

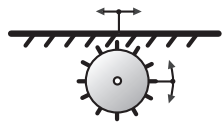
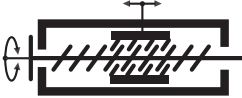
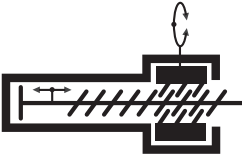
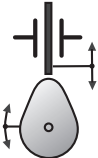
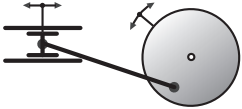
# Motion transformation systems

Complete this concept review handout and keep it as a record of what you have learned.

## Definition

- Motion transformation is the mechanical function of relaying a motion from one part to another while altering the nature of the motion.

## Characteristics of motion in the most common motion transformation systems

System		Possible transformations	Reversibility
Rack and pinion system		Rotation → Translation or Translation → Rotation	Yes
<u>Screw gear system, type I</u>		Rotation → Translation	No
<u>Screw gear system, type II</u>		Rotation → Translation	No
<u>Cam and follower system</u>		Rotation → Translation	No
<u>Slider-crank mechanism</u>		Rotation → Translation or Translation → Rotation	Yes

### Elements to consider when building motion transformation systems

System	Elements to consider
<p>Screw gear system, type I</p> <p>Screw gear system, type II</p>	<p>1. In type I, the nut must be connected to the screw in such a way that the nut cannot rotate.</p> <p>2. In both system types, the threads of the screws and nuts must match.</p> <p>3. In type II, the nut must be fixed in such a way that its only possible motion is rotational.</p>
<p>Rack and pinion system</p>	<p>1. The teeth on the rack and on the pinion must be identical.</p> <p>2. The system requires frequent lubrication.</p> <p>3. The greater the number of teeth on the pinion, the slower its rotation</p>
<p>Cam and follower system</p>	<p>1. The follower must be guided in its translational motion.</p> <p>2. The shape of the cam determines how the follower will move.</p> <p>3. A device (return spring) is usually necessary to keep the follower in continual contact with the cam.</p>
<p>Slider-crank mechanism</p>	<p>1. The connecting rod contains two bushings to attach it to the crank and piston.</p> <p>2. A slider must guide the part moving in translation.</p> <p>3. The system requires frequent lubrication.</p>