

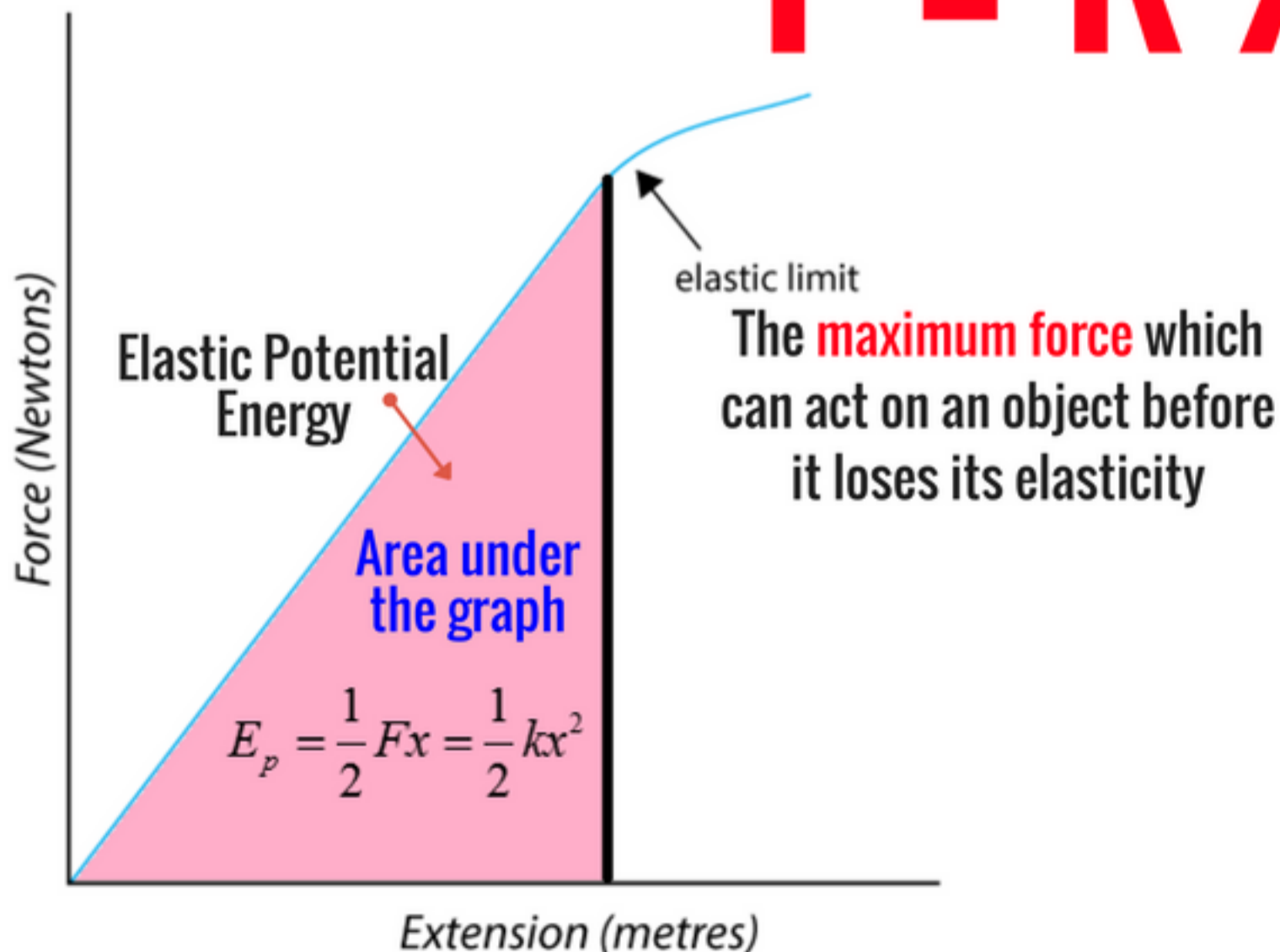
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The **extension** of a spring is directly proportional to the applied **force** provided the elastic limit is not exceeded

HOOKE'S LAW

$$F = kx$$



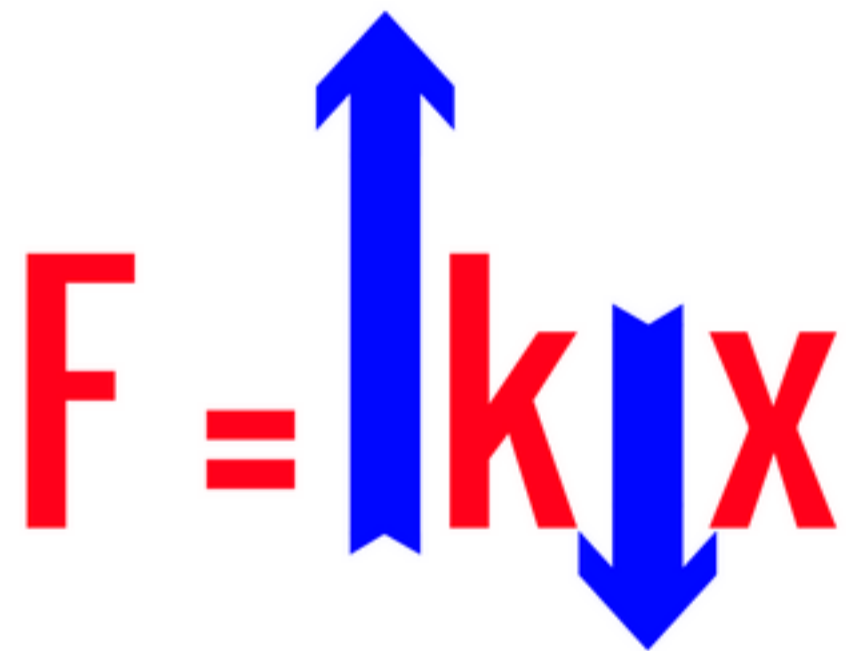
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The ability of an object to return to its original size / length / shape when the force that is acting on it is removed.

HOOKE'S LAW

ELASTICITY

$$F = kx$$
The equation F = kx is shown in red. A blue arrow points upwards through the 'k', and another blue arrow points downwards through the 'x'.

k ↑

more

elastic

suffer

elastic potential energy



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QUESTION 1

Explain how the forces between molecules cause the elasticity.

QUESTION 2

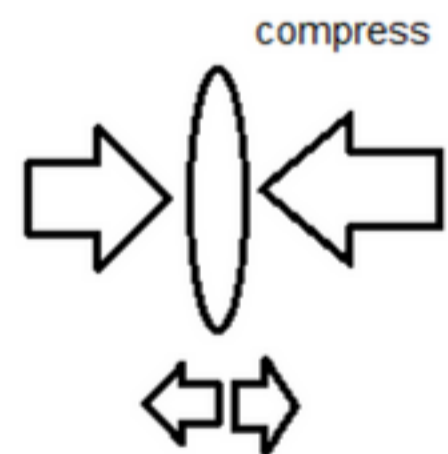
When the spring is compressed, its length decreases and returns back to its original length after compression force is removed due to elasticity property of a material. Based on the forces between atoms, explain why the spring is elastic.

HOOKE'S LAW

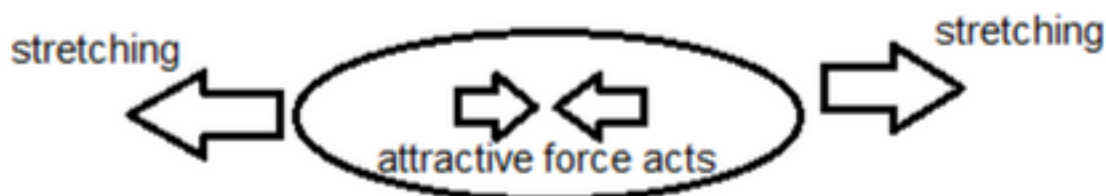
ANSWER:



1. Two forces acting between molecules are attractive and repulsive force



3. repulsive force between molecule acts



2. When the spring is stretched attractive force between molecule acts



4. When the force is released, the spring returns to its original position due to the forces

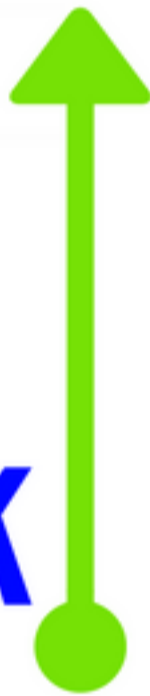


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**SPRING
CONSTANT**

k



HOOKE'S LAW

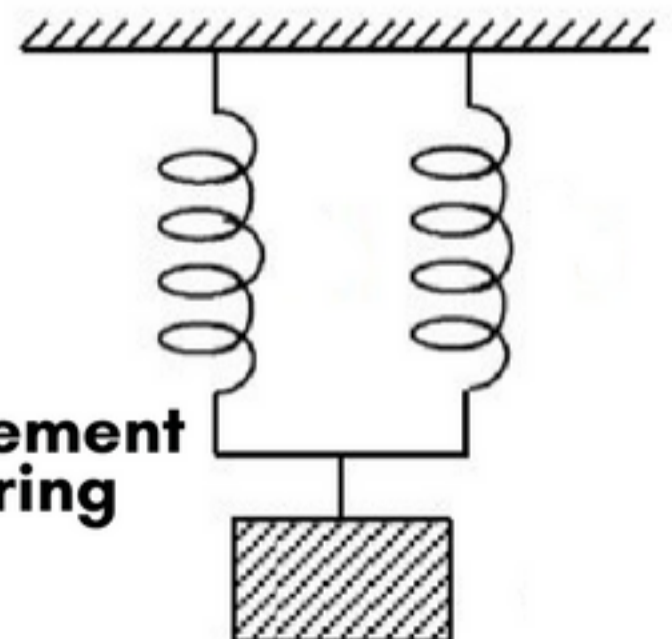


thickness of spring

**length of spring
diameter of spring**



**arrangement
of spring**



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QUESTION 3

HOOKE'S LAW

Diagram 1 shows a vehicle's shock absorber that used to reduce the effect of traveling over rough road.

Explain how the shock absorber able to absorb and damp shock impulses.



Diagram 1

ANSWER:

- **Compress when have shock impulses**
- **Prolong the time of impact & Reduce impulsive force**
- **Shock impulses will have bigger change of momentum.**
- **Lower the rate of change of momentum**



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QUESTION 4

HOOKE'S LAW

Using a catapult, explain how to enable a stone to travel a longer distance.

ANSWER:

Use a thicker rubber - to increase the elastic potential energy

Stretch the rubber longer - to increase the elastic potential energy

Use a stone with smaller mass - to increase the acceleration of stone

Use a strong material for the handle of the catapult - do not break easily



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**ARRANGEMENT
OF SPRING**

HOOKE'S LAW

Series

Parallel

