8:05 د

The correct answer to this question is (b).

35.14% of students got this question correct.

1. What do you think students should be able to do before they can answer this question?
2. Some students gave (a) as the correct answer. How did they decide on this answer?
3. What would you do to enable the student to understand the concept of time and also to improve their understanding to enable them to get the correct answer?

When you have discussed your answers to these questions you will find some suggested answers at the back. Check and see if your answers match the suggested answers and discuss why you think you have either the same answers or different answers

Here is another measurement question written in both Urdu and Sindhi

Q6: Competency Assessed: Student is able to choose correctly an appropriate unit for measurement of length

سوال نمبر 38 کراچی سے اسلام آباد کا فاصلہ ناپنے کے لئے موزوں ترین اکائی کونسی ہے؟

- الف) ملی میٹر
ب) سینٹی میٹر
ج) میٹر
د) کلو میٹر

سوال نمبر 38 کراچی، کان اسلام آباد جي مفاصلي ماپڻ لاءِ مناسب ترين ايڪو ڪهڙو آهي؟

- الف) میٹر
ب) کلومیٹر
ج) ملی میٹر
د) سینٹی میٹر

The correct answer to this question is (c).

18.16% of students got this question correct.

1. What do you think students should be able to do before they can answer this question?
2. Some students gave (a) as the correct answer. How did they decide on this answer?
3. What would you do to enable the student to understand the concept of measurement and also to improve their understanding to enable them to get the correct answer?

When you have discussed your answers to these questions you will find some suggested answers at the back. Check and see if your answers match the suggested answers and discuss why you think you have either the same answers or different answers

4d Geometry

What was assessed on geometry and what were the results?

The following geometry competencies were assessed and the achievement of the students in these areas is given in the table below.

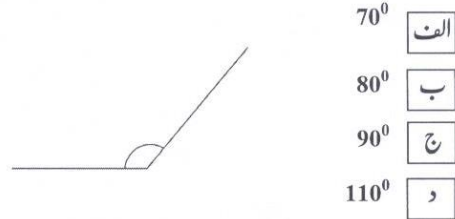
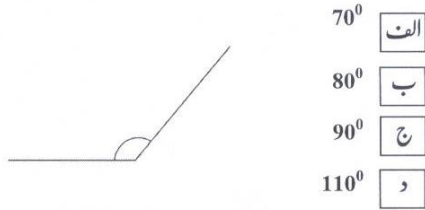
	Geometry Competencies	% Mean Score
1	Student is able to identify common shapes	64.12
2	Student is able to identify a right angle	52.51
3	Student is able to identify flat and curved faces on solid figures	55.36
4	Student is able to identify similar triangles	51.79
5	Student is able to identify different types of triangles	51.77
6	Student is able to identify types of angles - right angles, acute and obtuse angles	49.36
7	Student is able to compare angle size	44.02
8	Student is able to estimate the size of angles	32.61
9	Student is able to identify characteristics of a line, ray, line segment, vertical and horizontal lines	48.88
10	Student is able to demonstrate an understanding of perimeters and their measurement	38.72
11	Student is able to identify geometric shapes	26.77
12	Student is able to measure angles	40.53
13	Student is able to identify the angle properties of triangles	37.90
14	Student is able to measure the radius and diameter of a circle	32.53
15	Student is able to demonstrate an understanding of the steps in drawing a square and rectangle	30.60
16	Student is able to demonstrate an understanding of the use of geometric instruments	53.25

Teaching Issues

Here is a geometry question written in both Urdu and Sindhi

Q7 Competency Assessed: Student is able to estimate the size of angles

دیئے ہوئے زاویے کے لئے ذیل میں سے کوئی ہیپائٹس درست ہوگی؟



The correct answer to this question is (d).

32.61% of students got this question correct.

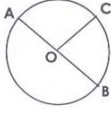
1. What do you think students should be able to do before they can answer this question?
2. Some students gave (c) as the correct answer. How did they decide on this answer?
3. What would you do to enable the student to understand the concept of angles and also to improve their understanding to enable them to get the correct answer?

When you have discussed your answers to these questions you will find some suggested answers at the back. Check and see if your answers match the suggested answers and discuss why you think you have either the same answers or different answers

Here is another geometry question written in both Urdu and Sindhi

Q8 Competency Assessed: Student is able to measure the radius and diameter of a circle

اگر $m\overline{AB}=16\text{ cm}$ تو \overline{OC} کی لمبائی کتنی ہے؟



- 5 cm الف
- 8 cm ب
- 10 cm ج
- 16 cm د

سوال نمبر 49 جيڪڏهن $m\overline{AB}=16\text{cm}$ آهي ته \overline{OC} جي ڊيگهه ڪيتري ٿيندي؟



- 5 cm الف
- 8 cm ب
- 10 cm ج
- 16 cm د

The correct answer to this question is (b).

42.30% of students got this question correct.

1. What do you think students should be able to do before they can answer this question?
2. Some students gave (a) as the correct answer. How did they decide on this answer?
3. What would you do to enable the student to understand the concept of radius and diameter of a circle and also to improve their understanding to enable them to get the correct answer?

When you have discussed your answers to these questions you will find some suggested answers at the back. Check and see if your answers match the suggested answers and discuss why you think you have either the same answers or different answers

Possible Classroom Teaching Needs:

Q1.

Only 32.59% of students got this question correct.

What do you think students should be able to do before they can answer this question?

Before being able to answer this question students should be able to:

- Know place values of numbers
- Understand the concept of multiplication – that multiplication is repeated addition (e.g. $269 \times 27 = 269 + 269 + 269 + \dots + 269$ 27 times)
- Know their multiplication tables
- Multiply one, two, three figures by one figure and two figures
- Know the multiplication process using one or two multipliers
- Be able to identify an incorrect answer through carrying out the processes required accurately

Why did some students decide that (a) was the correct answer?

- Perhaps they do not understand the concept of multiplication
- Maybe they do not know how to multiply by two figures and chose the first option
- Maybe they only multiplied the units number, 9 by 7. This would give them an answer of 63 which matches the given option of 7263

Possible activities to enable the student to understand the concept and process of multiplication might be as follows:

- Provide a **visual model** of the process
- **Complete number strategies** e.g. $23 \times 6 = 23 + 23 + 23 + 23 + 23 + 23 = 138$
- **Partitioning strategies:** when given a number to multiply, students can break the numbers down in a variety of different ways. For example, some students may divide the numbers into tens and ones ($32 \times 3 : 10 \times 3 = 30; 10 \times 3 = 30; 10 \times 3 = 30; 2 \times 3 = 6; 30 + 30 + 30 + 6 = 96$). Others may decide to partition by decades ($30 \times 3 = 90; 2 \times 3 = 6$), while others may find even more ways to divide the numbers.
- **Compensation Strategies:** Children often find ways to manipulate numbers to allow for easier calculations ($48 \times 3 : 50 \times 3 = 150; 2 \times 3 = 6; 150 - 6 = 144$).
- **Using Multiples of 10 and 100:** When presented with multiples of 10 and 100, students will often use the beginning part of the number to find the product. For example, for 300×12 , students will often first multiply 3×12 and then use that to help them figure out 300×12 . It is important to ensure students are not simply adding zeros to the end but actually understand why they are doing that.

Q2.

Only 34.70% of students got this question correct.

What do you think students should be able to do before they can answer this question?

Before being able to answer this question students should be able to:

- Know place values of numbers
- Know and understand the concept of 0
- Understand the concept of subtraction
- Know the subtraction process

Why did some students decide that (d) was the correct answer?

- Just guessing
- Maybe they do not know how to subtract
- They do not understand the concept of 0
- Maybe they took only the units away from each other and chose between (a) and (d) so that their selection of (d) was by chance

Possible activities to enable the student to understand the concept and process of subtraction might be as follows:

A Developing an understanding of the concept of 0

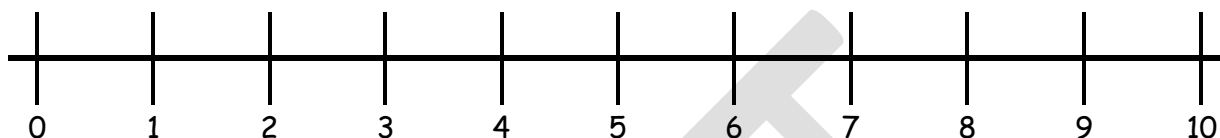
- Teach students numbers beginning with 0
- Provide real life situations, e.g. giving the student one pencil to identify it as 1; giving a second pencil which means the student now has 2. Take away the 2 pencils and ask the student what number he/she has now.

B Developing an understanding of the concept of subtraction through:

- **Take away – partitioning or counting out.**
 - ✓ For example, by **using a story** around structure – I have a set of 6 objects to start with and so many of them get partitioned off, taken away, eaten, lost... *'How many are left?'*
 - ✓ **modelling** with sets of 'things' – essentially the story follows the same plot of 'have', 'take away', 'have left'
- **Counting back from reduction.**
 - ✓ For example, by using a story around structure – 10 children on a bus and one gets off, there is one less ...or, a sweet costing 8p is reduced by 2p.
 - ✓ The reduction structure is the reverse of addition and is based on the concept of counting back.
 - ✓ The use of appropriate language e.g. less, less than, count back and models e.g. number tracks -including washing lines and number lines is essential.



- **Comparison:** find the difference, how many more – counting up, moving onto how many less.
 - ✓ For example, by using a story around structure – based on the idea of two quantities being compared. A price of 8p could be compared with a price of 3p, 12 cubes compared with 9 cubes, 12kg compared with 3kg. Stories might also include ‘how much older?’ ‘How much younger?’
 - ✓ When comparing two sets, language will include: how many more...how many less, the difference between
 - ✓ Using the number line is a powerful image to represent the gap between two numbers



- **Inverse: subtraction reverses addition:** This is an essential structure defining subtraction as the inverse of addition
 - ✓ In this structure $10 - 3$ is defined as ‘what must be added to 3 to make 10’
 - ✓ A story plot may be: ‘I have 3 pegs I want 10 pegs, how many more do I need?’ Or a chocolate bar costs 20p, I have 8p, how much more do I need?’

Q3.

66.17 % of students got this question correct. However this means that approximately 34% did not get the correct answer.

What do you think students should be able to do before they can answer this question?

Before being able to answer this question students should be able to:

- Understand the concepts of fractions and know that a fraction is part of a whole or part of a whole group

Why did some students decide that (d) was the correct answer?

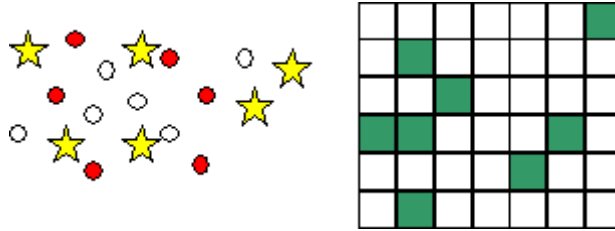
- Just guessing
- Maybe they do understand the concept of fractions

Possible activities to enable the student to understand the concept of fractions might be as follows:

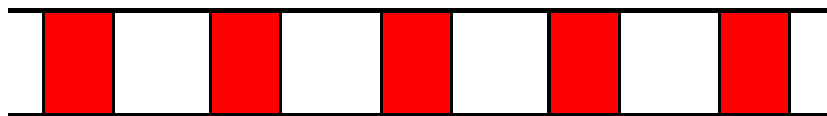
- Develop an understanding of equal shares – working with halves
- Partitioning

- Working in situations that offer opportunities to **explore fractions** in each of these situations.

- ✓ **Discrete wholes** - sweets, marbles, cherries, beads etc.
- ✓ **Continuous wholes** - cakes, chocolate bars, pizzas etc.
- ✓ **Definite wholes** - where the extent of the whole is clear, for example:



- ✓ **Indefinite wholes** - where the extent of the whole is not clear, for example we do not know how long the pattern extends in either direction in the image below:



Q4.

35.95% of students got this question correct.

What do you think students should be able to do before they can answer this question?

Before being able to answer this question students should be able to:

- Understand the concepts of fractions and know that a fraction is part of a whole or part of a whole group
- Know and understand mixed numbers (part that tells you the wholes and a fractional part that is less than one whole) and that mixed numbers can be written as fractions if all the parts are counted.
- Know how to add like fractions
- Understand equivalent fractions
- Understand how to add unlike fractions

Why did some students decide that (d) was the correct answer?

- Just guessing
- Maybe they do understand the concept of fractions
- They added the numerators together and added the denominators together to get the answer

Possible activities to enable the student to understand the concept of fractions might be as follows:

- All of the activities identified for concept development for Q3
- Understand the **meaning of the denominator and numerator** – denominator tells how many pieces the whole has been divided into; numerator says the fraction of the whole
- **Compare** fractions with different denominators
- **Develop the process skills**

Q5.

35.14% of students got this question correct.

What do you think students should be able to do before they can answer this question?

Before being able to answer this question students should be able to:

- Recognise the time on an analogue timepiece
- Understand how time works
- Know the conventions of time

Why did some students decide that (d) was the correct answer?

- Just guessing
- Maybe they do understand the concept of time
- Maybe they are only familiar with digital time

Possible activities to enable the student to understand the concept of fractions might be as follows:

- Use an analogue clock face (see below) to explain how the clock is divided into minutes and hours



- Relate students' day to day activities to time, prayer times, sunset and sunrise, school time etc. To enable them to understand the concept of time
- Practice time telling

Q6.

18.16% of students got this question correct.

What do you think students should be able to do before they can answer this question?

Before being able to answer this question students should be able to:

- Understand and know the measurements of millimetres, centimetres, metres and kilometres
- Understand that each measure is used to measure different distances/lengths of things

Why did some students decide that (a) was the correct answer?

- They guessed
- They have no knowledge about the use of different measurements
- They have not yet been taught about kilometres

Possible activities to enable the student to understand the concept of fractions might be as follows:

- Provide experience for children to use **informal measurements** such as hand span, feet, length from finger to elbow etc.
- Get the students to identify the need for **formal measurements**
- Develop the skills of **estimation**
- Provide experience in the **use of different measuring tools** for different requirements

Q7.

32.61% of students got this question correct.

What do you think students should be able to do before they can answer this question?

Before being able to answer this question students should be able to:

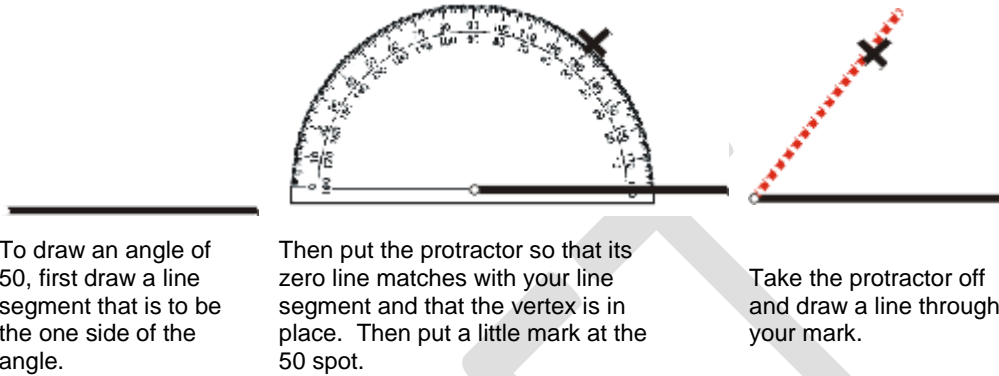
- Understand lines and rays
- Understand that angles are made up of two rays
- Identify bigger/smaller angles
- Know and understand the way angles are measured
- Understand estimation

Why did some students decide that (c) was the correct answer?

- They guessed
- They have little knowledge of diameter and radius
- They have not been taught this aspect of geometry

Possible activities to enable the student to understand the concept of fractions might be as follows:

- Provide real-life examples of angles to students e.g. measuring the angles of the windows, desks, chairs etc in the classroom; make angles with string, identify the angle of the sun from the ground at different times of day etc.
- Use informal unit to measure angles such as an angle windmill
- Get students to copy angles accurately
- Discuss student responses to a range of angles
- Teach students to measure using formal measuring tool – protractor



Q8

42.30% of students got this question correct.

What do you think students should be able to do before they can answer this question?

Before being able to answer this question students should be able to:

- Understand the concept of the circle
- Have knowledge and understanding of circumference, diameter and radius
- Construct and measure the diameter and radius of different size circles and discover the relationship between the two

Why did some students decide that (c) was the correct answer?

- They guessed
- They only know of 90°
- They do not understand the measurement of angles

Possible activities to enable the student to understand the concept of fractions might be as follows:

- Provide real-life examples of circles to students e.g. circular tables, plates, saucers etc.
- Ask students to draw a variety of circles and measure the diameter and radius of circles accurately
- Ask students to identify the relationship between the radius and diameter of circles

5. Related Publications

If you wish to find out more about the assessments carried out by Sindh Province, contact the RSU or the Bureau of Curriculum, Jamshoro.

Publications available related to Grade 4 mathematics testing are listed below:

- The 2006 Mathematics National Curriculum
- Technical Report on Grade 4 Mathematics Testing 2009
- Mathematics Assessment Results Report
- Leaflet on Mathematics Assessment

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