

Marvelous Meaningful Monthly Math

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Manufacturing January

Career – Clockmaker-Watchmaker

Math Activity

"Every time we open the back of a clock, we use math," says John Hiew, a master watchmaker. "We use math to calculate timing, the length of the pendulum and to calculate the ratio of wheels turning inside a clock."

You open the back of a watch and discover that the hour hand and the minute hand are connected to wheels called gear wheels. The large wheel is for the hour hand, the small for the minute hand.

Each of these gear wheels has teeth that lock into each other as they revolve around each other. The 2 wheels revolve against each other so that their relative speed of revolution is proportionate to their sizes.

The sizes of the wheels can be expressed in a ratio. If the bigger wheel is twice the size of the smaller, the ratio is 2:1.

You notice that the teeth on each of the gear wheels in the watch are the same size, even though the wheels are of a different size. This means the wheel size ratio can also be expressed by number of teeth. If the big wheel is twice as large as the small wheel, the ratio is 2:1. If the big wheel has 12 teeth, then the small one has 6 teeth.

Now that you understand how a gear wheel works, try and figure out the ratios below:

- A. If you have one wheel that has 12 teeth and another wheel that has 144 teeth, what is the size ratio of the 2 wheels?
- B. If you have a wheel with 48 teeth that is 4 times as big as the smaller wheel, how many teeth should the small wheel have?

Name _____ School _____ Teacher _____