

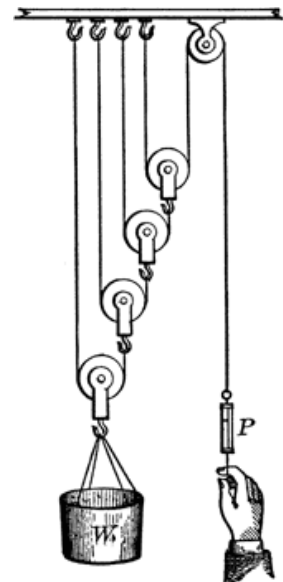
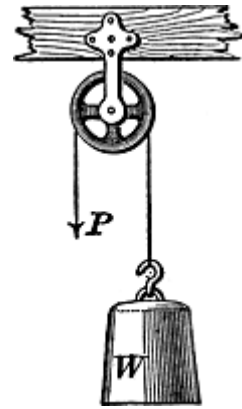
Pulleys

Simple machines have very few or no moving parts but help to make our work easier. There are six basic types of simple machines; these are the lever, the inclined plane, the wheel and axle, the screw, the wedge and the pulley. Today, we are going to talk about the pulley.

The pulley is simply a wheel, which has a groove around the outside edge. A rope or belt fits into the groove and is connected to the weight you want to lift. When **effort** is applied to one end of the rope – in other words, when you pull on the rope – the **load**, which is the weighted object on the other end, is lifted off the ground. It is easier to lift by pulling down on the rope because then gravity is on your side. The first diagram shows a simple pulley which is attached to a beam. This is a **fixed** pulley. In the second diagram, there are examples of **moveable** pulleys.

The more ropes and pulleys we use the easier it is to lift the weight. With enough ropes and pulleys you could even lift an elephant! The help the pulley gives us is called a **mechanical advantage**. Four ropes and pulleys (not counting the rope you are pulling) would give you a mechanical advantage of 4. This means that if the load weighs 100kg you can divide it by 4. So it will only feel like 25kg to you.

There are many examples of pulleys all around us. These include window blinds, the flagpole pulley, the pulley that lowers the bucket into the wishing well and the pulley used on the window washer's platform. Can you think of any other examples?



Name _____

Date _____

Pulleys

A: What are pulleys?

Here are some questions about pulleys. All the answers are in the reading but don't peek until you have finished.

1. What kind of machine is a pulley?
2. There are six basic types of these machines. Can you name them all?
3. What two objects do you need to make a basic pulley?
4. What do we mean by effort?
5. What do we mean by load?
6. Why is it easier to lift something by pulling down instead of picking up?
7. Two types of pulleys were mentioned in the reading. Can you remember what they are?
8. What mechanical advantage would you have if you use 3 ropes and pulleys?
9. If you have a mechanical advantage of 4 and the load weighs 20kg, what weight will you be lifting?
10. Give 3 examples of pulleys that are used everyday.

A: Now let's have some fun!

Design a pulley, which will help you lift an elephant. Decide how heavy your elephant is first and what weight you would be able to lift so that you know how many pulleys and ropes you will need. Draw the pulley and the elephant.

Pulleys Answers

Activity A

1. A simple machine.
2. The lever, the inclined plane, the wheel and axle, the screw, the wedge and the pulley.
3. A grooved wheel and a rope.
4. The force we exert on the rope (pulling on the rope).
5. The weight of the object we are lifting.
6. You lift against gravity, when you pull down gravity is on your side.
7. A fixed pulley and a moveable pulley.
8. 3
9. 5kg.
10. Window blinds, the flagpole pulley, the pulley that lowers the bucket into the wishing well and the pulley used on the window washer's platform (or any other examples the children might have thought of).

Activity B.

The weight of the elephant and the amount the children think they can lift depends upon their imagination. The calculation of the amount of pulleys/ropes needed should be accurate.