

Lesson 9 - Robert Hooke and Uses of Elastic Objects

Physics - KS3

Forces in Action

Mrs Wolstenholme



Which of these areas did Robert Hooke not contribute to?

Option 1

Astronomy

Option 2

Time keeping

Option 3

Paleontology

Option 4

Jazz



What word did Hooke use to describe the sections of wood?

Option 1

Cells

Option 2

Trees

Option 3

Organs

Option 4

Leaves



What does paleontology mean?

Option 1

Study of trees

Option 2

Study of fossils

Option 3

Study of planets

Option 4

Study of Ology



What do astrophysicists or astronomers study?

Option 1

The oceans

Option 2

Space

Option 3

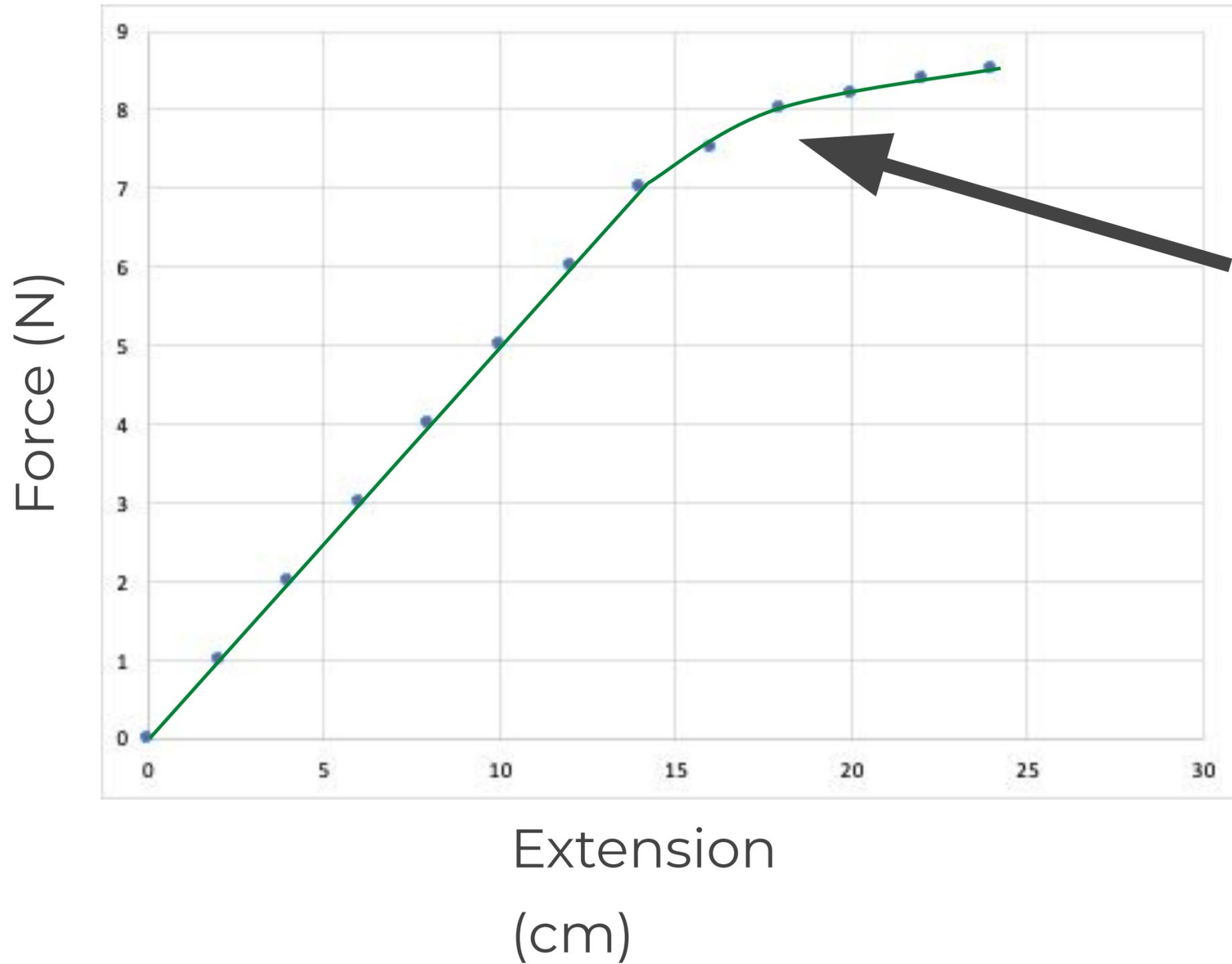
Any astroturf

Option 4

The weather



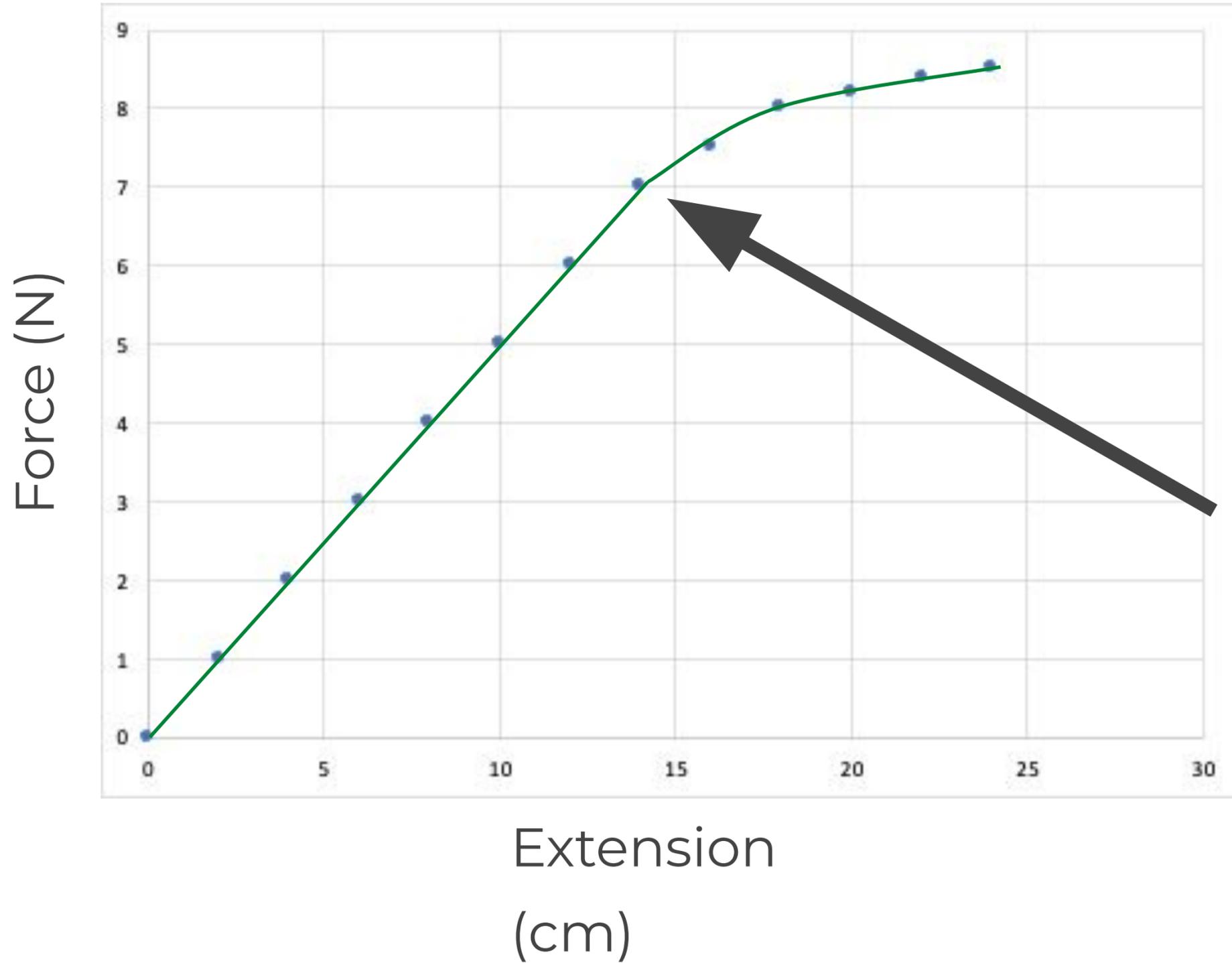
Reminder



Elastic objects return to original shape after force is removed if the force is below the elastic limit.



Reminder

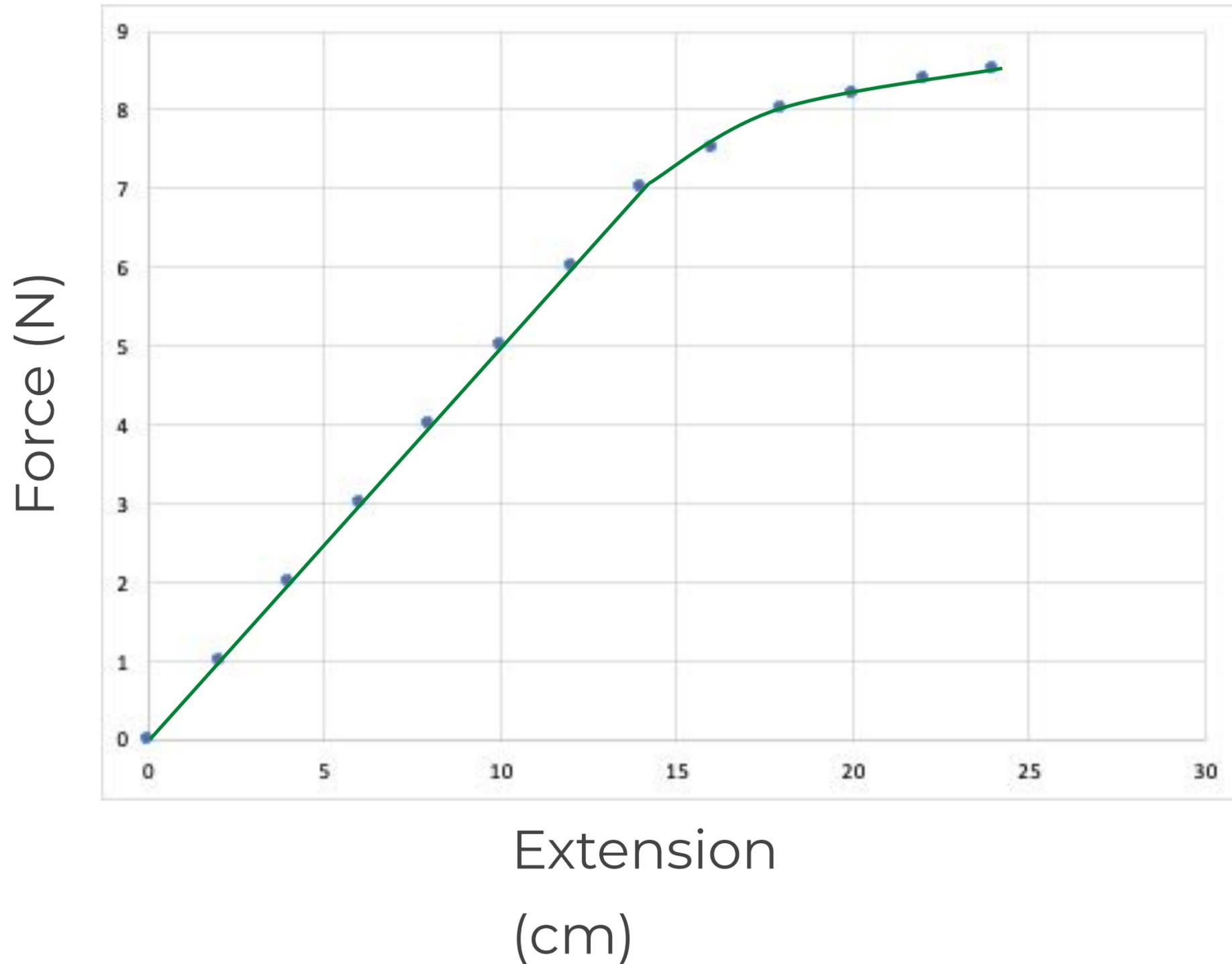


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Force and extension are directly proportional up to the limit of proportionality.



Reminder



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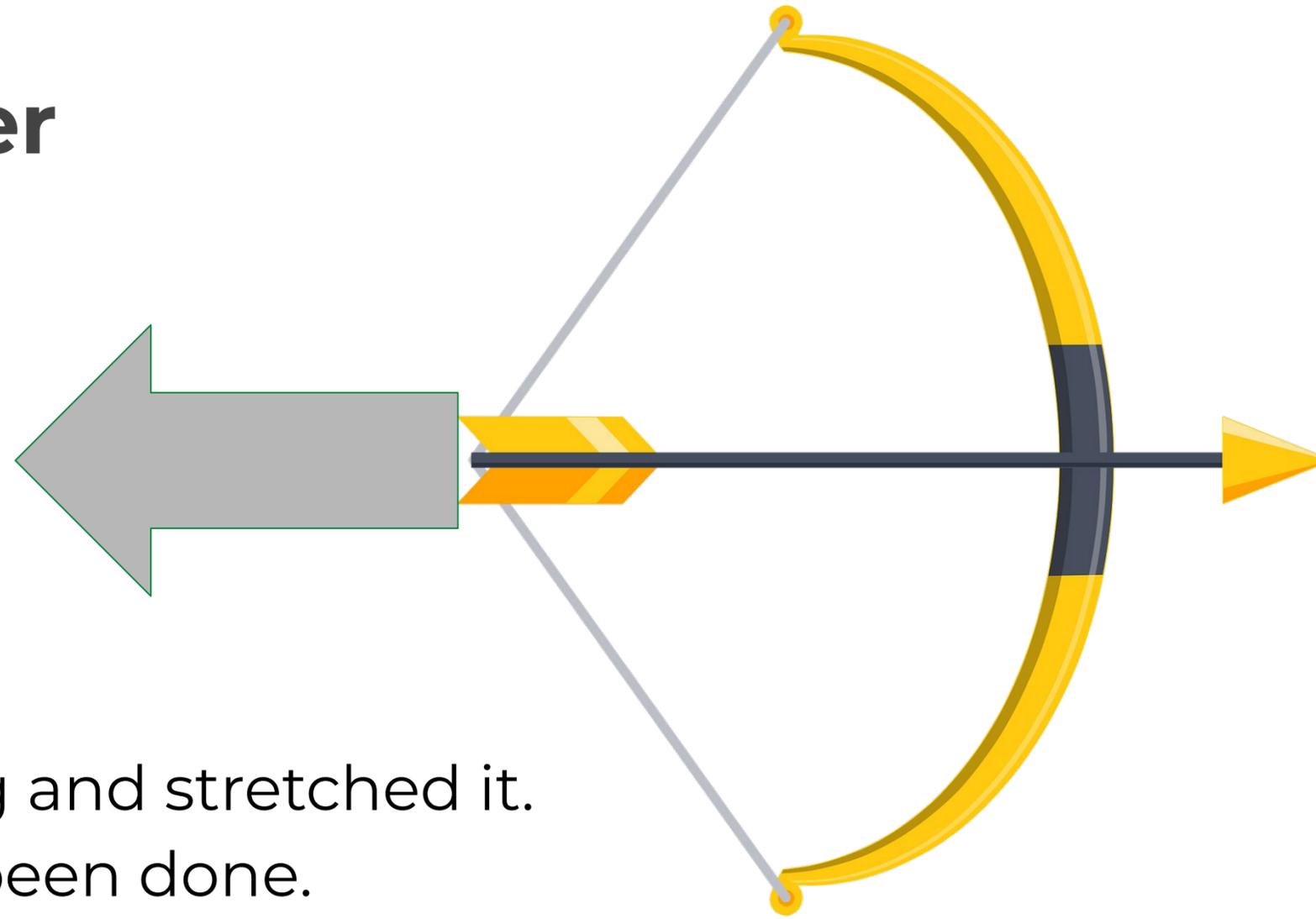
Force and extension are directly proportional up to the limit of proportionality.

A larger spring constant means a larger force is required to change the shape



Energy Transfer

Force



Force moves the string and stretched it.
This means work has been done.

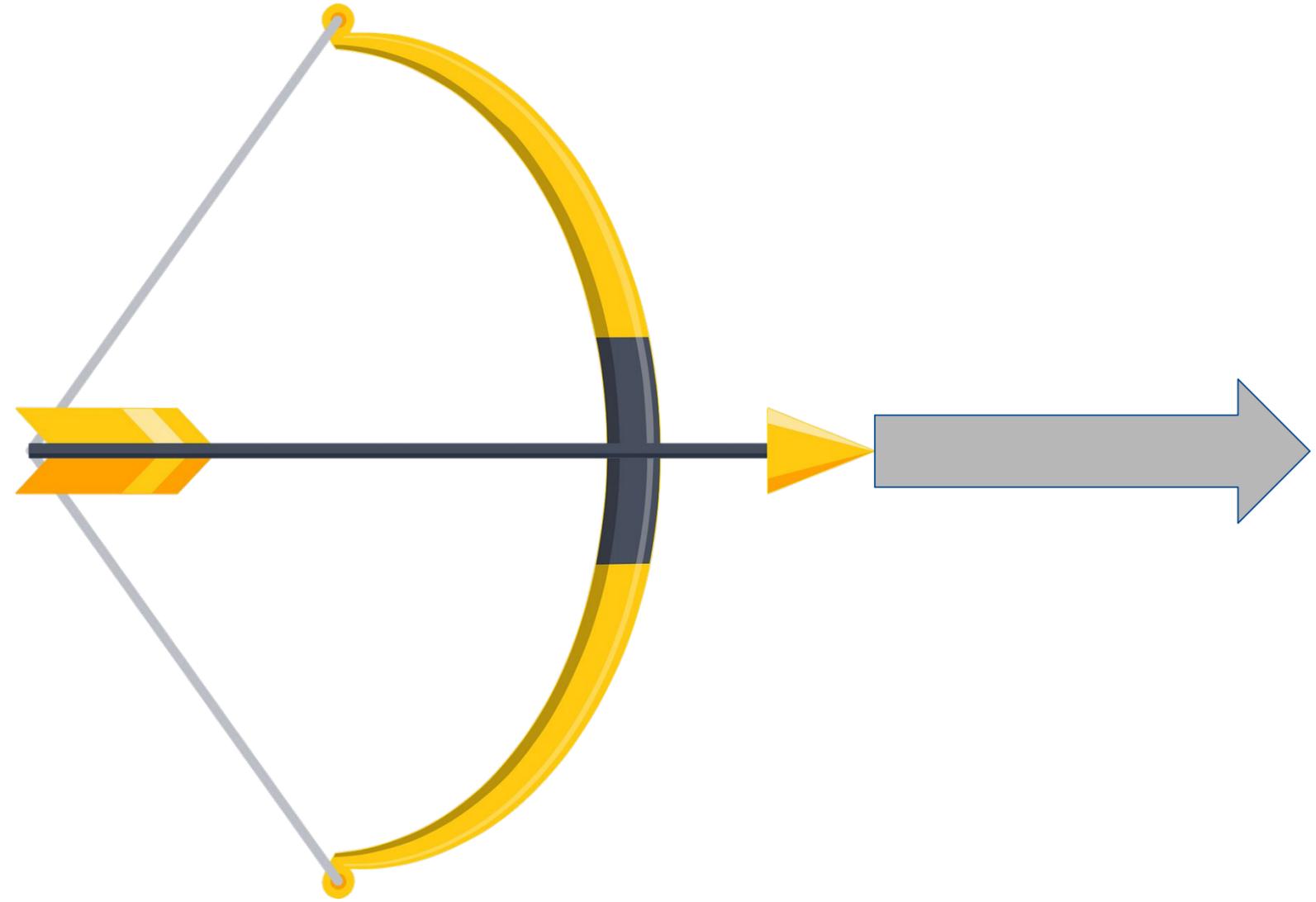
Credit: No attribution required

Energy has been transferred to the elastic
potential energy store of the string.



Energy Transfer

Energy is transferred to the kinetic energy store of the arrow

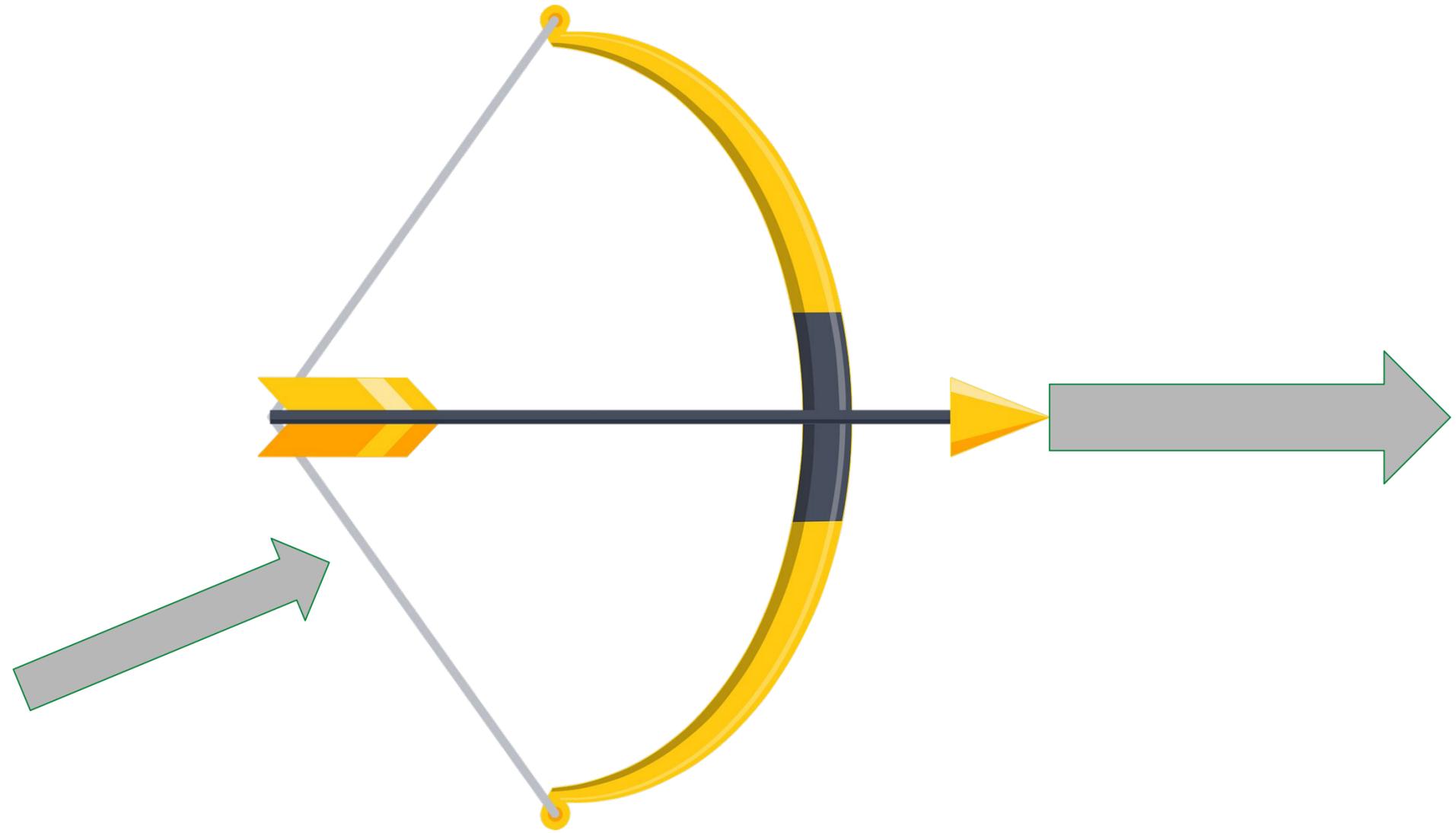


Credit: No attribution required



Energy Transfer

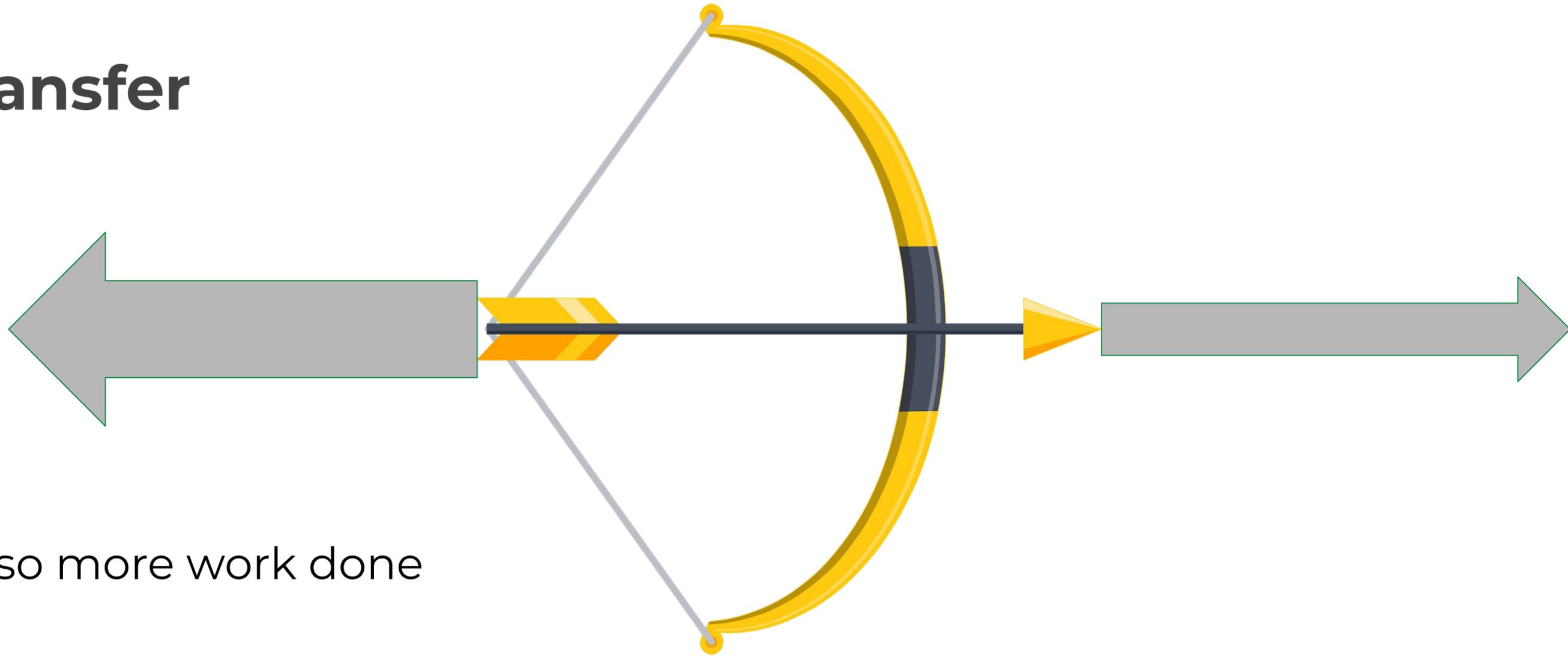
Larger spring constant (k)



Credit: No attribution required



Energy Transfer



So Larger Force so more work done

-> More energy transferred to the arrow

Credit: No attribution required



When we extend or compress an elastic object a force is required, this means:

Option 1

Work is done

Option 2

Energy is transferred

Option 3

People are happy

Option 4

Power is transferred



This energy is transferred to the _____ store of the object:

Option 1

Elastic potential

Option 2

Magnetic

Option 3

Kinetic

Option 4

Gravitational potential



The elastic object will

Option 1

Break

Option 3

Fly away

Option 2

Not move

Option 4

Return to its original shape



This means its elastic potential store of energy will

Option 1

decrease

Option 2

Not change

Option 3

increase



In a bow and arrow, this energy is transferred to:

Option 1

The gravitational potential store of the string

Option 3

The kinetic store of the arrow

Option 2

The magnetic store of the string

Option 4

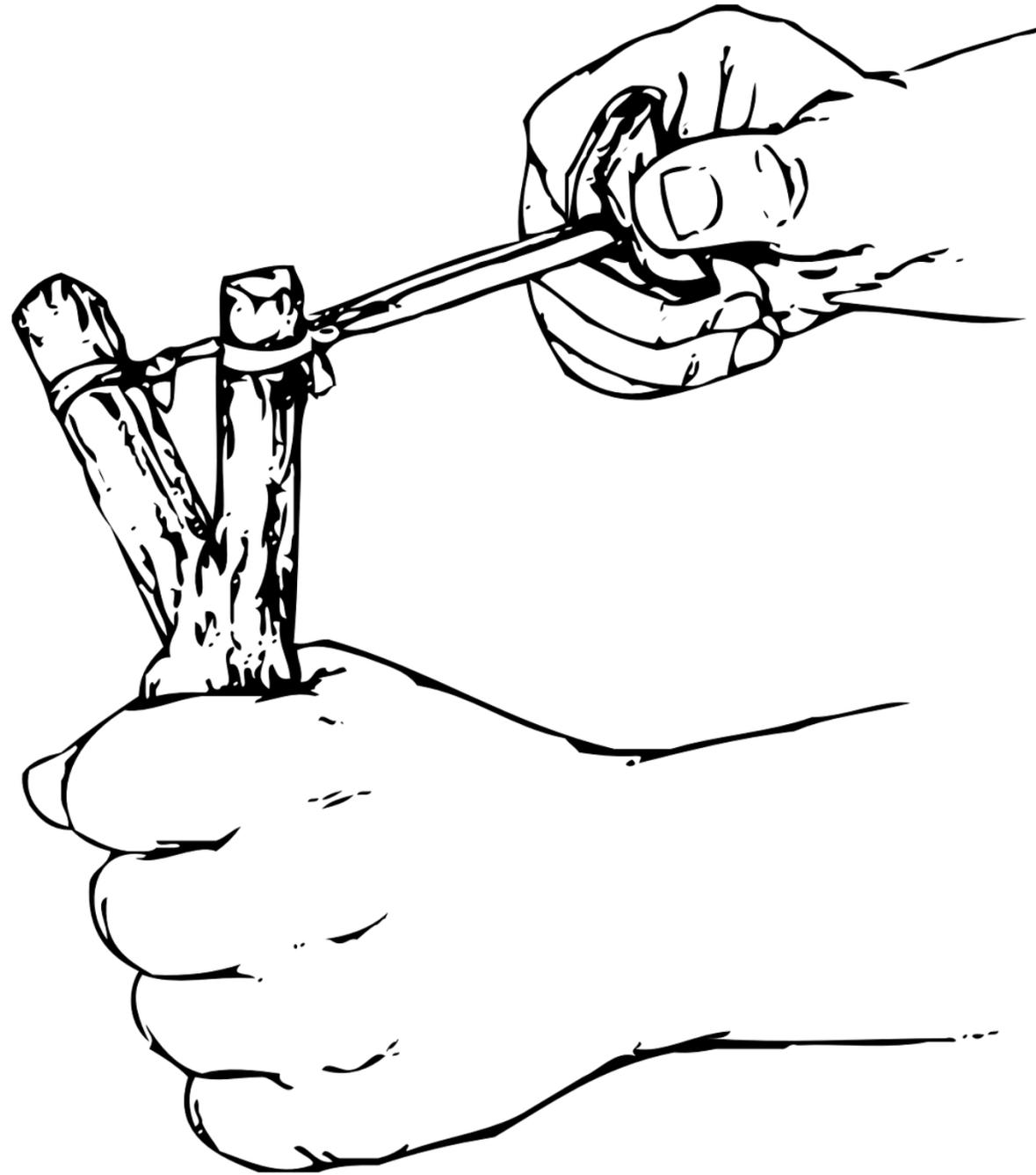
The elastic potential store of the arrow



Independent Task

Describe how a slingshot can launch a rock.

Key words: **force, work done, elastic potential store, energy transfer, kinetic store**



Credit: no attribution required



Independent Task

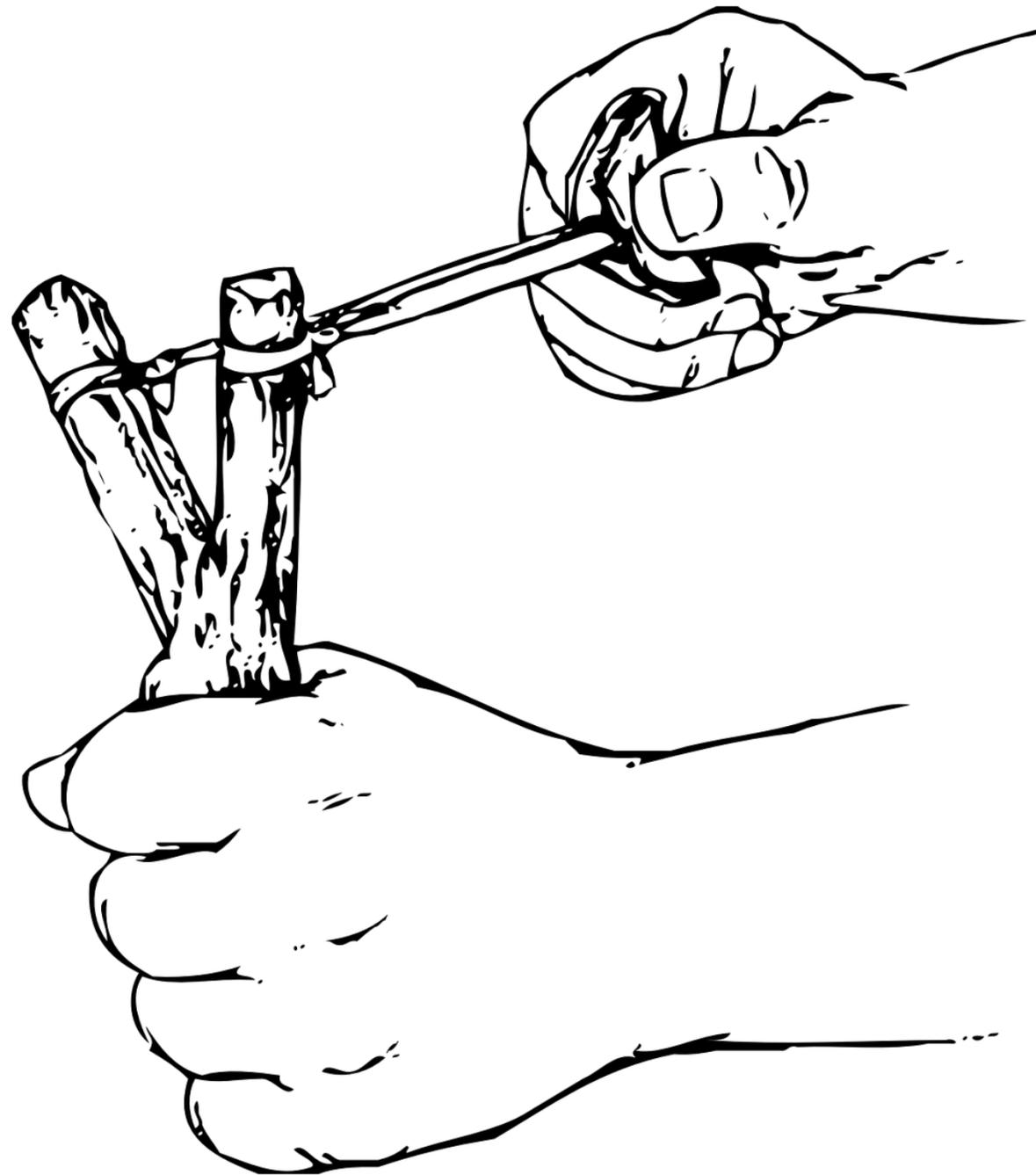
F_____ pulls the rubber band.

W_____ is done.

Energy is t_____ to the rubber band. The _____ store increases.

When we let go, the e_____ object will return to its original length.

This means energy will be _____ from the elastic potential store to the _____ store of the rock and it will move.



Credit: no attribution required



If a spring constant is too low -> Too much compression or extension and not enough energy stored

If a spring constant is too high -> Too little compression or extension

Too high -> not enough compression so uncomfortable

Too low -> too much compression so it just sinks



A high spring constant means

Option 1

A high force

Option 2

A low force

Option 3

High amount of energy stored

Option 4

Little energy stored



A low spring constant means

Option 1

A high force

Option 2

A low force

Option 3

High amount of energy stored

Option 4

Little energy stored



What would happen if the spring constant was too high or too low?

Too high -> not enough extension

Too low -> too much extension and won't spring back



What would happen if the spring constant was too high or too low?

Too high -> not enough extension

Too low -> too much extension and won't spring back

What would happen if an elephant got on the trampoline?

Elastic limit reached -> permanent deformation



Independent Task

- Describe what happens when the man jumps on the pogo stick;
- Describe what would happen if the spring was not very springy (high spring constant)
- Describe what would happen if the spring was too springy (low spring constant);
- Describe what happens when the pogo stick springs back up

Key words: **force, weight, elastic potential store, kinetic store, gravitational store**



Well Done!

