Climate Action Week 2024: Rainwater Calculations Early Second Level

Stage: P4-S2

Time: 1 hour

Introduction: Following Thursday's Climate Action Week Live Lesson on sustainable gardens, we would like pupils to complete some calculations designed to help them think about rainwater collection and storage.

Activity

This resource is aimed at early second level. We also have a resource containing more advanced calculations for upper second level, which can be found on our website.

Ask pupils to work through the calculations worksheet on pages 2-3. Teacher notes are available on pages 4-6, including points for further discussion.

A big thank you to Royal Botanic Garden Edinburgh for creating this resource.

Follow on

After this activity, pupils can move onto our overall week resource: 'Design your sustainable home' and complete design task 4.

Rainwater calculations 💧

In their talk, Eve and Caitlyn showed how capturing **rainwater can help plants grow** – and how growing the right plants can help us manage rainwater to avoid flooding and erosion.

Rainwater that falls on a roof is collected by gutters: pipes with an open top fixed around the bottom of roofs. This water then flows into downpipes.

Water butts (containers) can be attached to roof downpipes to store run-off rainwater. This water can then be used in the garden and not be wasted.

Water butts come in lots of different sizes - and so do watering cans!

> Show your working in the grey boxes

1. If there were **100 litres of water** in a water butt, how many **10-litre watering cans** could you fill with it?   = _____ cans

2. If there were **100 litres of water** in a water butt, how many **5-litre watering cans** could you fill with it?   = _____ cans

3. If there were **200 litres of water** in a water butt, how many **10-litre watering cans** could you fill with it?   = _____ cans

4. If there were **200 litres of water** in a water butt, how many **5-litre watering cans** could you fill with it?   = _____ cans

5. What things might **affect how much water** you need for a garden?

(Tick all the answers you think are right.)

☐ How big the garden is   ☐ The kind of plants being watered
☐ The air temperature   ☐ How much rain has fallen recently
☐ The kind of soil in the garden   ☐ Anything else? _____

_____

6. If your water butt had **200 litres of water** in it, and your garden needed **20 litres of water each day**, how many days would the water last?

                              = _____ days

7. If your water butt had **200 litres of water** in it, and your garden needed **10 litres of water each day**, how many days would the water last?

                              = _____ days

Well done!

Maths is useful in gardening to work out water, seeds, soil mixes, and lots more!

Teacher notes

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Horticulturists (professional gardeners) use lots of maths in their work.

These calculations are an opportunity to explore why division should be used in this real-life situation.

Differentiation

- The values can be changed to make the calculations easier or more challenging/realistic (for example 240-litre water butts and 12-litre watering cans).

Turning this exercise into an investigation

- Use real-life numbers from your school or pupils' own homes.
    - If you or your pupils have access to a water butt or any watering cans, those volumes in litres could be used.
    - Measure the length and width of a rectangular building or shed/store and use these measurements to draw a diagram of the roof and find its area. Making the measurements or estimating them can be a maths project in itself – pupils can use their own foot-lengths and convert the results to metres!
    - Use a rain gauge to investigate rainfall over time at your own school – or make your own rain gauge.
    - Explore the relative capacities of different containers.

Answers

1. 10 cans
2. 20 cans
3. 20 cans
4. 40 cans

It may help some pupils to think of multiple identical watering cans instead of one watering can being used multiple times. Then the water in the water butt is being divided amongst the watering cans, so the amount of water in the butt needs to be divided by the capacity of the cans.

Answers (continued)

5. All of the multiple-choice options are correct – they could all affect how much water a garden might need.

☐ You're likely to need more water for a big garden than a small one.

☐ If it's hot, water from the soil dries out and plants get thirsty.

☐ Some kinds of soil store more water than others.

☐ Some plants store more water than others.

☐ If it's been raining, you won't need to water as often, or at all!

Your pupils might also suggest that if a garden is at the bottom of a slope it might get water running off higher areas.

6. 10 days   7. 20 days

Extension discussions

- What else could rainwater be used for? (Examples could include washing cars.)

- Would all the water that fell on the roof go into the water butt and stay there? (Some water could escape the gutters, some could evaporate.)

- At what time of year might you need more water for the garden? Pupils could check rainfall in different months of the year by choosing your nearest weather station at metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages

- Why is it important not to waste water?

- How would our answers to these questions affect the numerical answers we got? Would our answers be too big or too small? If we did the investigation again, how might we adjust it to take some of these things into account? (There might be less rainfall collected than we think.)

Further teaching resources about plants

Take a look at our online classroom resources for schools.

For inspiration from other schools about positive ways to protect and promote biodiversity at school, please look at our PlantKind webpage.

Keep in touch!

If you'd like to hear more about schools resources, CLPL opportunities or schools workshops (online, at our four Gardens, in schools across Scotland), please join our e-newsletter mailing list.

If you have any suggestions about how we can make this resource better, or are happy to share any feedback about how you've used this resource, please email plantkindlearning@rbge.org.uk.