

NEWSPAPERS IN THE MATHEMATICS CLASS

PADMAPRIYA SHIRALI

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By the time students reach middle school, they are about twelve years old or more and have acquired basic literacy and numeracy skills. They can comprehend simple text and process information presented in tabular form or graphs. Their awareness of the world — geographically and culturally — is starting to grow. They begin to ask questions about the world around them.

Newspapers can serve as a good resource for middle school students to do real mathematics. For a major part of the time, students solve problems from their textbooks. While these problems may be realistic and drawn from life situations, they are not real time problems. On the other hand, newspapers have current data and report on the latest issues. The newness of it and the timeliness of it has a certain charm and a teacher's task to introduce problems based on the current contexts becomes easier as the students would find these to be more interesting and topical.

This data can be drawn from political, scientific, financial, or social areas. Using numerical data gives students a chance to glean real world mathematical information, often of subjects that are interdisciplinary in nature. They can also raise questions which bring in other subjects such as economics, history, geography, sociological issues, environmental issues, politics, etc. Students can bring to use various concepts covered in their curriculum. Financial literacy is now part of the curriculum as per the NEP, and usage of real time data from the news will make it meaningful for students.

Usage of news items may also expose students to concepts which are not part of their immediate curriculum. It is a way of learning new ideas which in turn might trigger further questions that lead to exploration of the topic.

The problems generated by discussion amongst teachers and students can break the monotony of standardized problems and generally lend themselves to strategic and lateral thinking.

While it is not possible to always work with real data, we must recognise the fact that students of the middle school



Figure 1

feel that the mathematics they do is disconnected from real life. Hence, periodically it is good to work towards helping students see the relevance of mathematics in everyday life. This will help students see more ways in which mathematics connects with their daily life.

Teachers may adopt different approaches in bringing and using items from newspapers in the classes. If the text is difficult to comprehend, teachers may like to summarise or make a simplified oral presentation of the news presented in the paper. However, to the extent possible, it is good to encourage students to read the published piece and comprehend the mathematical content involved.

Teachers can select appropriate news items over a week which will be of interest for students. They could encourage students to maintain a file for clipped items with embedded mathematical information which can be utilised for problem solving. The items selected can be mapped on to various chapters/concepts or they may be an exposure to a new aspect of mathematics for the students.

To understand such information effectively, students may need related facts which the teacher can provide by referring to the internet.

Big sports events like a Football World Cup, the ICC World Cup or the Olympics can provide a lot of math opportunities. The same applies to elections. As these are repetitive events, the ideas and approach can be used year after year.

The year's course work can end with doing a newspaper-based project which encompasses many concepts that have been covered over the year. The problems may be of an open-ended nature at times or may have multiple ways of solving them.

Keywords: Newspapers, current events, real world mathematics, data, analysis

NEWS ITEM 1 (SCIENCE NEWS)

Mathematical concepts: Ellipse, Speed

While this is a rare event, a lot of other news items about rockets and satellites connected to space exploration which appear often can be used to talk about speed, trajectory, rocket power, etc.

Chandrayaan-3 successfully inserted into lunar orbit, says ISRO.

Almost a month **since its launch**, India's third moon mission, Chandrayaan-3, was successfully inserted into the lunar orbit on Saturday, the ISRO said.

During the 42 days period, the LVM3 rocket will carry its 3895-kg payload using three different rocket power stages with a maximum thrust of 10.242 km/sec (speed over 36000 km/hr) being provided by the indigenous cryogenic C-25 engine fired on the rocket in the final phase.

The legs of Chandrayaan-3 have been strengthened to ensure that it would be able to land, and stabilise, even at a speed of **3 m/sec, or 10.8 km/hour**.



Figure 2

Here is a great opportunity to talk about orbits and the shape of orbit, an ellipse or oval.

The teacher can point out how the orbits of planets are nearly circular.

What about the orbits of satellites? Comets?

Class can try to figure out how to draw such shapes with the teacher's assistance.

To understand the speed of a rocket (36,000 km/hr) students can contrast it with the speed of a typical air flight which is 900 Km/hr. Other interesting data comparisons can also be made. Satellites generally travel at 28000 km/hr, whereas a Bullet train goes at 320 km/hr.

Related concepts of physics like thrust, basic idea of a rocket (students are familiar with Diwali rockets) and what propels it forward can be discussed. An idea of the gravity of Earth and moon will also come up in the discussion. Ideas of combustion can be talked about.

Another question that may arise is why the rocket makes three to four revolutions before entering lunar orbit.

Similar news items will make interesting read.



Figure 3

NEWS ITEM 2 (NATURAL CALAMITIES)

Mathematical concept: Measurement on Richter scale, Relationship of the numbers on the scale.

Earthquake in Delhi today: Tremors felt in Delhi-NCR, other parts of North India as quake of 5.8 magnitude jolts Afghanistan

The teacher can explain what the number 5.8 refers to by explaining the basic idea of a Richter Scale.

Scientists use the numbers from 1 to 10 to say how strong an earthquake is. This number system is called a Richter scale. On this scale, 1 means a very mild earthquake which will not be experienced by anyone, but a 10 means a very high intensity earthquake. Earthquakes with a measurement of less than three are known as 'micro-quakes' and can happen multiple times a day without anyone experiencing them. The most powerful quake ever recorded was a 9.8.

It is not necessary to explain to the students about

the Richter scale being a logarithmic scale as the students are not yet familiar with Logarithms. However, they can appreciate the fact that each number on the scale means a 10-fold increase. Ex. an earthquake rated as 5 is ten times as powerful as one rated as 4.

An earthquake's Richter magnitude does NOT change with distance from its source. An earthquake of, say magnitude 5 is a magnitude 5 earthquake no matter where on the globe it occurs. The ground effects, known as earthquake "intensity," die away with distance.

Students may raise further questions on what causes earthquakes and concepts involving plate tectonics and physics related to forces can be discussed.

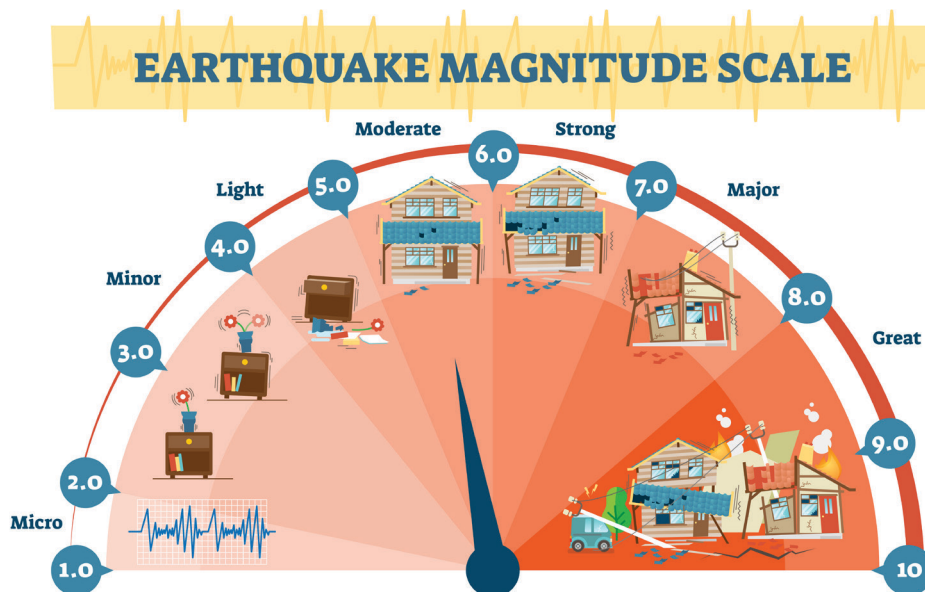


Figure 4

NEWS ITEM 3 (LARGE NUMERICAL DATA)

Mathematical concept: Large numbers, conversions from one system to another, Fractions.

'India's population in 2023 stands at 142.86 crore, according to the latest United Nations Population Fund data'.

How does one visualise such a number? Most of us live in cities or have visited a large city. We experience the jostling and the crowded feeling of a city. A typical Indian city's population is 2 to 3 crores.

Does that information help in imagining the number 142 crores? How many big cities would that be?

Teacher can extend the discussion further by bringing in more related information.

The world population is around 8 billion.

How do we compare these two figures?

Students can rewrite 142 crores in the international system. 142 crores is 142,00,00,000. When rewritten in the international system it is 1,420,000,000 that is 1 billion, 420 million.

What fraction of the world's population is in India?

Students may begin to wonder about other countries and teachers can share data of world population distribution to make a comparative study.

If information about the size of the countries is given, students will be able to figure out the density of the population, problems arising out of overcrowding, etc.

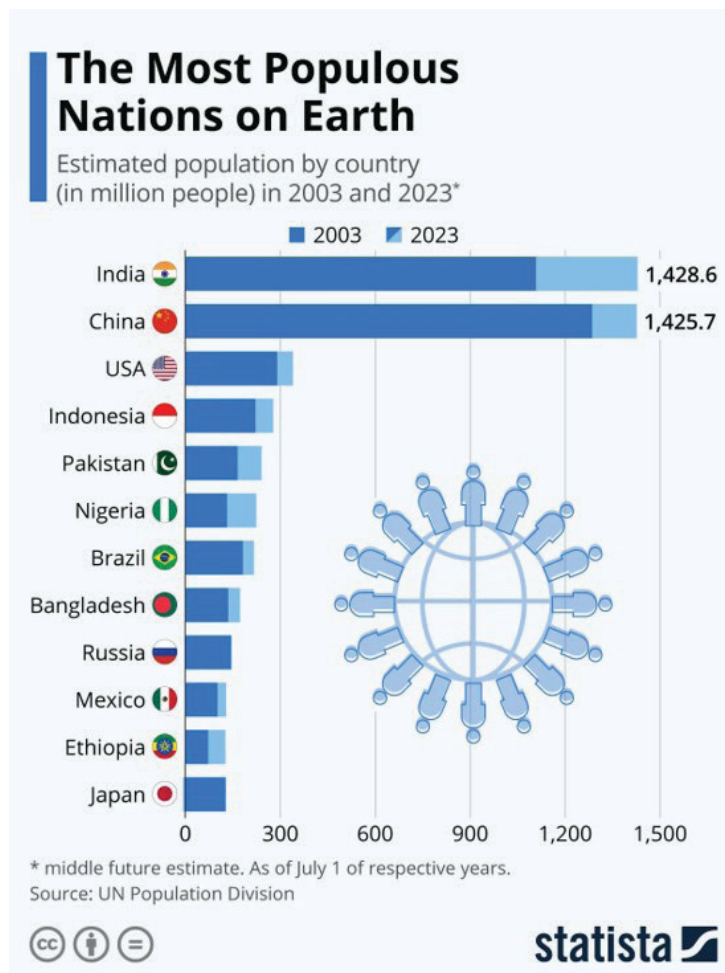


Figure 5

NEWS ITEM 4 (TEMPERATURE CHART)

Mathematical concepts: Measurement of temperature, average

Let students observe the various data items related to the weather that they notice in the weather charts.

Here is a weather chart of Pune city. What are the various data items that are given in the chart. Will the data vary from day to day?

Discuss the concept of temperature, how it is measured (centigrade). Also, what relative humidity denotes.

Why does the time of sun rise or moon rise differ over time?

Sunrise and sunset time bring in the concept of season, tilt of the earth's axis and the movement of Earth.

A lot of science can be discussed along with mathematical aspects.

Students can note down the maximum and minimum temperatures for a week and calculate the average high temperature and the average

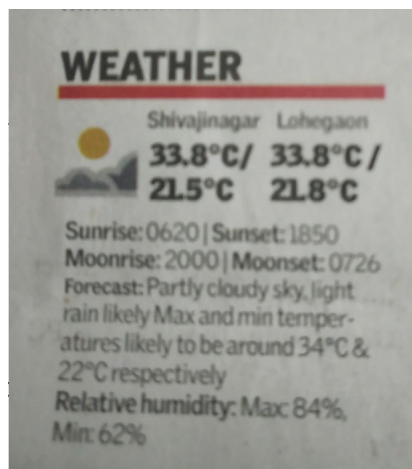


Figure 6

low temperature for the week. They can also represent this information as line graphs.

They can make predictions about rain or temperature for the week to follow and verify whether their predictions are close to the actual.

NEWS ITEM 5 (GRAPHS)

Mathematical concept: Graph interpretation, deconstructing graph, effectiveness of a graph in communication.

One finds many interesting graphs displayed along with articles in the papers. Graph reading and interpretation, studying the correspondence between the content of the article and the graph are various studies that can be taken up by students. Many questions requiring analysis can be asked of such graphs.

Example: Here is a graph depicting the GDP growth in four quarters over 3 years.

Teacher should first explain briefly to the students about GDP.

How does the growth of the first quarter of 21-22 compare with the growth of the first quarter of 22-23?

How does it compare with the growth of the last quarter of 22-23?



Figure 7

Here is a bar graph from a newspaper, which shows the rural and urban percentage of population in poverty.

What does this graph reveal about what is happening in India?

What could be the reasons for the higher rate in the rural areas?

Do you see evidence of this in the areas that you live in?

What can we do about it?

Do you think that the graph communicates effectively the status of poverty across states? Could it have been done in any other more effective way?

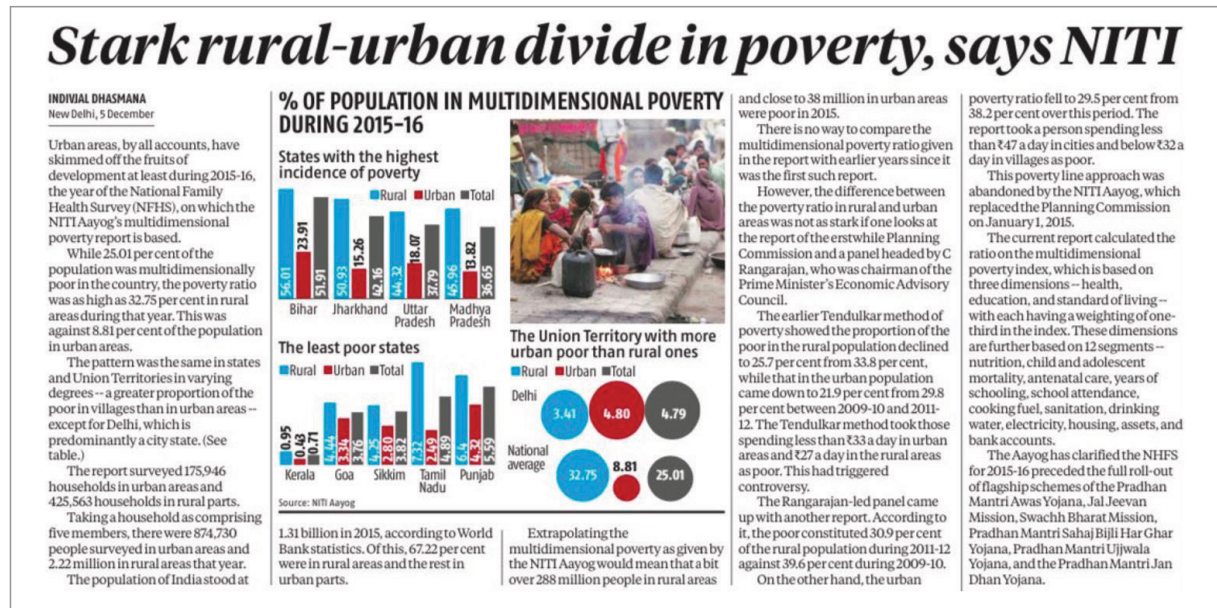


Figure 8

NEWS ITEM 6 (ECONOMIC SECTION)

Mathematical concept: Price increases, Percentages

Here is a piece about increase in air ticket prices during festive seasons. Which journey has risen the highest? By what percentage?

Why do the headlines say 'demand surges but not supply'? Does this happen for other modes of travel?

Do the prices of any goods rise during festive season? Which goods are these?

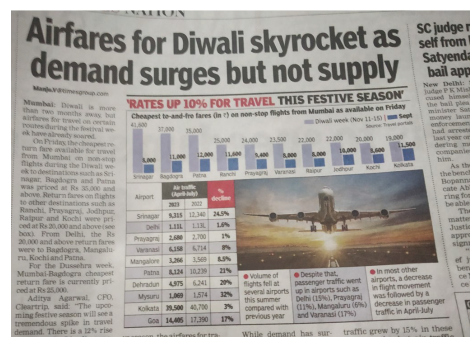
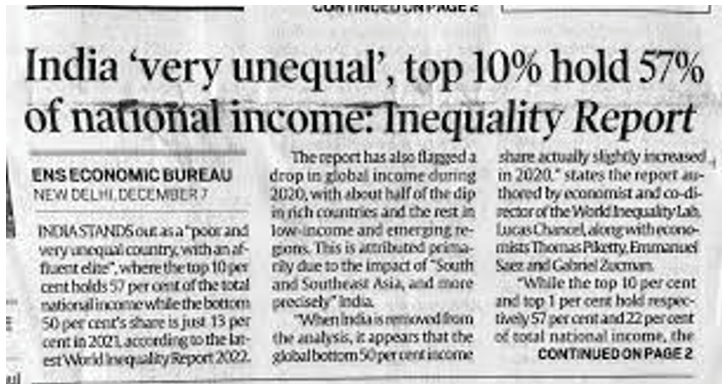


Figure 9

NEWS ITEM 7 (FINANCIAL SECTION)

Mathematical concept: Data comparison



Here is a report from a newspaper in 2021.

What is the basis of the statement 'very unequal' ? How does the writer justify it? What does it imply?

Figure 10

Here is another chart depicting the share of wealth held by people.

Teachers can discuss the graph to see if the students are able to understand where the figure 77.4% has come from.

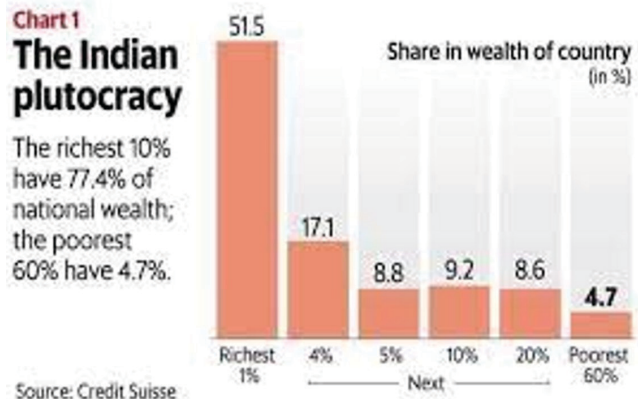


Figure 11

Here is a graph of rainfall data of Bangalore city.

For the given graph can the students build a table filling x and y values?

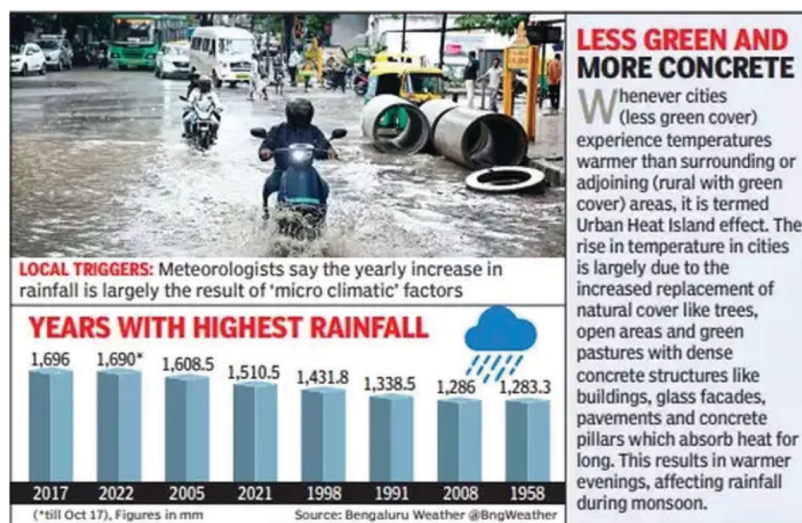


Figure 12

NEWS ITEM 8 (CURRENCY/ BULLION INFORMATION)

Math concept: Currency, currency conversions, financial literacy, direct proportion, inverse proportion

Item from the news 'Rupee falls 32 paise to close at 82.24 against US dollar'

Here is an opportunity for the teacher to explain the concept of different currencies and the conversion rates of one currency in terms of another. Students can find out currency used in different countries and the conversion rate of rupee to those currencies.

Students can watch for trends of price increase and decrease in prices of gold, silver etc. Teacher can explain about the economic importance of

gold as it can be a means of exchange even if the currency collapses.

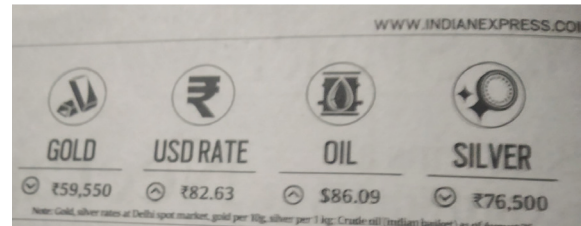


Figure 13

NEWS ITEM 9 (ADVERTISEMENTS FOR CONSUMER PRODUCTS)

Mathematics concepts: Prices, Taxes, Discounts

Full page advertisements offering goods at reduced prices appear in the newspapers.

Students can compare the original price and the reduced price to figure out the discount percentage.

On what kind of items is the discount percentage the highest?

Teachers can discuss GST and the students can compute the tax that is to be paid for the list of items.

Have a discussion around offers like 'buy two and get one' free. Do such promotions make us buy more things than we need?



Figure 14

NEWS ITEM 10 (FINANCIAL ADVERTISEMENT)

Mathematical concepts: Loans, Interest rates, EMI, down payment

Understanding loans for cars, trucks, homes, schooling, or other purposes



Figure 15

What does it mean to say starting @6.60%? What is an interest rate?

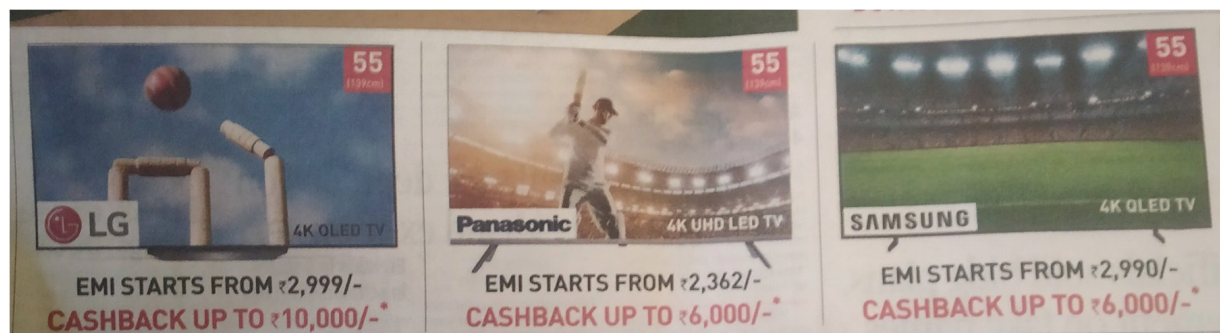


Figure 16

What does EMI stand for? What is a cashback? How does an EMI option benefit the consumer?

If the price of a Tv set is 55,000 how long will a consumer need to pay EMI if he chooses to pay Rs. 2990?

For what kind of purchases do people take loans? What is down payment?

If the car cost 3.5 lakhs, how much interest would you need to pay in the first year, if your down payment is 50,000?

If your family plans to buy an apartment for 60,00,000 and pay 4,00,000 as down payment, how much interest would they need to pay in the first year?

Mathematical concepts: Interpretation of data



Figure 17

On what basis is the statement 'driest and hottest august in India' being made? What data supports the statement? Has the situation between 2009 and 2023 deteriorated steadily or has it fluctuated?

By how much has the temperature increased from 2021?

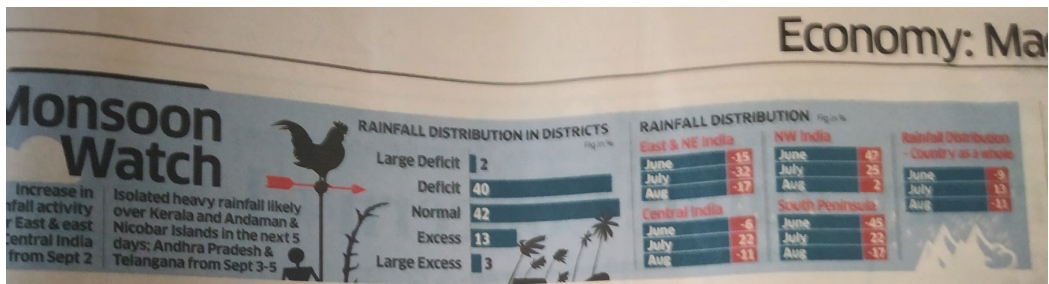


Figure 18

In which part of India was the deficit in rainfall the worst? Which part of India did not experience a deficit?

Here is one more such data chart. How does this information compare with the regional data given in the previous data chart? If you consider the three months together, are there other parts of India that did not experience a deficit?

Environmental news is of great value in the classroom to discuss various environmental problems that are occurring in the world today. It can lead to discussions on carbon emissions, deforestation, glacial melting, global warming, erratic weather patterns. Etc.



Figure 19

NEWS ITEM 12 (ANALYSIS OF A PAPER)

Mathematical concept: Areas/ Fractions/ Percentages/data handling

How much of the newspaper is really news?

Teachers can discuss with students what is news. Once the word news is clearly defined and commonly understood, students can identify all items which do not fall into the category of news. Advertisements, classifieds, etc.

Students can use various measures to measure the news component in terms of area or fraction or percentage to answer the question.

How can they estimate the space occupied by advertisements? Classifieds?

Is there more than one way of making these estimations?

Some students may approach it through fractions, some through estimation of area. Some may use transparent square grids to cover those sections and check.

They can finally express the answer as a percentage.

Different groups of students can study different



Figure 20

papers for this purpose and come up with a comparative study.

It can lead to a discussion on the interdependence of newspapers and advertisers.

NEWS ITEM 13

Mathematical concept: Estimation, problem solving strategies, implicit idea of average.

Can the students estimate the number of words of a full page?

How would they go about it? Teachers can brainstorm various ideas before students begin to work on the problem.

Would it work if they figure out for a quarter or one eighth of the paper and multiply by the appropriate factor?

Would they use the columns of the paper as a guideline? Are all the columns of the same length?

Would they need to look at the headlines separately?

What would they do with the photographs and advertisements in the paper?



Figure 21

NEWSPAPER PROJECT

Math concept: Measurement, usage of model, Layouts, proportion

It is great fun to get students to design a single page newspaper.

The newspaper could incorporate numerical fun facts about themselves or interesting activities in the school.

They could do a statistical survey of students' favourite snack items.

Develop a timeline of their school history.

What kind of an advertisement would they design to encourage students to buy a healthy snack?

While designing and developing a newspaper students will need to make close observations of a model paper to make some choices.

One choice will be about the font size.

A closer look at any paper will make the students notice the varied sizes of letters.

Let students use the front page of one newspaper and make a study of the font (character/letter).

How many different sizes of fonts do they see? What are those sizes? In what range do they lie?



Figure 22

Typically, there will be three or four sizes.

Students can come up with their own names for these various sizes, say, Headlines, column heading and text size.

Question: If you had to design your own paper which has a headline, three column heads and text, how much space will you need to allocate for the headlines, the column headings and the text?



Figure 23

Can the students come up with a reasonable answer? There is no single correct answer.

Students might carefully investigate the space occupied by the different categories in a paper and use that as a model.

They may use the font size of the headline, divide the width of the paper by the size to arrive at an answer. They may work out the number of columns and the space needed for the column heads.

The problem combines visual organisation along with numerical calculations.

What else do they notice about the fonts?
Boldness, colour, etc.

Can they give some reasons for having different coloured fonts in a newspaper?

Can they think of reasons for having short headlines?

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PADMAPRIYA SHIRALI

PADMAPRIYA SHIRALI is part of the Community Math Centre based in Sahyadri School (Pune) and Rishi Valley (AP), where she has worked since 1983, teaching a variety of subjects – mathematics, computer applications, geography, economics, environmental studies and Telugu. In the 1990s, she worked closely with the late Shri P K Srinivasan. She was part of the team that created the multigrade elementary learning programme of the Rishi Valley Rural Centre, known as 'School in a Box.' Padmapriya may be contacted at padmapriya.shirali@gmail.com.