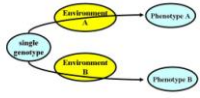




5.5 Environmental Effects on Phenotype

PHENOTYPIC PLASTICITY

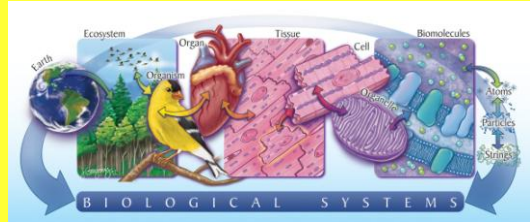


design courtesy of Chuck Finn



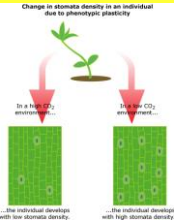
ENDURING UNDERSTANDING

SYI-3 Naturally occurring diversity among and between components within biological systems affects interactions with the environment.

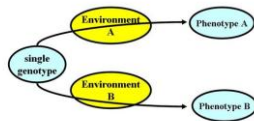


SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Environmental factors influence gene expression and can lead to phenotypic plasticity. Phenotypic plasticity occurs when individuals with the same genotype exhibit different phenotypes in different environments



PHENOTYPIC PLASTICITY



design courtesy of Chuck Finn

SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Height and weight in humans

WEIGHT lbs	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	
Age	46.5	47.7	50.0	52.3	54.5	56.8	59.1	61.4	63.8	65.9	68.2	70.5	72.7	75.0	77.3	79.5	81.9	84.1	86.4	88.6	90.9	92.9	95.5	97.7	
HEIGHT In/cm	Underweight	Healthy										Overweight										Obese	Extremely obese		
5'0" - 152.4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
5'1" - 154.9	19	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
5'2" - 157.4	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
5'3" - 160.0	17	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
5'4" - 162.5	17	18	18	19	20	21	22	23	24	24	25	26	27	29	30	31	31	32	33	34	35	36	37	38	
5'5" - 165.1	16	17	18	19	20	20	21	22	23	24	25	26	27	29	29	30	30	31	32	33	34	35	36	37	
5'6" - 167.6	15	17	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
5'7" - 170.1	15	16	17	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
5'8" - 172.7	15	16	16	17	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
5'9" - 175.2	14	15	16	17	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
5'10" - 177.8	14	15	16	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
5'11" - 180.3	14	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
6'0" - 182.8	13	14	14	15	16	17	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	34	
6'1" - 185.4	13	13	14	15	15	16	17	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	
6'2" - 187.9	12	13	14	14	15	16	17	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	
6'3" - 190.5	12	13	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	
6'4" - 193.0	12	12	13	14	14	15	16	17	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	

SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Flower color based on soil pH (ex: Hydrangea)



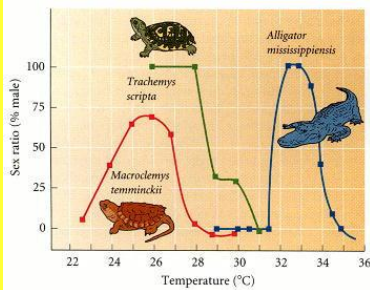
SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Seasonal fur color in arctic animals



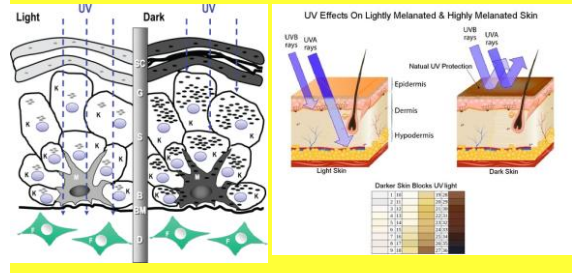
SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Sex determination in reptiles



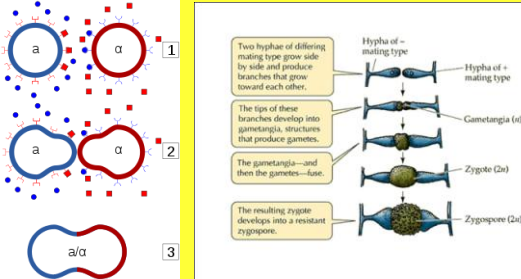
SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Effect of increased UV on melanin production in animals



SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Presence of the opposite mating type on pheromones production in yeast and other fungi



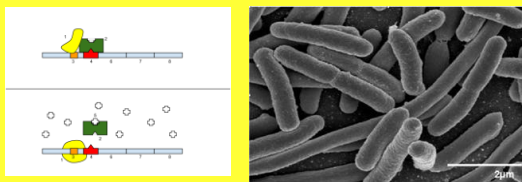
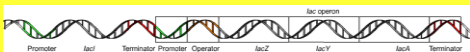
SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Density of plant hairs as a function of herbivory (ex: whitefly vs melon)



SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Effect of adding lactose to a Lac+ bacterial culture



SYI-3.B Explain how the same genotype can result in multiple phenotypes under different environmental conditions

- Ethylene levels cause changes in the production of different enzymes, allowing fruits to ripen.

