

GIANT BULLDOG SPOTTED IN BULLDOG STADIUM?

$$\left(\frac{SA}{V} \right)$$

$$\left(\frac{SA}{V} \right)$$

Washington Colony
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WELCOME TO FRESNO STATE
FUTURE BULLDOGS!

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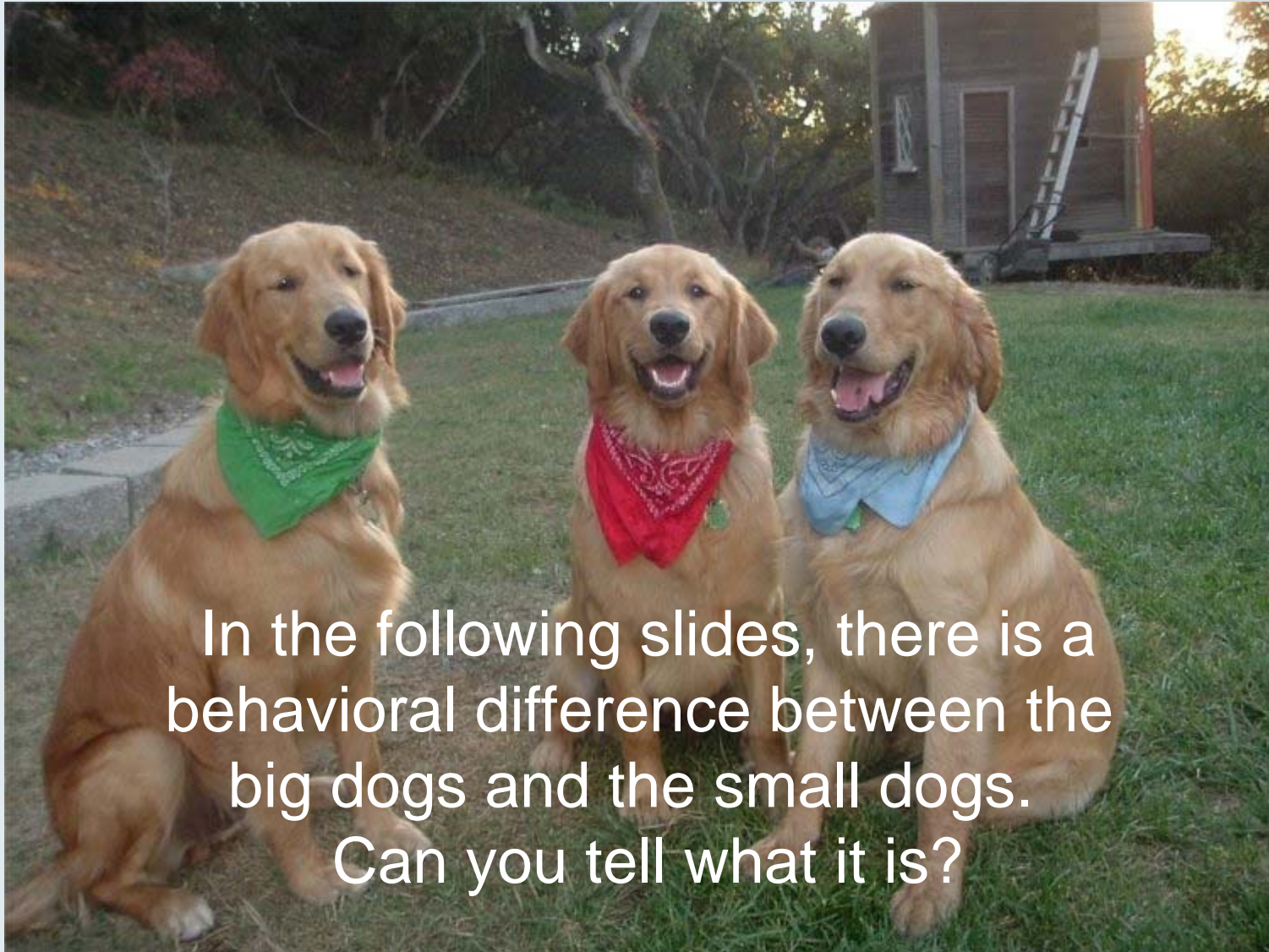
$$\left(\frac{SA}{V} \right)$$



Could a bulldog this size really exist?

It is over 30 feet tall!





In the following slides, there is a behavioral difference between the big dogs and the small dogs.
Can you tell what it is?













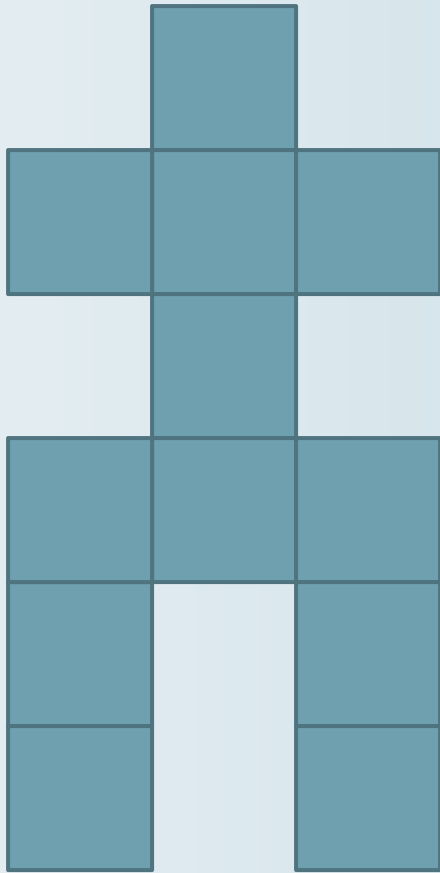




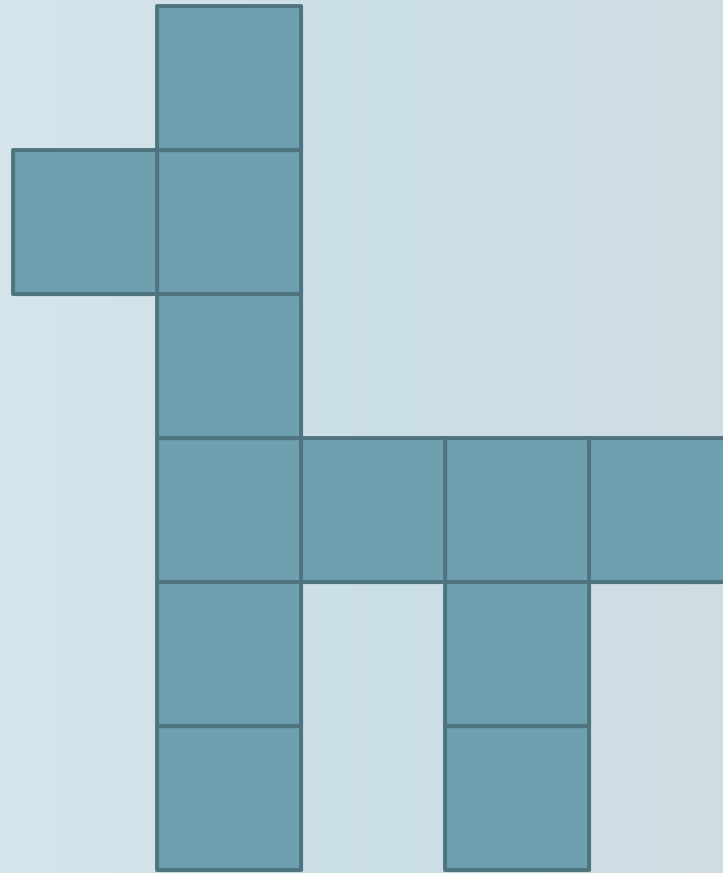




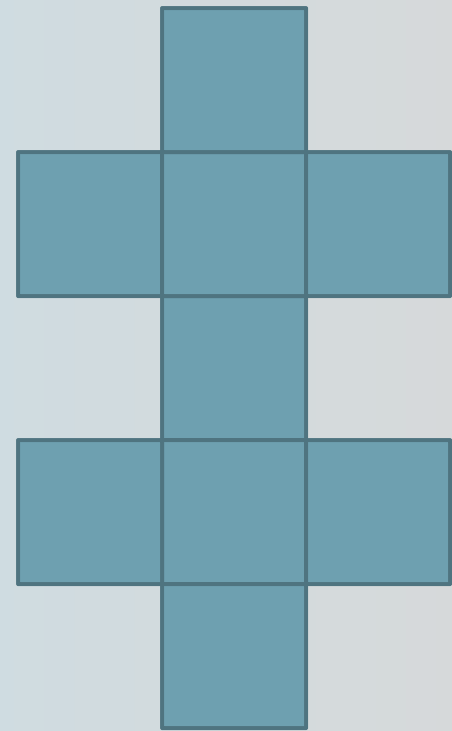
Q. Why do large dogs seem to pant more than small dogs?



FRONT & BACK



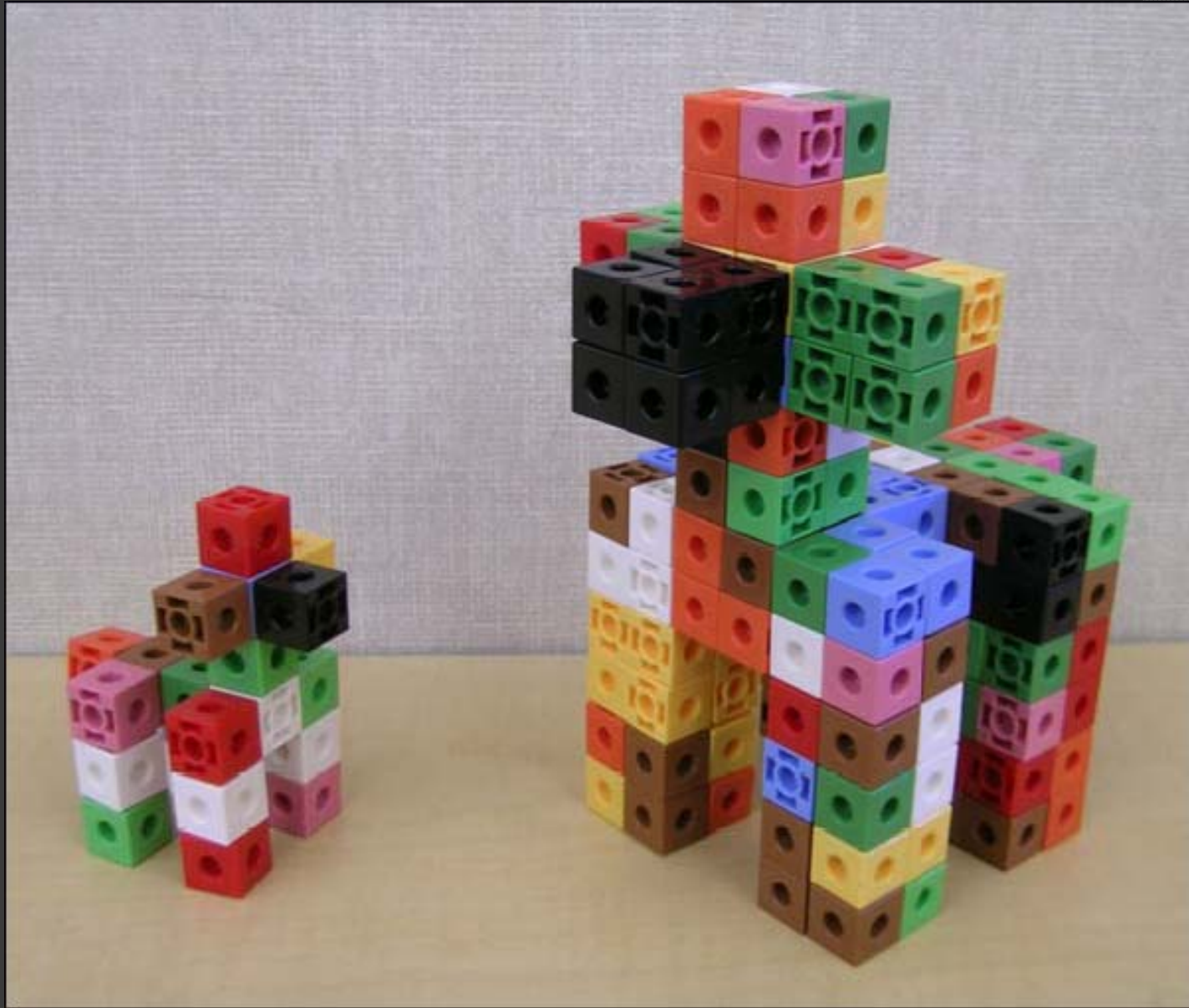
SIDES



TOP & BOTTOM

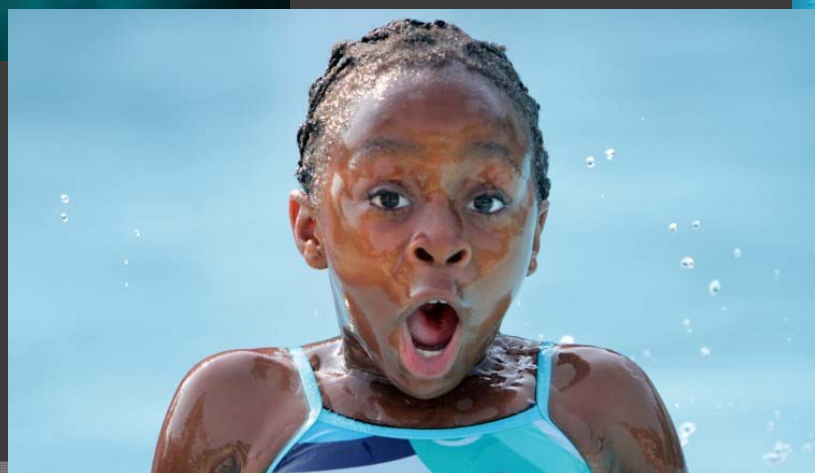
The Double Dog
dare! - Which team
will be the first to
make a doubled-
dog?

Hint: What would
the nose of a
doubled-dog look
like? Make that
first.





LittleFriendsPhoto.com



- ◎ If more surface area produces better cooling, then why do large dogs appear **hotter**,..., they have more surface area than a small dog!

An Important Ratio for all Life!

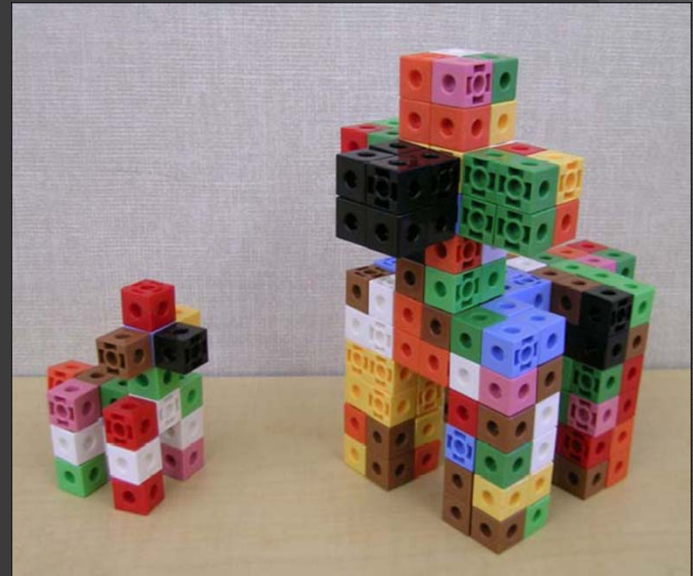
$$\left(\frac{SA}{V} \right)$$

Surface Area → think 'Skin and Cooling'

Volume → think 'Body size and Metabolism which makes Heat.'

$$\text{Puppy Surface Area} = 90u^2$$

$$\text{Puppy Volume} = 22u^3$$



$$\begin{aligned} \text{Doubled Dog Surface Area} &= 4 \cdot \\ 90 &= 360u^2 \end{aligned}$$

$$\text{Puppy Volume} = 8 \cdot 22 = 176u^3$$

$$\begin{aligned} \left(\frac{SA}{V} \right)_{large} &= \frac{360u^2}{176u^3} = \frac{4 \cdot 90u^2}{8 \cdot 22u^3} = \frac{1}{2} \cdot \left(\frac{SA}{V} \right)_{small} \\ &= \frac{\frac{1}{2} \cdot SA_{small}}{V_{small}} \end{aligned}$$

$$\left(\frac{1}{m} \right)^n \left(\frac{S}{V} \right)_{old} = \left(\frac{S}{V} \right)_{new}$$

Doubled twice!

Giant has $\frac{1}{4}th$ the skin
relative to the smallest dog.

To get to 32 feet from 1 foot would
take $2^5 \cdot 1 = 32$, five doublings!

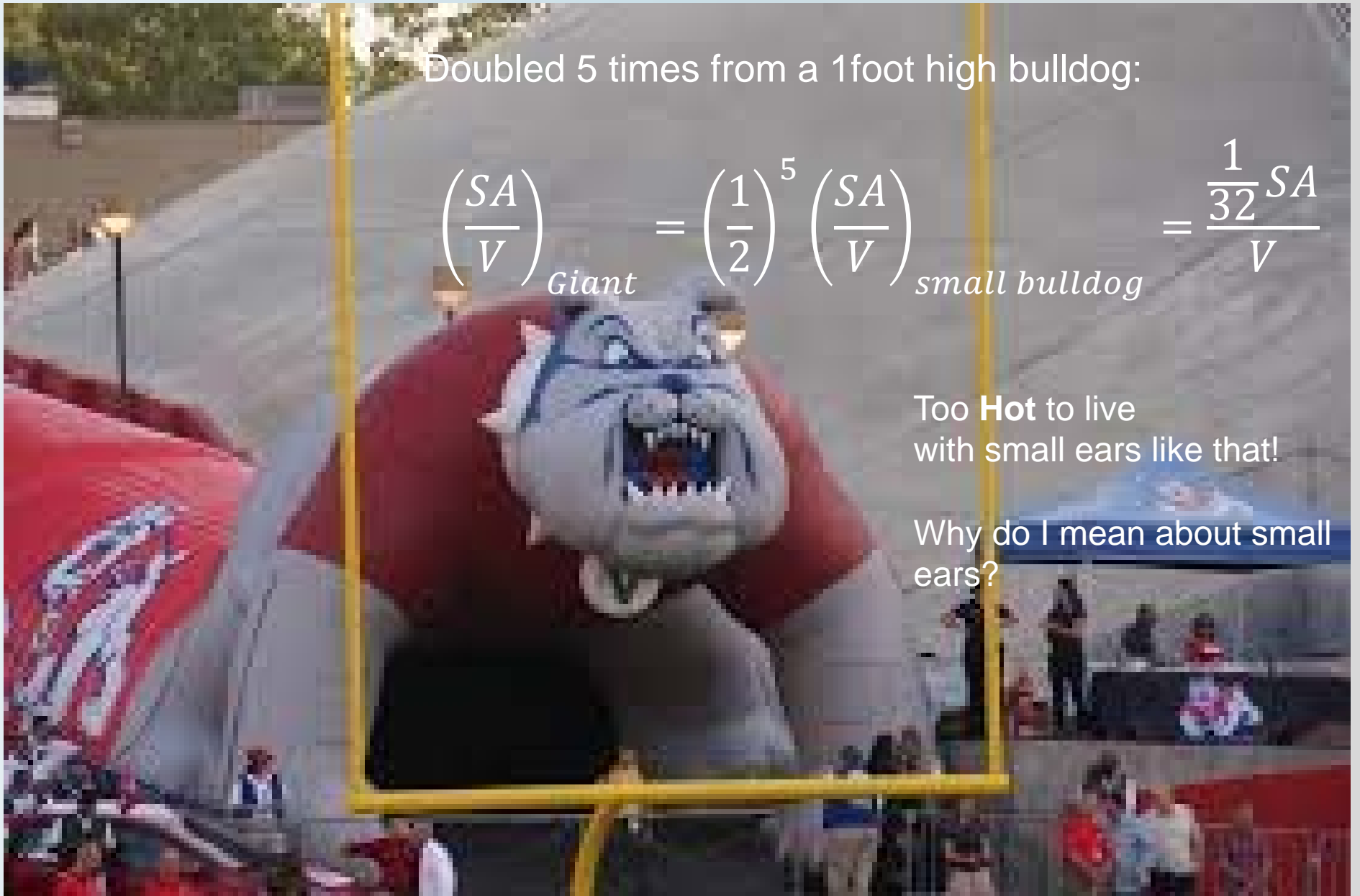


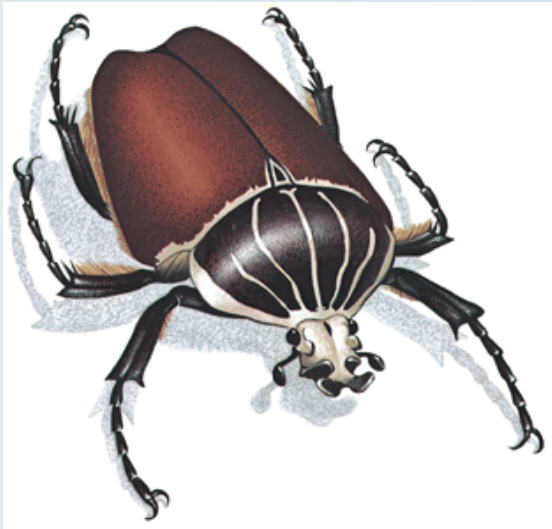
Doubled 5 times from a 1foot high bulldog:

$$\left(\frac{SA}{V}\right)_{Giant} = \left(\frac{1}{2}\right)^5 \left(\frac{SA}{V}\right)_{small\ bulldog} = \frac{1}{32} \frac{SA}{V}$$

Too **Hot** to live
with small ears like that!

Why do I mean about small
ears?





$$\left(\frac{SA}{V}\right)_{large} = \frac{360u^2}{176u^3} = \frac{4 \cdot 90u^2}{8 \cdot 22u^3} = \frac{1}{2} \cdot \left(\frac{SA}{V}\right)_{small} = \frac{\frac{1}{2} \cdot SA_{small}}{V_{small}}$$

p=8

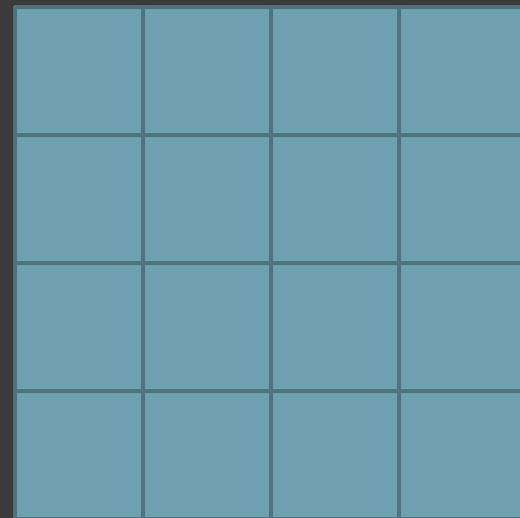
a=4

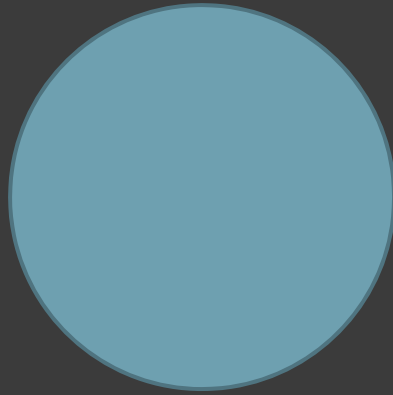
P=16

A=16

p/a=2/1

P/A=1/1





$$c=2(\pi)r \quad C=2(\pi)2r$$
$$a=(\pi)r^2$$

$$A=(\pi)(2r)^2$$
$$=4(\pi)r^2$$

$$c/a$$
$$=2(\pi)r/(\pi)r^2=2/r$$

$$C/A=2(\pi)2r/4(\pi)r^2$$
$$=1/r$$



See you in class in a few years...
study hard and get good grades!



We'll be waiting for
you here at Fresno State!

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