

# Forces In Action

## Learning Objective:

To recognise that levers and pulleys allow a smaller force to have a greater effect.

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That rock  
looks heavy! What could  
we use to make lifting the  
rock easier?

Think, pair, share your ideas.

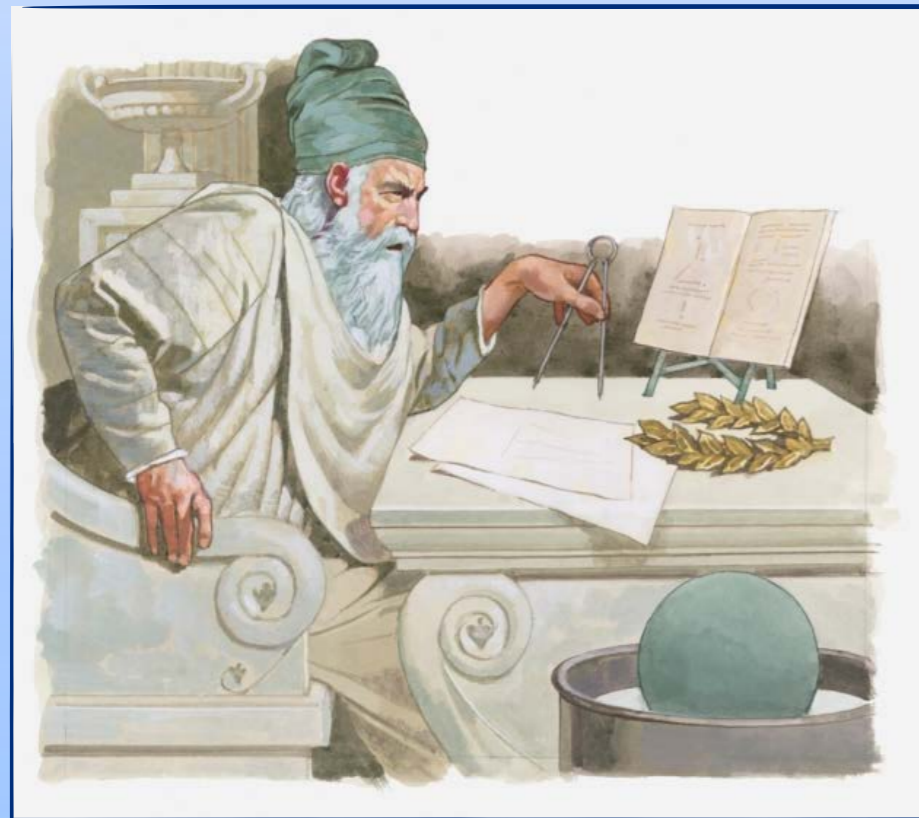


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A **pulley** could be used to lift the rock. Pulleys are useful because they make it easier to lift objects.

The Ancient Greeks were among the first to use pulleys; sailors used them to lift heavy objects from the shore onto their ships. Pulleys



are still used in

this way today. The Greek scientist and inventor, Archimedes, developed the design of pulleys to make them more efficient.



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**Belt pulleys** are used in lots of different machines to make it easier to lift or move heavy objects. Belt pulleys today have motors that use a small amount of force to lift or move very heavy things.

Can you think of any machines that use pulleys?

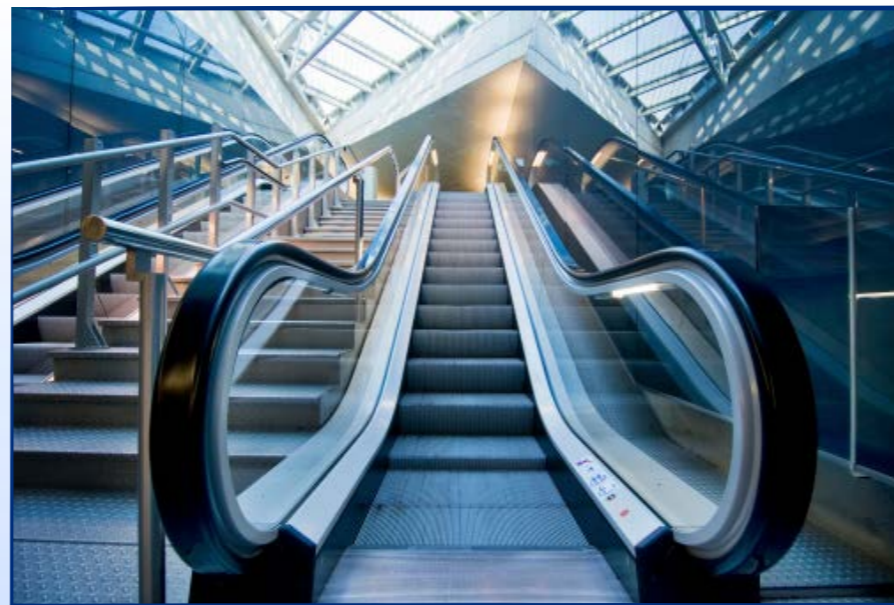


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supermarket checkouts



escalators



car engines



cranes

Did you think of any of these?

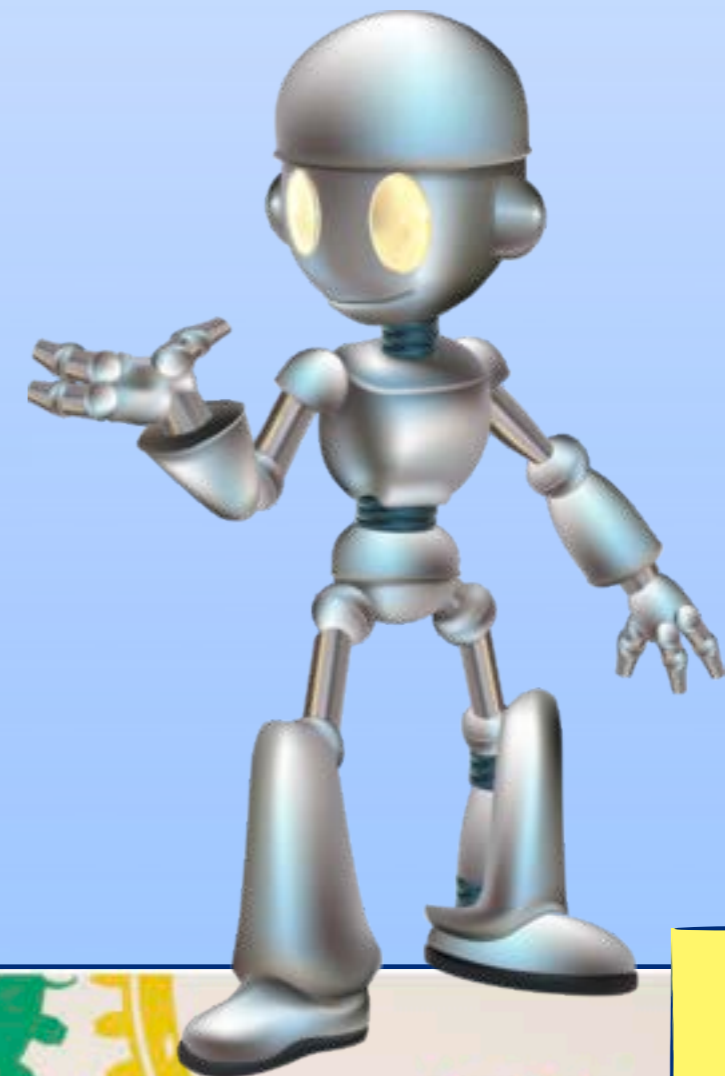


vacuum cleaners (these use belt pulleys to turn the brushes)

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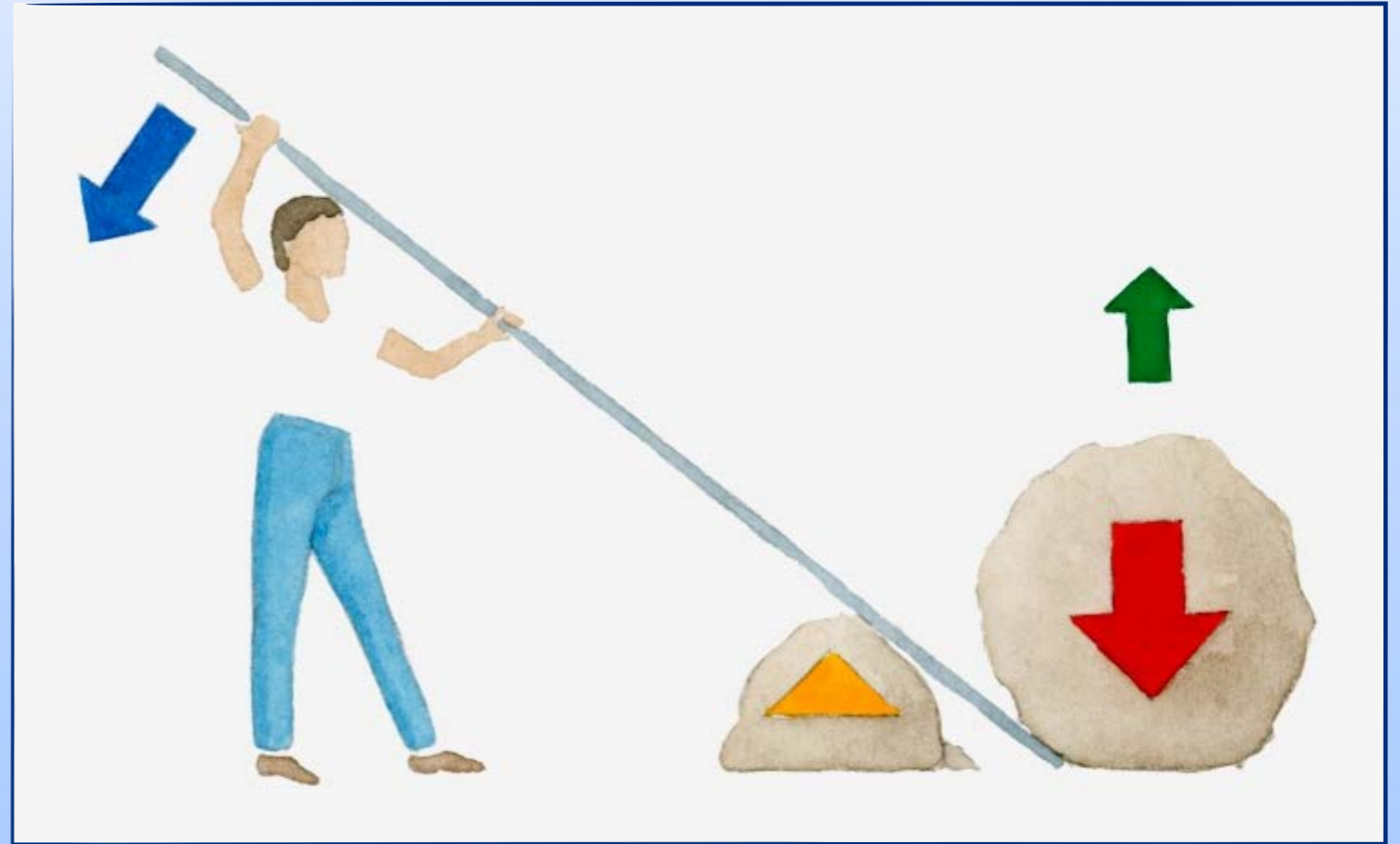
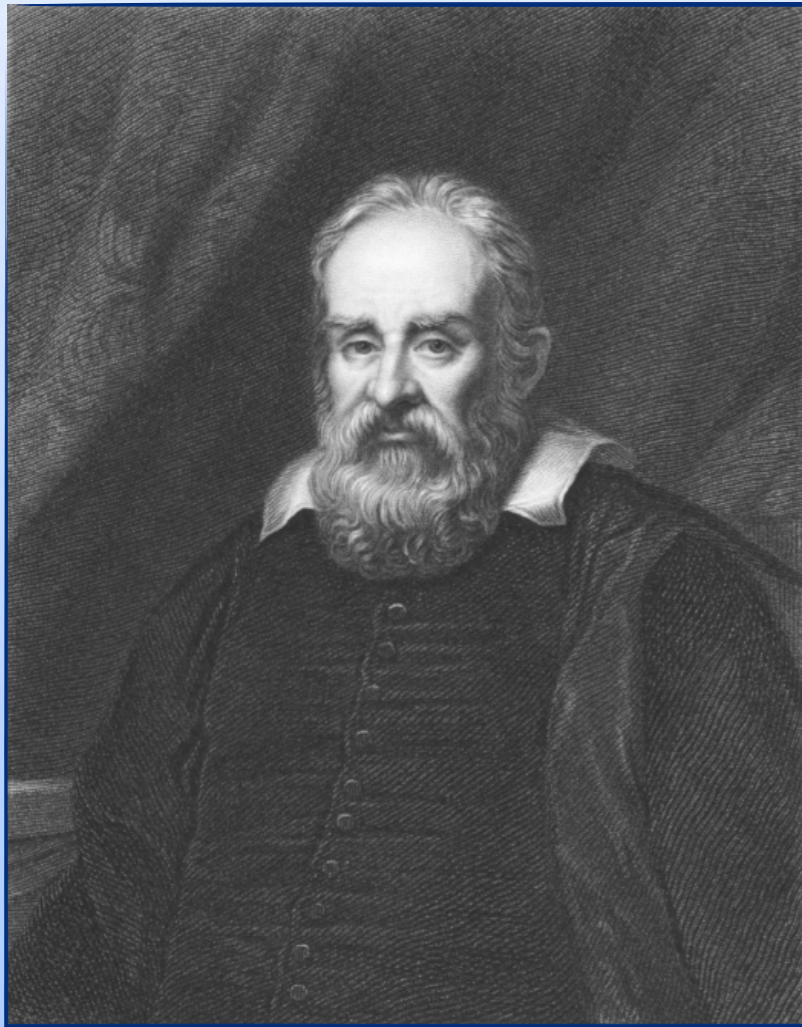
The chain on a bicycle is a special kind of belt pulley called a **chain drive**. Pulleys are used in lots and lots of machines!



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In the 1500s and 1600s, Renaissance scientists such as *Galileo Galilei* made lots of discoveries about pulleys and other devices that they called ‘simple machines’.

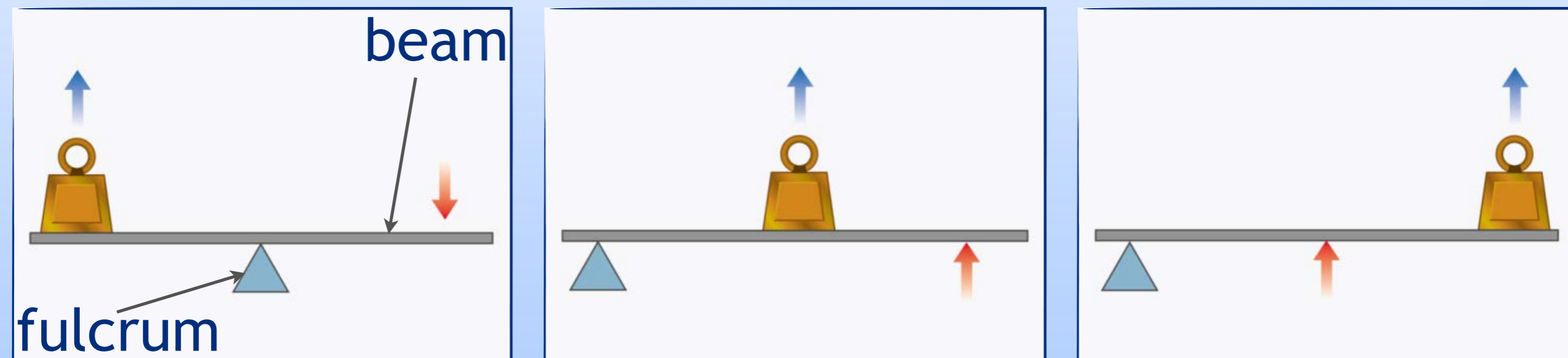


All of these machines made it easier to move or lift heavy things using a small amount of force. **Levers** are one of these simple machines.

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Levers work by increasing the amount of force. A beam is attached to a hinge or placed over a fulcrum. The position of the fulcrum affects how much the force is increased or decreased.



You can try this using a ruler and a pencil or a rubber as a fulcrum. What do you notice when you move the fulcrum? How much force is needed to lift an object?

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Since the time of the Ancient Greeks, levers have been used in warfare; they are found in catapults, ballistas and trebuchets.

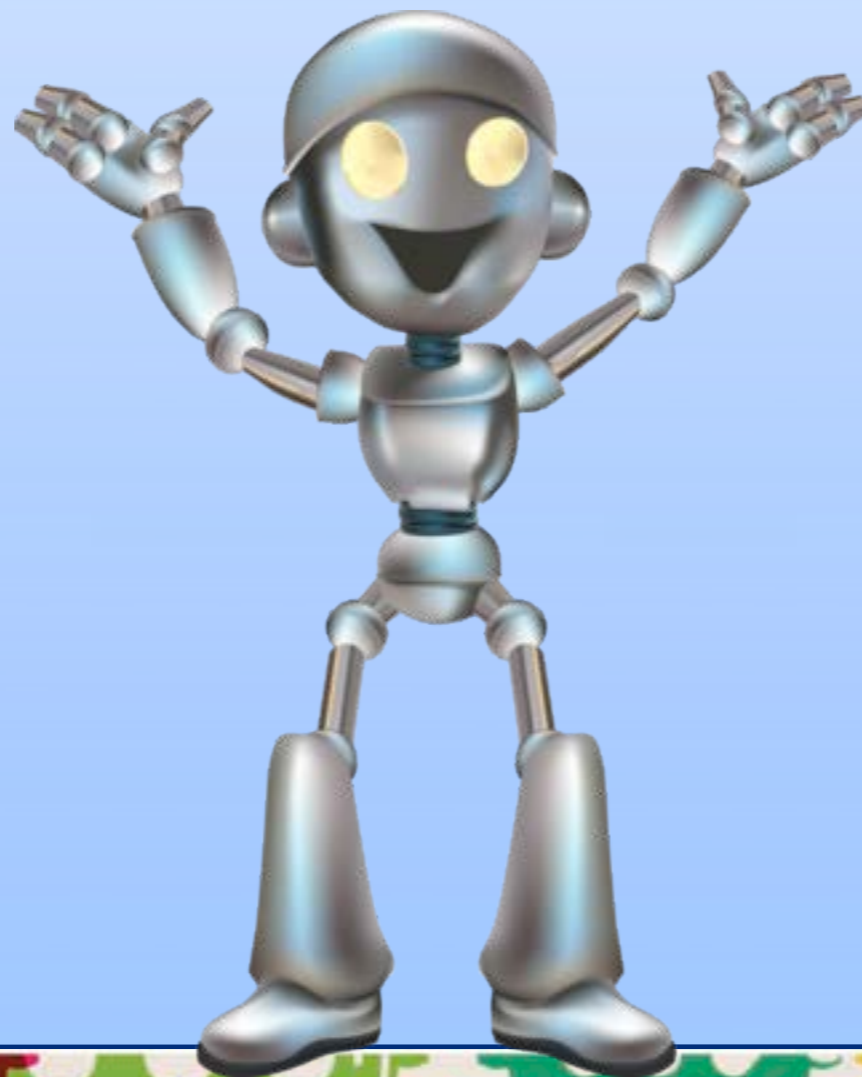


Can you see how levers are used in these weapons?

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Today we will be exploring ways in which simple machines using levers and pulleys allow a smaller force to have a greater effect.



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# Plenary

Can you use two or more of these words in a statement to show what you have learned about forces today?

force

pulley

lever

greater

effect

move

fulcrum

belt pulley

machine

lift

smaller

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