

Energy Needs and Diet Imbalances

KS3 Biology · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

A girl sleeps for 9 hours, using 240 kJ each hour. How much energy does she use while sleeping?

Step 1 · Energy = rate × time

$$240 \text{ kJ/h} \times 9 \text{ h.}$$

Step 2 · Calculate

$$240 \times 9 = 2160 \text{ kJ.}$$

Answer: 2160 kJ

Check: Even asleep, the heart beats, we breathe and cells keep respiring.

2. Now try one with the steps

A cereal bar contains 420 kJ. Running uses 2000 kJ per hour. How many minutes of running would use up the bar?

Step 1 · Energy per minute

Step 2 · Divide

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What unit is the energy in food measured in? [1]

2. What is the name for a disease caused by a lack of a vitamin or mineral? [1]

3. Which disease is caused by a lack of vitamin C? [1]

4. Which disease causes soft, weak bones in children and is linked to a lack of vitamin D or calcium? [1]

5. A lack of iron can cause anaemia. Give ONE symptom. [1]
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6. Walking uses 840 kJ per hour. How much energy is used in 2 hours, in kJ? [1]
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7. What is obesity? [1]
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8. Give TWO health problems linked to obesity. [2]
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9. Explain why a builder needs more energy each day than an office worker of the same mass. [2]
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10. Starvation is when the diet has far too little energy. What does the body use for energy first when food runs out? [1]
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11. A teenager uses 10 500 kJ per day but eats 11 200 kJ. How much extra energy per day is stored, in kJ? [1]
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12. 1 kcal = 4.2 kJ. A snack contains 250 kcal. How many kJ is that? [2]
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13. Suggest why a pregnant woman needs more energy and protein than usual. [2]
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14. Kwashiorkor causes a swollen belly in children whose diet is very low in protein. Why is protein especially important for children? [2]
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4. Before you hand it in

"Malnutrition means not eating enough."

Malnutrition is any imbalance: too little, too much, or missing nutrients. An obese person can still be malnourished if they lack vitamins.

"Everyone needs the same amount of energy."

Energy needs vary with age, sex, body mass, activity, pregnancy and growth.

Adding kJ and kcal together.

Convert first: $\text{kJ} = \text{kcal} \times 4.2$.