

Teacher Institute for Neuroscience and Society

LESSON PLAN

The Importance of Sleep

 Suggested Duration

45 min

 Grade Level

Middle School (Grades 6-8)

 Topic

Sleep health; screen time;
graphs & dot plots

Summary

The focus of this lesson is to have students explore the relationship between **sleep habits** and **brain health** using their own class data.

Students will **collect**, **visualize**, and **analyze** sleep data using dot plots and box plots in Geogebra. The culminating project will be a **personal reflection** in which students connect their findings to the impact of sleep on their daily lives.

Prerequisites

- A basic understanding of algebra and data visualization
- Ability to work collaboratively in small groups
- Basic writing skills for reflection and response tasks

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NGSS Science Standards

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS1-7: Develop a model to describe how the structures of organisms and their functions are related.

NGSS Writing Standards

W.7.1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.7.2: Write informative/explanatory texts to examine a topic and convey ideas and information

NGSS Practices

Analyzing and Interpreting Data: Students will collect data on sleep patterns and analyze their significance.

Engaging in Argument from Evidence: Students will discuss and debate the effects of screen time and sleep on cognitive function, using evidence from research.

Developing and Using Models: Students will create models (e.g., PSAs) to represent their understanding of the effects of sleep and technology on the brain.

NGSS Cross Cutting Concepts

Cause & Effect: Understanding how sleep patterns affect cognitive function and health.

Systems and System Models: Exploring how different parts of the brain relate to their functions, particularly in relation to technology use.

Stability and Change: Analyzing how advancements in technology can alter our priorities and behaviors.

Q Essential Questions

- Why is sleep important for brain health?
- How does technology, including cell phones, affect sleep patterns in adolescents?
- What message should we communicate to our peers about the importance of sleep?

Q Learning Objectives

All students will...

- Analyze data regarding sleep patterns.
- Explore the relationship between sleep, brain function, and technology.
- Reflect on what they learned from class data and how sleep affects their daily life.

Advanced students will...

- Write a detailed report summarizing their findings along with recommendations for improving sleep habits in adolescents.
- Optional: create a public service announcement (PSA) to convey key findings about sleep and its importance.

Materials

Downloadable Lesson Components

- Student worksheet
- Powerpoint slides

Supplies

- Geogebra: access to the Geogebra platform for creating dot plots and box plots.
- Chart paper: for displaying the class data and creating a visual representation of the dot plot.
- Sticky notes: for collecting survey results.
- Markers for labeling and creating visual aids.

References

Video Used in Lesson

- “Why is Sleep So Important - Wellness 101 Junior” video by Glucose Guy
<https://www.youtube.com/watch?v=egJs02gTpU8>

Additional Background

- “To Sleep or not to Sleep in Your Teens? Choose Sleep!” article from Frontiers for Young Minds
<https://kids.frontiersin.org/articles/10.3389/frym.2026.1593900>
- “Sleep and social media in tweens: Tips for better rest” article from EurekAlert! <https://www.eurekalert.org/news-releases/1052053>
- Adolescent Brain Cognitive Development Study (ABCD Study) news releases
<https://abcdstudy.org/news/>

INSTRUCTIONAL ACTIVITIES

Engage: Warm-Up Survey • 10 MIN

Note:

- Ensure students understand how to use Geogebra for data visualization.
- Encourage open discussion about sleep habits and their implications.
- Prepare the video in advance and check for technical issues.

The Importance of Sleep (Worksheet)

Teachers will...

- Conduct a quick **survey** asking students to write on a **sticky note** how many hours of sleep they got the previous night. Generate a dot plot using **Geogebra**.

Students will...

- Participate in the survey and observe the dot plot created.

INSTRUCTIONAL ACTIVITIES

Explore: Data Analysis • 15 MIN

 The Importance of Sleep (Worksheet)

Teacher will...

- Guide students in making **observations** about the dot plot data.

Students will...

- Take notes on the importance of sleep and engage in a brief **discussion**.
 - Create a box plot to summarize the sleep data.
-

Explain: Video Viewing • 5 MIN

 The Importance of Sleep (Worksheet)

 Why Is Sleep So Important (Short Video)

Teacher will...

- Show a short video on the **importance of sleep**.

Students will...

- Take notes on the **importance of sleep**.
-

Elaborate: Class Discussion • 10 MIN

Teacher will...

- Explain the significance of **sleep duration** and its effects on **brain function**.
- Discuss key takeaways from the data and video.

Students will...

- Take notes on the **importance of sleep** and engage in a brief **discussion**.
 - **Reflect** on the video and share **insights** in pairs..
-

Elaborate: Reflection Writing • 5 MIN

Teacher will...

- Have students **write** a brief **reflection** on how their sleep affects their daily life.

Students will...

- Write a brief **reflection** on how their sleep **affects** their daily life.

INSTRUCTIONAL ACTIVITIES

Closing (Evaluate) • 15-20 MIN

 The Importance of Sleep (Worksheet)

Teacher will...

- Direct students to complete their class activity sheet.
- Provide an extension worksheet or allow silent reading if they finish early.
- Circulate the room to assist students and provide feedback.

Students will...

- Complete the class activity sheet, reflecting on their learning.
- Turn in their work before dismissal.

Assessment or Deliverables	Formative: Participation in discussions and completion of data plots. Summative: Submission of a reflection sheet summarizing learning and insights.
Differentiation or Extension Activities	For students who need more support, the teacher may choose to review dot and box plots prior to this lesson. To extend this lesson, students can create a public service announcement (PSA) to convey key findings about sleep and its importance to different audiences.

LESSON PLAN CONSIDERATIONS

Possible Student Misconceptions

- **Underestimating Sleep Needs:** Students may believe that they can function well on fewer hours of sleep than is generally recommended (e.g., thinking 6 hours is adequate for adolescents).
- **Misunderstanding Sleep Quality:** Students might confuse the quantity of sleep with the quality of sleep, not realizing that both are important for cognitive function.
- **Believing Sleep Is Optional:** Some students may think that sleep is not crucial for their daily performance, equating it to personal choice rather than a biological necessity.

Suggested Background Information for the Teacher

Sleep Recommendations: Adolescents typically need 8-10 hours of sleep per night for optimal health and cognitive function.

Sleep Stages: Understanding the different stages of sleep (REM and non-REM) and their importance for brain health, memory consolidation, and emotional regulation.

Consequences of Sleep Deprivation: Effects of insufficient sleep on cognitive functions, mood, academic performance, and overall health.

Data Interpretation: Basic concepts of data visualization (dot plots, box plots) and how to analyze sleep data effectively.

LESSON PLAN CONSIDERATIONS

Glossary

Box Plot	A standardized way of displaying the distribution of data based on a five-number summary: minimum, first quartile, median, third quartile, and maximum.
Circadian Rhythm	The body's internal clock that regulates sleep-wake cycles over a 24-hour period.
Data Visualization	The graphical representation of information and data to highlight trends and patterns.
Dot Plot	A simple statistical chart that consists of dots plotted on a number line to display frequency of data points.
Sleep	A natural state of rest characterized by reduced consciousness, sensory activity, and inhibition of voluntary muscles.
Sleep Deprivation	A condition resulting from inadequate sleep, leading to cognitive and physical impairments.
Sleep Quality	The overall effectiveness of sleep, including aspects such as duration, depth, and disturbances.

CROSS CUTTING CONCEPTS

Cause and Effect	Understanding how sleep patterns (cause) affect cognitive function and health (effect).
Structure and Function	Exploring how different parts of the brain (structure) relate to their functions, particularly in relation to technology use.
Stability and Change	Analyzing how advancements in technology can alter our priorities and behaviors.

ACKNOWLEDGEMENTS

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