GRADES 6–12

PATHWAYS

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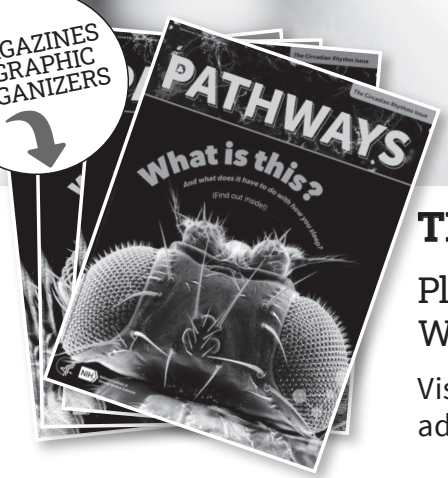
Engage Teens With the Fascinating Science of Circadian Rhythms and Sleep

MAGAZINES & GRAPHIC ORGANIZERS



TEACHING GUIDE

Plus, Digital Research Tool for Students With Interactive Informational Text

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Circadian Rhythms and Sleep

Launch a class-wide investigation into the science of sleep, and then have students investigate and track their own biological clocks.

Objective

Students will plan and carry out an investigation, then use their findings and additional research to write an evidence-based argument.

NGSS Standards

3. Planning and carrying out investigations

4. Analyzing and interpreting data

7. Engaging in argument from evidence

8. Obtaining, evaluating, and communicating information

Time

Part A: 60 minutes

Part B: 60 minutes

Allow extra work periods for essay research and writing as necessary.

Materials

- *Pathways* magazine
- Keep a Sleep Diary activity sheet
- Organize Your Argument activity sheet
- Science of Sleep digital tool at scholastic.com/pathways/sleep
- Vocabulary list at scholastic.com/pathways

PART A

1 **Ask:** *What do humans spend about one-third of their lives doing?* Answer: sleeping. Poll the class to see if they are night owls or early birds? Ask if anyone has heard the term *circadian rhythms* and if they can guess what it means.

2 **Read** the following statements aloud and ask students to guess if they are true or false.

Our body's cycle of sleeping and waking every day is the only example of circadian rhythms in humans.

▸ **False.** The sleep-wake cycle is just one example of a circadian rhythm—the natural cycle of physical, mental, and behavioral changes that our bodies go through in a roughly 24-hour period.

The body has a "master clock" that controls circadian rhythms.

▸ **True.** It coordinates a set of biological clocks that regulate things like body temperature, hormone release, digestion, hunger regulation, and sleepiness throughout the day.

Teenagers need more sleep than adults.

▸ **True.** Teens need 8–10 hours of sleep every night. This gets harder during adolescence, when a teen's biological clock shifts, causing them to feel alert later at night, which can make it challenging to get the sleep they need.

3 **Hand out** the *Pathways* student magazine. Discuss the ways that researchers and scientists study sleep and circadian rhythms through observation, and how their research can positively affect our everyday lives (because all of us need sleep to stay healthy and happy!). Point out that students can play the role of scientist and researcher by using the same principles of observation to conduct their own sleep experiment.

4 **Hand out** the Keep a Sleep Diary activity sheet. Challenge students to observe their sleep rhythms for one week, then design a research question to test a beneficial sleep habit in a second week of observation. Sample research questions: How might my sleep/mood/energy levels be affected if I introduced: a "no blue light" rule two hours before bedtime; five minutes of natural light after I wake up; a meditation practice before bed; or 20 minutes of exercise in the morning? *Note: Afterward, you may wish to tell students that if a clear trend or conclusion did not emerge from their data, it may simply be because of the complexity of the factors influencing sleep, not due to a data collection error on the student's part.*

PART B

5 **Hand out** the Organize Your Argument activity sheet. Direct students to conduct research and combine it with their sleep diary findings. Use the digital interactive tool at **scholastic.com/pathways/sleep** as a research source.

6 **Direct** students to use their data to create a persuasive argument about how either they or their school can use the science of circadian rhythms to improve health and wellness. Consider offering students a choice of how to show their work: essay, infographic, video, slides, or a short talk to the class.

Extension: Students may wish to share their findings with administrators or plan a campaign in the school to share information with peers.

Keep a Sleep Diary

Name _____

Fill in data and observations about your sleep for five nights in a row (make sure to include one weekend night). Then, design a research question and hypothesis to test in Week 2.

	Sleep Diary	DAY 1 /	DAY 2 /	DAY 3 /	DAY 4 /	DAY 5 /
EVENING	**I consumed caffeine today.** (Examples: soda, chocolate, tea, coffee, sports/energy drink)					
	Morning					
	Afternoon					
	Evening					
	I exercised for 20 or more minutes.					
	Morning					
	Afternoon					
	Evening					
	I took a nap today. Y/N					
	I felt tired today. Y/N					
	Morning					
	Afternoon					
	Evening					
NIGHT	**My mood today: (G)** good **(O)** OK **(B)** bad					
	Activities I did 1–2 hours before bed: (Examples: took a shower, messaged with friends, watched a video, finished homework, read a book, etc.)					
	I went to bed at:	AM PM	AM PM	AM PM	AM PM	AM PM
MORNING	**I woke up this morning at:**	AM PM	AM PM	AM PM	AM PM	AM PM
	I got out of bed this morning at:	AM PM	AM PM	AM PM	AM PM	AM PM
	Falling asleep last night was: (**E**) easy; (**O**) OK; (**D**) difficult					
	I woke up during the night. Y/N					
	I slept for a total of _____ hours.					
	I woke up feeling: (R) refreshed; **(T)** a little tired; **(VT)** very tired					

Turn over this sheet to record additional details. For example: It was too hot to sleep; I stayed up late to finish a movie; I felt stressed before bedtime because I had a test the next day; etc.

Name _____

Organize Your Argument

Ready to use your sleep-diary data and research to craft a persuasive argument? Choose a prompt below. Then organize your position, claims, and evidence with this planner.

A. How should schools use the science of circadian rhythms to improve students' lives?

B. How will YOU apply the science of circadian rhythms to improve your life?

You might want to consider ideas like school start times; breaks for exercise, nutrition, stress relief, or rest; strategies and supports for flagging energy; homework expectations; scheduling of extra-curricular activities; and blue light from electronic devices.

Persuasive Argument Planner

Introduction

- Hook/get reader's attention (e.g., introduce a stat or a question)
- Explain your chosen topic
- State your position

Claims Craft two or more claims to support your position (your argument). For example: Schools should _____ because that would help students who _____ to _____.	**Claim 1**	**Claim 2**	**Claim 3**
Supporting Evidence Provide research, facts, and scientific findings to support each claim.			

Conclusion

- Restate your position
- Summarize your argument and supporting evidence
- Write a concluding statement and call to action

NIH publication number: 20-GM-8114