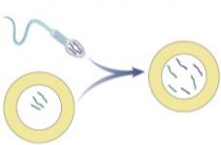




Probability & Genetics



Genetics & Probability

- Mendel's laws:
 - segregation
 - independent assortment

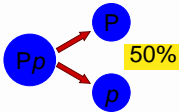
reflect same laws of probability that apply to tossing coins or rolling dice



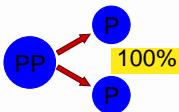
AP Biology

Probability & genetics

- Calculating probability of making a specific gamete is just like calculating the probability in flipping a coin



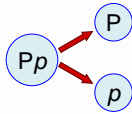
- probability of tossing heads? 50%
- probability making a P gamete...



AP Biology

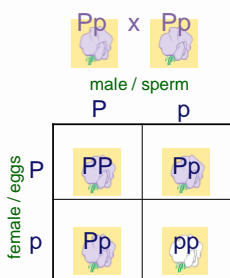
Probability & genetics

- Outcome of 1 toss has no impact on the outcome of the next toss
 - probability of tossing heads each time? 50%
 - probability making a P gamete each time? 50%



AP Biology

Calculating probability



sperm	egg	offspring
P 1/2	P 1/2	PP 1/4
P 1/2	p 1/2	Pp 1/4
p 1/2	P 1/2	Pp 1/4
p 1/2	p 1/2	pp 1/4

AP Biology

Rule of multiplication

- Chance that 2 or more independent events will occur together
 - probability that 2 coins tossed at the same time will land heads up

$$1/2 \times 1/2 = 1/4$$
 - probability of Pp x Pp → pp

$$1/2 \times 1/2 = 1/4$$

AP Biology

Calculating dihybrid probability

- Rule of multiplication also applies to dihybrid crosses
 - heterozygous parents — YyRr
 - probability of producing yyrr?
 - probability of producing y gamete = 1/2
 - probability of producing r gamete = 1/2
 - probability of producing yr gamete = $1/2 \times 1/2 = 1/4$
 - probability of producing a yyrr offspring = $1/4 \times 1/4 = 1/16$

AP Biology

Rule of addition

- Chance that an event can occur 2 or more different ways
 - sum of the separate probabilities
 - probability of Pp x Pp → Pp

sperm	egg	offspring	
P	p	Pp	1/4
1/2	x 1/2	= 1/4	
p	P	Pp	+ 1/4
1/2	x 1/2	= 1/4	<hr/> 1/2

AP Biology
