LESSON THREE **LAB 3.1 RAT FACTS - TEACHER KEY**

Student Name: _____ Date: _____

Rat Facts	
Common Name	**Scientific Name**
Norway rat, brown rat	*Rattus norvegicus*

Rat Biology

- Average weight: 400-500 g (~1 pound)
- Average length: 400 mm including tail
- Average life span: up to 3 years, but usually only live 1 year in the wild
- Diet: omnivorous (plants and animals)
- Front teeth (incisors) continue to grow throughout their life, must constantly chew to prevent overgrowth

Habits

- Live in extensive burrow system or under ground areas such as sewers
- Live in large hierarchical groups
- Good swimmers and diggers
- Do not climb as well as the Black rat (Rattus rattus)
- Nocturnal

Reproduction

- Max litter size: 14
- Average litter size: 7
- Gestation: 3 weeks (21 days)
- Up to 12 litters/year
- Weaned at 3 - 4 weeks
- Young are mature and can reproduce at 5 weeks (35 days) old

Geographical Distribution

- Worldwide, where ever humans live
- Believed to have originated in northern China
- Spread throughout world on ships

LAB 3.3.1 RAT MATH - TEACHER KEY

Student Name: _____ Date: _____

Rat Math							
Months	Pregnant Rats	Offspring	Male Offspring	Female Offspring	New Rat Population	Seabirds taken	Seabird Population
0	1				1	-	100,000
2	1	8	4	4	8*	2	99,998
4	4	32	16	16	40	16	99,984
6	20	160	80	80	200	80	99,920
8	100	800	400	400	1,000	400	99,600
10	500	4,000	2,000	2,000	5,000	2,000	98,000
12	2,500	20,000	10,000	10,000	25,000	10,000	90,000
14	12,500	100,000	50,000	50,000	125,000	50,000	50,000
16	62,500	500,000	250,000	250,000	625,000	250,000	0
18	312,500	2,500,000	1,250,000	1,250,000	3,125,000	1,250,000	0

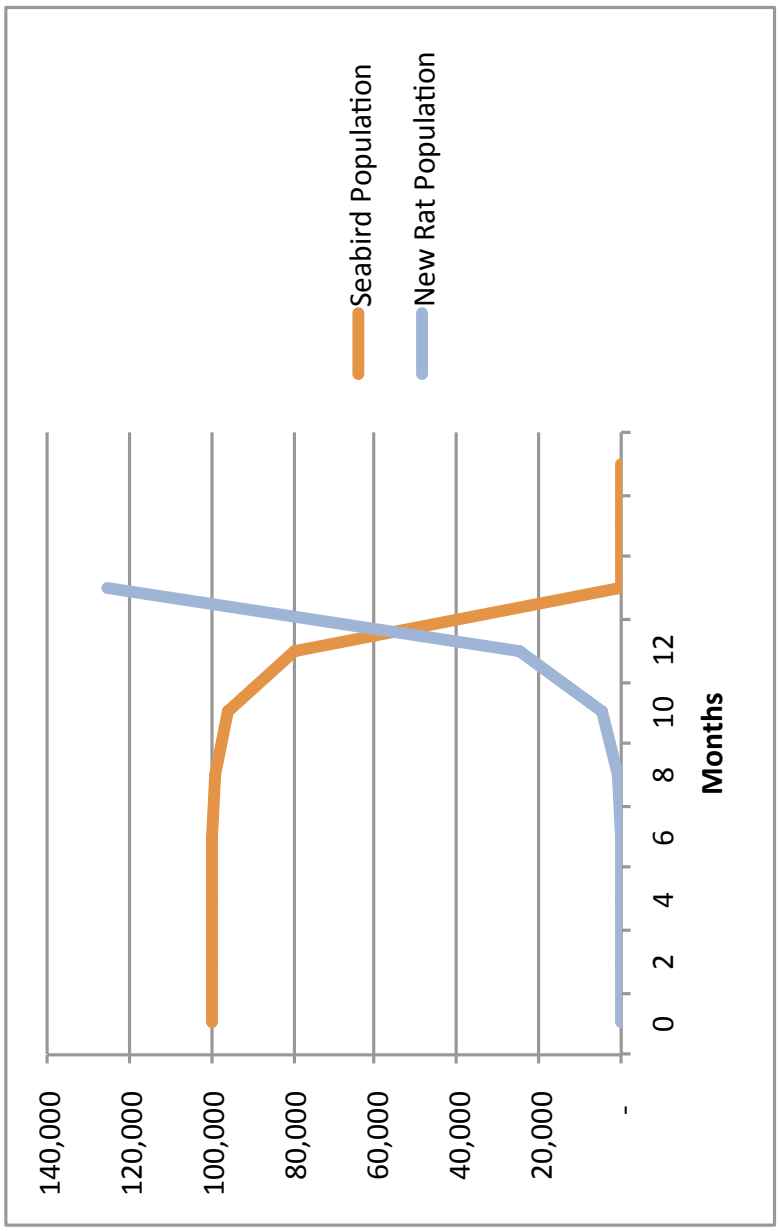
*Assume the original female rat dies after giving birth.

Instructions:

1. Start with one pregnant rat, assume she dies after raising her 8 offspring.
2. She has 8 offspring: 4 male, 4 female.
3. Rats reproduce every 2 months.
4. Each female rat has 8 babies (4 male, 4 female).
5. How many rats are on the island after one year?
6. For every adult rat 2 birds die.
7. On the island there are 100,000 seabirds.

Assumptions:

1. Every rat lives. No rats die.
2. Enough food for all the rats.
3. No new rats arrive. No rats leave.
4. No new birds arrive on the island.
5. None of the birds leave the island.


Seabird Population
New Rat Population
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
0
2
4
6
8
10
12
Months

LESSON THREE LAB 3.5 ADVANCED RAT MATH - TEACHER KEY

Rat invasion		Offspring				
Week	Adult Rat #	Immature females	Immature males	Mature females	Mature males	"Life Stage
Week 0	1	0	0	1	0	
Week 1	1	4	4	1	0	birth
Week 2	1	4	4	1	0	
Week 3	1	4	4	1	0	
Week 4	1	4	4	0	0	
Week 5	1	4	4	0	0	
Week 6	8	0	0	4	4	maturity
Week 7	8	0	0	4	4	
Week 8	8	0	0	4	4	
Week 9	8	16	16	4	4	birth
Week 10	8	16	16	4	4	
Week 11	8	16	16	4	4	
Week 12	8	16	16	4	4	
Week 13	8	16	16	4	4	
Week 14	40	0	0	20	20	maturity
Week 15	49	0	0	20	24	
Week 16	49	0	0	25	24	
Week 17	49	80	80	25	24	birth
Week 18	49	80	80	25	24	
Week 19	49	80	80	25	24	
Week 20	49	80	80	25	24	
Week 21	49	80	80	25	24	
Week 22	209	0	0	105	104	maturity
Week 23	249	0	0	125	124	
Week 24	249	0	0	125	124	
Week 25	249	420	420	125	124	birth
Week 26	249	500	500	125	124	
Week 27	249	500	500	125	124	
Week 28	249	500	500	125	124	
Week 29	249	500	500	125	124	
Week 30	1,089	0	0	545	544	maturity
Week 31	1,249	0	0	625	624	
Week 32	1,249	0	0	625	624	
Week 33	1,249	2,180	2,180	625	624	birth
Week 34	1,249	2,500	2,500	625	624	
Week 35	1,249	2,500	2,500	625	624	
Week 36	1,249	2,500	2,500	625	624	
Week 37	1,249	2,500	2,500	625	624	
Week 38	5,609	-	-	2,805	2,804	maturity

LAB 3.5 ADVANCED RAT MATH - TEACHER KEY

Rat invasion		Offspring				
Week	Adult Rat #	Immature females	Immature males	Mature females	Mature males	"Life Stage
Week 39	6,249	-	-	2,625	3,124	
Week 40	6,249	-	-	2,625	3,124	
Week 41	6,249	11,220	11,220	2,625	3,124	birth
Week 42	6,249	10,500	10,500	2,625	3,124	
Week 43	6,249	10,500	10,500	2,625	3,124	
Week 44	6,249	10,500	10,500	2,625	3,124	
Week 45	6,249	10,500	10,500	2,625	3,124	
Week 46	28,189	-	-	13,845	14,344	maturity
Week 47	30,749	-	-	15,125	12,624	
Week 48	30,749	-	-	15,125	12,624	
Week 49	30,749	55,380	55,380	15,125	12,624	birth
Week 50	30,749	60,500	60,500	15,125	12,624	
Week 51	30,749	60,500	60,500	15,125	12,624	
Week 52	30,749	60,500	60,500	15,125	12,624	
Week 53	30,749	60,500	60,500	15,125	12,624	
Week 54 or 1 Year	138,509	-	-	70,505	68,004	maturity