

# Sleep and Daily Rhythms

## Activities Guide for Teachers Activity Three: Sleepy Time



*National Space Biomedical Research Institute*

Houston, Texas



The National Space Biomedical Research Institute (NSBRI) is combining the basic research capabilities of some of the nation's leading biomedical research centers with operational and applied research conducted by the National Aeronautics and Space Administration (NASA) to understand and achieve safe and effective long-term human exploration and development of space. The NSBRI's discoveries and research products will help to counter the effects of weightlessness and space radiation and will contribute to the health and well-being of all mankind.



## National Space Biomedical Research Institute

One Baylor Plaza, NA-425

Houston, Texas 77030-3498

<http://www.nsbri.org>

The activities described in this book are intended for school-age children under direct supervision of adults. The authors, Baylor College of Medicine and the National Space Biomedical Research Institute cannot be responsible for any accidents or injuries that may result from conduct of the activities, from not specifically following directions, or from ignoring cautions contained in the text. The opinions, findings and conclusions expressed in this publication are solely those of the authors and do not necessarily reflect the views of Baylor College of Medicine or the National Space Biomedical Research Institute.

Authors: Nancy P. Moreno, Ph.D. and Barbara Z. Tharp, M.S.

Cover Illustration: T Lewis

Design and Production: Martha S. Young

### Acknowledgments

The authors gratefully acknowledge the support of Bobby R. Alford, M.D.; Laurence R. Young, Sc.D.; and Ronald J. White, Ph.D.; as well as the contributions of the following science reviewers: Mary A. Carskadon, Ph.D.; Kimberly Chang, Ph.D.; Charles A. Czeisler, Ph.D., M.D.; David F. Dinges, Ph.D.; Hans P.A. Van Dongen, Ph.D.; and Kenneth P. Wright, Jr., Ph.D. Preparation of this guide would not have been possible without the invaluable assistance of the following field test teachers: Yolanda Adams, Jeri Alloway, Vivian Ashley, Susan Babac, Henrietta Barrera, Paula Clark, Carol Daniels, Barbara Foreman, Carolyn Hopper, Susan King-Martin, Mary Helen Kirby, Sue Klein, Jacqueline McMahon, Sandra Prill, Carol Reams, Mary Ellen Reid, Sandra Saunders, Angi Signorelli, and Marcia Wutke.

This work supported by the National Space Biomedical Research Institute through NASA 9-58.

All rights reserved. No part of this book may be reproduced by any mechanical, photographic or electronic process, or in the form of an audio recording; nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use without prior written permission of the publisher. Black-line masters reproduced for classroom use are excepted.

© 2000 by Baylor College of Medicine  
All rights reserved. Published 2000  
Printed in the United States of America  
ISBN: 1-888997-41-9

## CONCEPTS

- All mammals, including humans, and many other kinds of animals need sleep.
- Most people have regular patterns of sleeping and waking.

## OVERVIEW

Students will collect data about their own sleep patterns and, if desired, those of members of their families.

## SCIENCE, HEALTH & MATH SKILLS

- Observation
- Data collection
- Graphing
- Drawing conclusions
- Learning to identify and practice healthy behaviors



# 3. Sleepy Time

## Background

Sleep takes up about one-third of our lives. All mammals, including humans, and most vertebrates sleep. Many aspects of sleep still are not understood. Once viewed as passive shutting-down of most body systems, sleep now is known to consist of several stages, each with differing levels of brain and muscle activity.

Most of us sleep about the same number of hours and wake at about the same time each day, even without an alarm. Many, however, vary their sleep patterns using external alarm clocks to meet school or work schedules. Daily wake-up times in humans are governed by an internal clock, consisting of about 10,000 nerve cells located deep inside the brain. Even without any light or sound cues, most people sleep and wake in cycles of close to 24 hours.

Patterns of sleeping and waking vary by age. For instance, newborns sleep 16–18 hours each day, including several naps. By age one, children sleep 12–14 hours, including about two naps. Nine or ten hours of sleep, without naps, is normal for children by age 12. Adults sleep about eight hours per day. The urge to nap in the afternoon is normal for teenagers and adults, and most override this urge to sleep by remaining active. For some who may be in a sleep-promoting setting, a nap may occur with possible hazardous consequences.

## Time

30 minutes to conduct initial class discussion; 3–7 days for students to collect data on sleep times; 30 minutes for discussion of results

## Materials

Each student will need:

- log or journal
- copies of “Sleeping Patterns Graph” student sheet

## Setup and Management

Begin the activity with a discussion involving the entire class. Working individually, students will collect data on themselves and family members. They will share their results with other members of their groups.

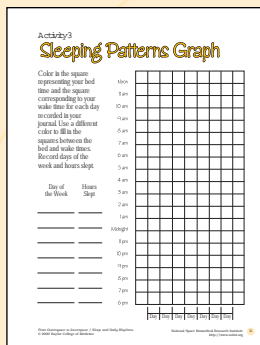
## Procedure

1. Challenge students to think about all the different things that they do every day. Let each student suggest one or more activities and create a list on the board.
2. Now ask, *What activities could you leave out of this list without affecting your health or how you feel? What activities must stay on the list? Why do you think so?*
3. Explain to students that they will be examining one of the essential activities on the list—sleep. Encourage students to share what they know

**All animals rest between periods of activity. Sleep patterns vary among different animals. Rabbits, for example, sleep for only a few minutes at a time. Dolphins have a unique form of sleeping: one half of the dolphin brain sleeps, while the other half continues to be alert and wide awake.**

about sleep. For instance, *when do they usually sleep, how long do they sleep, what makes them wake?*

4. Have each student create a journal, or “Sleep Log,” to record the times he or she goes to sleep and wakes daily. The journal should include: waking time; how student felt at waking; how student felt during the day (tired, well rested, etc.); bed time; and how student felt at bedtime. If possible, time the activity so that students are able to compare weeknight and weekend sleep patterns. Students may want to ask other members of their families to participate and record their family members’ data as well.
5. After 3–5 days, have students graph their data on the “Sleeping Patterns Graph.”



Also have students calculate the average number of hours of sleep received by each person included in the study.

6. Have students share and compare their graphs and journals with other members of their groups. Help them

look for similarities and differences. Also help the students identify patterns in their graphs. Ask questions such as, *Do most people go to bed and wake up at about the same time each day? Did you feel particularly sleepy on any day during this activity? Why or why not? Can you notice anything different about the part of the graph corresponding to that day? Who sleeps more—children or grown-ups? What about very young children—do they have the same sleep patterns as older children or adults?*

### Extensions

- In addition to recording sleeping and waking times, also have students record other essential activities, such as eating or exercising, in their journals.
- Have students investigate the sleeping habits of different kinds of animals (*Where do they sleep and for how long?*, etc.).
- Have students create a sheet of paper with 24 squares by folding it in half three times, followed by folding it into thirds. Have them number the squares with the hours of the day. Next, ask students to draw the activity that they did most during each hour of the day in the corresponding square. Have them count the number of squares dedicated to sleeping, eating, playing, studying, etc.

**Scientists only are beginning to understand why we sleep and what happens when we sleep. Sleep consists of two different phases. One phase, called non-REM sleep, is characterized by slow brain activity, no eye movement and lack of muscle tone. Another phase, Rapid Eye-Movement (REM) sleep, is characterized by an active brain, bursts of eye movements, and paralyzed muscles (which makes it safe to dream!).**

**Dreams are prevalent during REM sleep. Scientists have different ideas about why we dream. Some believe that the brain consolidates needed and erases unneeded information during dreaming.**

### Activity 3

# Sleeping Patterns Graph

Color in the square representing your bed time and the square corresponding to your wake time for each day recorded in your journal. Use a different color to fill in the squares between the bed and wake times. Record days of the week and hours slept.

Day of the Week	Hours Slept
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

