

Carbon Pathway

Instructions: Imagine you are a carbon atom in one of many places that carbon is found. Write your starting location on the first line, roll the die, and determine your next location. Follow the instructions for the number you roll to move to another station or stay where you are.

What process was responsible for moving you from one carbon pool to another? Repeat this step and record in the table below what happens during each round. Make sure to record what happens, even if you have to stay at one station for more than one turn.

Round	Starting Location (Carbon Pool)	What happened?	Ending Location (Carbon Pool)
Example	Atmosphere	Photosynthesis	Tree
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

How Much Carbon Is in a Tree?

Metric Units

Directions: Use this table to find a rough estimate of the amount of carbon stored in a tree using the tree's diameter at breast height (DBH) and its height (H). The estimated amount of carbon is in pounds. Please note that some values are intentionally blank, as trees with the corresponding dimensions are unrealistic.

Diameter at Breast Height (in centimeters)

Tree Height (in meters)	Diameter at Breast Height (in centimeters)																	
	10	15	20	25	30	35	40	45	50	60	70	80	90	100	110	120	130	140
2.0	11	13	16	20	24	29	36	42	51	70	91	116	145	177	212	250	292	338
4.0	13	17	23	30	39	49	63	75	93	131	174	223	281	344	415	491	574	666
6.0	14	20	30	40	54	69	90	108	135	191	256	330	417	511	619	733	856	994
8.0	16	24	36	50	69	89	117	141	177	252	338	437	553	678	822	974	1,139	1,323
10	18	28	43	60	84	109	144	174	218	312	420	544	689	846	1,025	1,215	1,421	1,651
12	19	31	50	70	99	129	171	207	260	373	502	650	824	1,013	1,228	1,456	1,703	1,980
14	—	35	56	81	114	149	198	240	302	433	584	757	960	1,180	1,431	1,697	1,986	2,308
16	—	—	63	91	129	169	225	273	344	494	666	864	1,096	1,347	1,634	1,938	2,268	2,636
18	—	—	—	101	144	189	252	306	386	555	748	971	1,232	1,514	1,837	2,179	2,550	2,965
20	—	—	—	111	159	209	279	339	427	615	830	1,078	1,368	1,682	2,040	2,420	2,833	3,293
22	—	—	—	121	174	229	306	372	469	676	912	1,185	1,504	1,849	2,243	2,661	3,115	3,621
24	—	—	—	132	189	249	332	405	511	736	994	1,292	1,639	2,016	2,446	2,902	3,397	3,950
26	—	—	—	—	204	269	359	438	553	797	1,077	1,389	1,775	2,183	2,649	3,143	3,680	4,278
28	—	—	—	—	—	289	386	471	595	858	1,159	1,505	1,911	2,351	2,852	3,384	3,962	4,606
30	—	—	—	—	—	309	413	504	636	918	1,241	1,612	2,047	2,518	3,055	3,625	4,244	4,935
32	—	—	—	—	—	—	440	537	678	979	1,323	1,719	2,183	2,685	3,258	3,866	4,527	5,263
34	—	—	—	—	—	—	467	570	720	1,039	1,405	1,826	2,319	2,852	3,461	4,107	4,809	5,592
36	—	—	—	—	—	—	494	603	762	1,100	1,487	1,933	2,454	3,019	3,664	4,349	5,091	5,920
38	—	—	—	—	—	—	—	636	804	1,160	1,569	2,040	2,590	3,187	3,867	4,590	5,374	6,248
40	—	—	—	—	—	—	—	669	846	1,221	1,651	2,146	2,726	3,354	4,070	4,831	5,656	6,577
42	—	—	—	—	—	—	—	—	887	1,282	1,733	2,253	2,862	3,521	4,273	5,072	5,938	6,905
44	—	—	—	—	—	—	—	—	929	1,342	1,815	2,360	2,998	3,688	4,476	5,313	6,221	7,233
46	—	—	—	—	—	—	—	—	—	1,403	1,897	2,467	3,134	3,856	4,660	5,554	6,503	7,562
48	—	—	—	—	—	—	—	—	—	1,463	1,980	2,574	3,269	4,023	4,883	5,795	6,786	7,890

These estimates are based on the formula: M_c (mass of carbon in the tree) = $0.5 \times M_w$ (mass of the wood), where $M_w = 0.55 \times V$ (volume of tree) $\times D_w$ (density of wood); $V = 0.0567 \times 0.5074 \times (CBH)^2 \times H$. It assumes that $D_w = 0.6 \text{ g/cm}^3$, and that water makes up 45 percent of the tree's mass.



How Much Carbon Is in a Tree?

English Units

Directions: Use this table to find a rough estimate of the amount of carbon stored in a tree using the tree's diameter at breast height (DBH) and its height (H). The estimated amount of carbon is in pounds. Please note that some values are intentionally blank, as trees with the corresponding dimensions are unrealistic.

Diameter at Breast Height (in inches)

Tree Height (in feet)	Diameter at Breast Height (in inches)																	
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
5	21	24	27	32	39	47	56	67	80	93	109	125	142	162	183	205	229	255
10	22	26	34	44	57	73	92	114	139	167	197	231	265	304	346	391	439	490
15	23	29	40	56	75	99	128	161	198	239	285	336	387	446	509	576	648	724
20	24	32	47	67	94	126	164	207	257	313	374	441	509	588	672	762	858	960
25	24	35	53	79	112	152	199	254	316	385	462	546	631	729	834	947	1,067	1,194
30	25	38	60	91	130	178	235	301	375	458	550	651	753	870	997	1,132	1,276	1,428
35	—	41	67	102	148	204	271	347	434	531	639	756	875	1,013	1,160	1,318	1,486	1,664
40	—	—	73	114	166	231	307	394	493	604	727	861	997	1,154	1,322	1,503	1,694	1,898
45	—	—	—	126	185	257	342	441	553	677	815	966	1,120	1,296	1,486	1,689	1,904	2,133
50	—	—	—	137	203	283	378	487	611	750	903	1,071	1,242	1,438	1,648	1,873	2,113	2,368
55	—	—	—	149	222	310	415	535	672	825	994	1,179	1,366	1,583	1,815	2,063	2,327	2,608
60	—	—	—	161	239	336	450	581	730	896	1,080	1,281	1,486	1,721	1,974	2,244	2,532	2,837
65	—	—	—	—	258	362	485	627	789	969	1,168	1,386	1,608	1,862	2,136	2,429	2,741	3,071
70	—	—	—	—	—	388	521	674	848	1,042	1,256	1,491	1,730	2,005	2,300	2,615	2,951	3,307
75	—	—	—	—	—	415	557	721	907	1,115	1,345	1,596	1,852	2,146	2,462	2,800	3,159	3,541
80	—	—	—	—	—	—	592	767	966	1,188	1,433	1,701	1,974	2,287	2,624	2,985	3,368	3,775
85	—	—	—	—	—	—	628	814	1,025	1,261	1,521	1,806	2,096	2,430	2,788	3,171	3,578	4,011
90	—	—	—	—	—	—	664	861	1,084	1,333	1,609	1,911	2,218	2,571	2,950	3,355	3,787	4,245
95	—	—	—	—	—	—	—	908	1,143	1,407	1,698	2,017	2,341	2,713	3,113	3,541	3,997	4,480
100	—	—	—	—	—	—	—	954	1,202	1,479	1,786	2,121	2,462	2,854	3,276	3,726	4,206	4,714
105	—	—	—	—	—	—	—	—	1,261	1,552	1,874	2,226	2,584	2,996	3,438	3,911	4,414	4,949
110	—	—	—	—	—	—	—	—	1,321	1,625	1,962	2,332	2,707	3,138	3,601	4,097	4,625	5,184
115	—	—	—	—	—	—	—	—	—	1,698	2,050	2,436	2,829	3,279	3,764	4,282	4,833	5,418
120	—	—	—	—	—	—	—	—	—	1,771	2,139	2,542	2,951	3,422	3,927	4,468	5,043	5,654

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