GEOLOGY WITH DR RÓNADH COX

TALKING POINTS

1) **Why is it important for geologists like Rónadh to help us and society understand the power of storm waves?** (See *Imagine this*, p1)

2) **How heavy was the heaviest boulder that was moved by the storm waves of 2013-14?** (See first paragraph of the article, p1)

3) **What evidence did Rónadh and her team have to prove that boulders weighing 10s or 100s of tonnes had been shifted by storm waves and not a tsunami?** (See *How did Rónadh's team prove the rocks had moved?* p1)

4) **Rónadh and her research team made graphs using topographic variables to show just how powerful storm waves can be. What topographic variables did her team base the graphs on?** (See *How did Rónadh's team prove the rocks had moved?* p1)

5) **The main difference between a storm wave and a tsunami wave is the period. Can you explain what this is?** (See *Why did people think a tsunami had moved these boulders?* p1)

6) **Why did some scientists assume that an ancient tsunami had moved the boulders and not storm waves?** (See *Why did people think a tsunami had moved these boulders?* p1)

7) **Rónadh says there are lots of reasons to become a geologist. What are the two reasons she lists? Can you think of any others?** (See *Why do we need geologists?* p3)

HOW DO YOU FIGURE OUT THE WEIGHT OF SOMETHING YOU CAN'T WEIGH?

You can't put a gigantic boulder on a weighing scale, so how did Rónadh and her team know how heavy the rocks were? Easy! You can calculate the mass of anything, without weighing it, if you know its volume and density because mass = volume x density. It's that simple.

Volume is the amount of space a thing takes up. Measures of volume include litres, gallons, teaspoons, cubic metres (m^3) or cubic centimetres (cm^3). Measure an object's height, width and depth, and multiply these measurements to get volume: height x width x depth. If the object measures 1 cm x 2 cm x 3 cm, what is its volume?

Density tells you how much matter is packed into an object. For example, a shotput and an orange may be the same size, but the shotput is heavier and therefore denser. Mass = volume x density, and density = mass/volume. If an object weighs 15 g and its volume is 6 cm^3, what is its density?

It's easy to measure the density of small objects. Measure mass (or weight) in kilograms and divide that by volume (height x width x depth), and you have the density. But what about huge objects like boulders? Luckily, the densities of rock and other substances are known, so you can look them up. For example, the density of iron is 7.87 grams per cubic centimetre (g/cm^3), and many rocks are about 2.5 g/cm^3. So, if you calculate the volume (remember: height x width x depth), you simply multiply this by the density to get the weight. Easy.

Now you're thinking like a geologist! Try measuring the mass, density and volume of objects around the room. Be creative!

USE A MOBILE PHONE APP TO MEASURE YOUR FRIEND!

Photogrammetry lets us measure objects by taking photos of them. CGI (computer-generated imagery) in films and video games uses photogrammetry to make scenes look more realistic, but it's also used by scientists such as geologists to measure things in the natural world. You can give photogrammetry a go using your phone. There are lots of free apps available, and once you have downloaded one you can make a 3D image of a chair, a cup, or even a friend! Just make sure you check with your teacher or parent before downloading a photogrammetry app.