

In a Hurry? Try Express Weight Training

Nature of Science & Math: Analyzing the Presence in Everyday
Communication

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Introduction

For this assignment I have selected an article from the New York Times, written by Gretchen Reynolds and published on Sept. 12, 2018. The article is titled: *In a Hurry? Try Express Weight Training*. The article describes a new study of how much - or little - weight training is needed to bring about a positive change in muscle strength and size. The outcomes of the study suggest that brief bouts of exercise may yield almost the same muscular benefits as extended weight training routines.

Nature of Science tenets

1. Scientific Knowledge is Based on Empirical Evidence

The outcomes of this study - muscular strength, upper-body endurance and muscular hypertrophy (Schoenfeld, B.J., 2018) - are easily observable when the appropriate instrumentation is used. The knowledge gained from this study is therefore based on empirical evidence.

2. Scientific Knowledge Assumes an order and Consistency in Natural Systems

Researchers recruited 34 fit young men for the study. The men were not ‘burly weight lifters’ (Reynolds, G., 2018) but all of them did resistance training with some regularity. Baseline muscular strength, endurance and muscular size were measured and then the men were randomly assigned into one of three different weight training routines. They followed their assigned routine three times a week for eight weeks and then returned to the lab to repeat their muscle measurements.

This assumes the order in natural systems that, when one makes consistent changes in one’s weight lifting routine, there will be a measurable impact on muscle size and endurance.

3. Science Addresses Questions about the Natural and Material World

Many working-age adults have a limited amount of time on their hands. Exercise competes with other demands on our time. The CDC recommends that health adults need to do two types of physical activity each week in order to improve and maintain health (US Dept. of Health &

Human Services). The research that is addressed in the article - to evaluate the muscular adaptations between low-, medium- and high-volume resistance training - and the possibility of gaining benefits from brief bouts of exercise, therefore relates to the everyday natural world of many adults.

Common Core Mathematics Practices

1. Attend to precision

The article describes the study into a fair amount of detail. Some examples are:

- The study had 34 participants (Reynolds, G, 2018)
- Each set of exercises would require lifting to failure through 8-12 repetitions (Reynolds, G, 2018)
- Each of the three study groups went through a different number of sets of each exercise (5, 3, 1) and the duration for each group is mentioned (90 mins, 40 mins and 13 mins respectively) (Reynolds, G, 2018)

From reading the NYTimes article, one can observe that the study was performed with attention to precise details. It is very clear that science is a quantitative discipline and I think this study lends itself very well to explore the use of statistics in a science study as suggested in Appendix L of the NGSS. I can imagine a lesson in which I would give students access to the original study and we would look into all the numbers and discuss how to know whether or not a trend is visible and relevant. This study deals with processes inside humans and how exercise affects certain functions of our organs and we could discuss if and how the data justify the conclusions that the researchers came to (Appendix L, page 30)

2. Reason abstractly and quantitatively

All three participant groups showed improvements in muscular strength. Muscular strength was measured by how many times they could repeat a bench press exercise, using a low weight. The result was used then as a quantitative measure for the change in muscular strength. (Schoenfeld, B.J., 2018 and Reynolds, G, 2018). Muscle mass was measured to quantify muscle size. A longer exercise routine resulted in a greater increase in muscle mass. The article does not quantify these numbers, but a qualitative analysis suffices.

3. Construct viable arguments and critique the reasoning of others

The article starts with identifying a problem - we all know that weight lifting has health benefits. The current thinking is that one has to complete 8-12 repetitions of an exercise during a set and at least three sets of each exercise in order to gain the benefits. This means that considerable time will be spent in the gym. (Reynolds, G., 2018). The study that the article describes challenged this assumption - how much weight training is really required to make our muscles larger and stronger? Is it possible that we can reap the benefits from just one set of lifts? The default thinking is challenged and research was done to come up with supporting arguments.

Bibliography

Reynolds, Gretchen, (Sept. 12, 2018). In a Hurry? Try Express Weight Training. *New York Times*, Retrieved from: online subscription.

US Department of Health & Human Services. *How much physical activity do adults need?* Retrieved from: <https://www.cdc.gov/physicalactivity/basics/adults/index.htm>

Schoenfeld BJ et al, (Aug. 28, 2018). Resistance Training Volume Enhances Muscle Hypertrophy. *Medicine and Science in Sports & Exercise*.
DOI:[10.1249/MSS.0000000000001764](https://doi.org/10.1249/MSS.0000000000001764).

APPENDIX L – Connections to the Common Core State Standards for Mathematics. Retrieved from: <http://static.nsta.org/ngss/AppendixL-CCSSMathConnections-6.3.13.pdf>