



The Lear's macaw is an endangered parrot species from South America. This species lives largely on palm fruits and nuts but also is sometimes found eating maize on farms, causing conflict with local farmers. They are now being bred in an international cooperative breeding program where they are reared by aviculturists who maintain large amounts of data on the birds. Though they are not visually dimorphic, male chicks tend to be larger than females so it is usually easy to determine sex by the chick's body mass.

In the Middle Eastern country of Qatar, Dr. Cromwell Purchase manages a breeding program for rare bird species such as the Lear's macaw at Al-Wabra Wildlife Preservation. He had reviewed the work of those before him and asked a question: *can the macaw chicks be handreared more efficiently and safely so that they wean at the same rate as when parent-reared?* After observing the behavioral differences between parent-reared and hand-reared birds, he made it his goal to produce birds that are not as tame or dependent on humans so that they will be more apt to socialize with other birds and breed. Dr. Purchase keeps daily records on weights to ensure the chicks are growing and maintaining a healthy body mass.

Your task: In small groups, review the data and do your best to make sense of it. Identify similarities and differences among the data and look for patterns. The numbers in yellow are weights on four (4) chicks that were raised with the previous handrearing protocol. The numbers in green are weights on four (4) chicks raised with Dr. Purchase's new handrearing protocol. What does this data tell you?

Before graphing, write your group's observations here. What do you see when observing the data?

Data Analysis: Plot the points on the graph provided and connect them with straight lines to view the growth rate of each chick. You can either make the lines for each chick different color or different patterns to easily differentiate them from each other.

Conclusions:

- 1) How are the chicks similar? _____

- 2) How are the chicks different? _____

- 3) Why do you think the numbers stop at different points for each chick? _____

- 4) There are differences between chicks that can help us determine their sex. Which are males and which are females? _____



Day	1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4
1	19.2	19.9	20	18	22.84	21.81	20.7	19.53
2	19.3	20.6	20	19.6	25.8	23.47	24.2	20.51
3	21.4	21.3	22.9	21.2	26.88	25.69	27.25	22.24
4	25.1	23.3	24.3	24.7	30.23	29.94	31.19	27
5	30.5	28.9	30.4	29.3	34.38	38.27	38.9	32.1
6	38.5	37.1	39.8	37.5	37.18	48.9	50.9	37.7
7	43.8	46.5	51	47.7	44.24	64	62.7	46
8	51.3	57.3	57.2	54.4	52.4	75.6	73.9	53.7
9	59.4	69.2	74	65.1	60.5	84.9	89.4	66.8
10	70.3	84.3	89.2	76	69	101.5	104.3	80.5
11	78.7	89.6	94.7	86.5	76.2	107.5	119.1	95.7
12	89.0	108	105	100	85.9	136.3	133.9	113.4
13	101.5	120.5	115	110	101.1	154.5	147.1	130
14	112.9	132.5	125	122	115.3	172	162.9	144.1
15	121.1	154	133	135	123.6	190.4	185.1	164.5
16	131.7	171	144	142	138.1	209.9	207.7	183.2
17	142	193	157	153	156.4	229.8	227.7	197.6
18	158	206	170	160	173.1	247.8	251.3	219.7
19	176	225	185	175	199.1	266.8	272.2	245.6
20	187	237	206	188	218	289.6	299.7	262.2
21	205	257	226	199	239.2	307.1	321.3	284.2
22	225	282	246	218	261.3	334.4	342.7	309.5
23	243	294	268	230	279	358.8	380.7	355.7
24	257	312	285	246	305.9	383.3	408.6	383
25	276	332	303	262	323.7	416	443.1	403.8
26	295	363	322	279	338.9	447.4	457	435
27	316	385	338	294	368.8	487.4	489.8	455
28	344	406	355	310	392.3	526.2	517.2	485.8
29	363	424	374	330	426.3	550	539.2	509.4
30	397	450	395	349	457	572.4	568.2	524
31	413	470	411	364	484	585.6	605.1	547.8
32	436	489	429	378	521	608.1	610	583.5
33	459	512	448	410	567	633.3	634.7	603.9
34	496	535	461	431	595.4	644	665.3	631.1
35	521	559	482	441	620.7	666.5	682	652.4

36	544	582	507	452	647.5	708.4	715.7	688.6
37	532	602	530	467	676.6	715.2	731.5	698.8
38	572	614	554	485	699.1	745.4	740.7	721.2
39	602	644	568	496	724.2	761.5	761	743
40	611	660	582	510	721	766	769.5	747.6
41	648	673	540	529	733.9	784	773.2	762
42	667	671	534	545	766	782.8	776	755
43	695	684	539	557	779.2	790	779.8	739.5
44	681	692	564	573	803	791	756.8	749.5
45	712	705	595	587	826.5	802.3	737	781
46	734	715	618	616	843.5	793.5	744.5	788
47	746	725	614	643	865.8	784	763	795
48	744	742	638	655	857	776.5	776	809
49	775	756	653	676	870	807	769	820
50	790	748	666	685	851.2	807	781	827
51	797	765	679	699	874.1	806	792	836
52	812	764	684	707	850	808	791	833
53	834	771	703	715	837.8	807	792	838
54	841	775	705	728	836.4	805	797	852
55	854	770	710	739	855	806	793	858
56	859	785	728	745	857.4	812	800	863
57	868	792	734	751	871.5	814	811	871
58	860	798	738	765	871	814	813	877
59	860	804	751	788	866	815	816	881
60	841	807	756	796	867	819	820	882
61	843	807	759	802	879	822	823	884
62	836	810	766	795	875	821	824	883
63	832	804	766	799	870	821	825	882
64	833	800	765	795	879	823	824	883
65	824	798	765	819	876	822	821	881
66	827	785	766	803	875	821	822	882
67	823	778	765	801	876	822	824	883
68	821	769	752	824	875	819	2821	881
69	823	774	741	809	873	820	819	879
70	817	760	720	806	871	819	818	877
71	811	763	711	805	872	817	818	877



72	812	747	716	802	868	815	816	872
73	808	745	719	799	866	812	811	874
74	807	748	714	793	865	811	812	873
75	808	752	714	789	863	809	811	871
76	809	748	716	783	865	804	809	869
77	810	746	734	793	862	801	806	865
78	817	739	728	775	862	799	806	866
79	818	752	721	794	860	796	801	864
80	810	753	719	778	861	792	799	862
81	809	738	738	782	860	791	796	861
82	801	737	737	780	861	788	794	860
83	803	752	733	777	859	784	791	860
84	792	739	730	756	860	778	788	854
85	801	732	725	757	856	780	781	851
86	796	733	731	751	852	776	782	853
87	790	735	719	742	850	775	779	851
88	783	735	726	717	844	776	776	846
89	781	730	713	713	842	770	775	842
90	775	721	709	717	840	767	769	839
91	767	719	716	690	835	762	769	838
92	760	713	709	697	833	760	762	830
93	751	710	714	695	829	761	763	831
94	743	713	711	677	829	761	763	832
95	741	694	714	672	830	759	762	831
96	732	694	695	682	829	758	762	830
97	728	699	708	670				
98	720	684	700	668				
99	713	680	685	659				
100	715	684	646	670				
101	714	676	665	655				
102	710	678	653	675				
103	711	673	650	674				
104	694	671	658	677				
105	702	670	653	665				
106	688	688	646	685				
107	710	685	645	684				

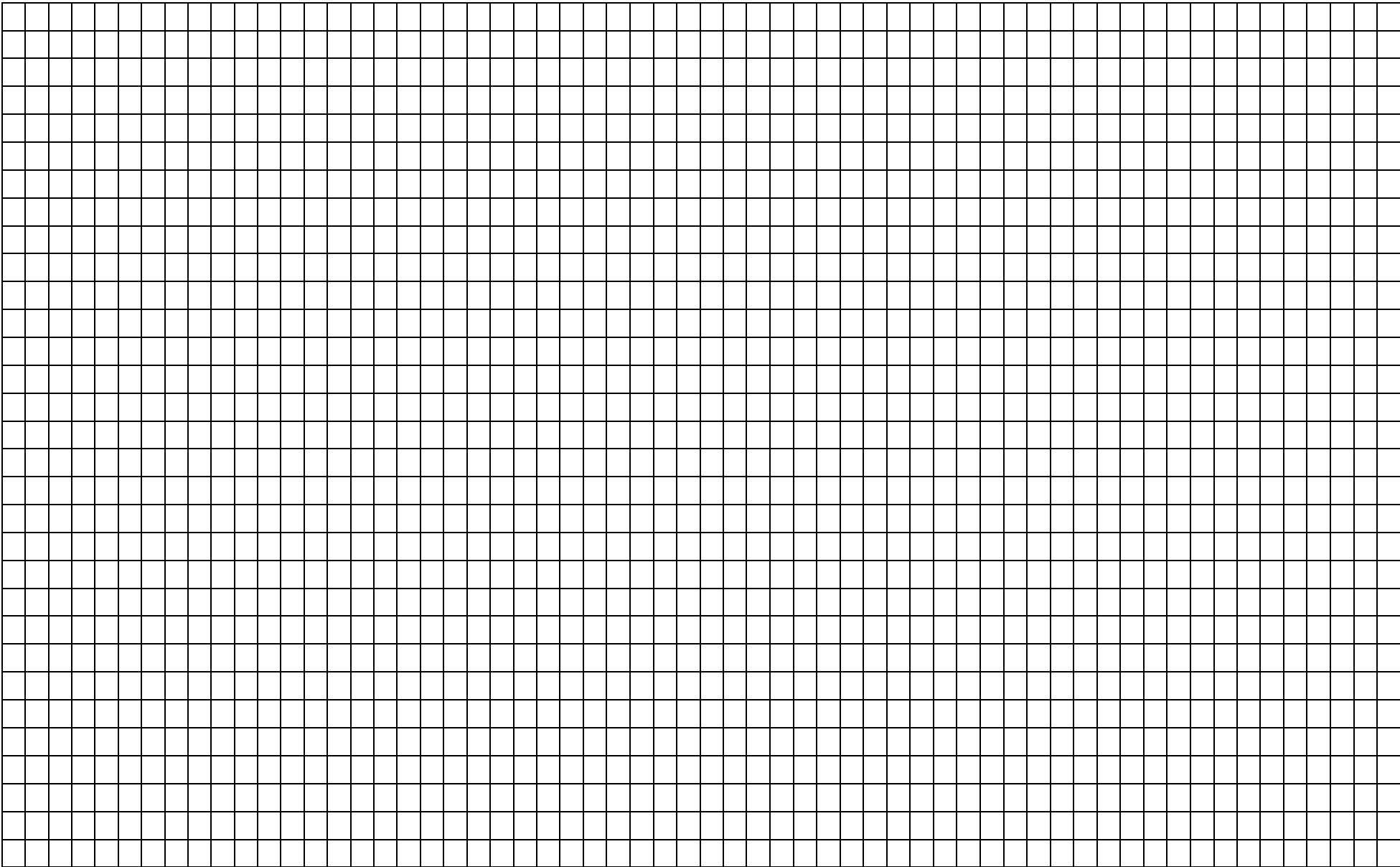
108	699	696	658	669				
109	706	685	643	661				
110	707	678	644	672				
111	703	710	640	678				
112	709	694	644	683				
113	700	696	668	669				
114	701	685	660	664				
115	710	713	668	662				
116	704	695	662	663				
117	705	706	658	665				
118	705	710	659	665				
119	698	706	686	671				
120	696	705	672	663				
121	699	719	665	659				
122	705	722	666	686				
123	714	702	666	671				
124	718	719	671	671				
125	725	730	670	662				
126	706	715	657	656				
127	715	718	659	665				
128		710	671	662				
129		700	640	664				
130		693	680	663				
131		706	674	657				
132		705	655	657				
133		712	676	664				
134		705	671	658				
135		730	666	669				
136		716	660	669				
137		711	665	660				
138		722	657	653				
139		709	664	660				
140		711	659	659				
141		703	658	667				
142		701	651	657				
143		701	653	675				



144		695	650	670				
145		689	649	654				
146		686	657	675				
147		683	659	670				
148		692	661	654				
149		685	650	653				
150		700	654	654				
151		697	647	653				
152		686	653	659				
153		680	651	657				
154		673	643	658				
155		685	668	657				
156		677	664	656				
157		667	644	663				
158		682	668	663				
159		672	664	653				
160		666	644	666				
161		682	642					
162		672	642					
163		666	641					
164		663	641					
165		664	645					
166		660	640					
167		670	637					
168		666	642					
169		670	642					
170		669	646					
171		672	628					
172		662	647					
173		667						
174		666						
175		670						



Graph – Be sure to assign even and equal increments on both the x-axis (time) and y-axis (weights).





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