Baby Surface Area

A baby weighs $3.87kg$ at birth.

His dad weighs $77.6kg$.

Find the volume scale factor between the two.

The average surface area of an adult male is $1.9m^2$. Calculate an estimate for the baby's surface area.

What is the surface area to weight ratio for the dad? Give an answer in $m^2 \ per \ kg$.

What is the surface area to weight ratio for the baby?

What conclusions can you draw about temperature regulation in babies?

Baby Surface Area SOLUTIONS

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$$\frac{77.6}{3.87} = \boldsymbol{20.05 \ to \ 2 \ d.p.}$$

The average surface area of an adult male is $1.9m^2$. Calculate an estimate for the baby's surface area.

$VSF = 20.05 \ldots \quad \Rightarrow \quad LSF = \sqrt[3]{20.05 \ldots} = 2.71 \ldots \quad \Rightarrow \quad ASF = (2.71 \ldots)^2 = 7.38 \ldots$

$$\Rightarrow \quad Baby \ surface \ area = \frac{1.9}{7.38 \ldots} = \boldsymbol{0.257 m^2 \ to \ 3 \ d.p.}$$

What is the surface area to weight ratio for the dad? Give an answer in $m^2 \ per \ kg$.

$$\frac{1.9}{77.6} = \boldsymbol{0.024 \ m^2/kg}$$

What is the surface area to weight ratio for the baby?

$$\frac{0.257}{3.87} = \boldsymbol{0.067 m^2/kg}$$

What conclusions can you draw about temperature regulation in babies?

The surface area to weight ratio for the baby is nearly 3 times that of the dad. This suggests that babies will lose heat much more easily, so they should be wrapped up warm!