



<TACO>
robobricks

STEM MAKER KIT

LESSON PLANS

THREE PULLEY SYSTEM



IMAGINE
BUILD
PLAY

OBJECTIVE

1. Understand how multiple pulleys can reduce force required.
2. Understand the difference between single pulley system and three pulley system.
3. Describe the advantages of pulleys.
4. Create a three pulley system model using the STEM maker kit.

WORD WALL

- **Fixed Pulley**

Pulley where wheel and axle stay in one place.

- **Movable Pulley**

Pulley that moves freely up and down, and is attached to ceiling or any other object by two ropes of the same length.

- **Force**

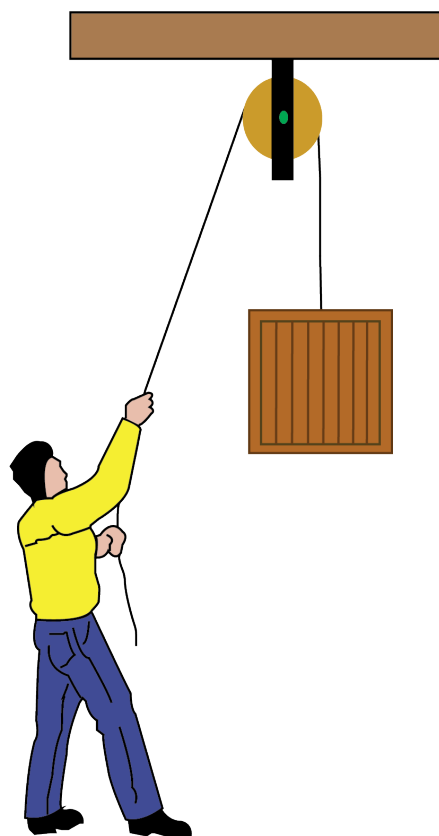
A push or pull on an object to move it.

PRE KNOWLEDGE-CHECK

1. Describe different types of pulleys.
2. Recognize the objects required to build the model.
3. Complete the model by snapping blocks with one another.

ASK**1. Identify the mechanisms used in this activity.**

- **Wheel and axle**
- **Pulley system**
- **Inclined plane**
- **Wedge**



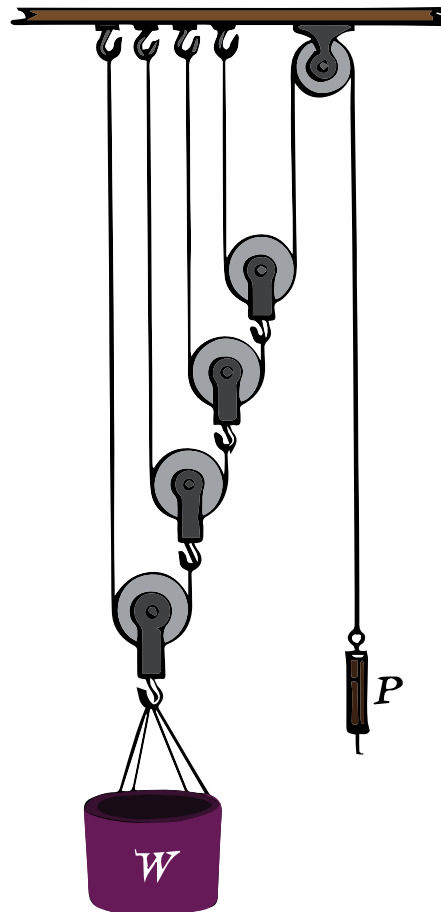
The mechanisms used in this activity are the wheel, axle, and pulley system.

2. What are the three types of pulleys?

The three types of pulleys are - Fixed pulley, Movable pulley and Compound pulley.

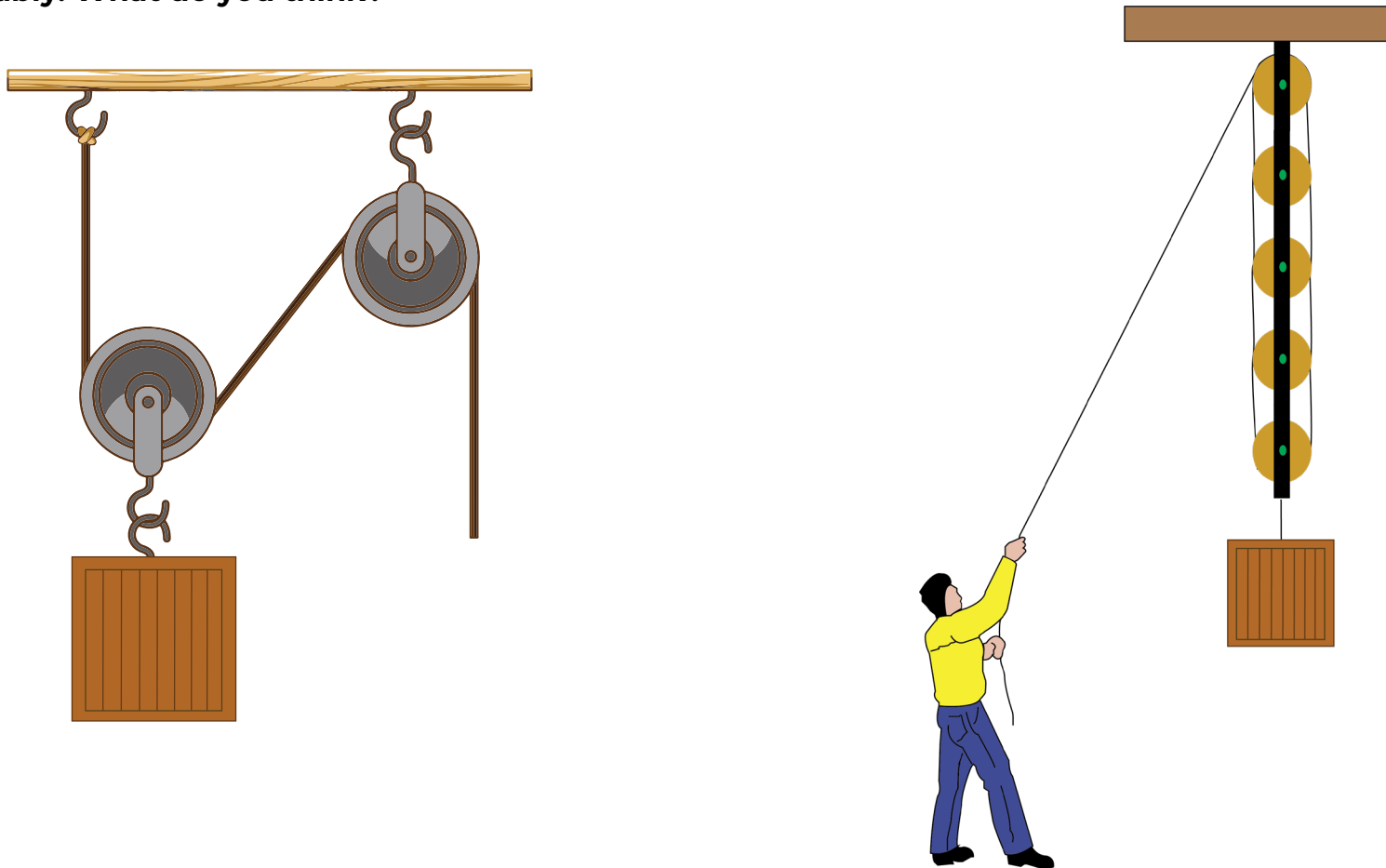
3. Define compound pulley system.

A compound pulley consists of fixed and movable pulleys which enables it to move heavy load with minimal physical effort.



IMAGINE

- In general, single pulleys or double pulleys are used to lift loads. This will require a considerable amount of effort to lift, depending on the weight. If the number of pulleys are doubled, like five pulleys, will this reduce workload considerably. What do you think?**



Yes. If the number of pulleys are increased, the workload will reduce considerably. There is a drawback that the rope has to be pulled to a long distance due the increase in the number of pulleys.

2. A few facts about simple machines are given below. Identify the relevant simple machines with the help of the given facts.

- **This has a wheel that has a rope fixed to it for moving objects**
(Pulley)
- **This is a simple machine made of a rigid beam and a fulcrum**
(Lever)
- **This consists of a sloping surface used for raising heavy objects**
(inclined plane)
- **This is a weight suspended from a wire that swings freely when let go**
(pendulum)
- **This converts rotational motion into linear motion**
(Cam machine)

3. Name a few objects that had a pulley system, which has gone obsolete now.

E.g. Cassette tape

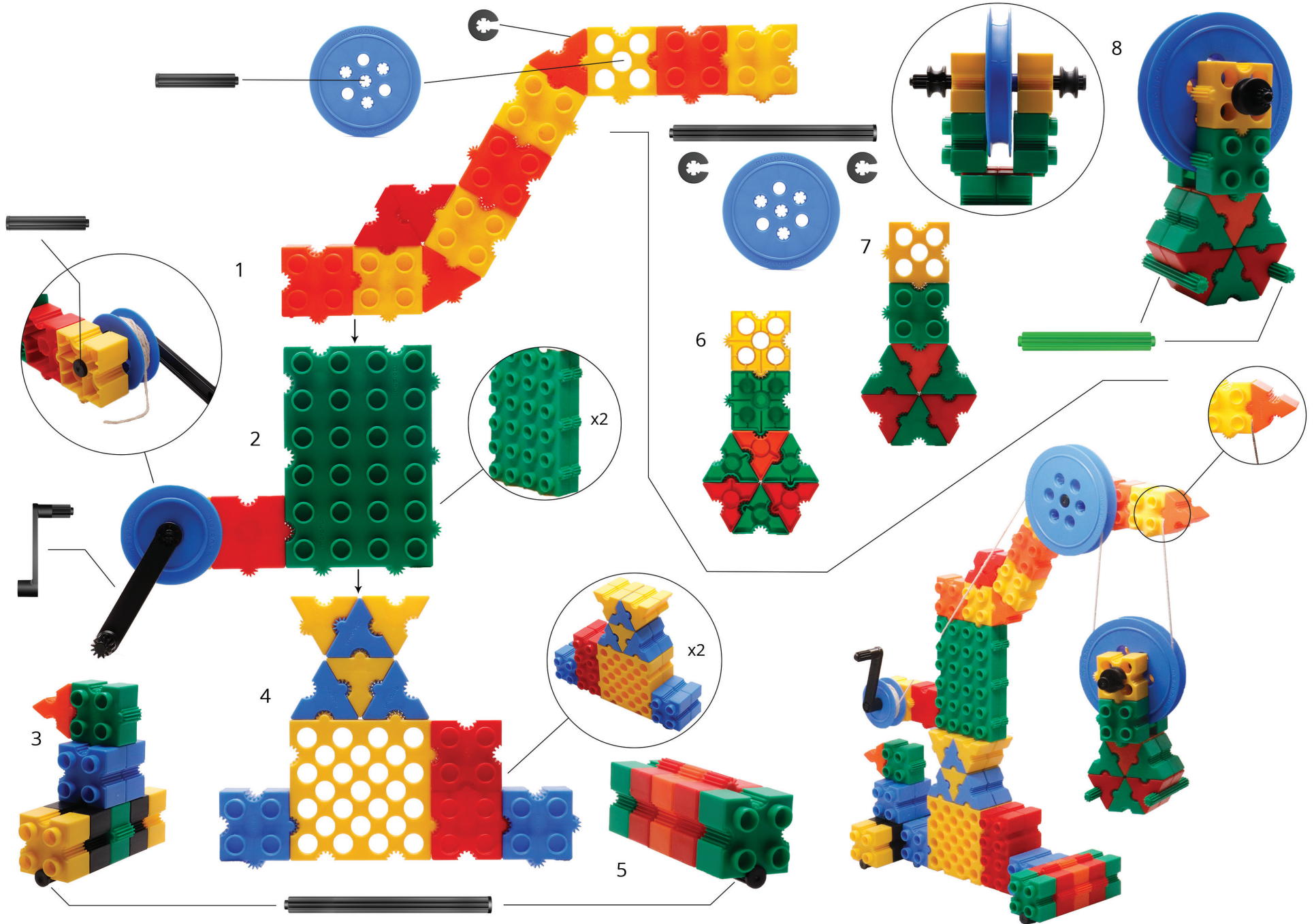


PLAN

Discuss among your friends and construct a three pulley system. Think which among the parts will be required and how many will be required.

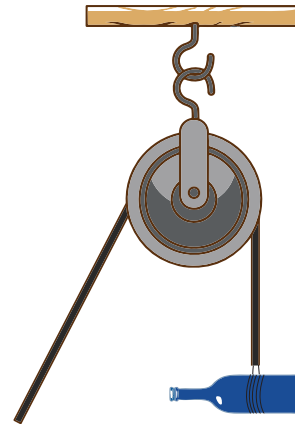
CREATE

Create a three pulley system model by following the steps shown below.



EXTEND

- Modify the model by adding more weight to it and see how it works.
- Imagine that you are lifting a bottle using a pulley, which has a smooth texture. The rope you are using also has a smooth texture. How do you think this will affect the force required to lift the bottle? Do you think the effort will vary, since the load as well as the rope are of smooth texture?



SHARE

Share the created model with your friends and family and have fun trying theirs.

DID YOU KNOW?

- A pulley is a wheel with a groove along its edge that holds a rope or cable. Usually, two or more pulleys are used together to reduce the amount of force required to lift a load