



# **Snooze... You Lose?**

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Summer 2000**

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**2000  
Lesson  
#5**

# Snooze... You Lose?

## *Suggestions for Teachers*

### **Purpose:**

To explore the relationship between hours slept on school nights and reflex and response time. This activity is appropriate for grades 9 – 12.

### **Objectives:**

- Student will be able to distinguish between reflexes and responses.
- Student will be able to design experiments that test reflex and response time.
- Student will be able to graph data.
- Student will be able to explain the relationship between sleep and reflex and response time.

### **Materials:**

Students will work in groups of three. Each group will need:

- Penlight with a pupil gauge
- Percussion mallet
- Meter stick
- Ruler with a ridge down the middle
- Stopwatch
- Pennies
- 4x4 cards

A class set of the following materials should also be available for students to use when designing experiments to test response time:

- Magnetic letters
- Cookie trays
- True Colors Poster (English/Spanish)
- Whole Brain Game

Each Student will also need:

- Sleep diary
- Lab notebook.

The True Colors Poster and Whole Brain Game can be purchased from MindWare.

The sleep diary can be downloaded from the National Sleep Foundation web page.

### **Preparation and Procedure:**

- Prior to beginning this lesson students should know different methods for data collection.
- Prior to beginning this lesson students should have mastered graphing. Students should know what type of graph best represents different data. For example, if a student wants to illustrate different percentages then a pie graph is best.
- Prior to beginning the inquiry part of this lesson students should learn the difference between reflexes and responses. There is an APS activity titled “Neural Networks” that helps students understand the differences between reflexes and responses.
- Working in groups of three the students will design experiments to test their reflex and response time.
- Once the experiments are approved by the teacher data collection will begin.
- Data will be collected for a one-month period. The students will conduct their experiments during the first ten to twenty minutes of class time.
- Students will keep a sleep diary.
- Students will also enter the following data into their lab notebook every morning:  
Number of hours slept \_\_\_\_\_.  
Reflex time \_\_\_\_\_.  
Response time \_\_\_\_\_.
- At the end of the one-month period students will analyze the class data.
- Students will graph the class data.
- Students will write a laboratory report in which they explain their findings. The laboratory report must include an introduction, which explains the importance of sleep.
- Students may find that they are able to perform better when they sleep less.
- I asked a sleep study researcher and he explained that this might be due to students motivating themselves to excel since it is such a simple task they are performing. He suggested response experiments that require more concentration. For example, the game “concentration.” The game costs \$15.00 at Toys R Us.

### **Safety:**

Students should design experiments that will not harm the subject. The teacher must approve all experiments before they are begun.

### **Questions to Ask:**

- How many hours do you sleep at night? Do you think this affects your schoolwork? How can we find out? (This is a good time to introduce the sleep diary. Hopefully the students will suggest it themselves.)
- Do you think the hours you sleep at night affect how quickly you react or respond to things? How can we find out if there is a connection between hours slept and reaction and response time? (This question is best asked once students know the difference between reflexes and responses. This question also leads right into experimental design.)

### **Where to Go From Here:**

- This lab/activity should be used when discussing the Nervous System.
- After completing this activity it would be beneficial to invite a sleep specialist for a classroom visit.
- Students should be encouraged to continue explorations in this area. In the sleep diary there are sections that take into consideration the effect of caffeinated drinks, physical activity, alcohol, medications, and food consumption on sleep. Once data is collected and analyzed students may want to extend their research to include other factors which affect sleep and reflex/response time.

### **References and Resources:**

[www.sleepfoundation.org/publications/teensleep.html](http://www.sleepfoundation.org/publications/teensleep.html)

Adolescent Research Report Sleep Needs and Resource Guide and Patterns

[www.onhealth.com/conditions/in-depth/item,2473\\_1\\_1.asp](http://www.onhealth.com/conditions/in-depth/item,2473_1_1.asp)

Lack of Sleep Impairs Coordination

[www.onhealth.com/conditions/in-depth/item/item,35807\\_1\\_1.asp](http://www.onhealth.com/conditions/in-depth/item/item,35807_1_1.asp)

How Much Sleep Is Enough?

[www.sleepfoundation.org/publications/sleepdiary.html](http://www.sleepfoundation.org/publications/sleepdiary.html)

National Sleep Foundation Sleep Diary

[www.the-aps.org/education/outreach/outreach/acts%20labs/neural%5Fnetworks.htm](http://www.the-aps.org/education/outreach/outreach/acts%20labs/neural%5Fnetworks.htm)

Neural Networks

MindWare

1-800-999-0398 or [www.MINDWAREonline.com](http://www.MINDWAREonline.com)

### **Assessment:**

Students will be assessed on the basis of their lab notebook, lab report, and class discussions.

## **Snooze...you lose?**

### ***Student Activity Sheet***

#### **Purpose:**

To explore the relationship between hours slept on school nights and reflex and response time.

#### **Materials:**

Each group will need a penlight with a pupil gauge, a percussion mallet, a meter stick, a ruler with a ridge down the middle, a stopwatch, pennies, and 4x4 cards. A class set of the following materials should also be available for students to use when designing experiments to test response time: magnetic letters, cookie trays, True Colors Poster (English/Spanish), and Whole Brain Game. Each student will also need a sleep diary, and a lab notebook.

#### **Procedure:**

- Working in groups of three students will design experiments to test their reflex and response time.
- Once the experiments are approved by the teacher data collection will begin.
- Data will be collected for a one-month period. The experiments will be conducted during the first ten to twenty minutes of class.
- Students will keep a sleep diary.
- Students will also enter the following data into their lab notebook every morning:  
Number of hours slept \_\_\_\_\_.  
Reflex time \_\_\_\_\_.  
Response time \_\_\_\_\_.
- At the end of the one-month period students will analyze the class data.
- Students will graph the class data.
- Students will write a laboratory report in which they explain their findings. The laboratory report must include an introduction, which explains the importance of sleep.