Sleepy Reactions
Activity 3A

Objectives:
Students will be able to:
• Explore the effect of sleep amounts on reaction time
• Collect, graph and analyze data
• Infer and draw conclusions from data analysis

Activity Description:
This activity involves measuring student reaction time with a simple setup, grouping students according to the average amount of sleep they have had over the past three days and comparing the data sets that result. After analyzing the data, students draw their own conclusions about the effect of sleep amounts on reaction time. Students will apply the findings to their daily lives and will begin to craft a personal understanding of how important sleep is to their daily functioning and to their overall health.

Activity Background:
It used to be thought that sleep was a very passive process in which our bodies rest. However, the development of technology that monitors what really happens during sleep has proven otherwise. Sleep has significant effects on cognitive processing and is critical to long-term health.

Sleep deprivation has become a very significant worldwide problem. This problem has developed as a result of people working long hours and getting less sleep in order to find time to get other things done. Concentration, reaction time and overall health are affected by sleep deprivation. Additionally, accident rates increase significantly among sleep-deprived people, especially adolescent drivers.

How do you know if you’re sleep deprived? It occurs when people sleep less than is needed over a period of time. On average, people need six to nine hours of sleep every night. When less sleep occurs over a period of time, the body has a homeostatic mechanism that requires this sleep to be made up.

Changes in behavior, cognitive function and reaction time occur in all ages, but adolescents show significant changes when they are sleep deprived. Sleep deprivation in adolescents can affect academic performance, tardiness, and absenteeism. High school graduation rates have also been linked to adolescent sleep schedules and school start times. Caffeine is often used to overcome the effects of sleep deprivation, but it can actually make people feel more tired when the caffeine wears off. Research has shown that sleep deprivation which occurs over long periods of time can shorten life spans.
Activity Materials:
- Stopwatch
- Meter Stick
- Calculator

Activity Management Suggestions:
In order to prevent student exaggeration of the amount of sleep they have gotten (or not gotten), avoid explaining too much about the purpose of the activity until students have reported the amount of sleep they had over the past three days and have measured their reaction times.

Modifications: Careful selection of group members will maximize the participation level of students with special needs.

Extension:
Students can conduct a self-study of their sleep patterns and the effect they have on reaction time over a longer period of time.

References Used:


Thank you to Dr. Fankhauser, Ph.D., Professor of Biology & Chemistry at the University of Cincinnati Clermont College for granting permission to use his procedure for measuring reaction time. The procedure was extracted from the following web page on 11/17/2004: [http://biology.clc.uc.edu/fankhauser/Labs/Anatomy_&_Physiology/A&P202/Nervous_System_Physiology/Visual_Reaction.htm](http://biology.clc.uc.edu/fankhauser/Labs/Anatomy_&_Physiology/A&P202/Nervous_System_Physiology/Visual_Reaction.htm)
**Activity “Administrivia”:**

**Grade Levels 6-8**

---

**Relevant TEKS:**

**Health**

6.2 (A)

(2) Health information. The student recognizes ways that body structure and function relate to personal health throughout the life span. The student is expected to:

(A) analyze the relationships among the body systems;

6.4 (B)

(4) Health information. The student comprehends ways of researching, accessing, and analyzing health information. The student is expected to:

(B) use critical thinking to research and evaluate health information.

7.1; 8.1 (A)

(1) Health information. The student comprehends ways to enhance and maintain personal health throughout the life span. The student is expected to:

(A) analyze the interrelationships of physical, mental, and social health

7.12; 8.12 (A, B, C, G)

(12) Personal/interpersonal skills. The student analyzes information and applies critical-thinking, decision-making, goal-setting and problem-solving skills for making health-promoting decisions. The student is expected to:

(A) interpret critical issues related to solving health problems;

(B) relate practices and steps necessary for making health decisions;

(C) appraise the risks and benefits of decision-making about personal health;

(G) demonstrate time-management skills.

**Middle School ELA**

6.16; 7.16

(16) Writing. Students write about their own experiences. Students are expected to write a personal narrative that has a clearly defined focus and communicates the importance of or reasons for actions and/or consequences.

8.16

(16) Writing. Students write about their own experiences. Students are expected to write a personal narrative that has a clearly defined focus and includes reflections on decisions, actions, and/or consequences.

6.20 (A, B)

(20) Oral and Written Conventions/Handwriting, Capitalization, and Punctuation. Students write legibly and use appropriate capitalization and punctuation conventions in their compositions. Students are expected to:

(A) use capitalization for:

(i) abbreviations;

(ii) initials and acronyms; and

(iii) organizations;

(B) recognize and use punctuation marks including:

(i) commas in compound sentences;

7.20 & 8.20 (A, B)

(20) Oral and Written Conventions/Handwriting, Capitalization, and Punctuation. Students write legibly and use appropriate capitalization and punctuation conventions in their compositions. Students are expected to:

(A) use conventions of capitalization; and

(B) recognize and use punctuation marks including:

(i) commas after introductory words, phrases, and clauses; and

(ii) semicolons, colons, and hyphens.

6.21 (A)

(21) Oral and Written Conventions/Spelling. Students spell correctly. Students are expected to:

(A) differentiate between commonly confused terms (e.g., its, it’s; affect, effect);

7.21 & 8.21

(21) Oral and Written Conventions/Spelling. Students spell correctly. Students are expected to spell correctly, including using various resources to determine and check correct spellings.

6.28

(28) Listening and Speaking/Teamwork. Students work productively with others in teams. Students will continue to apply earlier standards with greater complexity. Students are expected to participate in
Activity “Administrivia”:

Grade Levels 6-8

student-led discussions by eliciting and considering suggestions from other group members and by identifying points of agreement and disagreement.

7.28; 8.28

(28) Listening and Speaking/Teamwork. Students work productively with others in teams. Students will continue to apply earlier standards with greater complexity. Students are expected to participate productively in discussions.

Middle School Science

6.1, 7.1, 8.1 (A)

(1) Scientific investigation and reasoning. The student, for at least 40% of instructional time, conducts laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices. The student is expected to:

(A) demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards.

6.2, 7.2, 8.2 (C, D, E)

(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations. The student is expected to:

(C) collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers;
(D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns; and
(E) analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.

6.4, 7.4, 8.4 (A)

(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry. The student is expected to:

(A) use appropriate tools to collect, record, and analyze information, including journals/notebooks, meter sticks, calculators, computers and other equipment as needed to teach the curriculum;

6.8 (A)

(8) Force, motion, and energy. The student knows force and motion are related to potential and kinetic energy. The student is expected to:

(A) compare and contrast potential and kinetic energy;

Biology

Bio 1 (A)

(1) Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

(A) demonstrate safe practices during laboratory and field investigations;

Bio 2 (F, G, H)

(2) Scientific processes. The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:

(F) collect data and make measurements with accuracy and precision;
(G) analyze, evaluate, make inferences, and predict trends from data; and
(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

Chemistry

Chem 2 (F, H, I)

(2) Scientific processes. The student uses scientific methods to solve investigative questions. The student is expected to:

(F) collect data and make measurements with accuracy and precision;
(H) organize, analyze, evaluate, make inferences, and predict trends from data; and
(I) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports, and technology-based reports.