

## NQA1 – Making Sense of Units

This standard requires to rewrite quantities in terms of different units using multiplication and division. Copy the examples below in your NOTES NOTEBOOK, then try the Quick Practice on page 3 of this document.

Ex 1

A remote control car travels at a rate of 10 feet per second. How many inches per second is this?



Set it up as a unit ratio

$$\frac{10 \text{ ft}}{1 \text{ s}}$$

Convert feet to inches and multiply.

$$\frac{10 \text{ ft}}{1 \text{ s}} = \frac{10 \text{ ft}}{1 \text{ s}} \cdot \frac{12 \text{ in.}}{1 \text{ ft}}$$

Divide out common units

$$\frac{10 \cancel{\text{ ft}}}{1 \text{ s}} \cdot \frac{12 \text{ in.}}{1 \cancel{\text{ ft}}}$$

Simplify

$$\frac{120 \text{ in}}{1 \text{ s}} \longrightarrow 120 \text{ in/sec}$$

Ex 2

A swordfish can swim at a rate of 60 miles per hour. How many feet per hour is this?

You can use 1 mile = 5,280 feet to convert the rates.

$$\frac{60 \text{ mi}}{1 \text{ h}} = \frac{60 \text{ mi}}{1 \text{ h}} \cdot \frac{5,280 \text{ ft}}{1 \text{ mi}}$$

Multiply by  $\frac{5,280 \text{ ft}}{1 \text{ mi}}$ .

$$= \frac{60 \cancel{\text{ mi}}}{1 \text{ h}} \cdot \frac{5,280 \text{ ft}}{1 \cancel{\text{ mi}}}$$

Divide out common units.

$$= \frac{60 \cdot 5,280 \text{ ft}}{1 \cdot 1 \text{ h}}$$

Simplify.

$$= \frac{316,800 \text{ ft}}{1 \text{ h}}$$

Simplify.



A swordfish can swim at a rate of 316,800 feet per hour.

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$$\frac{120 \text{ in}}{1 \text{ s}} \longrightarrow 120 \text{ in/sec}$$

These come from your conversion chart!

Ex 2

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$$\frac{60 \text{ mi}}{1 \text{ h}} = \frac{60 \text{ mi}}{1 \text{ h}} \cdot \frac{5,280 \text{ ft}}{1 \text{ mi}}$$

Multiply by  $\frac{5,280 \text{ ft}}{1 \text{ mi}}$ .

$$= \frac{60 \cancel{\text{mi}}}{1 \text{ h}} \cdot \frac{5,280 \text{ ft}}{1 \cancel{\text{mi}}}$$

Divide out common units.

$$= \frac{60 \cdot 5,280 \text{ ft}}{1 \cdot 1 \text{ h}}$$

Simplify.

$$= \frac{316,800 \text{ ft}}{1 \text{ h}}$$

Simplify.



A swordfish can swim at a rate of 316,800 feet per hour.

# Quick Practice

Before you start the Skills Practice, check to see if you can accurately predict the fractions that need to be multiplied to the problems below.

Check on the next page.

1.  $165 \text{ cm} \times \boxed{\text{_____}}$  = \_\_\_\_\_ in

2.  $\frac{146,600,000 \text{ km}}{365} \times \boxed{\text{_____}} \times \boxed{\text{_____}}$  = \_\_\_\_\_ miles/hour

3.  $55 \text{ kg} \times \boxed{\text{_____}}$  = \_\_\_\_\_ pounds

# Quick Practice

Before you start the Skills Practice, check to see if you can accurately predict the fractions that need to be multiplied to the problems below.

1.  $165 \text{ cm} \times \frac{1 \text{ inch}}{2.54 \text{ cm}} = \underline{\hspace{2cm}}$  in

2.  $\frac{146,600,000 \text{ km}}{365} \times \frac{1 \text{ mile}}{1.609 \text{ km}} \times \frac{1 \text{ day}}{24 \text{ hours}} = \underline{\hspace{2cm}}$  miles/hour

3.  $55 \text{ kg} \times \frac{1 \text{ pound}}{0.435 \text{ kg}} = \underline{\hspace{2cm}}$  pounds