

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

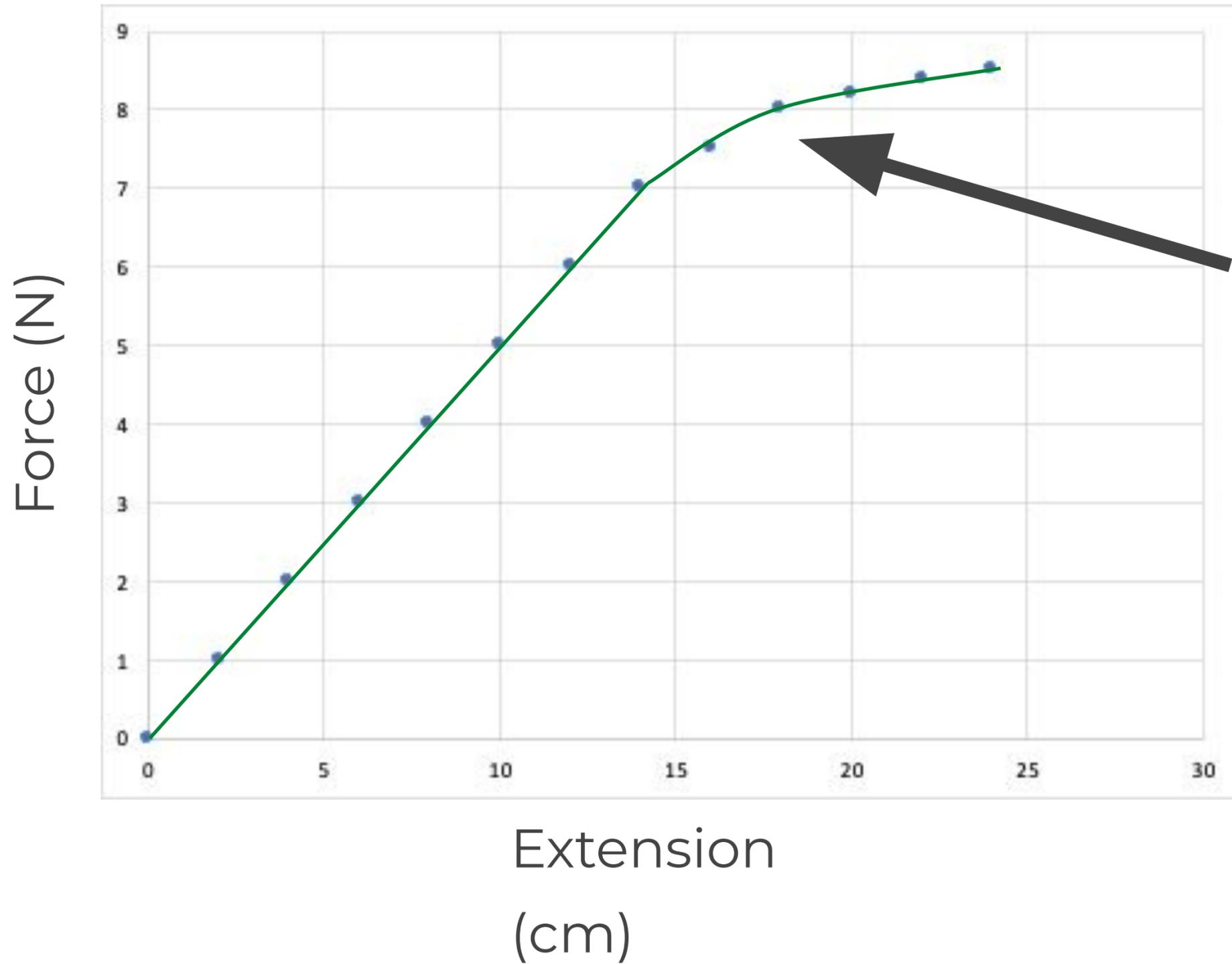
Any astroturf

Option 4

The weather



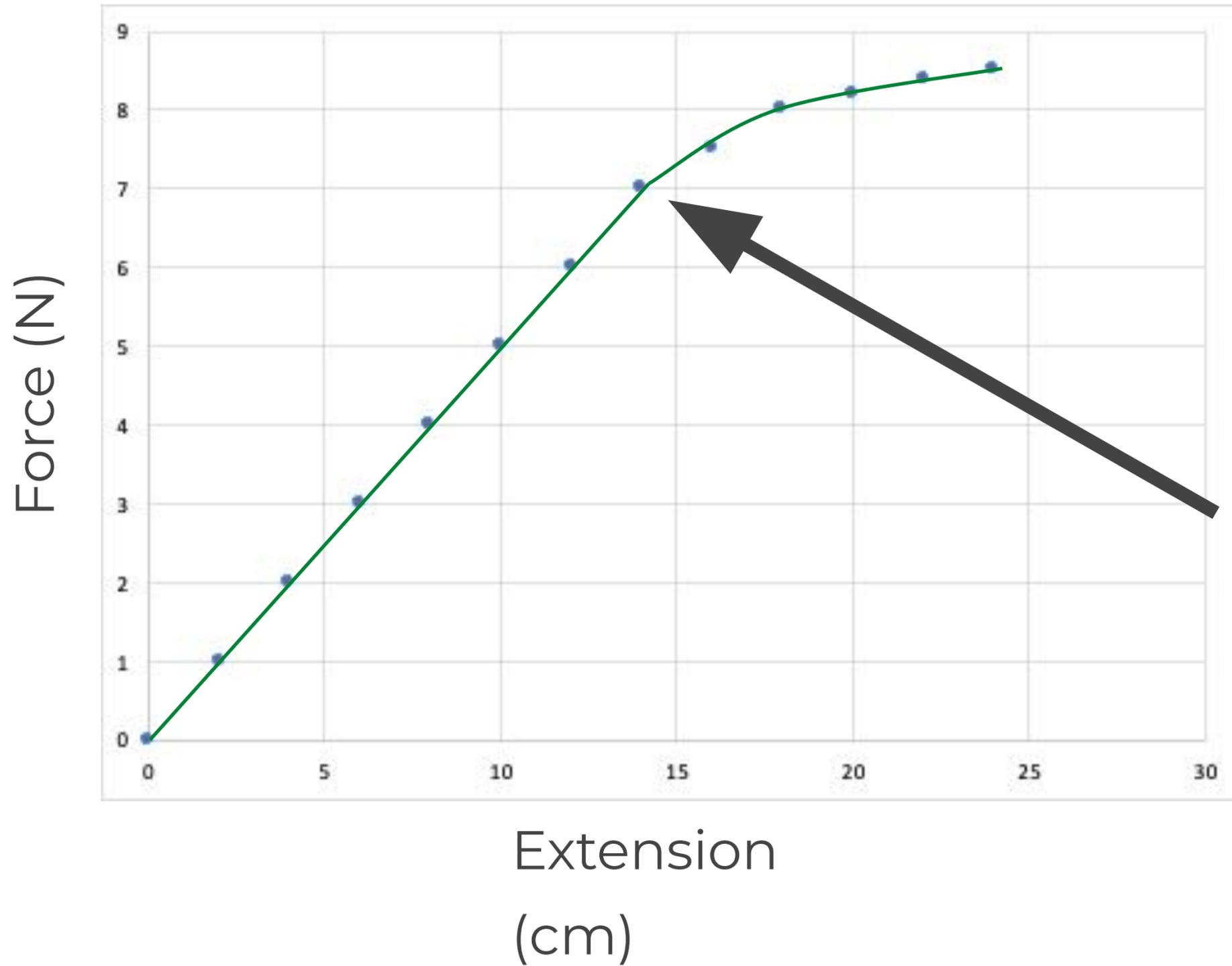
Reminder



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



Reminder

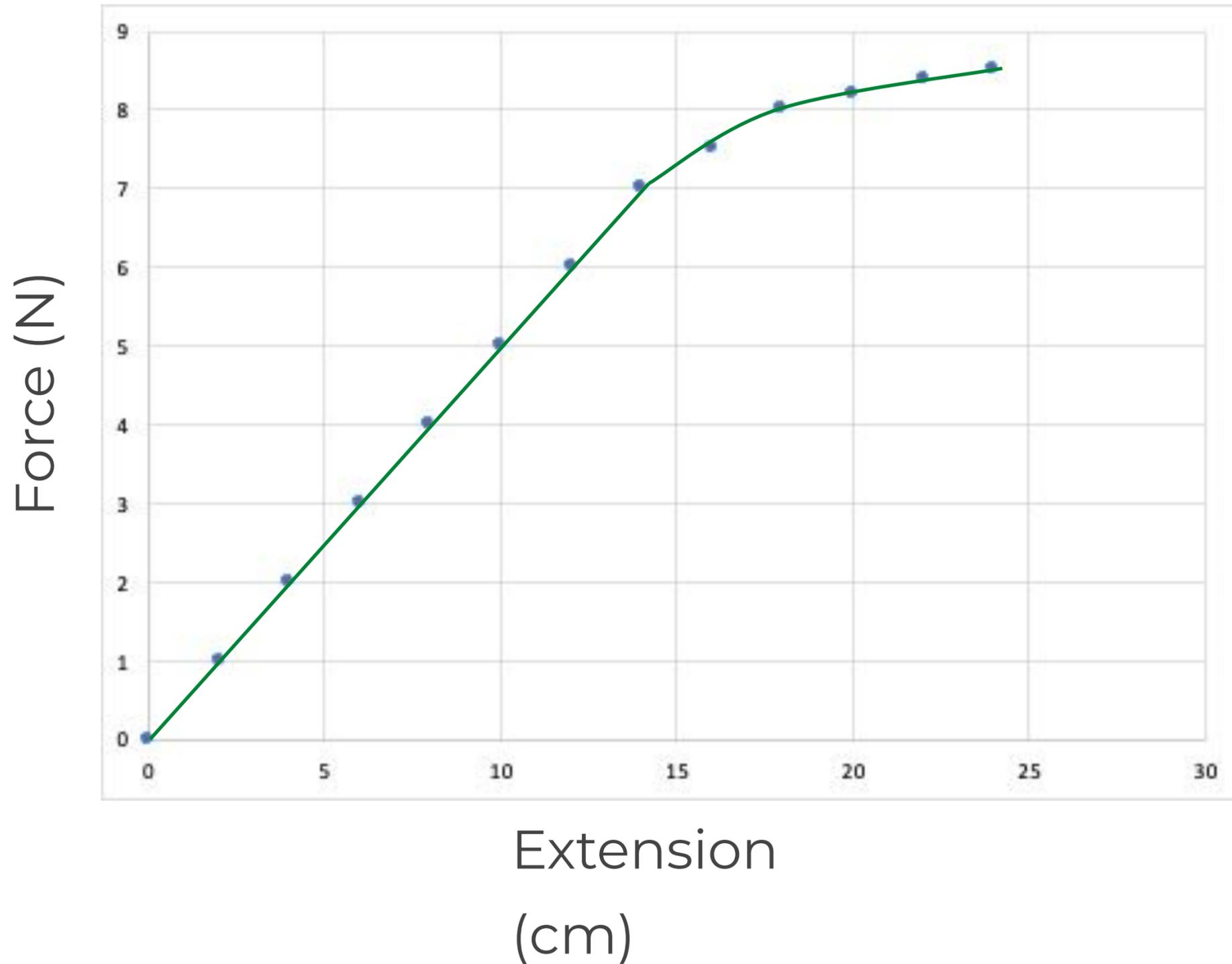


Elastic objects return to original shape after force is removed if the force is below the elastic limit.

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



Reminder



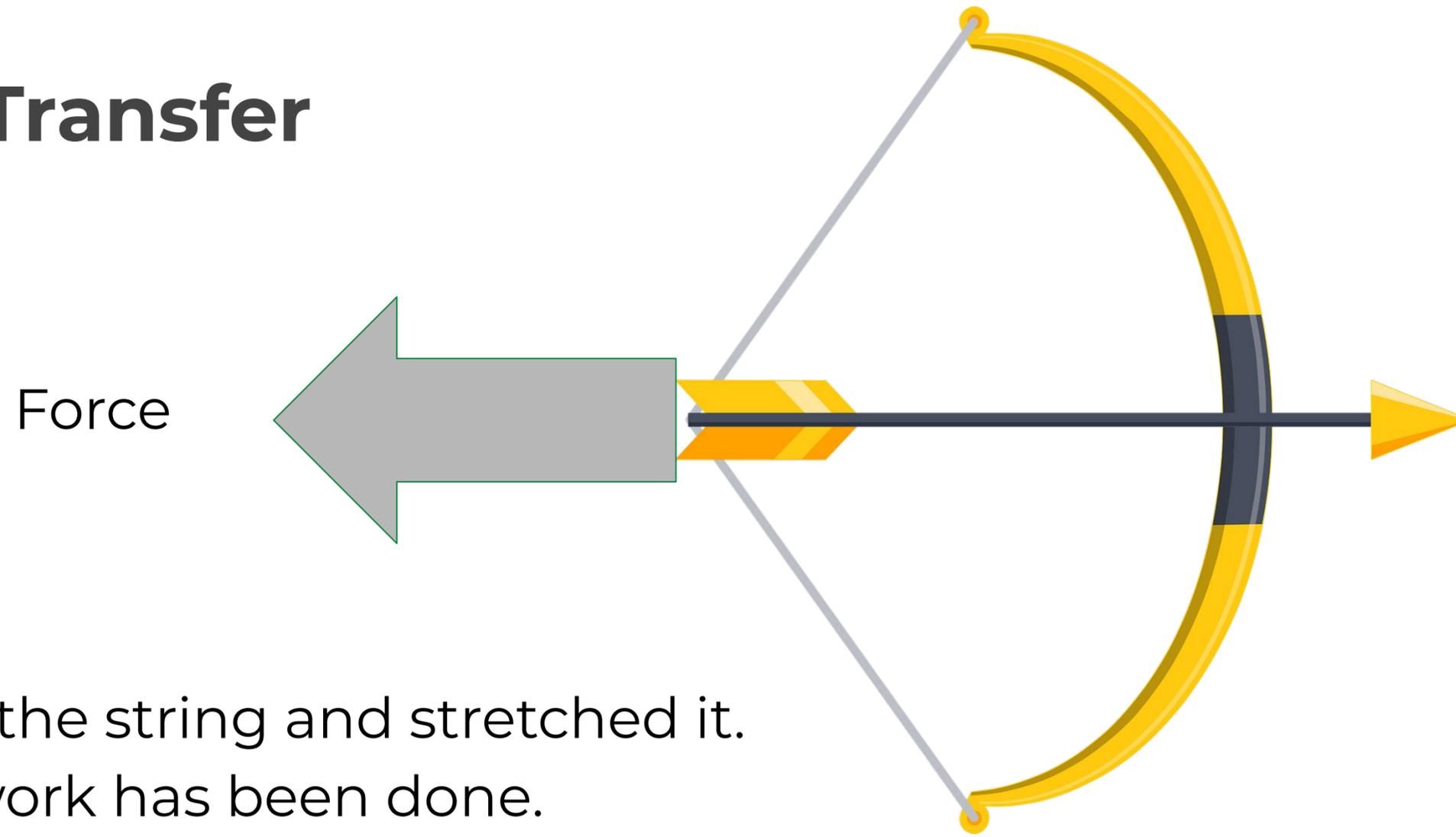
Elastic objects return to original shape after force is removed if the force is below the elastic limit.

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

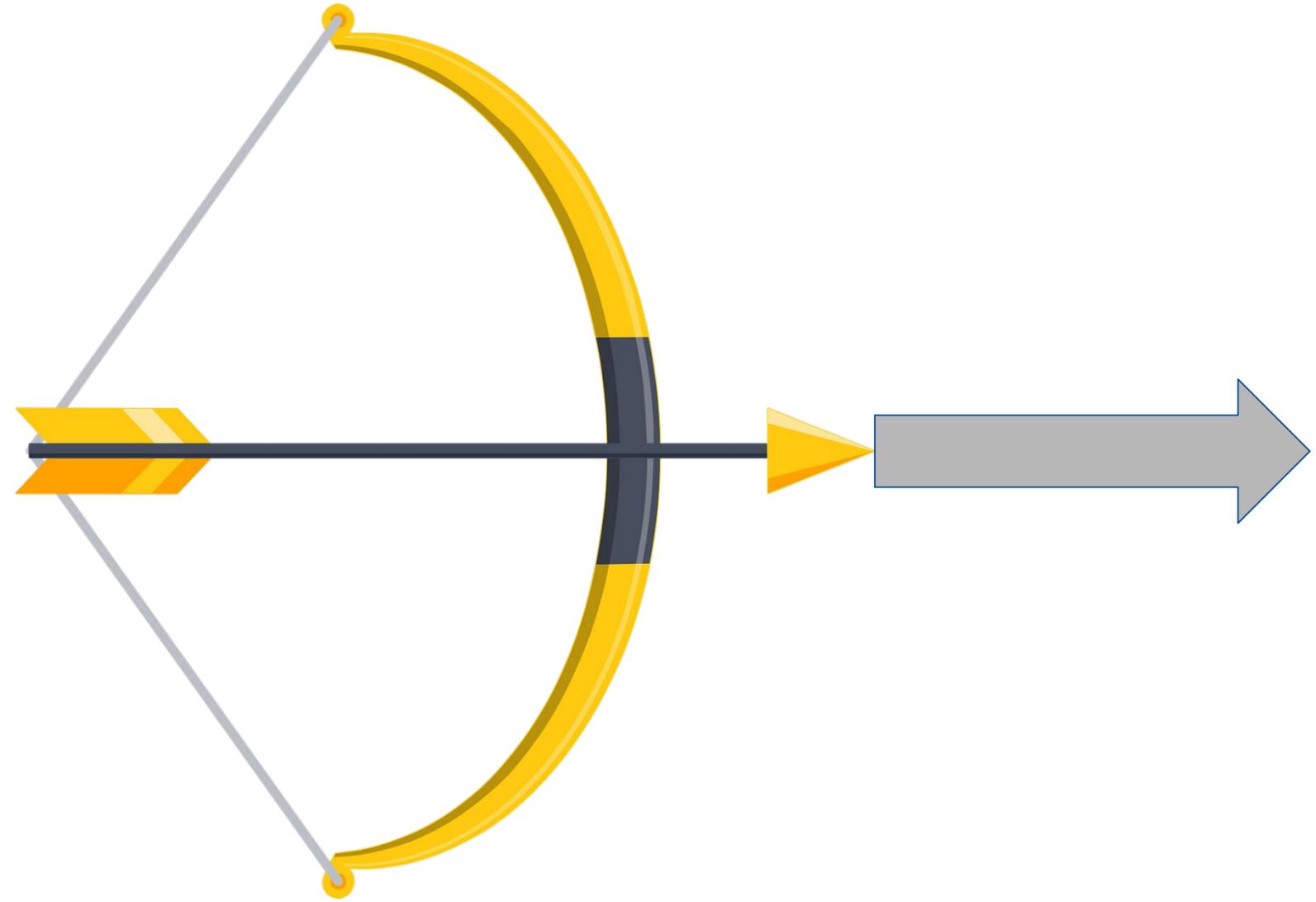
Credit: No attribution required

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

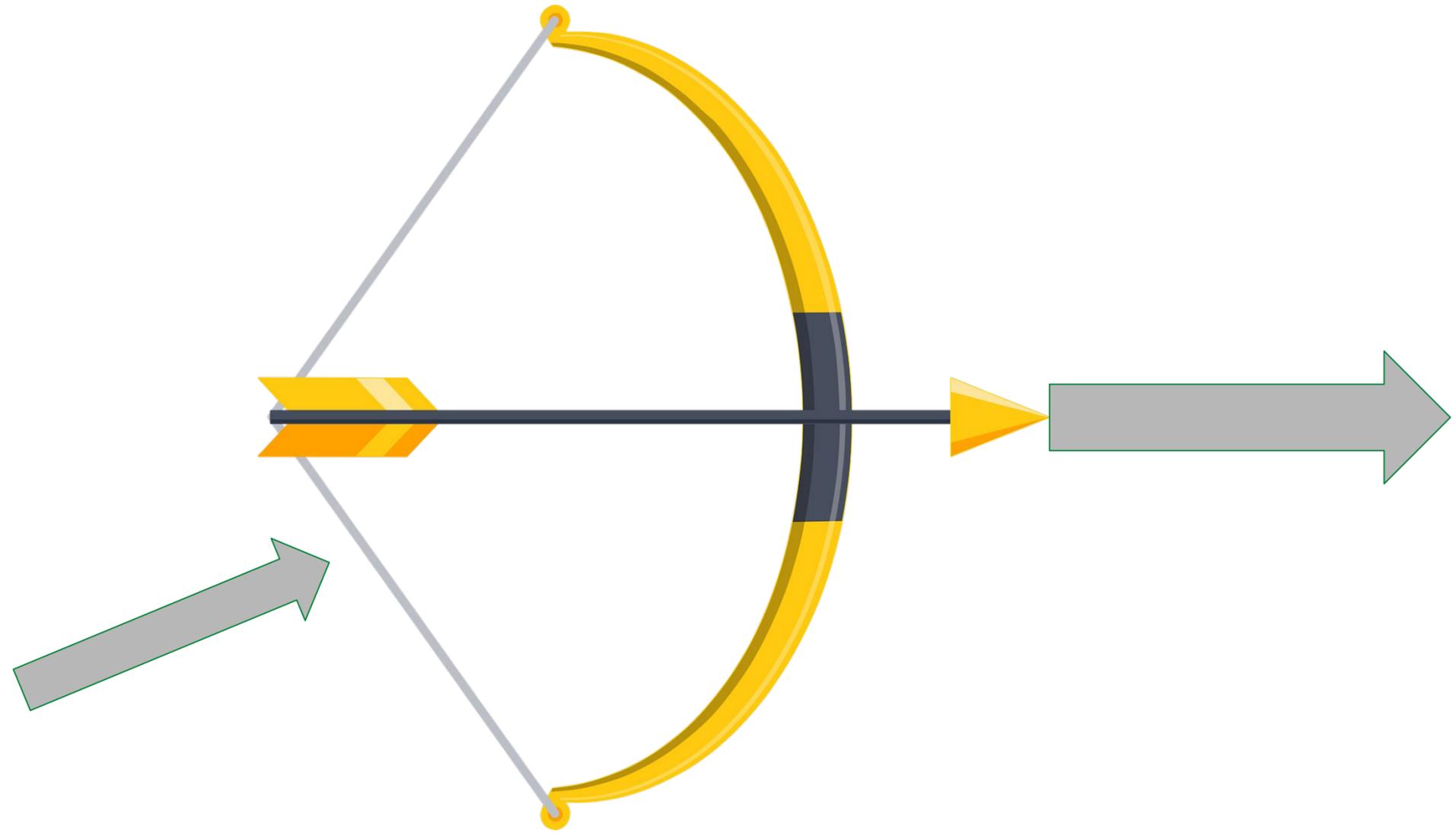


Credit: No attribution required



Energy Transfer

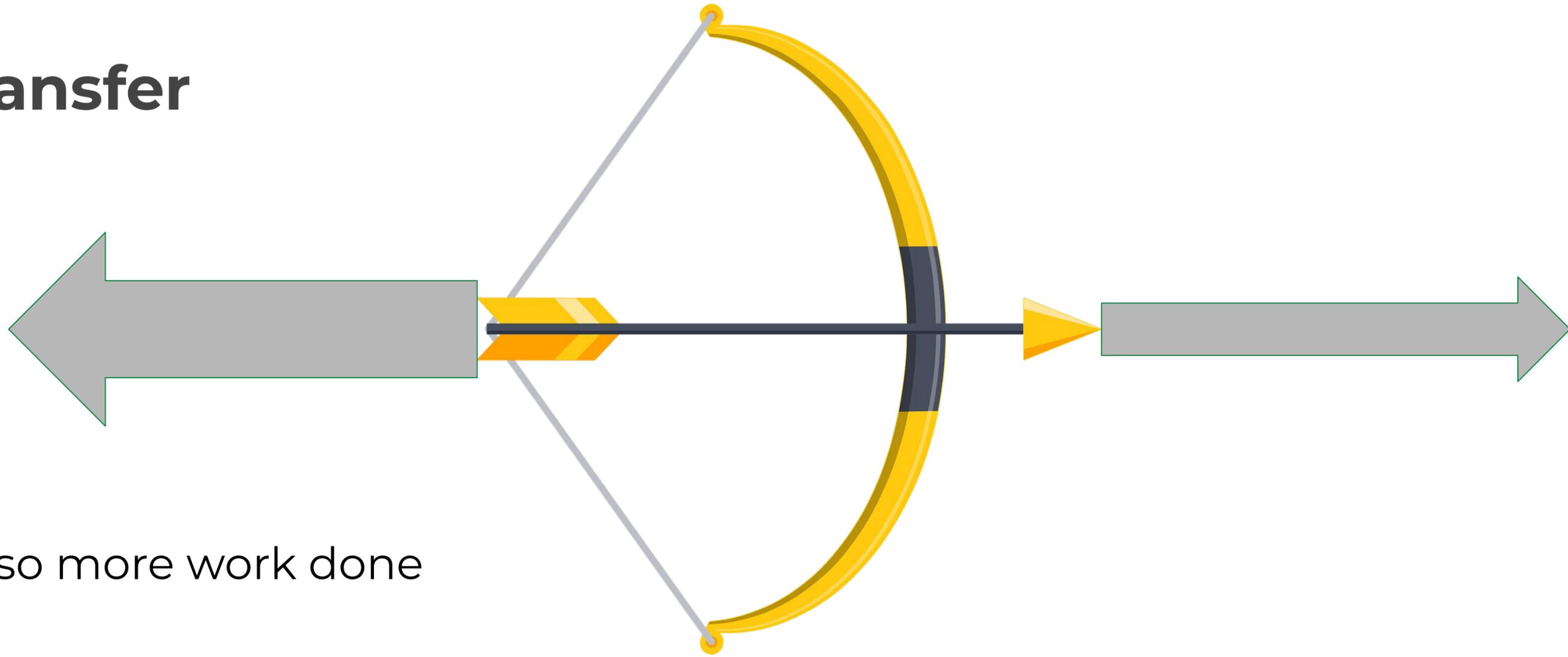
Larger spring constant (k)



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

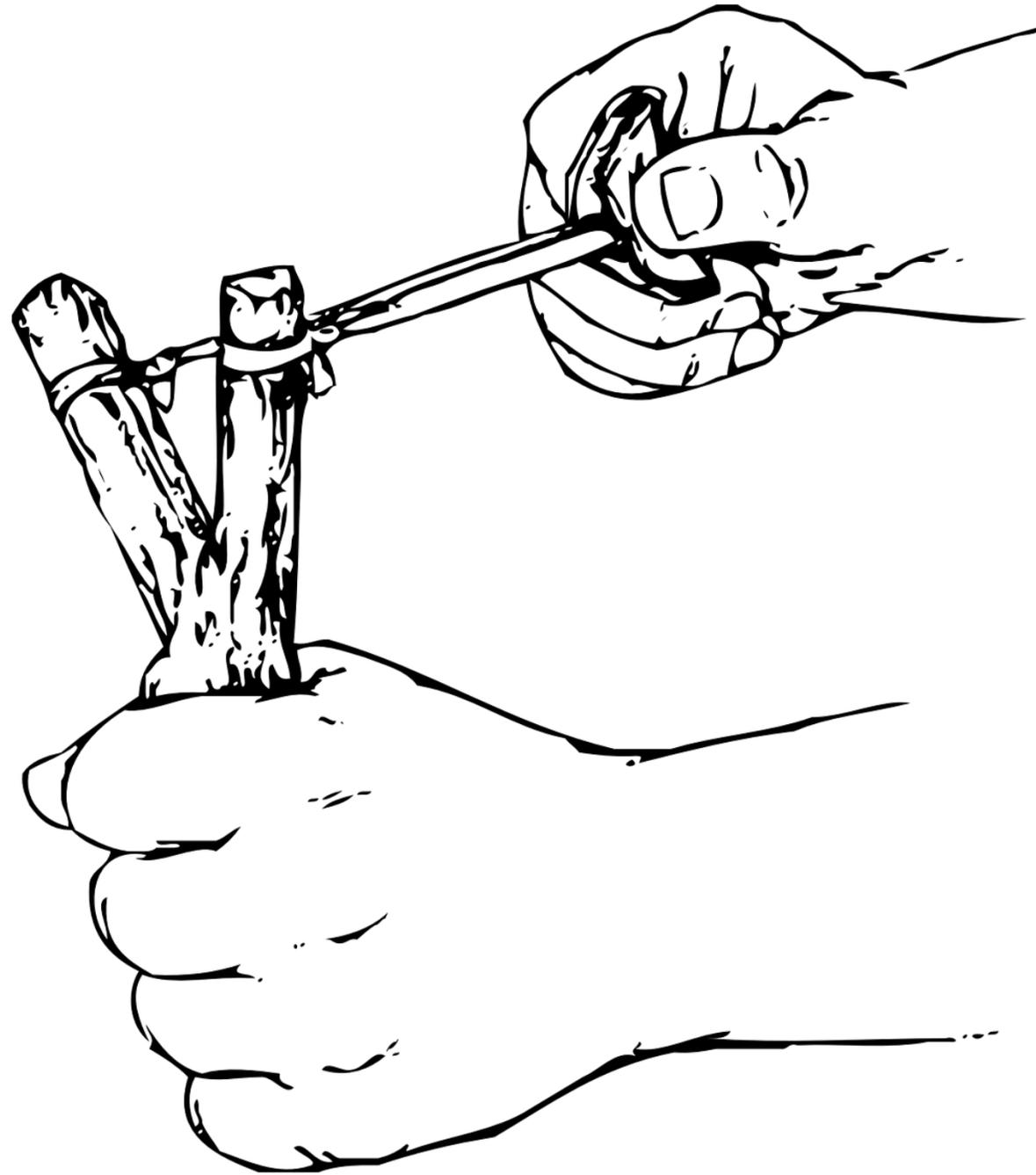
The elastic potential store of the arrow



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

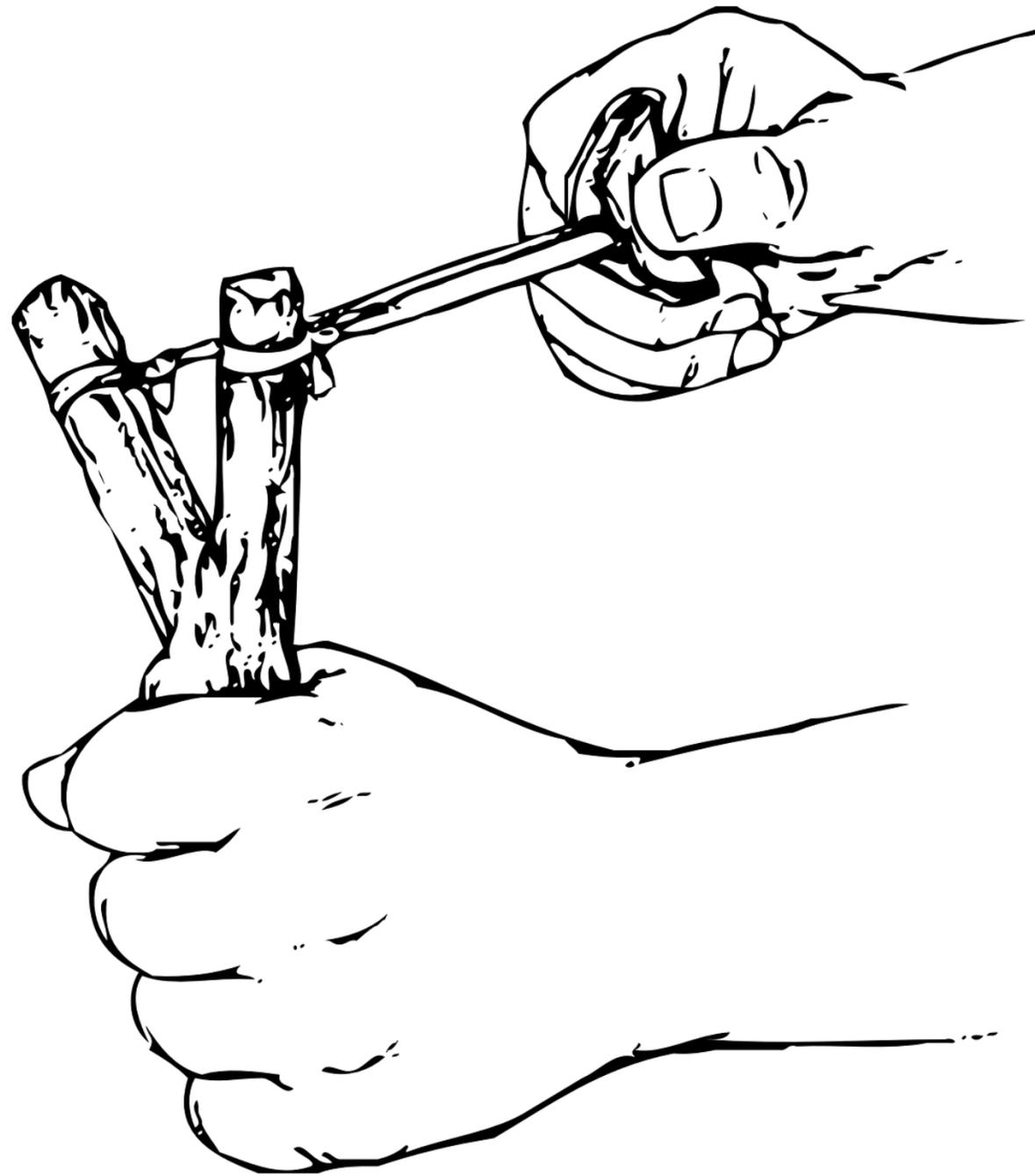
F_____ pulls the rubber band.

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!

