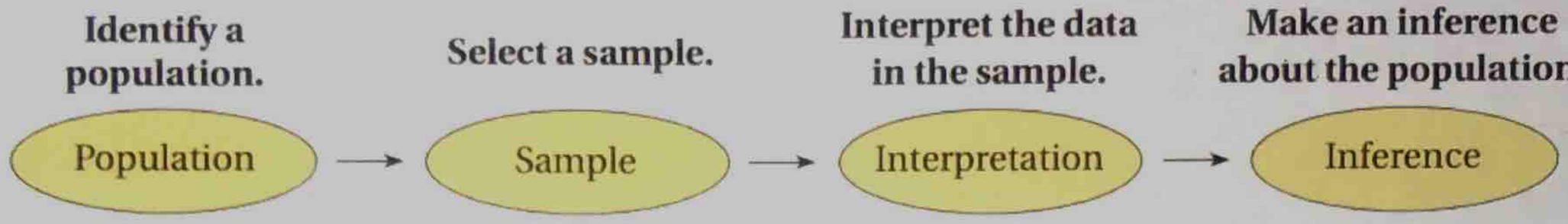
10.6 Samples and Populations

population – an entire group of people or objects

sample – a part of the population; used to make an inference, or conclusion, about a population



WHY WOULD YOU WANT TO USE A SAMPLE INSTEAD OF THE ENTIRE POPULATION WHEN COLLECTING DATA?

There are many ways to select a sample from a population. To make valid inferences about a population, you must choose a **random sample** very carefully so that it accurately represents the population.

unbiased sample – representative of the population, selected at random and is large enough to provide accurate data

biased sample – not representative of the population, one or more parts of the population are favored over others

Ex 1: Identify the population and the sample

a.

The students in a school

pop

The students in a math class

sample

b.

The grizzly bears with GPS collars in a park

sample

The grizzly bears in a park

pop

c.

150 quarters

sample

All quarters in circulation

pop

d.

All books in a library

pop

10 fiction books in a library

sample

Determine which one is a **random sample**.

Ex 2: You want to know the favorite extracurricular activity of students at your school.

a. You ask members of the school band.

b. You publish a survey in the school newspaper.

c. You ask every eighth student who enters the school in the morning.

d. You ask students in your class.

Ex 3: You want to estimate the number of students in a high school who ride the school bus.

(A) 4 students in the hallway

(B) all students in the marching band

(C) 50 seniors at random

(D) 100 students at random during lunch

Ex 4: You want to know how the residents of your town feel about adding a new stop sign. Determine whether each conclusion is valid.

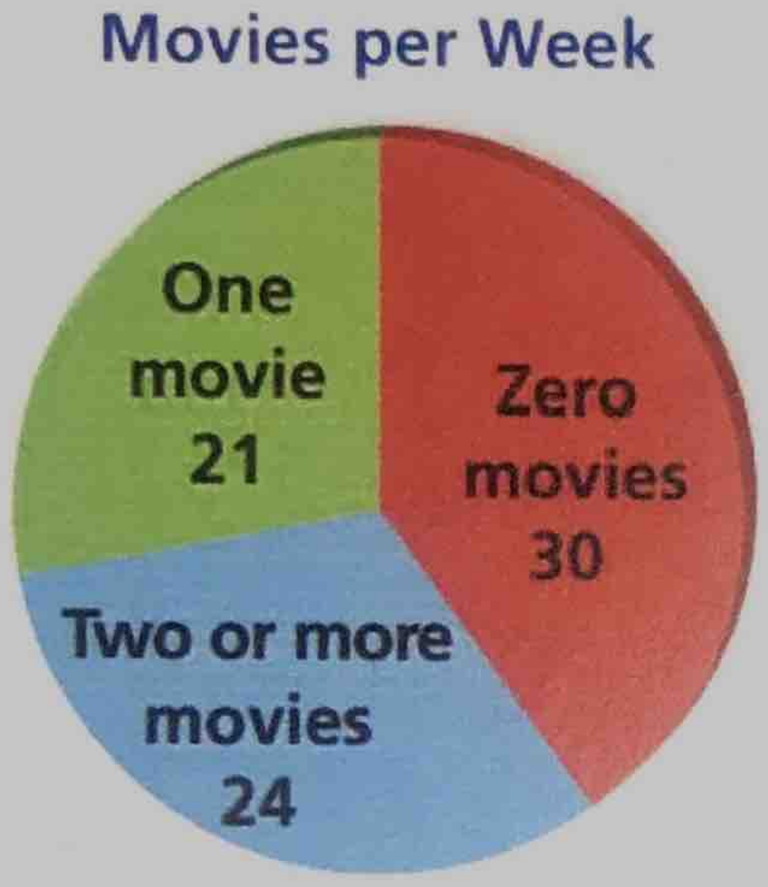
a. You survey the 20 residents who live closest to the new sign. Fifteen support the sign, and five do not. So, you conclude that 75% of the residents of your town support the new sign.

conclusion not valid b/c sample biased

b. You survey 100 residents at random. Forty support the new sign, and sixty do not. So, you conclude that 40% of the residents of your town support the new sign.

valid conclusion

Ex 5: You ask 75 randomly chosen students how many movies they watch each week. There are 1200 students in the school. Predict the number of students in the school who watch one movie each week.



(sample) (population)

Ⓢs watch 1 movie / all Ⓢs = Ⓢs watch 1 movie / all Ⓢs

$\frac{21}{75} = \frac{X}{1200}$

$X = 336$ students