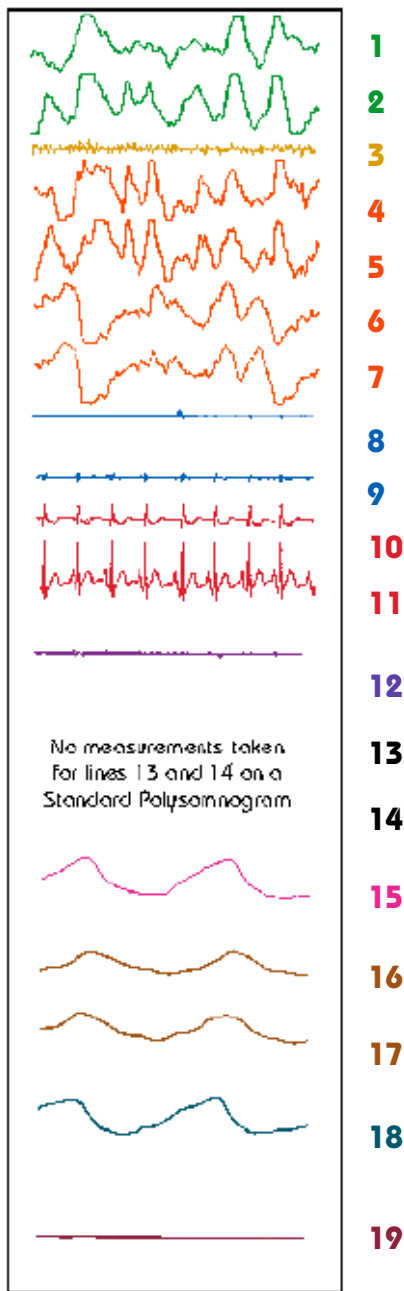




Each line has information about a specific body function. Once trained to read these waves, a sleep specialist can provide a detailed report about what is happening to a person when they sleep.



ZZZZZZ



**Figure 2 – Standard Polysomnogram**

Remember from **Activity 4 D, Somnosurfin'** that you studied four types of brain waves. *Beta waves* are *shorter and closer together* and they have the highest frequency and lowest amplitude. These waves are produced when a person is *alert*. *Delta waves* are *taller and farther apart*, so they have the lowest frequency and the highest amplitude. These waves are produced as a person relaxes and produces slow rolling eye movements. It is important to remember that waves with low energy have low amplitude and high energy waves have high amplitude. Also, high energy waves have shorter frequency while low energy waves have lower frequency. This information will help you interpret the waves on a polysomnogram – higher energy waves will be higher and closer together.

## Activity Materials: (Per Student)

- Colored Map Pencils or Markers
- 1 Copy of Standard Polysomnogram Page
- 1 Copy of The Visual Polysomnogram Page



## Activity Instructions:

First, read the background material very carefully and check what you learned by answering the questions that follow. You will create a visual polysomnogram by illustrating the process in each section of the polysomnogram.

1. List ten measurements that are made during human sleep studies.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

2. How can Delta brain waves be distinguished from Alpha brain waves on an EEG?

\_\_\_\_\_

\_\_\_\_\_

3. When a person is relaxed, which type of brain wave would be produced?

\_\_\_\_\_

4. What is a polysomnogram?

\_\_\_\_\_

\_\_\_\_\_

5. Making a Visual Polysomnogram Instructions



- Using **Table 1, Standard Polysomnogram Information** on next page as a guide, label each section in the **Visual Polysomnogram**.
- Color the lines in the **Visual Polysomnogram** as indicated in the table on the next page (Standard Polysomnogram Information).
- Next, draw a picture in the box beside each section on the **Visual Polysomnogram** page included in this activity. Your picture should illustrate clearly what body process each section measures.
- You will have a unique **Visual Polysomnogram** when you finish.

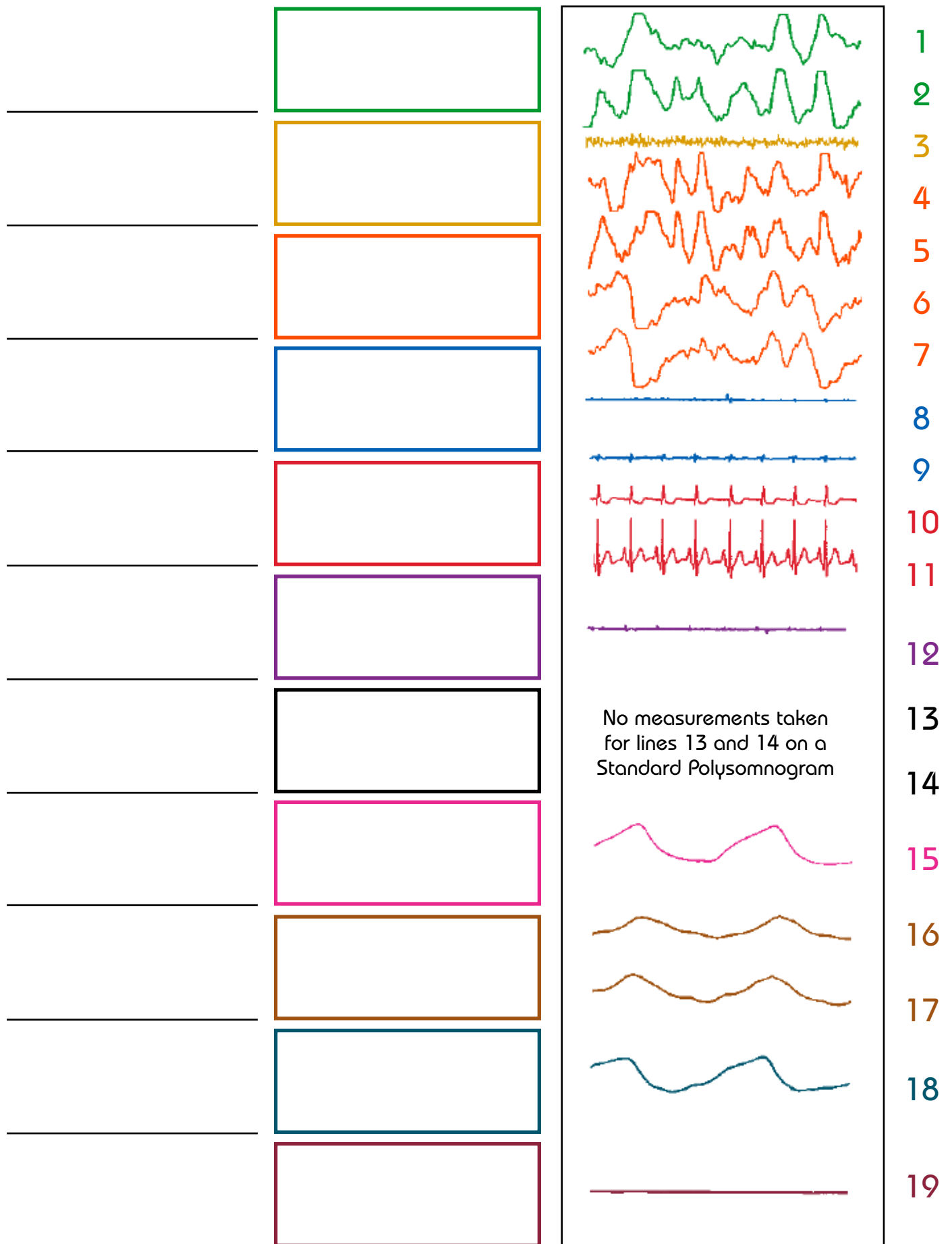


**Table 1 Standard Polysomnogram Information**

#	What this part of the Polysomnogram Measures	Color
1	Left eye movements (EOG electrode)	Green
2	Right eye movements (EOG electrode)	Green
3	Jaw movements & teeth grinding (Chin strap)	Yellow
4	Brain wave activity (EEG electrodes)	Orange
5	Brain wave activity (EEG electrodes)	Orange
6	Brain wave activity (EEG electrodes)	Orange
7	Brain wave activity (EEG electrodes)	Orange
8	Left leg movement (EMG electrode)	Blue
9	Right leg movement (EMG electrode)	Blue
10	Heart rhythm (EKG electrodes)	Red
11	Heart rhythm (EKG electrodes)	Red
12	Snoring/Talking (Sound monitoring)	Purple
13	Breathing (Oral Air Flow)	Pink
14	Breathing - Chest expansion and contraction (Thoracic Belt)	Brown
15	Breathing - Stomach cavity expansion and contraction (Abdominal Belt)	Brown
16	Backup belt (sometimes one and sometimes two are used)	Aqua
17	Oxygen saturation of blood (Pulse Oximeter)	Maroon



**Figure 3 – Visual Polysomnogram**



6. Look at the polysomnogram in *Figure 4*, Drowsy below. It shows measurements taken from a person who is drowsy and about to enter Stage 1 of NREM sleep. Now look at the polysomnogram in *Figure 5*, below. *Figure 4, Drowsy* is labeled, so it is a *known* polysomnogram; *Figure 5* ????? is not labeled, so it is an *unknown* polysomnogram. What do you think might be happening to explain the differences in most areas of the two polysomnograms?

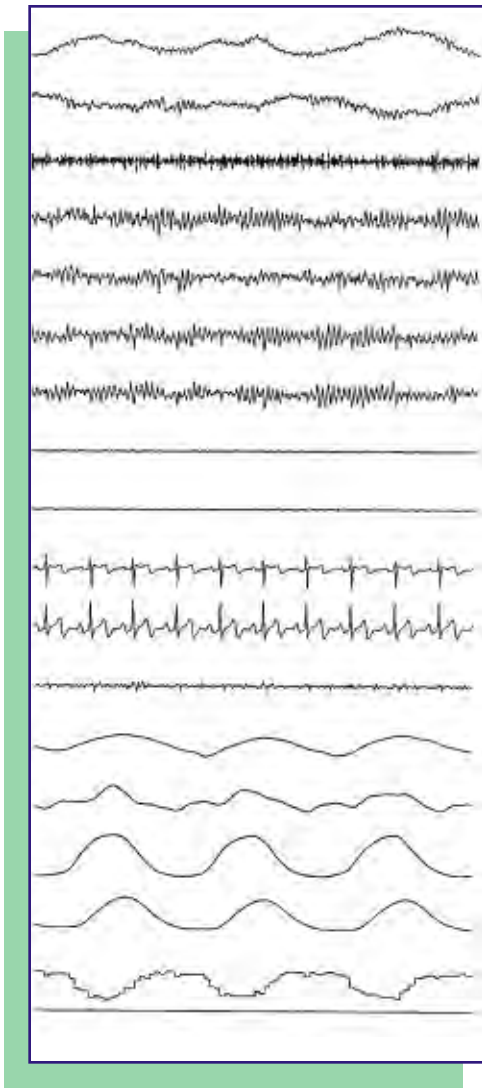
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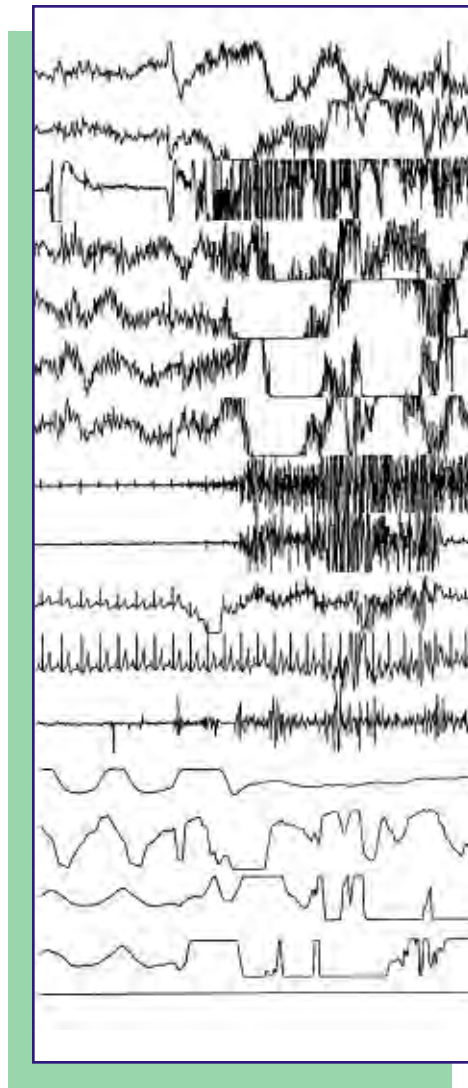
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**Figure 4 – Drowsy**



**Figure 5 – ?????**



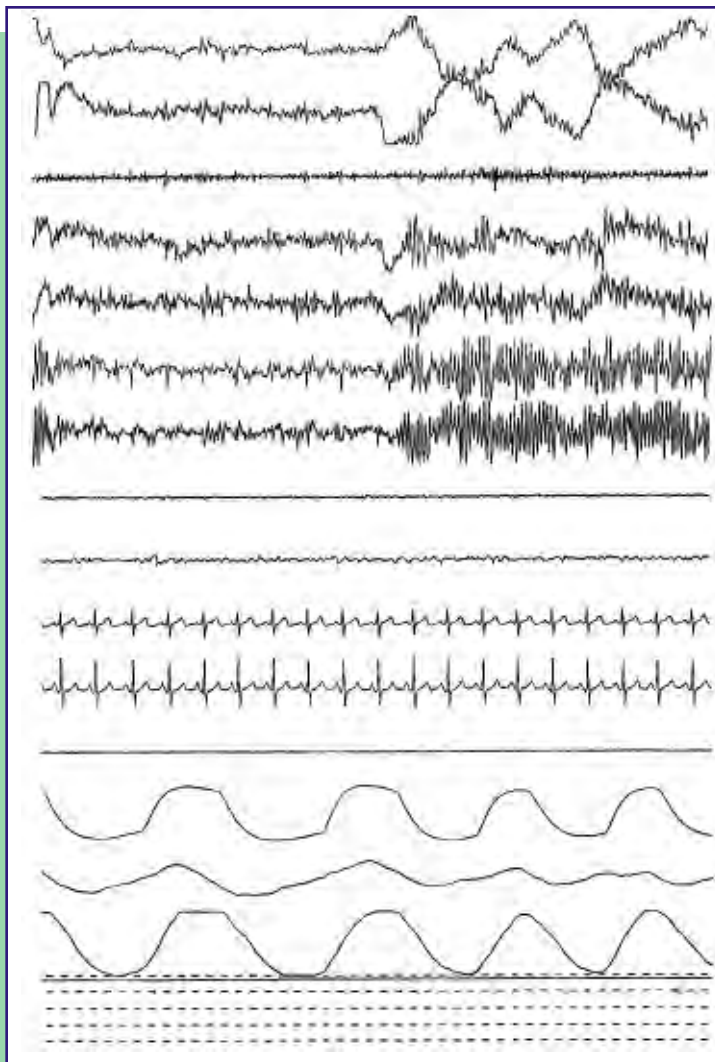
7. Look at the polysomnogram in *Figure 6 Stage Awake* (Eyes Closed and Eyes Open) below. Which line or lines of the polysomnogram will you be looking at to determine if the eyes are open or closed?



What evidence do you see in these lines that the person's eyes are closed?

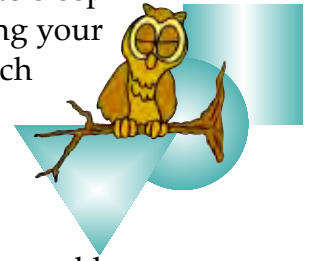
Observe the appearance of the lines having to do with left and right eye movements and think about the characteristics of waves you learned about during the *Somnosurfin'* activity. How did the lines change when the eyes opened?

Why does this change indicate that the eyes were open?



**1** Figure 6 – Stage Awake  
**2** (Eyes Closed and Eyes Open)  
**3**  
**4**  
**5**  
**6**  
**7**  
**8**  
**9**  
**10**  
**11**  
**12**  
**15**  
**16**  
**17**  
**18**  
**19**

8. Upon completion of a sleep study to determine why you are not able to sleep throughout the night, the sleep specialist tells you that you are grinding your teeth at night and having trouble breathing regularly. By number, which sections of your polysomnogram might indicate these problems?



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9. How do you *think* polysomnograms would be used to detect breathing problems while a person is asleep?

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