

Lesson Plan – Problem Solving/Discussion

Topic – Water Footprints

A set of activities to explore the idea of a water footprint

Learning Objectives

To increase knowledge and understanding of the importance of water	To understand the ideas of 'embodied water' and 'water footprint'	To consider their own water footprints and water use
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Resources

Slide deck

Embodied water card game

Water footprint exercise

Activity

Slide 1 - Introduce the lesson objectives

Slides 2-8 are about the importance of water

Slide 2 show the short You Tube film '*The Importance of Water*'

<https://www.youtube.com/watch?v=kxqbpPWTl6A>

Slides 3-7 summarise the points from the film

Slide 8 forecasts increased freshwater use and water stress

Slide 9 – ask what the students have used water for so far today

Slide 10 – pie chart summarises typical domestic water use

Slide 11 – introduces the idea of a *water footprint* '*The amount of fresh water used in the production or supply of goods and services used by an individual*'

Slide 12 – explains the idea of '*Embodied water is the amount of water used during the growing, processing and transportation of the goods we use or consume, or the services we use*'

Slide 13 – Embodied water example – a bowl of pasta

Slide 14 - Embodied water card game

Embodied water card game

1. Provide each group of 4-6 students with a set of picture cards (and have them cut them out if not already cut)
2. Ask students to move the cards into an order of largest to smallest embodied water content. Encourage them to discuss the each item with members of the group.
3. Have students place a figure from between 10 and 20,000L next to each picture. They will probably find it difficult but you can point out that, as they are calculating the "hidden" water content in these foods and materials, it is supposed to be difficult.

Encourage them to have a go anyway and not get too worried about being right or wrong.

4. Ask each group to finalise their lists, and then go through the solutions.
5. Discuss any anomalies and the use of water in growing, processing and transport phases of the food production cycle.
6. Give out the Embodied Water totals sheet covering a range of foods. Ask if there are any comments.

Water Footprint exercise

Using the Calculating Water Footprints Worksheet answer the questions about Sam's water footprint.

Answers

1. Look at Sam's water footprint graph
 - a. What is the total volume of water consumed each year in cubic metres?
3573
 - b. If an Olympic swimming pool contains 2500 cubic metres of water, calculate what proportion the total footprint is of a swimming pool.
1.429
 - c. What volume of the total water footprint is due to food? What is this as a percentage of Sam's total use?
2545 71.2%
 - d. What volume of total water footprint is due to domestic use?
Give some examples of domestic water use.
504
 - e. What do you notice when you compare water consumed for domestic use and that used for food?
Much more for food

Q. What two kinds of food make the biggest contributions to the water footprint?

Meat and dairy

Q. How many cubic metres do they contribute to Sam's footprint?

1895

Q. Convert these figures into percentages of Sam's food water footprint.

Meat 60.4% Dairy 14.02% = 74.6%

Q. What kinds of food contribute the least?

Vegetables and fruit

Q. Make some suggestions about how the average person can reduce their water footprint by eating differently.

Less meat and dairy more vegetables and fruit

Q. Would there be any other benefits to changing their diet in this way?

Health benefits, carbon footprint

Q. What would be the costs to a) individuals? b) some farmers?

Spend less. Farmers need to move away from meat and dairy

Slide 17 What ideas about reducing water footprints?

Complete the section in the S4S week booklet and answer the two questions '*What did I learn in this lesson?*' and '*How does Ethical Science or Technology Justice apply to this lesson?*'

OR

Reflect on the use of **science for good** in water use.