# GIANT BULLDOG SPOTTED IN BULLDOG STADIUM?

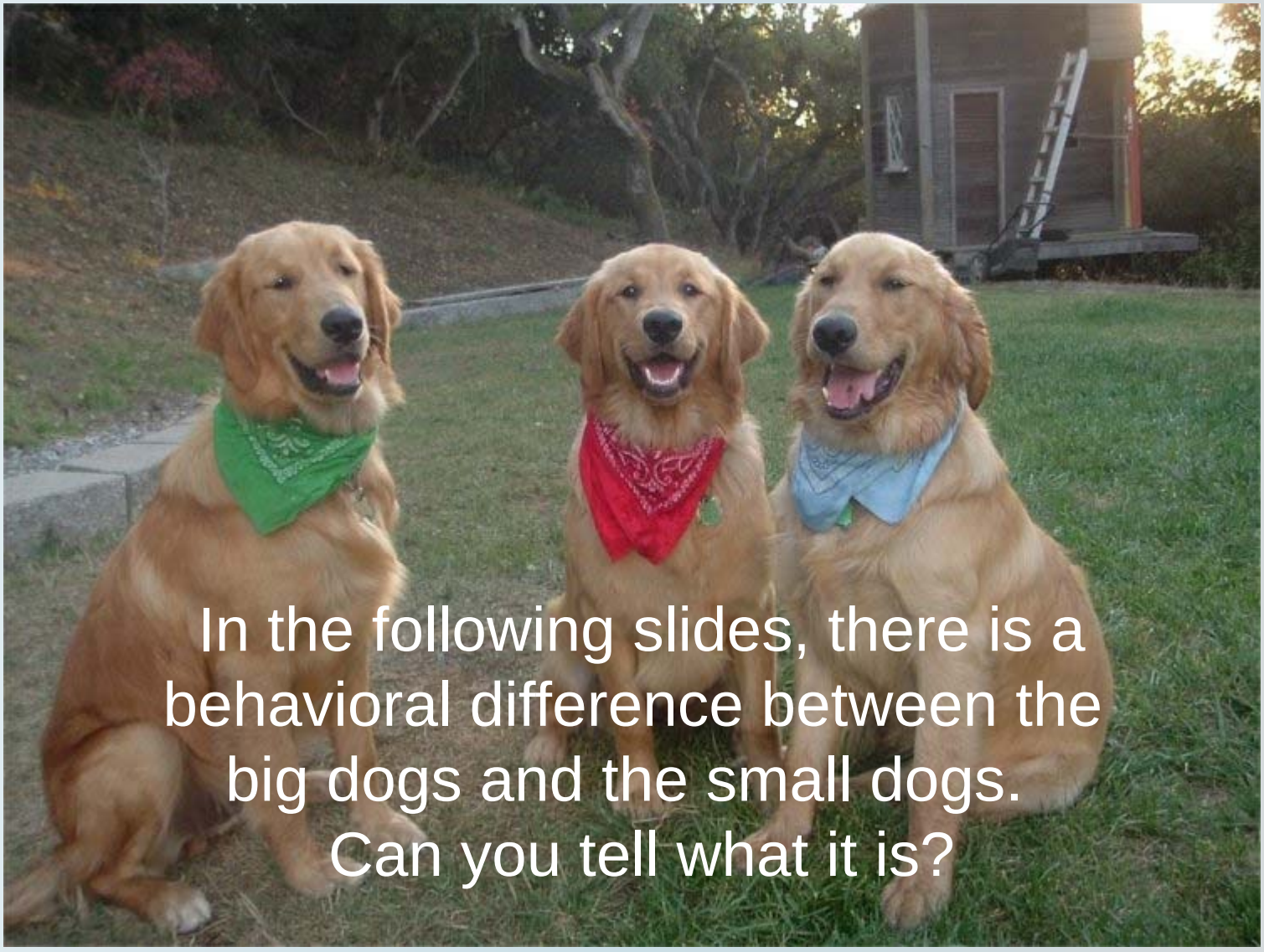

*Making It Happen Conference*

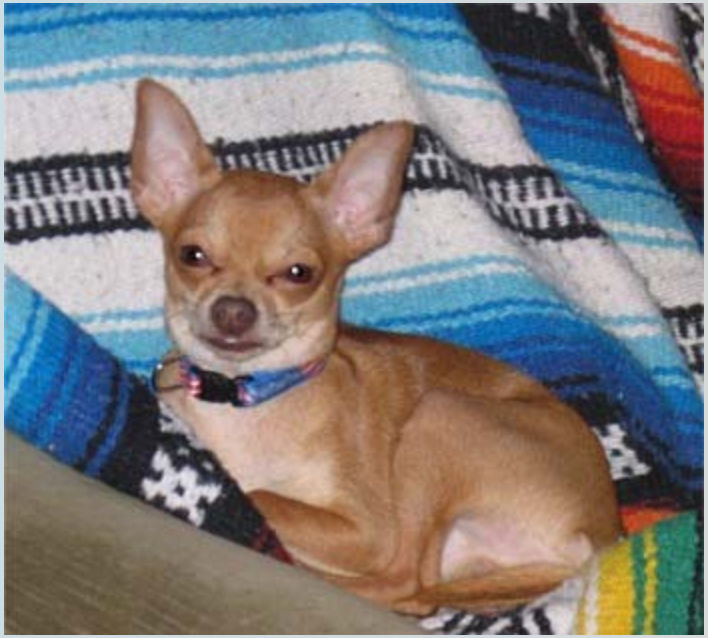
2016

WELCOME TO FRESNO STATE
FUTURE BULLDOGS!

Dr. Lance Burger
Mathematics Department
College of Science and Mathematics

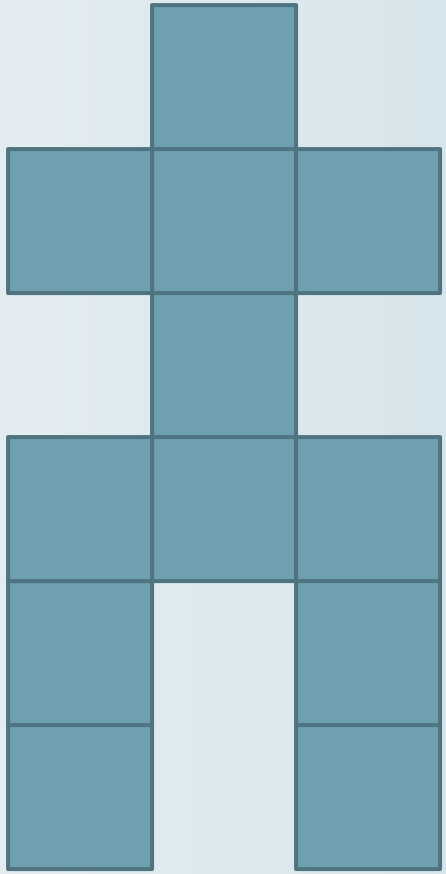

Could a bulldog this size really exist?
It is over 30 feet tall!


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

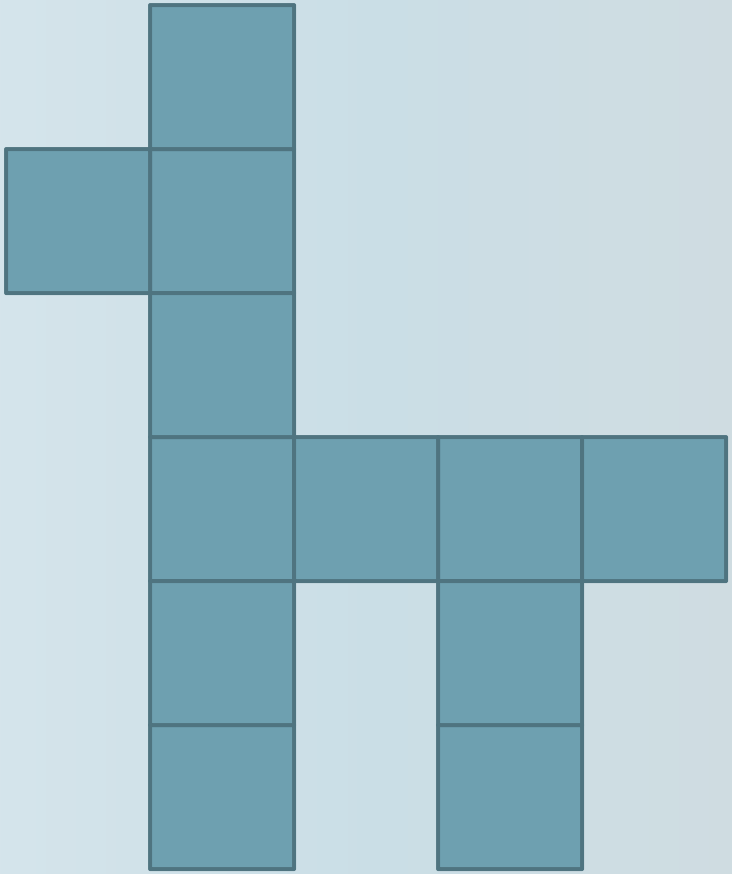



Packire.

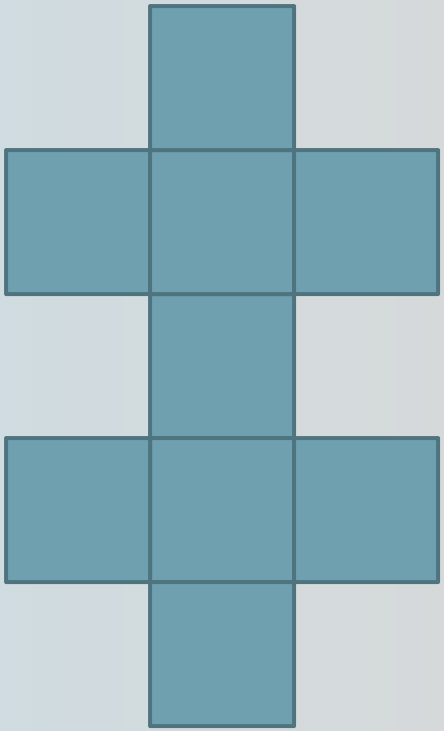
Q. Why do large dogs seem hot and pant more than small dogs?



FRONT & BACK

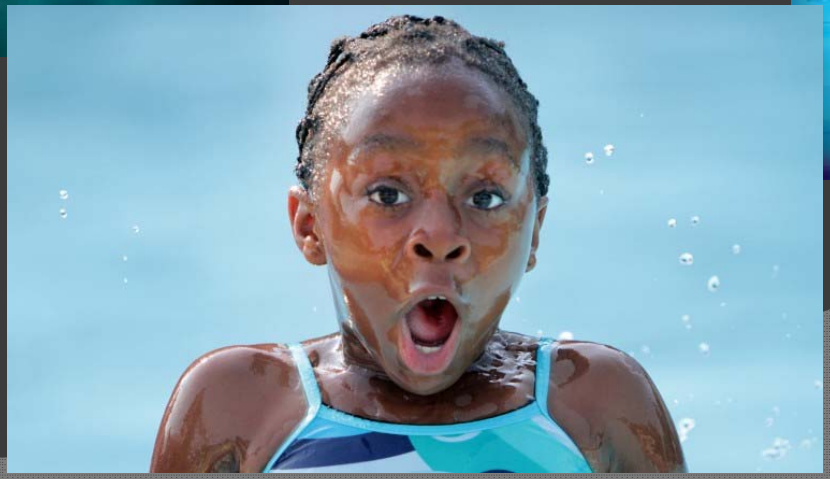


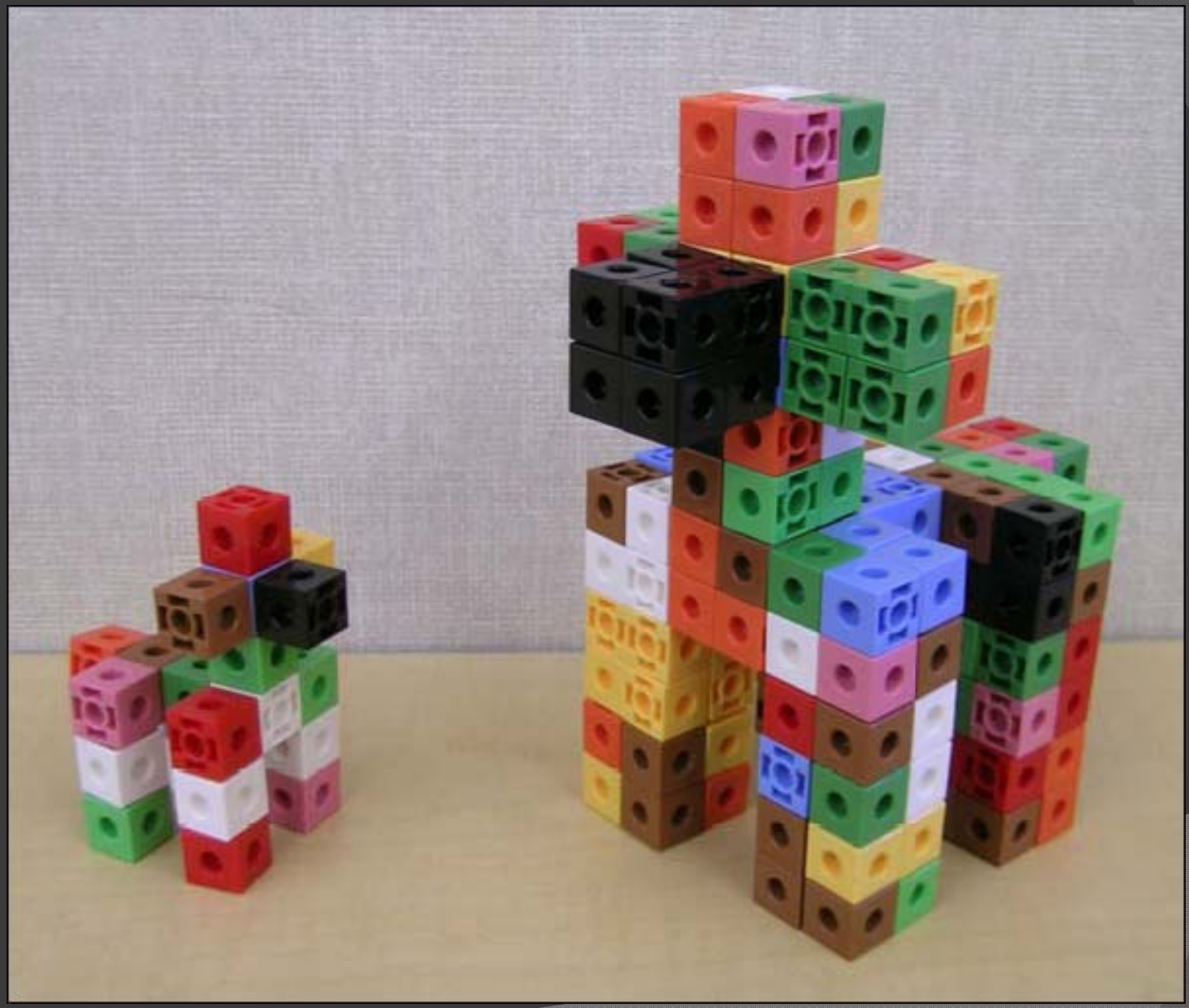
SIDES



TOP & BOTTOM

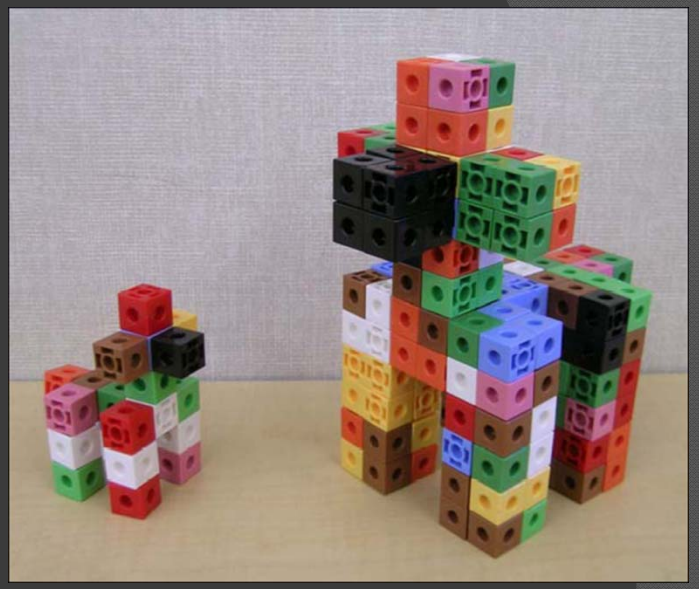

LittleFriendsPhoto.com





Puppy Surface Area = $90u^2$

Puppy Volume = $22u^3$



Doubled-Dog Surface Area = $4 \cdot 90 = 360u^2$

Doubled-Dog Volume = $8 \cdot 22 = 176u^3$

- 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!


Surface Area → think ‘Skin and Cooling’

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

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

$$= \frac{\frac{1}{2} \cdot SA_{small}}{V_{small}}$$

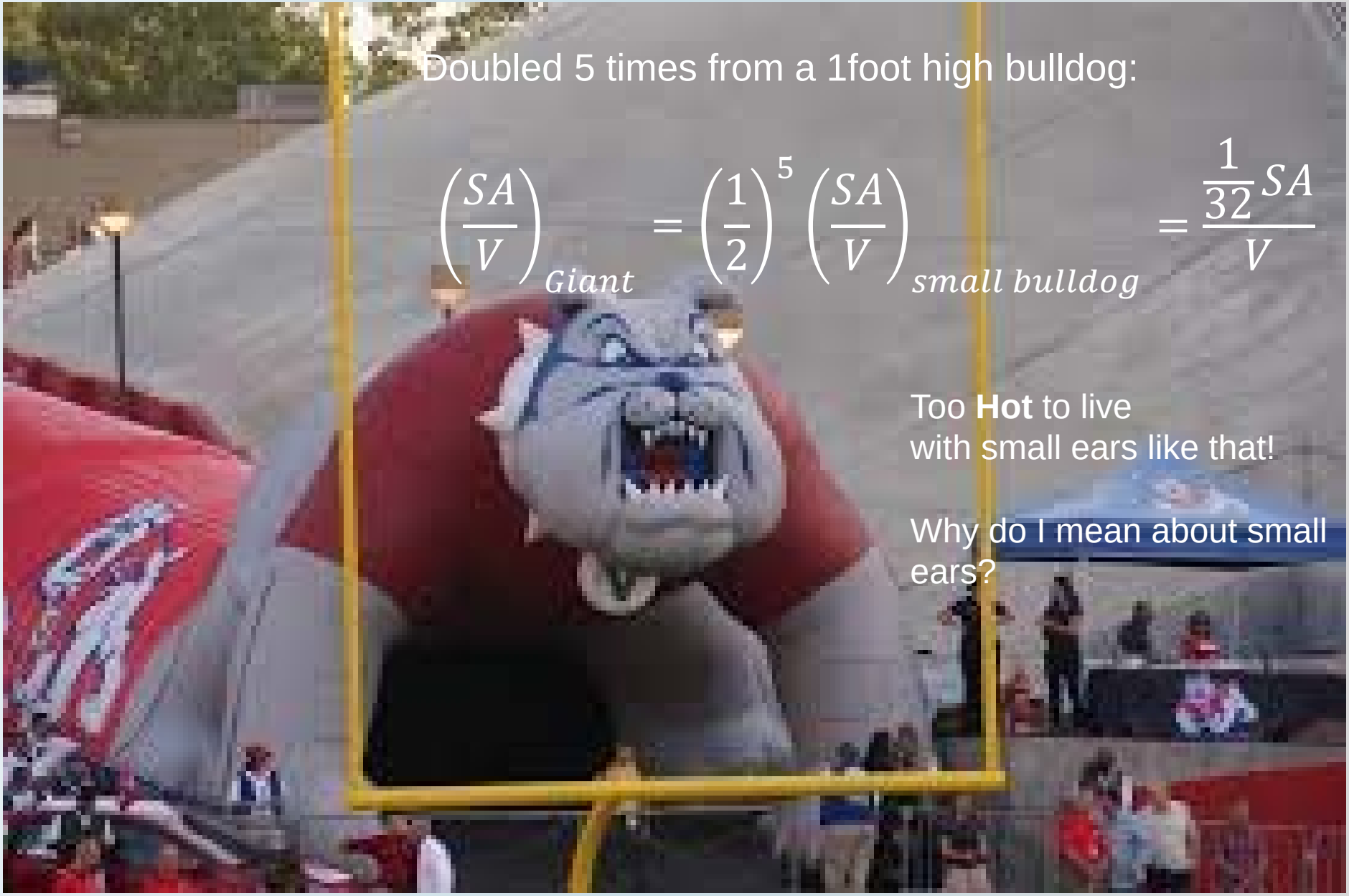
$$\left(\frac{1}{m}\right)^n \left(\frac{S}{V}\right)_{old} = \left(\frac{S}{V}\right)_{new}$$

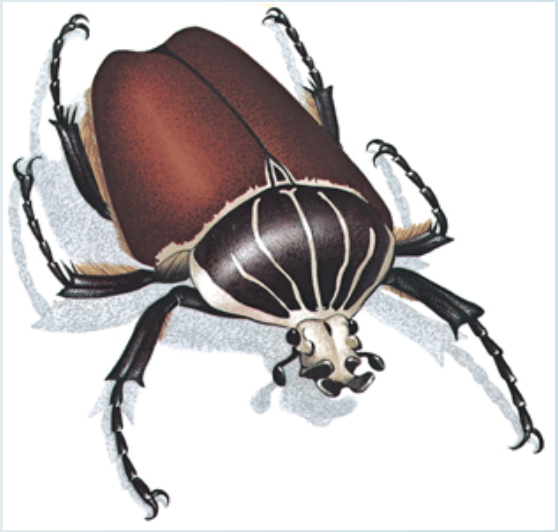
Doubled twice!

A doggy doubled twice has $\frac{1}{4}th$ the s
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:
$\left(\frac{SA}{V}\right)_{Giant} = \left(\frac{1}{2}\right)^5 \left(\frac{SA}{V}\right)_{small\ bulldog} = \frac{\frac{1}{32}SA}{V}$
Too **Hot** to live
with small ears like that!
Why do I mean about small ears?



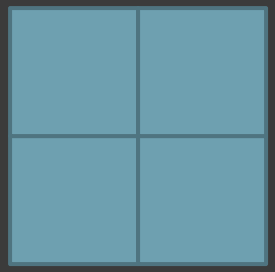
$$\left(\frac{SA}{V}\right)_{large} = \frac{360u^2}{176u^3} = \frac{4\cdot 90u^2}{8\cdot 22u^3} = \frac{1}{2}\cdot\left(\frac{SA}{V}\right)_{small} = \frac{\frac{1}{2}\cdot SA_{small}}{V_{small}}$$

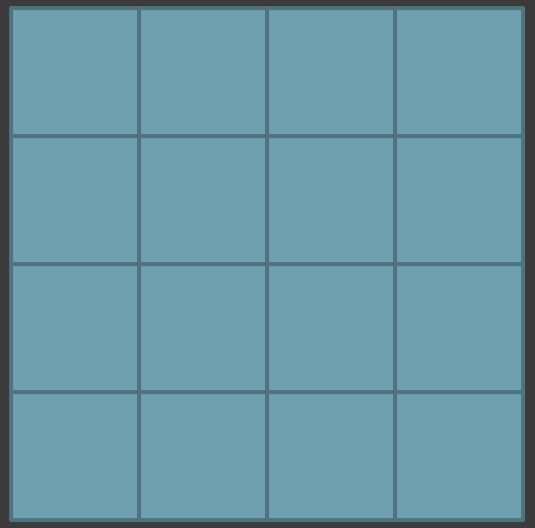
p=8
a=4

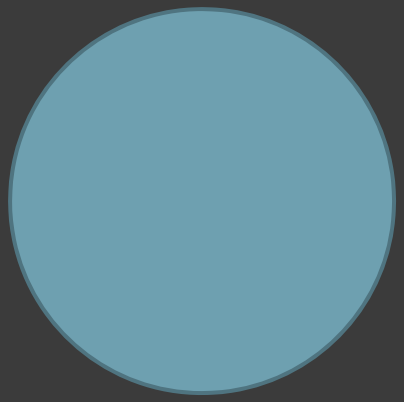
P=16
A=16

p/a=2/1

P/A=1/1





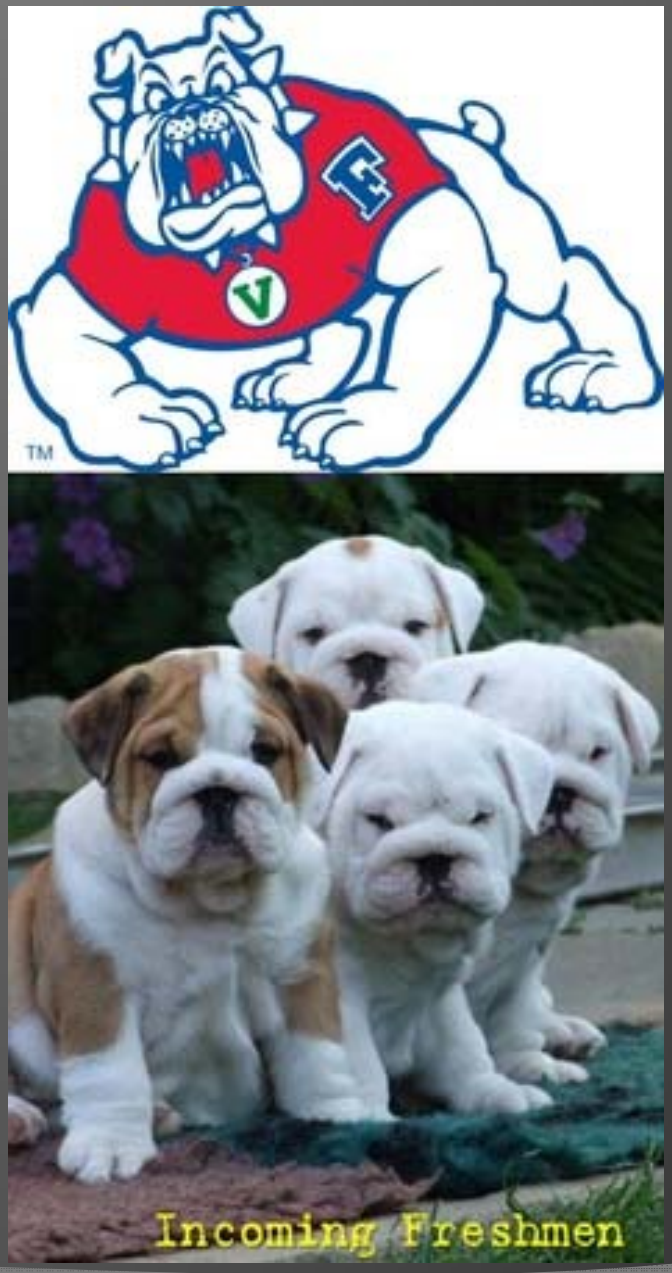


c=2(pi)r  C=2(pi)2r
a=(pi)r^2

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!

FRESNO STATE

Discovery. Diversity. Distinction.