Making Neuroscience Fun

A Brain Awareness Program for All Ages

Brain Health: It's SPECtacular

What to do TODAY
Grade 3 (A Physical Health Story)

This story describes sleep, what it is, how it changes over time and most importantly, why you do not act out your dreams.

- There are actually different stages of sleep that do different things.
- People have different sleep needs based on their age. Babies sleep up from 14-17 hours a day (and there are only 24 hours in a day!), while older people, like your grandparents, may only sleep between 6-8 hours a day.
- We have 2 kinds of dreams, the ones that are more realistic and occur during SWS (slow wave sleep) and the ones that are more bizarre and occur during REM (rapid eye movement). Your brain has a way to protect you from acting out your dreams that occur during REM sleep.

- For this presentation, you need to have the "Sleep Basics" Story Video and you will need to have downloaded the video - https://www.youtube.com/watch?v=ORo-nbJ-F18. You will be presenting the first ~14 minutes of the video in Pt 1 and doing the Experiment: REM Detective – which takes about 10-15 minutes. You will need enough paper for one sheet per student.

- Start the Story Video and stop after the title page.

This story is about Physical Health – which includes moving our bodies, eating, and SLEEPING.

Today, we will describe what sleep is and why it is important to your Physical Health and your Brain Health.

Next time, we will talk about sleeping behaviors change during the course of our lifetime AND, most importantly, we will talk about what the dreams are all about.

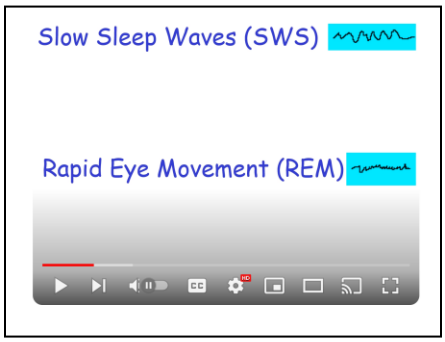
- Continue the Story Video and stop after this screen.

We all know that during the day our brain is REALLY busy, because our brain helps us do EVERYTHING that we do.

What are some of the things that you do during the day??? (After every response…SAY…YUP…you need your brain to do that!!!)

So, while animals are sleeping the brain is busy fixing, cleaning and storing information that from ALL the work that it did during the day.

- Continue playing the video and stop after the following slide after the definition of the EEG activity of both SWS and REM .

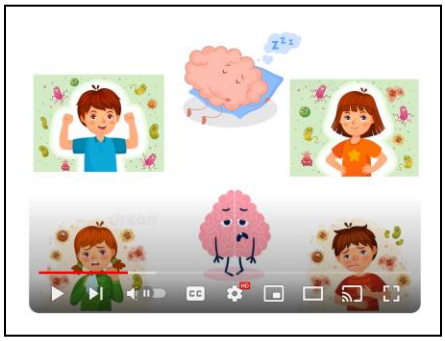


We can look at your brain activity while you are awake or sleeping by putting electrodes on top of your head that record neurons “talking to each other”.

Remind the students that in SLOW WAVE SLEEP (SWS for short) the “bumps” or waves are high and slow. During RAPID EYE MOVEMENT (REM for short) the bumps or waves are low and fast.

Ask the students to raise their hands if they can see the difference.

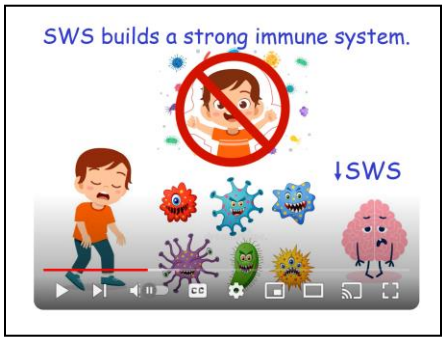
- Continue playing the video and stop after the following slide.



So, during sleep along with the brain helping to fix itself and the rest of the wear and tear of you body that happens during the day…the brain is also helping the IMMUNE to stay strong and work properly.

Your immune system is the body’s defense system – and we need it to protect us from germs and to keep us healthy.

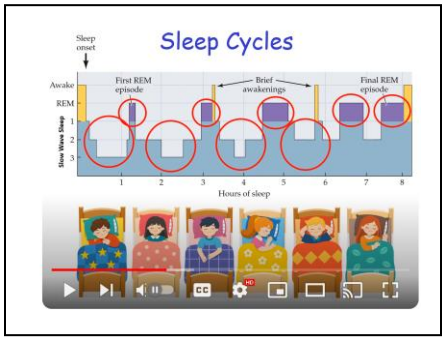
- Continue playing the video and stop after the following slide.



It turns out that sleep – especially Slow Wave Sleep – is important for making your immune system strong.

If you don’t get enough sleep, then your immune system is not strong enough to protect you from all the nasty germs there are in the world.

- Continue playing the video and stop after the following slide.

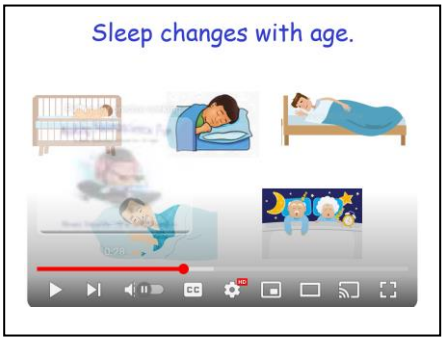


Ok..so when you are asleep at night, your brain is cycling about every 60-90 minutes from SWS to REM sleep.

During the course of the night, the amount of time you spend in SWS gets smaller (point this out on the slide) and the amount of REM sleep gets longer.

Here is a question for you…If your immune system gets stronger during SWS, then what part of your sleep cycle would be doing the most to make sure you can fight off germs? (Discuss this once you get an anwer.)

- Continue playing the video and stop after the following slide.



Scientist know that sleep changes with age.

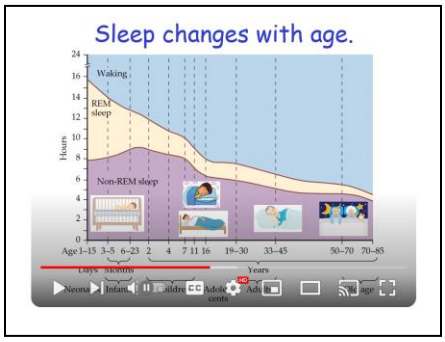
Who do you think sleeps more – babies or you?
Raise your hand if you think babies sleep more. Raise your hand if you think you sleep more.

Who do you think sleeps more – you or your parents?
Raise your hand if you think you sleep more. Raise your hand if you think your parents sleep more.

Who do you think sleeps more – you or your grandparents? Raise your hand if you think you sleep more. Raise your hand if you think your grandparents sleep more.

Let see what the science says…

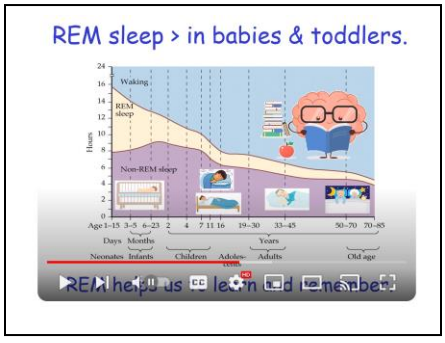
- Continue playing the video and stop after the following slide.



So, according to the science… (show the students how to look at the graph – hours of sleep on the vertical axis and age on the horizontal axis)

Babies sleep more than you.
You sleep more than your parents.
You sleep more than your grandparents.

- Continue playing the video and stop after the following slide. This will be the end of the Video Story for the day.



Show the students the difference between SWS and REM sleep across the ages.

So…we know when you are in SWS or REM sleep when you have electrodes on your head. BUT, did you know that you can tell if someone is in SWS or REM sleep just by looking at them.

Let's do an experiment.

- Do the Experiment: REM Detective. In this activity, students will watch a video of someone sleeping and make observations as they are in REM sleep mode.

Remind that students that REM stands for Rapid Eye Movement.

- It is called this because your eyeballs literally go back and forth very quickly when you are in the REM sleep cycle.
- During this part of your sleep cycle, the muscles in your arms and legs get limp meaning they are not working. This is why you can lift up someone's arm while they are in REM and just drop it.

1. For this experiment, put the student's into groups of 2. If there is an odd #, then you will work with a student.
2. Show the video - https://www.youtube.com/watch?v=ORo-nbJ-F18
3. As the video plays:
    - Read the text.
    - Discuss the content as you go.
    - Answer any questions the students might have.
4. Pass out the observation sheets.
5. Explain that they will work with a partner for the first part of the activity and watch the video again for the second part.
    - Tell the students to first observe each other's eye movements. Have one of the partners (#1) close their eyes.
    - Then ask the person to move their eyeballs from side to side with their eyes still closed.
    - Have the student record what they notice for #1 on the observation sheet.
      NOTE: They should notice a small bulge moving behind the person's eyelids.
    - Repeat with student #2.
6. After all partner groups have observed their partner's closed eyes, tell them they will watch the video again.
7. As they watch the video, they are going to write down everything they notice about the person sleeping. Remind them that good detectives pay close attention to details.
8. Ask students if they have any questions or need any clarification. Clear up any misunderstandings.
9. Play the video.
    NOTE: The video can be played again as it might be difficult for the student(s) to observe and write. Do what is best for the student(s).
10. Go over observations the students made. Were there any commonalities or differences among the observations? If so, discuss.

In closing, remind students that after the baby stage, people of all ages then need the same amount of REM sleep so that they can continue to learn about the world around them. This information is then stored so that people can continue to learn new things rather than relearning things they have already learned. Getting enough rest, including REM sleep will help keep the body and brain happy and healthy.

- End the presentations.

Tell the students that you had fun talking with them today and ask them if they had fun learning.

Remind the students that today we learned more about sleep – which is important for our Physical Health.

We learned…

- while we sleep our brains are busy repairing and cleaning up our brains and also storing all the things we learned during the day.
- We can measure the brain activity while we sleep with electrodes. The activity in the brain while we sleep cycles between Slow Wave Sleep (SWS) and Rapid Eye Movement (REM) Sleep.

- People have different sleep needs based on their age. Babies sleep up from 14-17 hours a day (and there are only 24 hours in a day!), while older people, like your grandparents, may only sleep between 6-8 hours a day.

Next time, we will learn about our DREAMS.

Be sure to thank them for listening and the Brain Health Team of JHU students will see them soon.