10.3 Comparing static and dynamic methods of determining spring stiffness

**Introduction**

This practical activity is intended to be carried out as an investigation rather than being a defined set of instructions.

**Aims**

* To determine the spring constant, *k*, using *F= kx*
* To determine the spring constant for the same spring using a dynamic method (SHM) where the spring oscillates vertically with period, T, with a mass, m, suspended from it following the formula,

 *T* = 

* To obtain data to allow calculation of values for k using the two methods
* To analyse and evaluate that data

**Equipment:** set of masses, metre rule, spring, stand, boss and clamp, stopclock

**Procedure**

* Write a method with enough detail to replicate you results.
* Calculate values for the spring constant, *k*, using the two methods.
* Analyse and comment on your results.

**Recording**

As evidence for the Practical Endorsement you should have detailed your method and the variables which you took into account. You should have evidence of the data collected in a clear and logical format followed by your calculations and an analysis and evaluation of your results using appropriate scientific terminology. All work should be clearly dated.

**Practical Skills Assessed**

* 1.2.1(a) apply investigative approaches and methods to practical work
* 1.2.1(b) safely and correctly use a range of practical equipment and materials
* 1.2.1(c) follow written instructions
* 1.2.1(d) make and record observations/measurements
* 1.2.1(e) keep appropriate records of experimental activities
* 1.2.1(f) present information and data in a scientific way
* 1.2.1(g) use appropriate software and tools to process data, carry out research and report findings
* 1.2.1(j) use a wide range of experimental and practical instruments, equipment and techniques appropriate to the knowledge and understanding included in the specification
* 1.2.2(a) use of appropriate analogue apparatus to record a range of measurements to include length/distance and angles (b) use of appropriate digital instruments
* 1.2.2(c) use of methods to increase accuracy of measurements, such as timing over multiple oscillations
* 1.2.2(d) use of a stopwatch for timing

**CPAC**

* (1) Follows written procedures
* (2) Applies investigative approaches and methods when using instruments and equipment
* (3) Safely uses a range of practical equipment and materials
* (4) Makes and records observations