

Lesson Plan: Basic Data Handling Using Climate Data

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As a **Primary** and **Middle School Mathematics** teacher, you can use this set of computer-based tools to teach your students the basics of **data handling** using climate data.

This lesson plan can be used to introduce your students to data handling, data representation and interpretation using weather and climate data of India. Climate change is believed to cause more frequent extreme weather events such as higher than average temperatures and increased rainfall/precipitation. This lesson plan will enable students to assess such climate variability by analyzing local climate data.

Thus, the use of this lesson plan allows you to integrate the teaching of a climate science topic with a core topic in **Mathematics**.

Use this lesson plan to help your students find answers to:

1. What is data and how can it be represented?
2. What is the data range of a given dataset?
3. What is the temperature and precipitation range of a city for a selected month over a 10-year period?
4. Does the climate data from your hometown show extreme weather events that may be linked to climate change?

About the Lesson Plan

Grade Level: Primary and Middle School

Discipline: Mathematics

Topic(s) in Discipline: Data Handling, Data Representation and Interpretation, Data Range, Bar Graphs

Climate Topic: Introduction to Climate Change

Location: India

Access: Online

Language(s): English

Approximate Time Required: 40-50 min

1 Contents

1. Teaching Module (~8-12 min)

A video micro-lecture that introduces the basics of data representation followed by a practice set.

This can be accessed at:

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-math-reasoning/pre-algebra-representing-data/v/ways-to-represent-data>

2. Teaching Module (~ 10-15 min)

Video tutorials followed by practice sets on how to create and read bar-graphs.

This can be accessed at:

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-math-reasoning/pre-algebra-picture-bar-graphs/v/creating-bar-charts-1>

3. Classroom Activity (10-20 min)

A classroom activity for simple data analysis using climate data of cities in India from the Indian Meteorological Department (IMD).

The IMD webpage for selecting climate datasets for various Indian cities can be accessed at:

http://www.imd.gov.in/pages/city_weather_main.php

4. Suggested questions/assignments for learning evaluation

- What is data and how can it be represented?
- What is the data range of a given dataset?
- What is the temperature and precipitation range of a city for a selected month over a 10-year period?
- Does the climate data from your hometown show extreme weather conditions that may be linked to climate change?

2 Step-by-step User Guide

Here is a step-by-step guide to using this lesson plan in the classroom/laboratory. We have suggested these steps as a possible plan of action. You may customize the lesson plan according to your preferences and requirements.

1. Topic introduction and discussion

Use the tool, '[Representing Data](#)' by Khan Academy to introduce the concept of a data set to your students. Further, explain how this data can be sorted and represented in tabular form, bar-graphs, line graphs and so on. Explain how the represented data can then be interpreted by asking relevant questions. Use the given practice set of questions to reinforce these concepts.

This can be accessed at:

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-math-reasoning/pre-algebra-representing-data/v/ways-to-represent-data>

2. Further their understanding of data representation using bar-graphs

Use the teaching module, '[Creating a bar graph](#)' by Khan Academy to describe how bar graphs are constructed to represent data. Navigate to the following tabs- 'Reading Bar graphs' and 'Interpreting Bar graphs' to enable your students to understand how bar graphs are used. Use the practice set of questions within the teaching module to allow students to apply their understanding of these concepts.

This can be accessed at:

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-math-reasoning/pre-algebra-picture-bar-graphs/v/creating-bar-charts-1>

3. Classroom Activity: Constructing bar graphs using climate data

Use the website of the [Indian Meteorological Department \(IMD\)](#) to obtain climate datasets for selected cities.

Instructions to obtain climate data for Indian cities:

Enter the name of the chosen city in the filter for 'City Weather' to obtain the current weather report. Click the tab, 'Extreme and Climatological Information' at the bottom of this webpage to obtain datasets for 'Extreme Weather Events in the Current Month' in the past 10 years, and a climate dataset for a 30-year period.

Conduct the activity with the data obtained as follows:

Use the 'Climatological Table' on the webpage to make bar graphs of:

- 1) Daily Maximum temperature (y-axis) versus months of the year (x-axis) and
- 2) Mean Total Rainfall in mm (y-axis) versus months of the year (x-axis)

A simple how-to video guide on making bar graphs using climate data can be accessed [here](#).

These graphs will allow your students to understand the annual weather patterns in different Indian cities. Explain what the data ranges are for both weather parameters. You can use these representations to describe the climate of a city.

- 3) Now, use the data for a particular month eg. September, as a baseline and plot the corresponding data points (Maximum temperature and 24 Hours Highest Rainfall from 'Extreme weather events' table) for the past 10 years. Describe the data range, which is the variation of these weather parameters from the climatological baseline conditions. Facilitate a classroom discussion on any weather extreme events and the possibility of it being linked to climate change.

The climate data of Indian cities can be accessed at:

http://www.imd.gov.in/pages/city_weather_main.php

Teachers of other countries may conduct a similar activity using their local climate and weather data.

4. Questions/Assignments

Use the tools and the concepts learned so far to discuss and determine answers to the following questions:

- What is data and how can it be represented?

- What is the data range of a given dataset?
- What is the temperature and precipitation range of a city for a selected month over a 10-year period?
- Does the climate data from your hometown show extreme weather conditions that may be linked to climate change?

3 Learning Outcomes

The tools in this lesson plan will enable students to:

- understand what data is and how it can be represented
- practice using bar-graphs and line-graphs to represent data
- learn the relevance of data ranges and how to interpret data
- use real climate datasets of local cities to understand climate variability due to climate change

4 Additional Resources

If you or your students would like to explore the topic further, this additional resource will be useful.

1. [Reading; '12.1: Stem-and-Leaf Graphs \(Stemplots\), Line Graphs, and Bar Graphs'](#)

A reading by Libretexts™ that introduces the basic ways of representing categorical data- stem-and-leaf graphs, line graphs and bar graphs.

This can be accessed at:

[https://math.libretexts.org/Courses/Heartland_Community_College/Introduction_to_Statistics_\(Lathrop\)/12%3A_Categorical_Data/12.1%3A_Stem-and-Leaf_Graphs_\(Stemplots\)%2C_Line_Graphs%2C_and_Bar_Graphs](https://math.libretexts.org/Courses/Heartland_Community_College/Introduction_to_Statistics_(Lathrop)/12%3A_Categorical_Data/12.1%3A_Stem-and-Leaf_Graphs_(Stemplots)%2C_Line_Graphs%2C_and_Bar_Graphs)

5 Credits/Copyrights

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1. Teaching Module; 'Representing Data' and 'Creating a Bar graph'

Created by Khan Academy

2. Video; 'How to Construct a Climate Graph'

Created and presented by [Darron Gedge](#), New Zealand.

3. Webpage: 'City Weather'

By the [Indian Meteorological Department \(IMD\)](#)

4. Additional Resources

[Libretexts™](#)