

[Home](#) [Gameboard](#) [Physics](#) [Mechanics](#) [Statics](#) [Springs 2](#)

Springs 2

Essential Pre-Uni Physics B7.2

GCSE

P

P

P

A Level

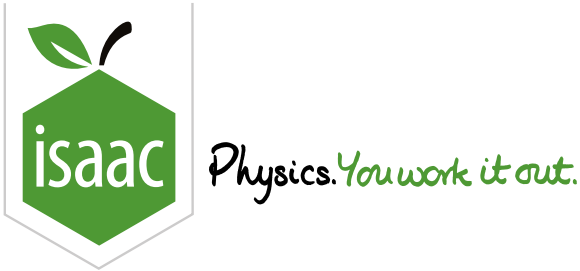
P

P

P

A spring of natural length 10.0 cm and spring constant 4.00 N cm^{-1} has a load of 22.0 N placed on it. What is its new length?

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[Home](#) [Gameboard](#) [Physics](#) [Mechanics](#) [Statics](#) [Springs 3](#)

Springs 3

Essential Pre-Uni Physics B7.3

GCSE

P

P

P

A Level

P

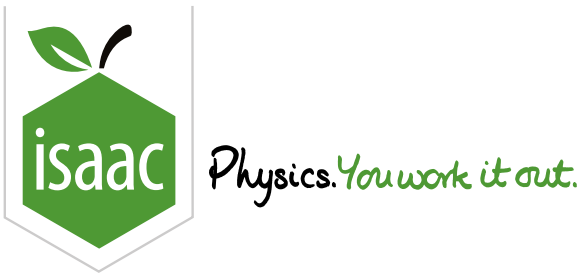
P

P

If a spring of natural length 1.50 cm stretches to 1.65 cm when a 16 N force is applied, what is its spring constant?

Gameboard:
[**STEM SMART Physics 9 - Springs & Materials**](#)

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Springs 7

Essential Pre-Uni Physics B7.7

GCSE

c

c

c

A Level

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Part A

Tension in series

Two identical springs, each of natural length 2.0 m and spring constant 80 N m^{-1} are placed in series (that is, one joined to the end of the other), with a weight of 7.5 N suspended from the bottom spring.

State the tension in each spring.

Part B

Total extension in series

Work out the total extension of the system.

Part C

Tension in parallel

If the two identical springs were placed in parallel so that they can share the load, with the same weight of 7.5 N suspended from the combination, work out the tension in each of the springs.

Part D

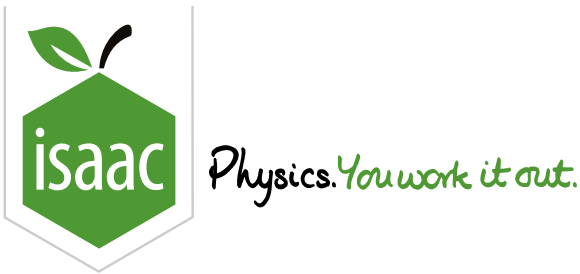
Total length in parallel

What is the total length of the system now? Give your answers to 3 significant figures.

Gameboard:

STEM SMART Physics 9 - Springs & Materials

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Springs 8

Essential Pre-Uni Physics B7.8

GCSE

c

c

c

A Level

c

c

c

If three identical springs were put in series, how would:

Part A Spring constant

a) the spring constant of the system compare to just one of the springs on its own with the same force applied?

- ☐ A quarter of the original
- ☐ The same
- ☐ $\frac{1}{3}$ as much
- ☐ Three times as large

Part B Total extension

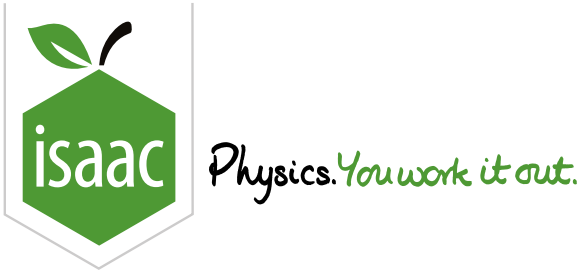
b) the total extension of the system compare to just one of the springs on its own with the same force applied?

- ☐ Three times as much
- ☐ A third as much
- ☐ The same
- ☐ A quarter of the original

Gameboard:

STEM SMART Physics 9 - Springs & Materials

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Stress, Strain and Young's Modulus 4



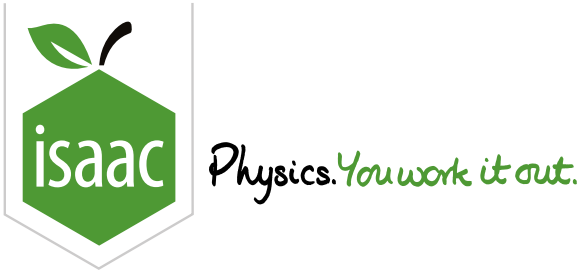
Essential Pre-Uni Physics B6.4

A brass pin has a cross sectional area of 0.50 cm^2 . Brass has a tensile strength of 190 MPa . Calculate the maximum tensile force it ought to be able to withstand without breaking.

Gameboard:

STEM SMART Physics 9 - Springs & Materials

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Stress, Strain and Young's Modulus 5

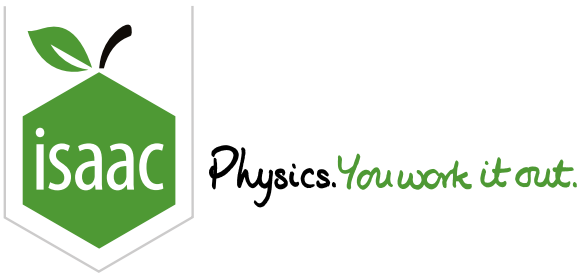
Essential Pre-Uni Physics B6.5



Mild steel has a breaking strength of 500 MPa. If you want to support a 200 kg piano using a single steel wire, what is the minimum diameter of wire you require? Give your answer to 2 significant figures.

Gameboard:
[**STEM SMART Physics 9 - Springs & Materials**](#)

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Energy, Springs and Materials 4

Essential Pre-Uni Physics B9.4

GCSE

C

C

C

A Level

P

P

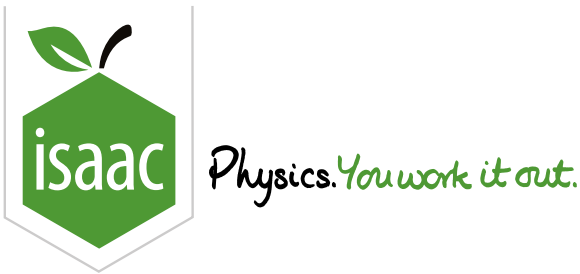
P

Assume that extension is proportional to the tension.

60 J of work is done to stretch a spring with spring constant 7.5 N cm^{-1} from its natural length of 0.24 m to some new length. Work out this new length.

Gameboard:
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Energy, Springs and Materials 5

Essential Pre-Uni Physics B9.5

GCSE

C

C

C

A Level

C

C

C

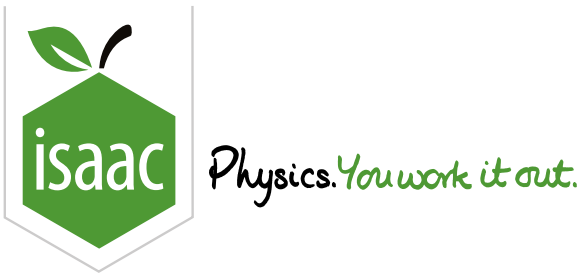
Assume that extension is proportional to the tension.

Calculate how much extra work must be done in order to stretch a spring from 17 cm to 20 cm, if its spring constant is 300 N m^{-1} and natural length 15 cm.

Gameboard:

[STEM SMART Physics 9 - Springs & Materials](#)

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Stress, Strain and Young's Modulus 6

A Level

c

c

c

Essential Pre-Uni Physics B6.6

A bolt is needed to attach an actor's harness to a wire across a stage. The bolt is 5.0 cm long with a 0.25 cm² cross sectional area, and must extend by no more than 0.020 mm when supporting a 900 kg mass. Calculate the minimum value of Young's Modulus of a material if it is to be suitable.

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