

The Factoring Factory

Activity One

Shaun has a workshop in his basement. He has finally succeeded in making a replicating machine.

On his dial, he uses the numbers $\times 2$, $\times 3$, $\times 4$, $\times 5$, and $\times 6$. Shaun puts a \$2 coin into the machine with the dial set to $\times 3$.

Wow! This is easier than mowing the lawns!



Out comes \$6.

He takes the three \$2 coins and puts them into the machine with the dial set to $\times 5$.



Out comes \$30 in \$2 coins.

1. By multiplying by 3, then 5, how many times more \$2 coins does Shaun have than when he started?
2. Shaun tries other combinations of multipliers. How many times does each of the following combinations of multipliers increase the starting number of \$2 coins?

- a. $\times 3$ then $\times 2$
- b. $\times 4$ then $\times 3$
- c. $\times 4$ then $\times 5$
- d. $\times 3$ then $\times 3$ then $\times 3$
- e. $\times 6$ then $\times 5$ then $\times 2$
- f. $\times 2$ then $\times 2$ then $\times 2$ then $\times 2$

Great! I can shout Terry and Eric to the movies!



It's my turn to wash my soccer team's dirty socks!

Activity Two

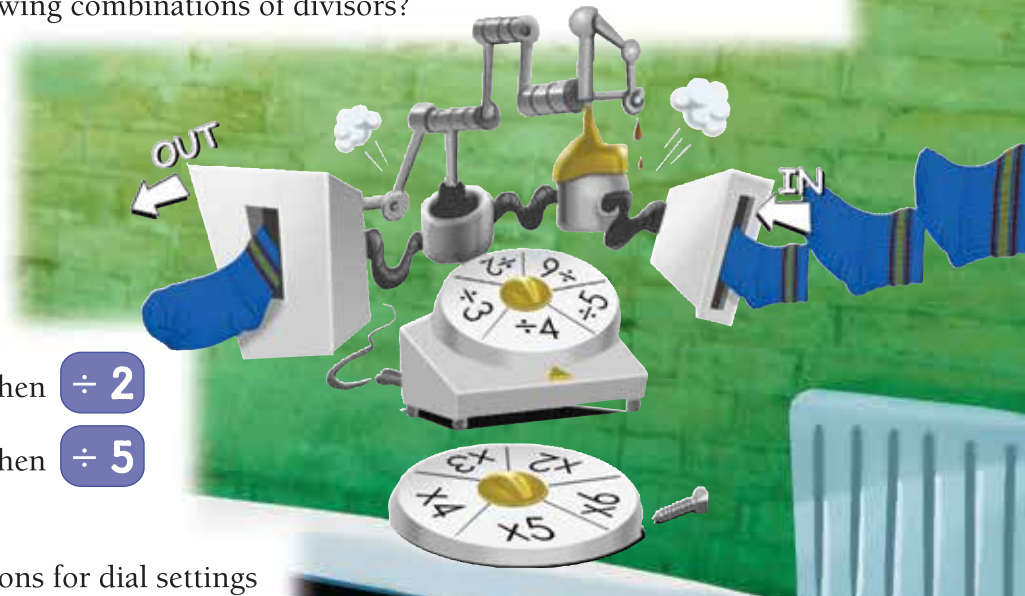
Shaun swaps the dial on his replicating machine so that the machine decreases what goes into it.

He takes 24 dirty socks and puts them into the machine with the dial set to $\div 2$. Out come only 12 dirty socks. Much less work!

He takes the 12 socks and puts them into the machine with the dial set to $\div 3$. Out come only 4 dirty socks. Even better!

1. By dividing by 2, then by 3, what fraction of the 24 dirty socks is left to wash?
2. Shaun tries other combinations of divisors. What fractions of the starting number are left after each of the following combinations of divisors?

- a. $\div 2$ then $\div 5$
- b. $\div 4$ then $\div 5$
- c. $\div 6$ then $\div 3$
- d. $\div 5$ then $\div 2$
- e. $\div 2$ then $\div 2$ then $\div 2$
- f. $\div 3$ then $\div 3$ then $\div 5$



3. a. Give Shaun instructions for dial settings that will help him solve these problems:

- i. I need to make sandwiches for my sports club social. I've only got 4 slices of bread, and I need 27 times as many as that. But I don't have 27 on my machine.

- ii. I've got 64 overdue library book fine notices. I can only afford to pay $\frac{1}{16}$ of them. How can I decrease the number of fines?

- b. Are there other settings on his dials that Shaun could have used? Explain your answer.

4. Are all the settings on the dials needed to solve problems? Explain your answer.

