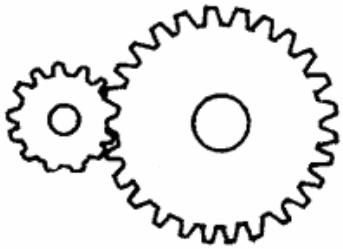
Name_____ Date_____

Gearing up – Learning about Gears

Reading/Discussion:

What is a gear? A gear is a simple machine, which turns another gear. The simplest and most common gears are **spur gears**. A spur gear is a wheel with teeth, or **cogs**, around its rim. When the teeth of two gears fit together or **interlink** and one gear turns the other will turn too, but in the opposite direction. If the gears are the same size and have the same number of teeth they will turn at the same speed but if one is smaller than the other the smaller one will turn faster, so by using different size gears you can slow things down or speed them up. Because the cogs fit together, the gear can transfer a great deal of **torque** or **twisting force** without slipping.



Let's look at a bicycle to see why gears are so helpful.
In a bicycle the gears are linked to each other by a chain.
When you turn large gear, which is attached to the pedals, the small gear, which is attached to the wheels turns faster.
In the diagram the large gear has twice as many teeth as the small gear. We say that the **ratio** of the gears is 2:1. This means that if you turn large gear 50 times the wheels will turn 100 times. This is a higher gear and it moves you further each time you turn the pedals. If you want to go uphill you can change down to a lower gear. This means that a smaller gear drives or turns a larger gear. The lower gear moves you a shorter distance each time you turn the pedals which makes it easier to pedal uphill.

There are many other machines that use gears. Some examples include cars, eggbeaters, clocks and can openers. Can you think of anymore?

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Gearing up – Learning about Gears Questions

A: What do you remember?

Can you fill in the missing words in the sentences below – without looking at the reading?

1. The simplest and most common gears are _____ _____.
2. A gear is a wheel with teeth, or _____, around its rim.
3. When the teeth of two gears interlink and one gear turns the other will turn in the _____ direction.
4. The gear can transfer a great deal of torque or _____ _____ without slipping.
5. We say that the _____ of the gears is 2:1

B. Make your own gears.

On the next page is a template of two different sized gears. Paste it onto card and then cut out each gear separately. Fit the gears one above the other on a separate piece of card so that the cogs mesh and turn easily. Turn one of the gears and watch the other. Which way does it turn? Which one turns the fastest? Count the cogs on both gears. What do you think the ratio is between the two gears?

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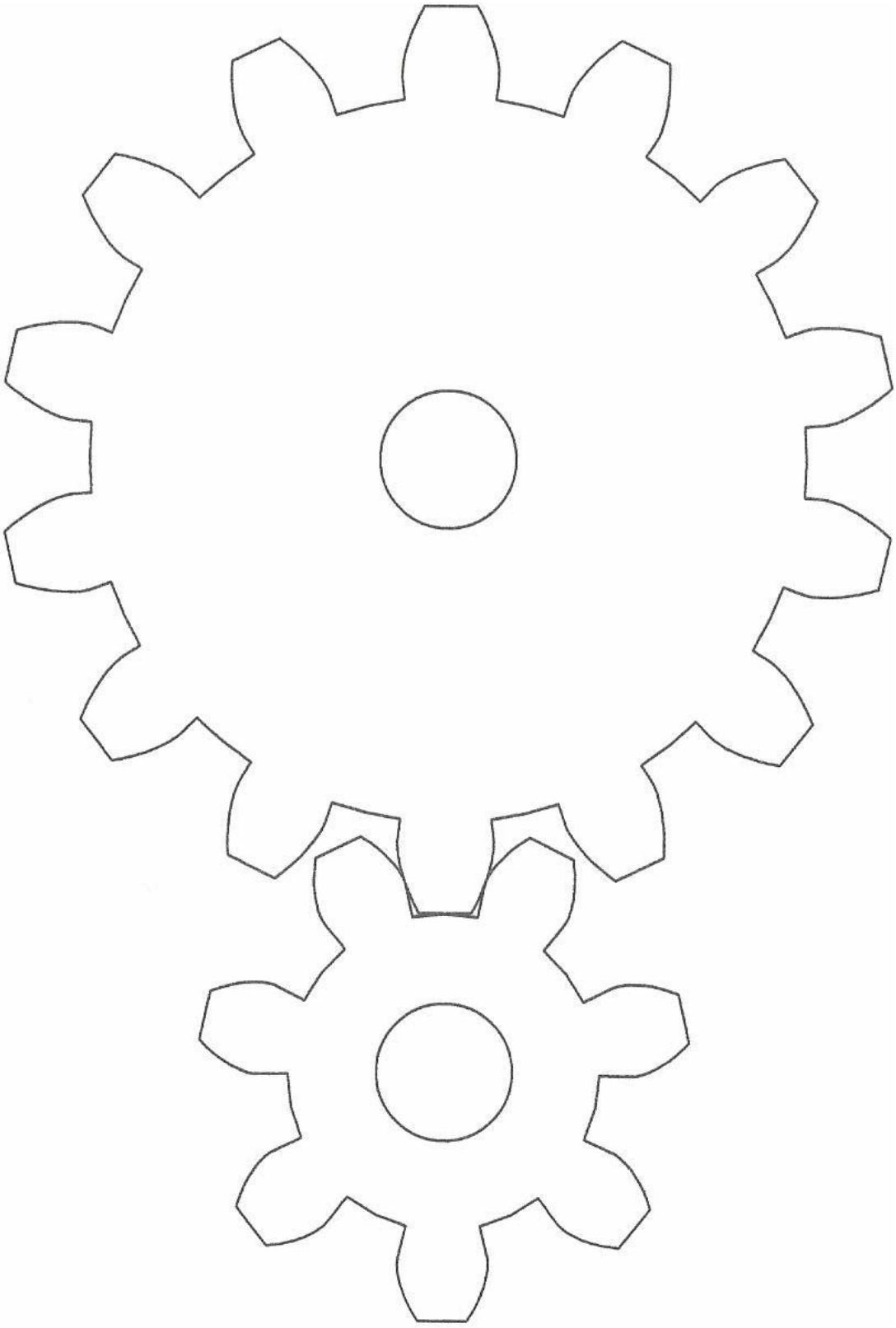

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Gearing up – Learning about Gears Answers

Activity A

1. The simplest and most common gears are **spur gears**.
2. A gear is a wheel with teeth, or **cogs**, around its rim.
3. When the teeth of two gears interlink and one gear turns the other will turn in the **opposite** direction.
4. The gear can transfer a great deal of torque or **twisting force** without slipping.
5. We say that the **ratio** of the gears is 2:1

Activity B

The larger gear has 14 cogs and the smaller one 7, which makes a ration of 2:1.