



# SLEEP/WAKE ANALYSIS

Actiware scores all epochs as either sleep or wake. Whether a particular epoch is scored as wake is determined by comparing activity counts for the epoch in question and those immediately surrounding it, to a threshold value set by the researcher. If the number of counts exceeds the threshold, the epoch is scored as wake. If it falls below, or is equal to, the threshold, the epoch is scored as sleep.

Sleep = Total Activity Counts  $\leq$  Wake Threshold Value

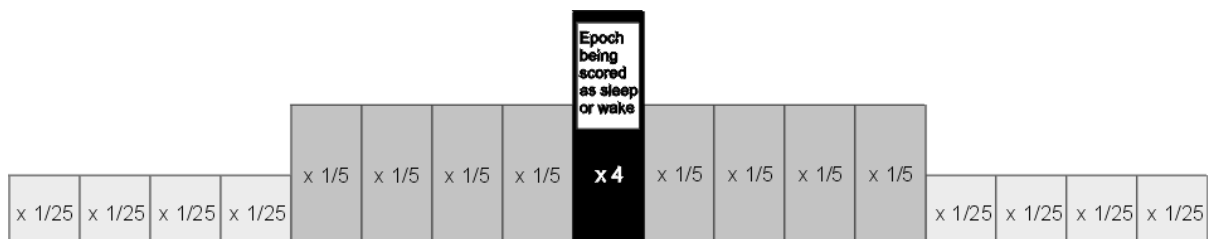
Wake = Total Activity Counts  $>$  Wake Threshold Value

## Calculating Total Activity Counts

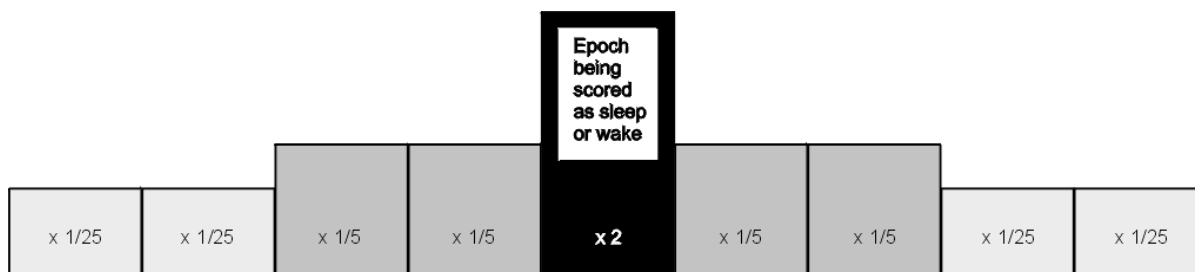
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Actiware calculates total activity counts based on the sampling epoch. Below are four diagrams showing how this scoring calculation is done.

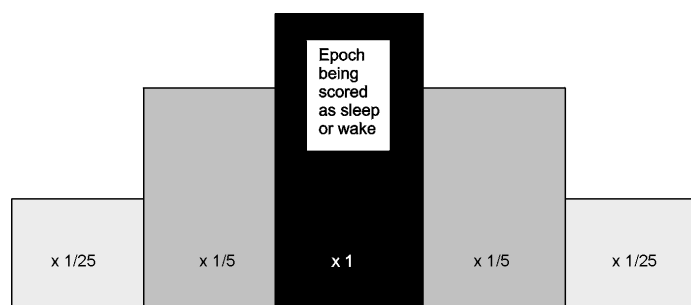
15-second  
sampling  
epochs



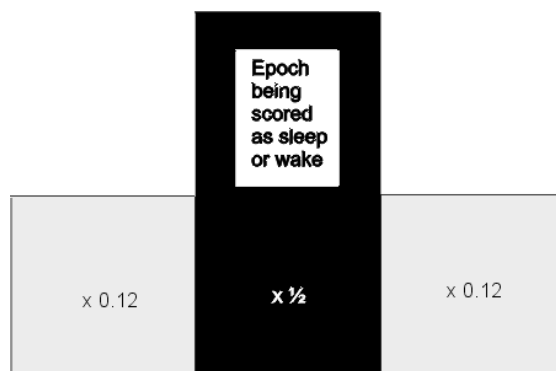
30-second  
sampling  
epochs



1-minute  
sampling  
epochs



2-minute  
sampling  
epochs



For instance, assume a 1-minute sampling epoch and the following activity values on/and surrounding the time 12:00.

Time	Corresponding Activity Data
11:58	100
11:59	42
12:00	20
12:01	13
12:02	67

The total activity value for the 12:00 epoch would be:  
 $100 * (1/25) + 42 * (1/5) + 20 + 13 * (1/5) + 67 * (1/25) = 37.68$ .

If this value is less than or equal to the wake threshold value (next paragraph) then the epoch would be scored as sleep.

## Wake Threshold Values

The total number of activity counts calculated above is compared to the wake threshold value selected by the researcher. These thresholds are listed in the table below.

Wake Threshold Selection	Wake Threshold Value*
Low	20
Medium	40
High	80
Automatic	Computed automatically based on activity data
Custom	User-selectable value

\*The Automatic Wake Threshold Value calculation is this:

1. Sum the activity counts for all epochs of the data set;
2. Count the number of epochs scored as MOBILE for the data set (see below for definition of MOBILE);
3. Compute the MOBILE TIME (number of epochs scored as MOBILE from step 2 multiplied by the Epoch Length) in minutes;
4. Compute the Auto Wake Threshold = ( (sum of activity counts from step 1) divided by (MOBILE TIME from step 3) ) multiplied by 0.88888

Definition of MOBILE:

An epoch is scored as MOBILE if the number of activity counts recorded in that epoch is greater than or equal to the epoch length in 15-second intervals. For example, there are four 15-second intervals for a 1-minute epoch length; hence, the activity value in an epoch would have to be greater than or equal to four to be scored as MOBILE.

