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Model Assignment
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Why you can't sleep with the lights on

Purpose: To show the importance of the suprachiasmatic nucleus in the sleep/wake cycle.

Materials: A Nerf ball gun, the balls labeled as light, a free standing target with butcher paper, and a structure representing the pathway to the suprachiasmatic nucleus, a box representing the nucleus, sunglasses, cones, blindfold, boxes, different colored balls to represent serotonin, and norepinephrine.

Procedure: There will be at least four kids involved. One will use the Nerf gun to shoot "light" through the target. This target is the retina of the eye, which is a hole that changes diameter with different times of the day (for example the hole will measure 12 inches across during the "day" and when the sun is down the hole will be about 6 inches to represent "night". On the other side of the target there is another student waiting to catch the signal ball and take it through the cone maze in order to reach the suprachiasmatic nucleus. At the nucleus there will be two other kids waiting, one will be assigned to get the serotonin and the other to get the norepinephrine. Each neurotransmitter messenger will give their specific NT to a kid that will, according to which neurotransmitter it is, to perform a specific action. The action that we have chosen is to jump rope ten times for every ball of neurotransmitter received. We will explain the importance of daylight in stimulating different parts of the brain to perform various actions (basically helping you stay awake). We will also that daylight alone does not keep the body awake and that other systems are involved. For example we will explain that a person can get tired when an action is performed for a too long.

After running through the experiment we will explain in further detail how serotonin and norepinephrine help keep the body awake. If there is more time we would open it up to any other questions pertaining to sleep or sleep disorders. All kids will receive candy some sort of reward such as candy participating or asking inquisitive questions pertaining to the subject matter previously discussed.

Issues: One of the major issues associated with our project is that the pathway only involves about two parts of the brain. These are basically the retina and the suprachiasmatic nucleus. We do not explain that light actually travels through photoreceptors, ganglion cells, bi-polar cells and to other parts of the brain. Also, along the way to and from the suprachiasmatic nucleus the signal travels through other various anatomical brain features such as the pons and thalamus. Furthermore, when we will need to explain why the body gets so tired when performing an action for a long time, which involves many parts of the brain and numerous functions. Also, the kids will probably not know what neurotransmitters actually are, but we are definitely simplifying it into words telling them that they are "signals" that tell the brain to perform various actions.