# Scientific Project: Question & Hypothesis

**Learning Objectives:**
1) Identify a problem or goal regarding personal wellness.
2) Formulate a scientific research question.
3) Create a research hypothesis with appropriate independent and dependent variables.

## Project Overview:

For this project, you will apply the principles of the scientific method to a self-experiment based on one of the dimensions of wellness.

Throughout the parts of the scientific project, you must remember to properly cite your references. Each component of the project that you submit should have a corresponding reference list. Please use American Medical Association (AMA) citation style for your references. For guidance with AMA references, please refer here: https://owl.english.purdue.edu/owl/resource/1017/03/

## Instructions for Question & Hypothesis:

What aspect of health and wellness interests you? Perform some preliminary research and provide background information on a topic of your choice. Background information should paint a picture of what your self-experiment will cover. This information should be gathered from *scholarly, scientific research*, NOT blog posts and Google searches. Then, develop a research question and hypothesis. Remember, your hypothesis must be a single sentence, simply stated, with at least 2 variables clearly stated, and testable. You must include your references with proper citations throughout your background section. All Project Submissions are Final.

There are three parts to receive full credit for this assignment you must have these three subheadings:

### 1. Background Information:

- Background information should paint a picture of what your self-experiment will cover. This information should be gathered from *scholarly, scientific research*, NOT blog posts and Google searches.
- You need at least 2 peer-reviewed resources. Make sure to watch Scott Stone's videos to aid you in finding resources.

### 2. Question:

- Phrase your research question as a question, not a statement.

- The topic must clearly relate to a dimension of wellness (if you feel your topic warrants an explanation of how it relates to a dimension of wellness, please provide this here).

**3. Hypothesis:**

- State what you believe you will find after conducting this experiment.
- This hypothesis must be based on existing literature related to your topic.
- Make sure that you have familiarized yourself with the literature and are generating a realistic hypothesis founded in scientific research.
- Clearly identify your independent and dependent variables.
- If your dependent variable isn't obviously measurable, please provide a brief explanation as to how your variable will be measured
    - For example: ▪ Body weight is clearly measured by standing on a scale, and is always represented by a number (either in pounds or kilograms). "I will lose weight" is clearly and obviously measured only one way.
    - Level of stress is not clearly measured or represented by a number, so you must explain how it will be measured. The statement "I will feel less stressed" does not obviously demonstrate how stress is measured. Instead, try "I will feel less stressed, as measured by the Perceived Stress Scale." This shows that you are turning a normally qualitative variable, stress, into a quantitative variable that can be measured using a numeric scale.

**Things to Take in Consideration:**

- You are the only participant in this experiment.
- You need to decide your topic based on the literature.
- Do not chose inappropriate topics not limited but examples that involve drugs, alcohol, excessive weight loss, ingesting any material that would alter your state that could be considered detrimental to your health (increase or decrease heart rate).
- Need to choose a measurable outcome that can be compared pre and post-self experiment. Make sure to sure quantitative variables and qualitative.
    - Reference material for further explanation: https://www.simplypsychology.org/qualitative-quantitative.html

**Rubric for the Project:**

| Descriptor | Superior | Good | Poor | Unacceptable | |
|---|---|---|---|---|---|
| **Points** | **5** | **3** | **1** | **0** | **Total** |
| **Criterion 1: Background** | Background information provides a clear and concise material that relates to your research question and hypothesis. | Background information is present but only addresses partial portion of the research question and hypothesis. | Background information does not relate to the research question and hypothesis. | No background information stated. | |
| **Criterion 2: Research Question** | Research question is phrased as a question, and topic is appropriate within the confines of the project. | Research question is not phrased as a question, but topic is still appropriate within the confines of the project. | Topic is not appropriate (inappropriate subject matter, too many participants required, timeline too long, etc.). | No research question stated. | |
| **Criterion 3: Dimension of Wellness** | Question is clearly and directly related to a dimension of wellness. | Question is somewhat related to a dimension of wellness. | Question is loosely related to a dimension of wellness. | Question is unrelated to a dimension of wellness. | |
| **Criterion 4: Hypothesis** | Hypothesis is testable and concise. | Hypothesis is testable and slightly concise. | Hypothesis is testable but is not stated in one single sentence. | Hypothesis is not testable. | |
| **Criterion 5: Variables** | The hypothesis clearly states the independent and dependent variables. | It is difficult to identify the independent and dependent variables from the student's hypothesis. | The hypothesis is missing a variable. | No variables are stated in the hypothesis. | |
| **Criterion 6: Formatting** | Complete sentences, appropriate subheadings are used throughout the document, and there are two references. | Complete sentences are implemented; some subheadings are included in the document, and two references. | Complete sentences are used, but there are no subheadings included a no references are present. | The assignment is not written in complete sentences. | |
| | | | | **Total Possible Points** | **30** |

Here are a few examples ***(Please do not Duplicate any of this material, if any of it is duplicated it is an automatic zero).***

**Example 1:**

**Background information** so far has indicated positive growth in resilience and compassion in students of many different health fields, typically involving stress in the pursuit of academics.[1,2] The experiment will involve meditating each day, ideally in the morning at a consistent time, and documenting any changes in stress levels throughout several weeks. In order to follow those specific levels, I will use scales such as the Resilience Quotient Test, Cognitive and Affective Mindfulness Scale-Revised, and Perceived Stress Scale.[2,3]

**Research Question and Hypothesis**

Through this project, my question and hypothesis will focus on the psychological effects of mindful meditation. The topic of mindful meditation caught my attention because it fits in with the mental aspect of health and wellness, and maybe even spiritual. As someone who struggles with stress and anxiety, this self-experiment may provide positive direction in treatment**.**

**Research Question:**

How does meditating each day for 15 minutes affect my resilience and ability to cope with stress measured with Resilience Quotient Test, Cognitive and Affective Mindfulness Scale-Revised, and Perceived Stress Scale ?

**Hypothesis:**

If I practice mindful meditation for 15 minutes each day, my resilience and ability to cope with stress will increase.

**References**

1. Mahon M, Mee L, Brett D, Dowling M. Nurses' perceived stress and compassion following a mindfulness meditation and self compassion training. Journal Of Research In Nursing [serial online]. December 2017;22(8):572-583. Available from: CINAHL Plus with Full Text, Ipswich, MA. Accessed August 14, 2018.

2. Alsaraireh F, Aloush S. Mindfulness Meditation Versus Physical Exercise in the Management of Depression Among Nursing Students. Journal Of Nursing Education [serial online]. October 2017;56(10):599-604. Available from: CINAHL Plus with Full Text, Ipswich, MA. Accessed August 14, 2018.

3. Hwang W, Lee T, Kwon J, et al. The effects of four days of intensive mindfulness meditation training (Templestay program) on resilience to stress: a randomized controlled trial. Psychology, Health & Medicine [serial online]. June 2018;23(5):497-504. Available from: CINAHL Plus with Full Text, Ipswich, MA. Accessed August 14, 2018.

Example 2:

**Background:**

Sleep in one of the most important parts of human life, playing major roles in memory formation and maintenance[1], as well as more obvious roles in general wakefulness and alertness throughout the next day and as such, understanding factors that can improve or hinder sleep quality is very useful. In recent years sleep quality has been decreasing, and it is theorized that this may be due to the increased use of electronic media before bedtime[2]. The data around this point is not unified however,

with some studies showing increased sleep latency along with reduced next-morning alertness[2] and other studies showing no decrease in reported sleep latency and only changes in EEG dynamics[3] when comparing reading on an electronic device versus on a physical book before sleep. Further studies have even shown no change in sleep polysomnography when reading a book versus an electronic device in the evening, if this were preceded by exposure to bright light[4].

This experiment will explore the effects of electronic media usage before sleep in the context of a male undergraduate student. This context differs from other research in that as a college student there is a high amount of exposure to light from digital screens and electronic media throughout evening hours, which may have an effect on overall sleep quality and next day alertness. In order to try to combat the potential adverse effects of this exposure, 30 minutes of electronic media usage just prior to sleep will be replaced with reading a physical book for one week. Sleep quality measurements will be taken through modified PSQI surveys weekly and a National Sleep Foundation Sleep Log.

**Reasearch Question:**

How does replacing electronic media exposure prior to sleep with reading a physical book will increase sleep quality as measured through the modified PSQI and a sleep log?

**Hypothesis:**

I hypothesize that replacing electronic media exposure prior to sleep with reading a physical book will increase sleep quality as measured through the modified PSQI and a sleep log.

Works Cited

1. Ackermann S, Rasch B. Differential Effects of Non-REM and REM Sleep on Memory Consolidation. *Curr Neurol Neurosci Rep* 2014; 14(2): 430. https://doi.org/10.1007/s11910-013-0430-8. Published 2014 Jan 07. Accessed 2018 Aug 18.

2. Chang AM, Aeschbach D, Duffy JF, Czeisler CA. Evening use of light-emitting eReaders negatively affects sleep, circadian timing, and next-morning alertness. *Proc Natl Acad Sci U S A.* 2015; 112(4): 1232-7. https://www.ncbi.nlm.nih.gov/pubmed/?term=25535358. Published 2014 Dec 22. Accessed 2018 Aug 18.
3. Grønli J, Byrkjedal IK, Bjorvatn B, Nødtvedt Ø, Hamre B, Pallesen S. Reading from an iPad or from a book in bed: the impact on human sleep. A randomized controlled crossover trial. *Sleep Med*. 2016; 21: 86-92: https://www.ncbi.nlm.nih.gov/pubmed?term =27448477. Published 2016 Mar 2. Accessed 2018 Aug 13.
4. Rångtell FH, Ekstrand E, Rapp L, Lagermalm A, Liethof L, Búcaro MO, Lingfors D, Broman JE, Schiöth HB, Benedict C. Two hours of evening reading on a self-luminous tablet vs. reading a physical book does not alter sleep after daytime bright light exposure. *Sleep Med*. 2016; 23: 111-118: https://www.ncbi.nlm.nih.gov/pubmed/?term=27539026. Published 2016 Jul 25. Accessed 2018 Aug 13.

**Example 3:**

**Background:** Breakfast is usually defined as the most important meal of the day due to its positive health- and school- related effect on students. Consuming breakfast is associated with improved cognitive function, attention, and memory, improved academic scores and attendance and lower body mass index.[1] Students who eat breakfast also get along with their peers better than non-breakfast eaters meaning that there is improvements in social interactions.[1] Other research shows that there are only short-term effects on individuals who eat breakfast. According to one study, a breakfast-eating high school student's cognitive performance and mood improved only for a short-term and was not sustained for the whole day.[2] In my research, I hope to further explore the effects of eating breakfast through a self-experiment.

**Research Question:** Does breakfast consumption affect my alertness throughout the day?

**Hypothesis:** Eating breakfast every morning will increase my alertness throughout the day which will be measured by using a modified Stanford Alertness Test.

**References:**

1. Hearst, M. O., Shanafelt, A. , Wang, Q. , Leduc, R. and Nanney, M. S. Barriers, Benefits, and Behaviors Related to Breakfast Consumption Among Rural Adolescents. *J School Health*. 2016;86: 187-194.

2. Widenhorn-Müller K; Hille K; Klenk J; Weiland U. Influence of Having Breakfast on Cognitive Performance and Mood in 13- to 20-Year-Old High School Students: Results of a Crossover Trial. *Pediatrics.* 2008;122(2):279-284.