

Total Gym® Incline Bodyweight Training

Notes Resistance training on Total Gym incline bodyweight trainers is a form of adaptive bodyweight training used to improve musculoskeletal health. By properly manipulating specific training variables (load, repetitions, sets, rest, frequency and order), the soft and osseous tissues of the body can adapt. The specific adaptations of the muscular system are increased strength, hypertrophy, muscular endurance and production of power. In addition to the muscular adaptations, Total Gym incline training also challenges dynamic stability and proprioceptive awareness. These additional variables can help improve balance, prevent injuries and preserve functional capacity.

Incline Plane Resistance

To better understand the effectiveness of Total Gym incline bodyweight training, it is important to appreciate the quantitative resistance that is generated by incline plane resistance. Gravity is always constant in its direction and force. Movement that is performed on an incline plane generally requires less force than movement performed directly against gravity. For example, a squat performed on an incline plane requires less force compared to a squat performed in a standing, upright position. This is also the case with exercises such as the push up and abdominal crunch. For example, a push up on the ground, which positions targeted muscle groups against the force of gravity, requires more force compared to a push up that is performed against a wall or on an incline plane.

Calculating the Resistance

As a gravitationally dependent apparatus (i.e. it relies on gravity for resistance), Total Gym incline bodyweight trainers use a universal constant to determine its exercise load. The force required to perform exercises on Total Gym incline trainers is dependent upon the weight of the glideboard and participant, and any friction between the rails and the glideboard wheels. With the quality of parts used on Total Gym models, this frictional resistance is insignificant compared to the force required to move the participant on the glideboard up the rails. To determine what this angular resistance may be (without pulleys), we can perform the following calculations:

- Determine the angle of the rails to the vertical floor (this allows us to determine the angle against gravity).
- Using the trigonometric function (sine) we can then transfer the angle of the rails into a formula that can determine the load (force) required (i.e. sine of 22° is .3746)
- Compute the exercise load (force) in pounds by using the formula: (Bodyweight (lbs.) + 37) x sine of the angle where 37 is the weight of the glideboard* (lbs.)

For example: A 150 lb. person is exercising at an angle of 22° (Level 16). The sine of 22° is .3746. Therefore the formula would be:

$$\begin{aligned} \text{Exercise load (lbs.)} &= (150 + 37) \times .3746 \\ &= 187 \times .3746 \\ &= 70 \text{ lbs.} \end{aligned}$$

This person requires approximately 70 pounds of force to move the glideboard at an angle of 22°, which would be approximately 47% of the total bodyweight. Note: if you are figuring exercises that incorporated the center pulley attached to the glideboard, use 50% of the charted number, e.g., 70 lbs x 50% = 35 lbs. or 23% bodyweight.

* Calculations based on adjustable glideboard weight of 37 lbs. Please refer to the appropriate resistance chart for the glideboard you are using (adjustable or standard).

Total Gym Incline Bodyweight Resistance Charts

The Resistance Chart for all models is the same except the Total Gym PowerTower® is the only model that can accommodate all the levels shown. The Total Gym GTS® has levels from F to 22. Level F stands for “Fold,” where the rails must be located to fold the Total Gym incline bodyweight trainer; however, it can also be used for exercise.

Total Gym incline bodyweight trainers are designed to load nominal percentages of bodyweight. Note each level changes by 2.5% of the 150 lb nominal bodyweight. See the resistance charts on the following pages.

All Total Gym incline bodyweight trainers use a variable angle incline plane to create exercise resistance by modifying the effect of the user’s bodyweight—a steeper angle normally generates more resistance. The Resistance Chart is calculated to indicate the resistance load at each level relative to a percentage of bodyweight.

If you desire to add weight to the glideboard it must be done by purchasing the optional Weight Bar and following the safety instructions provided with it and as listed below:

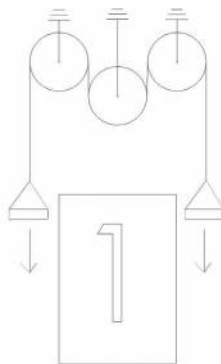
1. Plate weights with a nominal 1” bore can be added to the Weight Bar as long as the size and quantity does not interfere with the motion of the glideboard.
2. Any quantity and weight can be added to the Weight Bar as long as the total weight including the user’s bodyweight does not exceed 650 lb or 295 kg.
3. The plate weights must be equally loaded on each side and secured on the ends with a clamp before use.
4. The person exercising should face the equipment at all times during the exercise. The weights on the Weight Bar should remain within the field of vision of the user throughout the exercise to prevent danger to a third party.

Resistance Charts can be found on the following pages (44-45). Charts for both pounds and kilograms have been provided.

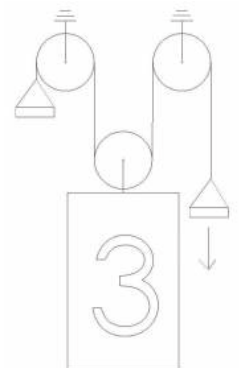
Resistance values based on cable usage

Resistance table values should be divided by appropriate value based on cable connection and pull usage as shown below.

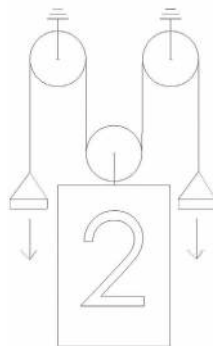
1. Tables values are valid for two-hand pulls on the bars, squats and pulley handles, while there is no connection to the glideboard.



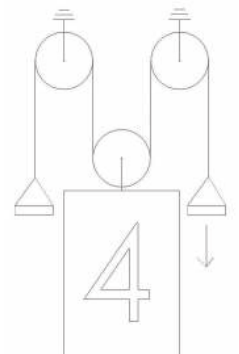
3. Divide Resistance Table value by 3 for unilateral movements or when using only one handle with the center pulley connected to the glideboard and when the other handle is not held.



2. Divide Resistance Table value by 2 for bilateral or two-hand pulls while the center pulley is connected to the glideboard.



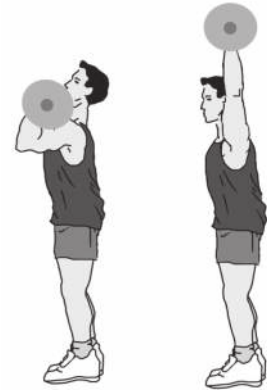
4. Divide Resistance Table value by 4 for unilateral movement with one static hold, i.e., hold one handle stationary while pulling with the other handle while the center pulley is connected to the glideboard.



Notes | A Comparative Example of Force

As previously determined, force is measured in pounds or kilograms on Total Gym® incline bodyweight trainers. Force is the required exercise load to move the glideboard and participant up and down the incline ramp. Force answers the question “How much are you lifting?”

Compare two exercises that illustrate a 70 lb. force. In this example, a 70 lb. force has been produced by the participant to press the 70 lb. barbell vertically against gravity. It has been successfully lifted because the arms and shoulders generated a greater upward force.



In the following example, a 70 lb. force has been created by gravity's effect on a 150 lb. person on incline bodyweight trainer at an angle of 22° (Level 16). The sine of 22° is .3746. Therefore the formula would be:

$$\begin{aligned} \text{Force} &= (150 + 37) \times .3746 \\ &= 187 \times .3746 \\ &= \sim 70 \text{ lbs.} \end{aligned}$$



In both examples, the amount of force required to move the objects is the same. However, this does not take into consideration other important exercise conditions such as support, safety and enjoyment, which can vary greatly.

The Pulley System

Many exercises on Total Gym incline bodyweight trainers use handles that are attached to a pulley system via cables. With the use of this pulley system, the participant can perform numerous upper and lower body exercises with free motion cables. Determining the specific power required (or relative intensity of load) for each exercise as it relates to the resistance generated by this pulley system is complicated and beyond the spectrum of this workbook. However, it is important to appreciate that the force required to move the glideboard and participant along the incline is transferred and divided within the pulley system. When calculating the resistance for exercises that incorporate the pulley system, divide the external force required to move the glideboard by 2 (i.e. use 50% of total exercise resistance).

Example: A 50 lb. force required to move a 150 lb. person up an 17° ramp when using the pulley system (assuming both cables are used equally in identical directions). The total force required would be approximately 25 lbs. Therefore, the force requirement on each single pulley would be approximately 12.5 lbs.

Beginning position
 150 lb. person
 17° angle
 To move the glideboard, ~50 lbs. of force is required.

To use the pulley system bilaterally (both pulleys), total force required is 25 lbs.

To use the pulley system unilaterally (single pulley), total force required is 12.5 lbs.



↑ Bilateral



↑ Unilateral

Notes

Resistance Charts Adjustable Glideboard - Pounds (lbs)

Weight of Adjustable Glideboard: 37 lbs

Resistance in Pounds (lbs)

Degree of Incline	Incline Level	Your Bodyweight + Weights Added (lbs)									
		100	130	150	180	200	250	300	400	500	650
35.5°	26	79	96	108	125	137	166	195	253	311	398
34.1°	25	76	93	104	121	132	160	188	244	300	384
33.1°	24	74	90	101	118	129	156	183	238	292	374
31.6°	23	71	87	97	113	124	150	176	228	281	360
30.2°	22	68	83	93	108	118	144	169	219	269	345
28.7°	21	65	80	89	104	113	137	161	209	258	330
27.3°	20	62	76	85	99	108	131	154	200	246	315
25.9°	19	59	72	81	94	103	125	147	191	234	300
24.6°	18	56	69	77	90	98	119	139	181	223	285
23.2°	17	53	65	73	85	93	113	132	172	211	270
21.9°	16	51	62	69	80	88	106	125	162	199	255
20.5°	15	48	58	65	76	83	100	118	153	188	240
19.2°	14	45	54	61	71	78	94	110	143	176	226
17.9°	13	42	51	57	66	72	88	103	134	165	211
16.6°	12	39	47	53	62	67	82	96	124	153	196
15.3°	11	36	44	49	57	62	75	89	115	141	181
14.0°	10	33	40	45	52	57	69	81	106	130	166
12.8°	9	30	37	41	48	52	63	74	96	118	151
11.5°	8	27	33	37	43	47	57	67	87	107	136
10.2°	7	24	29	33	38	42	51	60	77	95	122
9.0°	6	21	26	29	34	37	45	52	68	84	107
7.7°	5	18	22	25	29	32	38	45	59	72	92
6.5°	4	15	19	21	24	27	32	38	49	60	77
5.2°	3	12	15	17	20	21	26	31	40	49	63
4.0°	2	9	12	13	15	16	20	23	30	37	48
2.8°	1	7	8	9	10	11	14	16	21	26	33
1.3°	F	3	4	4	5	5	6	7	10	12	15
		Resistance in Pounds (lbs)									

Resistance as % of Bodyweight (lbs)

Degree of Incline	Incline Level	Your Bodyweight + Weights Added (lbs)									
		100	130	150	180	200	250	300	400	500	650
35.5°	26	79	74	72	70	68	66	65	63	62	61
34.1°	25	76	71	69	67	66	64	63	61	60	59
33.1°	24	74	70	68	65	64	62	61	59	58	58
31.6°	23	71	67	65	63	62	60	59	57	56	55
30.2°	22	68	64	62	60	59	57	56	55	54	53
28.7°	21	65	61	60	58	57	55	54	52	52	51
27.3°	20	62	58	57	55	54	52	51	50	49	48
25.9°	19	59	56	54	52	52	50	49	48	47	46
24.6°	18	56	53	51	50	49	47	46	45	45	44
23.2°	17	53	50	49	47	46	45	44	43	42	42
21.9°	16	51	47	46	45	44	43	42	41	40	39
20.5°	15	48	45	43	42	41	40	39	38	38	37
19.2°	14	45	42	41	39	39	38	37	36	35	35
17.9°	13	42	39	38	37	36	35	34	33	33	32
16.6°	12	39	36	35	34	34	33	32	31	31	30
15.3°	11	36	34	33	32	31	30	30	29	28	28
14.0°	10	33	31	30	29	29	28	27	26	26	26
12.8°	9	30	28	27	26	26	25	25	24	24	23
11.5°	8	27	25	25	24	23	23	22	22	21	21
10.2°	7	24	23	22	21	21	20	20	19	19	19
9.0°	6	21	20	19	19	18	18	17	17	17	16
7.7°	5	18	17	17	16	16	15	15	14	14	14
6.5°	4	15	14	14	14	13	13	13	12	12	12
5.2°	3	12	12	11	11	11	10	10	10	10	10
4.0°	2	9	9	9	8	8	8	8	8	7	7
2.8°	1	7	6	6	6	6	6	5	5	5	5
1.3°	F	3	3	3	3	3	3	2	2	2	2
		Resistance as % of Bodyweight (lbs)									

Resistance Charts Adjustable Glideboard - Kilograms (kgs)

Weight of Adjustable Glideboard: 16.8 kgs

Resistance in Kilograms (kgs)

Degree of Incline	Incline Level	Your Bodyweight + Weights Added (kgs)									
		50	60	70	80	100	120	150	180	240	295
35.5°	26	38	44	50	56	67	79	96	114	149	181
34.1°	25	37	43	48	54	65	76	93	110	144	174
33.1°	24	36	42	47	53	63	74	91	107	140	170
31.6°	23	35	40	45	50	61	71	87	103	134	163
30.2°	22	33	38	43	48	58	68	84	99	129	156
28.7°	21	32	37	41	46	56	65	80	94	123	150
27.3°	20	30	35	40	44	53	63	76	90	118	143
25.9°	19	29	33	38	42	51	60	73	86	112	136
24.6°	18	28	32	36	40	48	57	69	82	106	129
23.2°	17	26	30	34	38	46	54	65	77	101	123
21.9°	16	25	28	32	36	43	51	62	73	95	116
20.5°	15	23	27	30	34	41	48	58	69	90	109
19.2°	14	22	25	28	32	38	45	55	65	84	102
17.9°	13	20	23	26	30	36	42	51	60	79	96
16.6°	12	19	22	25	27	33	39	47	56	73	89
15.3°	11	17	20	23	25	31	36	44	52	68	82
14.0°	10	16	18	21	23	28	33	40	48	62	75
12.8°	9	15	17	19	21	26	30	37	43	57	69
11.5°	8	13	15	17	19	23	27	33	39	51	62
10.2°	7	12	14	15	17	21	24	29	35	45	55
9.0°	6	10	12	13	15	18	21	26	31	40	49
7.7°	5	9	10	12	13	16	18	22	26	34	42
6.5°	4	7	9	10	11	13	15	19	22	29	35
5.2°	3	6	7	8	9	11	12	15	18	23	28
4.0°	2	5	5	6	7	8	10	12	14	18	22
2.8°	1	3	4	4	5	6	7	8	9	12	15
1.3°	F	1	2	2	2	3	3	4	4	6	7
Resistance in Kilograms (kgs)											

Resistance as % of Bodyweight (kgs)

Degree of Incline	Incline Level	Your Bodyweight + Weights Added (kgs)									
		50	60	70	80	100	120	150	180	240	295
35.5°	26	77	74	71	70	67	66	64	63	62	61
34.1°	25	74	71	69	67	65	64	62	61	60	59
33.1°	24	72	69	67	66	63	62	61	60	58	58
31.6°	23	69	67	65	63	61	60	58	57	56	55
30.2°	22	67	64	62	60	58	57	56	55	54	53
28.7°	21	64	61	59	58	56	55	53	52	51	51
27.3°	20	61	58	57	55	53	52	51	50	49	48
25.9°	19	58	56	54	53	51	50	48	48	47	46
24.6°	18	55	53	51	50	48	47	46	45	44	44
23.2°	17	52	50	49	47	46	45	44	43	42	42
21.9°	16	49	47	46	45	43	42	41	41	40	39
20.5°	15	46	45	43	42	41	40	39	38	37	37
19.2°	14	44	42	41	40	38	37	36	36	35	35
17.9°	13	41	39	38	37	36	35	34	33	33	32
16.6°	12	38	36	35	34	33	32	32	31	30	30
15.3°	11	35	34	33	32	31	30	29	29	28	28
14.0°	10	32	31	30	29	28	28	27	26	26	26
12.8°	9	29	28	27	27	26	25	24	24	24	23
11.5°	8	26	25	25	24	23	23	22	22	21	21
10.2°	7	24	23	22	21	21	20	20	19	19	19
9.0°	6	21	20	19	19	18	18	17	17	17	16
7.7°	5	18	17	17	16	16	15	15	15	14	14
6.5°	4	15	14	14	14	13	13	13	12	12	12
5.2°	3	12	12	11	11	11	10	10	10	10	10
4.0°	2	9	9	9	8	8	8	8	8	7	7
2.8°	1	6	6	6	6	6	5	5	5	5	5
1.3°	F	3	3	3	3	3	3	2	2	2	2
Resistance as % of Bodyweight (kgs)											