

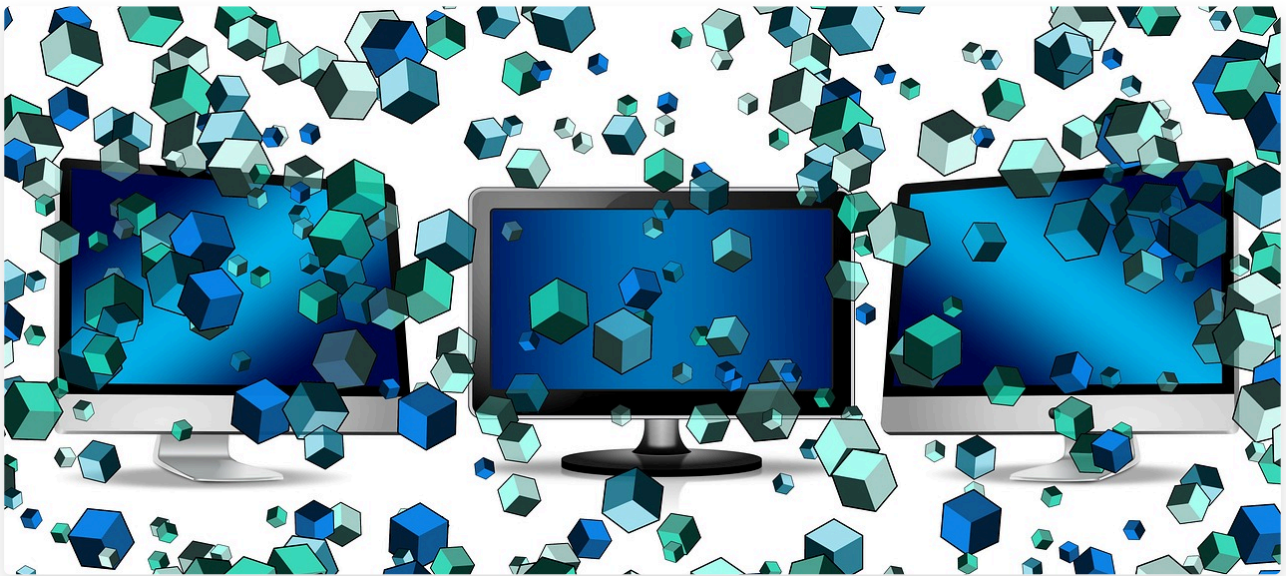
# Understanding Data

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## Textbook

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## Understanding Data



### What Are the Three States of Data?

Think of data like water. It can sit still, move around, or be used to make something happen. In the digital world, data also has **three states**:

- **Data at Rest** This is data that is **stored** on a device or in the cloud.
  - Examples: Files on a flash drive, saved photos, or a stored document
  - Threats: Hackers breaking into storage or stealing devices
- **Data in Motion** This is data that is **moving** between devices or over the internet.
  - Examples: Sending a message, uploading a file, or streaming music
  - Threats: Data being **intercepted** or stolen during transfer
- **Data in Use** This is data that is **actively being used** by a program or user.
  - Examples: A calculator using numbers, or a game running your score
  - Threats: Malware that can see what you're typing or doing

Understanding the **state** data is in helps us know how to **protect it**.

## What Makes Data Useful?

Not all data is helpful. Sometimes we get so much information that it's hard to know what matters. That's where we have to learn to **separate usable data from extra stuff**.

Let's say you want to find out which school lunch is the most popular. You collect:

- How many students chose each lunch option (usable)
- What time they ate (maybe not helpful)
- Their favorite color (definitely not helpful)
- Comments about the food (usable)

**Usable data** helps answer your question. **Miscellaneous data** is off-topic or random.

Smart decision-makers ask:

- Does this data help me solve the problem?
- Is it connected to my goal?
- Is it from a reliable source?

## Using Math to Make Sense of the World

Once we have usable data, we often need **math** to understand it.

For example:

- You gather survey responses from 100 students about internet safety habits.
- You calculate how many use strong passwords or click on unknown links.
- You use a chart or graph to show the results.

This is called **applying math to real-world problems**.

Great thinkers:

- **Investigate** to find out what's really happening
- **Model** or draw the situation with charts or diagrams
- **Compare outcomes** to make better decisions
- **Revise their ideas** if new data shows something different

Math isn't just for class—it's a **power tool** for solving digital problems!


## Quick Activity: Sort That Data!

**"What are students' favorite times to use the internet at home?"**

Data info:

- A student's favorite YouTuber

- Time of day when students go online
- Number of siblings they have
- How many hours they spend online on weekdays

**Sort the data** into:  **Useful** (helps answer the question) or  **Miscellaneous** (not helpful)

Explain your thinking to a partner or group.

## Critical Thinking Questions

1. Why is it important to know the state data is in when thinking about how to protect it?
2. How can you tell whether a piece of information is usable or just extra?
3. Why do you think applying math to data is important in real life, not just in class?

## Questions (5)

### 1. Which of the following is an example of data at rest?

MULTIPLE CHOICE

**Choose the correct answer:**

- A. A video streaming on your phone
- B. A message being sent in a chat
- C. A photo saved on your tablet
- D. A score changing during a game

### 2. What threat is most likely for data in motion?

MULTIPLE CHOICE

**Choose the correct answer:**

- A. A file being deleted accidentally
- B. A message being intercepted by someone
- C. A virus stealing your stored files
- D. Someone renaming a document

**3. Which of the following is most likely usable data when researching school lunch popularity?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. The color of each student's tray
- B. The name of the lunch lady
- C. How loud the lunchroom was that day
- D. The number of students who chose each meal

**4. What is one way math helps us use data better?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. It helps organize and understand what the data is saying
- B. It helps delete bad files
- C. It lets us skip reading the data
- D. It makes the internet faster

**5. What question should you ask when deciding if a piece of information is usable?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. Is it cool or funny?
- B. Did my best friend tell me?
- C. Is it short enough to read quickly?
- D. Does it help answer the question I'm investigating?

## Answer Keys & Solutions

### Questions

1. Which of the following is an example of data at rest?

MULTIPLE CHOICE

Correct Answer:

- A. A video streaming on your phone ✗ Incorrect
- B. A message being sent in a chat ✗ Incorrect
- C. A photo saved on your tablet ✓ Correct
- D. A score changing during a game ✗ Incorrect

2. What threat is most likely for data in motion?

MULTIPLE CHOICE

Correct Answer:

- A. A file being deleted accidentally ✗ Incorrect
- B. A message being intercepted by someone ✓ Correct
- C. A virus stealing your stored files ✗ Incorrect
- D. Someone renaming a document ✗ Incorrect

3. Which of the following is most likely usable data when researching school lunch popularity?

MULTIPLE CHOICE

Correct Answer:

- A. The color of each student's tray ✗ Incorrect
- B. The name of the lunch lady ✗ Incorrect
- C. How loud the lunchroom was that day ✗ Incorrect
- D. The number of students who chose each meal ✓ Correct

#### 4. What is one way math helps us use data better?

MULTIPLE CHOICE

**Correct Answer:**

- |   |             |
|---|-------------|
| A. It helps organize and understand what the data is saying | ✓ Correct   |
| B. It helps delete bad files                                | ✗ Incorrect |
| C. It lets us skip reading the data                         | ✗ Incorrect |
| D. It makes the internet faster                             | ✗ Incorrect |

#### 5. What question should you ask when deciding if a piece of information is usable?

MULTIPLE CHOICE

**Correct Answer:**

- |  |             |
|--|-------------|
| A. Is it cool or funny?                                | ✗ Incorrect |
| B. Did my best friend tell me?                         | ✗ Incorrect |
| C. Is it short enough to read quickly?                 | ✗ Incorrect |
| D. Does it help answer the question I'm investigating? | ✓ Correct   |