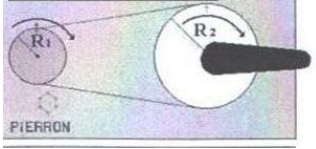
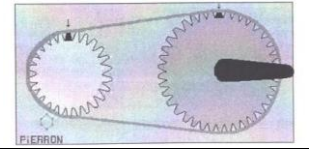
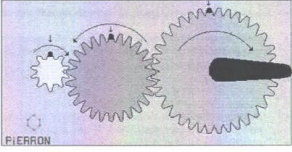
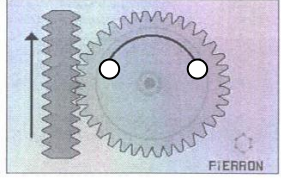
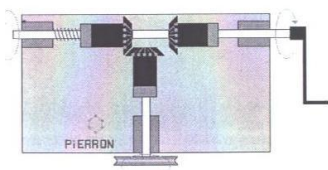



Name \_\_\_\_\_

PART 1 Station Number	Diagram	Questions	Answers
1		<ol style="list-style-type: none"> <li>1. Turn the handle and find out how many turns the small pulley makes for every complete turn made by the larger pulley.</li> <li>2. How big is the diameter of the large pulley compared to the smaller one?</li> </ol>	<ol style="list-style-type: none"> <li>1. It was about 1.5</li> <li>2. The diameter will also be 1.5 times wider.</li> </ol>
2		<ol style="list-style-type: none"> <li>1. What is the direction of the smaller gear if the larger one is turned counterclockwise?</li> <li>2. Would the direction of the smaller gear change if the gears were connected directly to each other?</li> <li>3. What name is given to this gear system?</li> </ol>	<ol style="list-style-type: none"> <li>1. Also counterclockwise.</li> <li>2. Yes. The smaller one would turn clockwise instead.</li> <li>3. Chain and sprocket</li> </ol>

<p>3</p>		<ol style="list-style-type: none"> <li>1. Find the velocity ratio of this gear train.</li> <li>2. Find the mechanical advantage for the middle gear if the small one is the input.</li> <li>3. How is the rotational direction of the small gear related to the largest gear?</li> </ol>	<ol style="list-style-type: none"> <li>1. <math>V = i/o = 40/10 = 4</math></li> <li>2. <math>M = o/i = 20/10 = 2</math></li> <li>3. same</li> </ol>
<p>4</p>		<ol style="list-style-type: none"> <li>1. What name is given to this system?</li> <li>2. If the part on the left hand side is moving up, in which direction is the circular part moving?</li> <li>3. If you wanted this mechanism to punch hole where would you place the sharp component?</li> </ol>	<ol style="list-style-type: none"> <li>1. Rack and pinion.</li> <li>2. Clockwise</li> <li>3. At the base of the rack</li> </ol>
<p>5</p>		<ol style="list-style-type: none"> <li>1. Draw the system in the blank square to the left, and label all the parts.</li> <li>2. Which part is the link?</li> <li>3. Why is the link needed in this case?</li> </ol>	<ol style="list-style-type: none"> <li>1. It was a cam and follower. The teardrop shape is the cam and the linear part is the follower</li> <li>2. The spring is the link</li> <li>3. Without the spring, the follower</li> </ol>

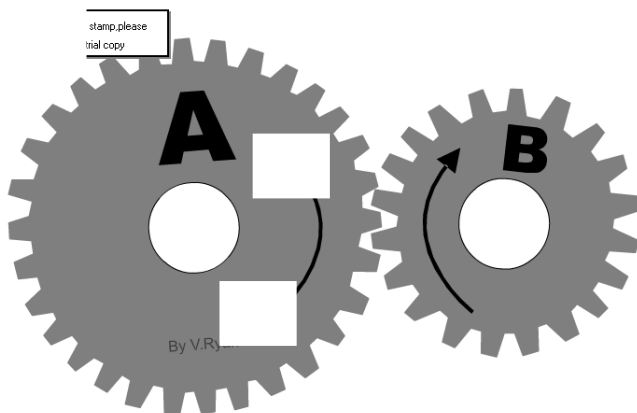
Name \_\_\_\_\_

			<p>won't spring back into its original position.</p>
6		<ol style="list-style-type: none"><li>1. What would you have to add to this system so that it could lift a weight?</li><li>2. Circle the part that turns in the same direction as the handle.</li><li>3. Circle the parts that would need lubrication.</li></ol>	<ol style="list-style-type: none"><li>1. It needs a string or rope attached to the pulley.</li><li>2. The first gear turns in the same direction as the handle.</li><li>3. All three gears need lubrication.</li></ol>
7		<ol style="list-style-type: none"><li>1. Is the link direct?</li><li>2. Is the link complete?</li><li>3. Is it removable?</li></ol>	<ol style="list-style-type: none"><li>1. Yes it is direct. There is a screw and the threads inside the clamp are part of the clamp.</li></ol>

Name \_\_\_\_\_

			<p>There's no extra part.</p> <p>2. No it's partial, since the clamp does not move while the screw turns.</p> <p>3. It is not removable</p>
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## PART 2



1. If B is the input, what is the velocity ratio? Show work.

$$V = 20/30 = 0.666..$$

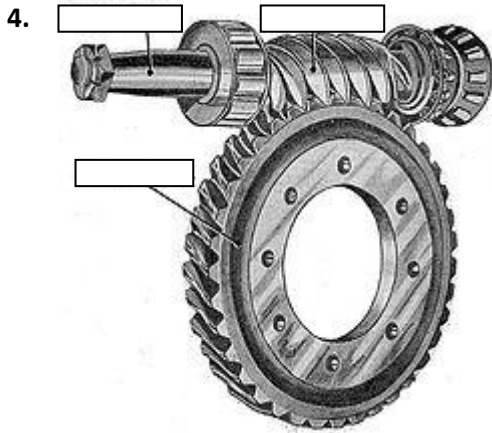
2. If A's speed is 22 turns per minute, what is the speed of gear B? Show work and units.

**B is going faster, so it will move  $22/0.6666.. = 33$  turns/min**

3. If a third gear equal in size to gear B is connected to gear A, what will be the velocity ratio?

$$=20/20 = 1$$

Name \_\_\_\_\_



a) Label all the parts of this system.

**Motor shaft, worm on top**

**Worm gear at the bottom**

b) Which part would the motor be attached to? **motor shaft**

c) Which part moves the fastest? **worm**

d) Which part has the most turning force? **Worm gear**

Name \_\_\_\_\_

5. A) Where's the cam or cams in the following diagram. Circle them.

**They are the semi-circles**

- B) What important linking part is needed for the follower to work?

**spring**

- C) What is the purpose of this machine?

**To punch holes in the paper. Notice that the rack moves the cam, which then moves the followers.**

