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.