

AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES SCHOOLS ENRICHMENT CENTRE (AIMSSEC) AIMING HIGH

This INCLUSION AND HOME LEARNING GUIDE

suggests related learning activities for all ages from 4 to 18 on the theme of REPRESENTING DATA

Just choose whatever seems suitable for your group of learners

The original MATCH THE MATCHES was designed for Years 7 to 12

MATCH THE MATCHES

Two teams Alpha United and Beta Rovers have each played 15 matches.

The data shows how many goals the teams scored in their matches.

There are six sets of data, three showing the results for Alpha United and three for Beta Rovers.

Match the data to the teams and explain your answers.



	The mode number of goals scored by Alpha United is one more than the mean number of goals they scored The mean number of goals scored by Alpha United is equal to the median	number of goals they scored	d in		Number of goals Tally	0	-	2	°°	4	
1 goal	2 goals 4 goals	3 goals	A pie chart to show the number of goals score fifteen football matches	Frequency	9	5	4 ന	2		0 1 2 3 4	Number of goals scored
	ne mode of the number of goals scored by Beta Rovers is one less than the mean number of goals they scored The mean number of goals scored by Beta Rovers is equal to the median	number of goals they scored				A pictogram to show the number of goals scored	1 goal to football matches	2 goals	3 goals 😴 😴 🦉	4 goals	

HELP

For an easier activity on pie charts see Ice Cream Pie on the AIMING High website. It might be helpful to make jottings on the cards as they work on this task.

ICE CREAM PIE



An ice cream stall sells vanilla, strawberry and chocolate ice creams.

The pie chart illustrates the sales of ice cream for last Saturday.

The number of vanilla and the number of chocolate ice creams sold were the same.

The stall sold 60 strawberry ice creams.

How many chocolate ice creams were sold?

https://aiminghigh.aimssec.ac.za/years-4-9-ice-cream-pie/

NEXT

Work with a partner and make your own version of this problem. It could be about football matches or anything else you are interested in.

INCLUSION AND HOME LEARNING GUIDE

THEME: REPRESENTING DATA

Early Years

Ask the children what they see in this pictogram chart.

Say that it shows the numbers of different sorts of vehicle that you saw looking down a street one day.

Ask 'how many cars?' 'how many buses?' ... etc.

Ask 'how many vehicles altogether?'.

Ask 'how many vehicles could take more than 5 people?'.

Car	
Bus	
Truck	
Digger	
Bicycle	
Minivan	
Coach	

You could take the children out in the street and see how many vehicles of different sorts you see in 5 minutes and then draw your own pictogram.

Or collect data about something else and draw a pictogram.

Lower Primary

The pictogram shows the number of students and teachers at Newtown School.

Key:



represents 20 schoolboys represents 20 schoolgirls



Discuss with the learners how many students there are in Newtown School and how many teachers.

Collect the data needed and assist the learners to draw a pictogram for their school or for a club or other group that they belong to.



Upper Primary

Discuss these charts with your group of learners. They show how the students at Newtown School travel to school.

Ask the learners what they notice about the charts?

Can they say which coloured sector represents each way of getting to school.

Assist them to fill in the empty cells in the table and to label the pie chart?

How the students travel to school	Number	Angle in pie chart
Walk	100	$\frac{100}{600} \times 360^{\circ} = 60^{\circ}$
Bus	240	
Car	180	
Cycle	40	
Train	20	$\frac{20}{600} imes 360^\circ = 12^\circ$
Other	20	
TOTAL		



DIAGNOSTIC ASSESSMENT This can be done before or after the lesson and as a group as described below, or the question can be answered individually. Show this question and say: "Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 for D". 1. Notice how the learners respond. Ask them to explain why they gave their answer and DO NOT say whether it is right or wrong, simply thank the learner for the answer. 2. It is important for learners to explain

- 2. It is important for learners to explain the reason for their answer so that, by putting their thinking into words, they develop communication skills and gain a better understanding.
- 3. With a group, make sure that other learners listen to these reasons and try to decide if their own answer was right or wrong.



4. Ask the learners to vote again for the right answer by putting up 1, 2, 3 or 4 fingers. Look for a change and who gave right and wrong answers.

D. is the correct answer 32 + 15 = 47.

Common Misconceptions

A. This is the number of women who ordered tea.

B. This is the number of men who ordered coffee.

C. This is the first number given for men who ordered tea and not the total number of men. <u>https://diagnosticquestions.com</u>

Secondary

Start with the diagnostic question. It tests whether learners can interpret tables of information and this is an important skill. It is best to give the learners a few minutes to work it out before asking them to vote on the answer.

This activity is suitable for small group work in pairs, threes or fours. Give out copies of the worksheet (page 1) and the 6 cards which the learners can cut out (page 2).

As an introduction to this task, you may choose to ask general questions about the different forms of data as shown on the six cards. This might be most helpful in the case of the pie chart if the class is not so familiar with this method of representation. For example, you could ask questions such as:

- Looking at the pie chart, in approximately what fraction of the total number of games did the team score one goal?
- What does the tally chart show us?

Learners should be encouraged to talk to each other about the cards as they interpret the data. Listen to their discussions, they will give you a chance to assess their understanding, and also to think whether you should or should not intervene to guide their learning. and how you could base your guidance on what they have done.

The HELP section could be used as a preliminary task if the learners are not confident about pie charts. The NEXT section is for learners who solve the problem before others have finished.

To guide them if they need help to solve the problem, ask them about what clues they can discover about links between the data in the different charts. Then suggest they look for more clues.

You could suggest they put all the information that they can find into two tables, one for Alpha United and one for Beta Rovers. Ideally let them design their own tables but, if necessary, give them the headings for the columns in the tables:

Results for Alpha United Represented in the tally chart and the pictogram					
Number of goals	Frequency - number of matches	Total number of goals	Angle in pie chart		

Results for Beta Rovers Represented in the pie chart and the frequency graph					
Number	Frequency	Total	Angle		
of goals - number number in pie					
	of matches	of goals	chart		

After they have solved the problem you can ask the learners to explain how knew which forms of data go together.

Key Questions

- What is the total number of goals each team scored over the fifteen matches?
- Have you tried comparing pairs of charts with each other?
- Do you think they represent the same team's goals? Why or why not?

SOLUTION

Results for Alpha United Represented in the tally chart and					
	the picto	ogram			
Number	Frequency	Total	Angle		
of goals	- number	number	in pie		
	of matches	of goals	chart		
0	3	0	72		
1	3	3	72		
2	2	4	48		
3	5	15	120		
4	2	8	48		
		30	360		
Mode 3 goals Mean 2 Median 2					

Results for Beta Rovers Represented in the pie chart and					
t	he frequen	cy graph			
Number	Frequency	Total	Angle		
of goals	- number	number	in pie		
	of matches	of goals	chart		
0	1	0	24		
1	6	6	144		
2	2	4	48		
3	4	12	96		
4	2	8	48		
		30	360		
Mode 1 goal Mean 2 Median 2					

Early Years

7 cars, 1 bus, 1 truck, 2 diggers, 3 bicycles, 2 minivans, 1 coach. 17 vehicles altogether.

Lower Primary

Schoolboys 320, schoolgirls 280, teachers 20

Upper Primary

Walk	60°	Dark blue
Bus	144º	Orange
Car	108º	Grey
Cycle	24º	Gold
Train	12°	Green or light blue
Other	12º	Light blue or green

Why do this activity?

This activity could be used at the start of a series of lessons on data handling, or for assessment at the end of the unit or to check on prior knowledge before going on to do further work on data handling. It will get learners talking meaningfully about mathematics and presenting and justifying arguments.

Learning objectives

In doing this activity students will have an opportunity to:

- review and deepen understanding of pictograms and frequency graphs;
- review and deepen understanding of pie charts.

Generic competences

In doing this activity students will have an opportunity to practise interpreting data given in different forms.

Follow up

People Stats 30-Minute Global Lesson (if not done already) https://aiminghigh.aimssec.ac.za/years-4-12-people-stats-30-minute-global-lesson/

Drinking Water https://aiminghigh.aimssec.ac.za/years-6-10-drinking-water/

Water Crisis 1 and 2 <u>https://aiminghigh.aimssec.ac.za/years-4-8-water-crisis-1/</u> https://aiminghigh.aimssec.ac.za/years-6-8-water-crisis-2/

A Richer World <u>https://aiminghigh.aimssec.ac.za/years-9-12-a-richer-world/</u>



Go to the **AIMSSEC AIMING HIGH** website for lesson ideas, solutions and curriculum links: <u>http://aiminghigh.aimssec.ac.za</u> Subscribe to the **MATHS TOYS YouTube Channel** <u>https://www.youtube.com/c/mathstoys</u> Download the whole AIMSSEC collection of resources to use offline with

the AIMSSEC App see <u>https://aimssec.app</u> Find the App on Google Play.

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and school years up to Secondary 5 in East Africa. New material will be added for Secondary 6.

For resources for teaching A level mathematics (Years 12 and 13) see https://nrich.maths.org/12339

Mathematics taught in Year 13 (UK) & Secondary 6 (East Africa) is beyond the SA CAPS curriculum for Grade 12						
	Lower Primary	Upper Primary	Lower Secondary	Upper Secondary		
	Approx. Age 5 to 8	Age 8 to 11	Age 11 to 15	Age 15+		
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12		
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6		
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12		
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13		