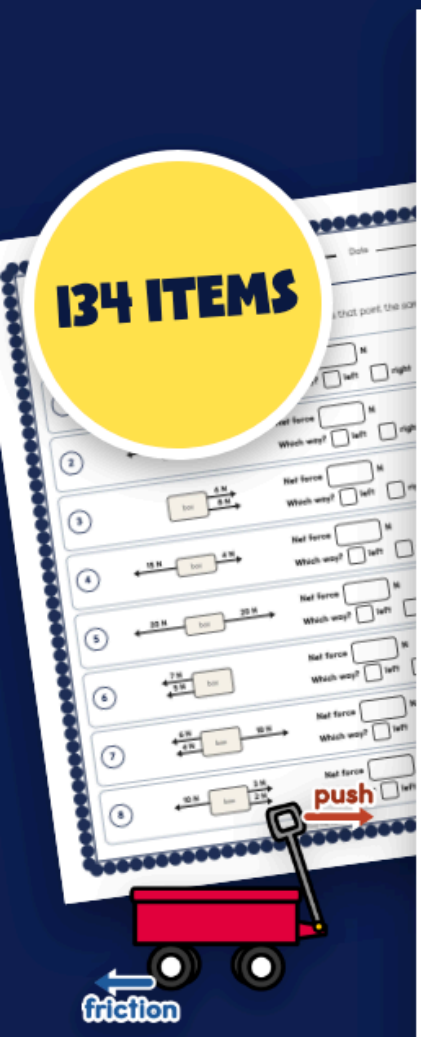
NET FORCE

BALANCED AND UNBALANCED FORCES - GRADES 6-8

134 ITEMS

42 PAGES



My name _____ Date _____

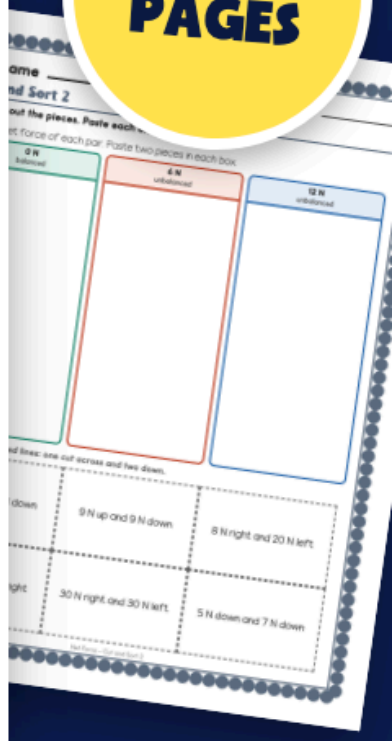
Balanced or Unbalanced?

Look at the arrows. Is it balanced? Will it accelerate?

Look at the size and direction of every arrow. Forces are in newtons (N) and are made up.

1. 12 N | box | 12 N
   ☐ balanced ☐ unbalanced
   Will it accelerate? ☐ yes ☐ no
2. 9 N | box | 15 N
   ☐ balanced ☐ unbalanced
   Will it accelerate? ☐ yes ☐ no
3. 4 N | box | 7 N (up), 7 N (down), 4 N
   ☐ balanced ☐ unbalanced
   Will it accelerate? ☐ yes ☐ no
4. 20 N | box | 8 N
   ☐ balanced ☐ unbalanced
   Will it accelerate? ☐ yes ☐ no
5. box | 16 N (up), 10 N (down)
   ☐ balanced ☐ unbalanced
   Will it accelerate? ☐ yes ☐ no
6. 11 N | box | 6 N, 5 N
   ☐ balanced ☐ unbalanced
   Will it accelerate? ☐ yes ☐ no
7. 3 N, 2 N | box | 7 N
   ☐ balanced ☐ unbalanced
   Will it accelerate? ☐ yes ☐ no
8. box | 8 N, 3 N (up), 14 N (down)
   ☐ balanced ☐ unbalanced
   Will it accelerate? ☐ yes ☐ no

Net Force - Balanced or Unbalanced?



Bright Path Sped

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- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- Every name line, answer box, check box and ruled box on the student pages is a type-in field, and so are the tracker and the other record pages. You can also print any page and write by hand.
- It works offline, with no account needed.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart and the cut pieces stay the size the pages say. Balanced is green, unbalanced is orange-red and two directions is blue, and every box also carries the word, so a black and white copy reads too.

Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder.

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PREVIEW

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Teacher Notes

The parts of a student page, the page types in order, and a few teaching notes.

The parts of a page

- **The arrow diagram.** A labeled box with an arrow for each force. The number beside an arrow is its size in newtons (N). A longer arrow is a bigger force.
- **The answer box.** A bordered box. Click it to type, or print and write in it.
- **The check box.** Left, right, up, down or none; balanced or unbalanced; yes or no; true or false; the quiz choices.
- **The ruled work box.** Lines 0.34 inch apart, one idea to a line.
- **The cut lines.** Mats 1 and 2: 6 pieces in 3 across by 2 down, each 2.4 by 1.46 inches. Mat 3: 10 pieces, 5 across by 2 down, each 1.46 by 1.18 inches. Edge to edge.

Page type	What it looks like	What the student does
Balanced or Unbalanced?, Force Words	2 pages, 6 items	Side-by-side comparison with arrow diagrams, then six words to match.
Read: four short readings	4 pages, 20 items	Net force, balanced, unbalanced, forces and motion; choose or write.
Worked Example	1 page, 3 items	Four steps on one diagram, then a Your Turn.
Find the Net Force 1 and 2	2 pages, 14 items	Read the arrows, find the net force, check the direction.
Balanced or Unbalanced?, Missing Force	2 pages, 14 items	Classify each box, say if it accelerates; find a missing force.
Two Directions 1 and 2	2 pages, 10 items	Net force left-right and up-down on the same box.
Word Problems 1 and 2	2 pages, 8 items	Invented scenarios with room to show work.
Fix It 1 and 2	2 pages, 10 items	True or false; rewrite each false statement.
Claim, Evidence, Reasoning 1 and 2	2 pages, 12 items	Four short scenarios with invented numbers.
Quiz, Short Answer	2 pages, 15 items	Ten choices, then five written answers.

Two steps, marked by a shape

- **Circle.** Balanced or Unbalanced? (page 14) and Two Directions 1 (page 16).
- **Triangle.** Two Directions 2 (page 17): different numbers, the same steps.

Teaching notes

- Say it every day: **same way, add. Opposite ways, subtract.** The net force points the way of the bigger force.
- Students often think a moving object must have an unbalanced force. The steady-speed items ask them to check the net force instead: 0 N means the motion does not change.
- The forces here are written in plain words, never as an equation sheet. Newton's first and second laws are stated simply on page 10.
- All forces are invented for practice. No lab procedure is included; follow your own school's lab rules.

PREVIEW

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My name _____ Date _____

Balanced or Unbalanced?



Read about balanced and unbalanced forces. Keep this page next to you.

Memory help: forces in the **same** direction, **add**. Forces in **opposite** directions, **subtract**. Net force 0 N means **balanced**.

Balanced

Forces equal in size, opposite in direction.
Net force 0 N.
Motion does not change.
Example 10 N right and 10 N left.



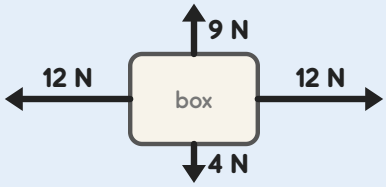
Unbalanced

Forces not equal, or not opposite.
Net force big minus small, pointing the way of the bigger force.
Motion changes. It accelerates.
Example 12 N right and 5 N left: net force 7 N right.



Two Directions

Forces up and down, left and right.
Do it twice find the net force up-down, then left-right.
Motion accelerates if either net force is not 0 N.
Example 9 N up and 4 N down: net force 5 N up.



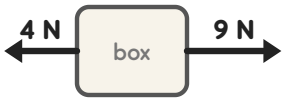
PREVIEW

My name _____ Date _____

Read: Net Force

Read. Then answer the questions.

A force is a push or a pull. We measure force in newtons (N). Usually more than one force acts on an object at the same time. The net force is all of the forces added together. If two forces point the same way, add them. If two forces point in opposite directions, subtract the smaller from the larger. The net force points the same way as the larger force.



1. What unit do we use to measure force?

☐ **newtons** ☐ **meters** ☐ **seconds**

2. Two forces point the same way. What do you do?

☐ **add them** ☐ **subtract them** ☐ **ignore one**

3. A box has 9 N pushing right and 4 N pushing left. What is the net force?

☐ **5 N right** ☐ **13 N right** ☐ **5 N left**

4. When two forces point in opposite directions, which way does the net force point?

_____

5. In your own words, what is a net force?

_____

PREVIEW

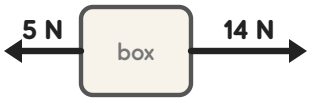
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My name _____ Date _____

Read: Unbalanced Forces

Read. Then answer the questions.

Forces are unbalanced when the net force is not 0 N. An unbalanced force changes an object's motion. It can start the object, stop it, speed it up, slow it down or turn it. Any change in speed or direction is called acceleration. The object accelerates in the direction of the net force. A bigger net force makes a bigger change in motion.



1. The net force of unbalanced forces is...

☐ **0 N** ☐ **not 0 N**

2. Which way does an object accelerate?

☐ **the way the net force points** ☐ **the opposite way** ☐ **it does not accelerate**

3. What can an unbalanced force do?

☐ **speed an object up or slow it down** ☐ **nothing at all** ☐ **keep motion the same**

4. What is acceleration?

_____

5. The net force on a cart is 7 N to the left. Which way will it accelerate?

_____

PREVIEW

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My name _____ Date _____

Worked Example

Read how it is done. Then try one.



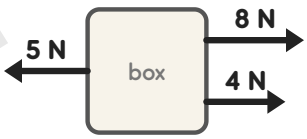
Step 1 Find the forces. The box has 15 N pushing right and 6 N pushing left.

Step 2 Same way or opposite? Opposite directions, so subtract the smaller from the larger.

Step 3 Do the math. 15 - 6 = 9. The bigger force points right, so the net force is **9 N to the right.**

Step 4 Balanced? The net force is not 0 N, so it is unbalanced. The box accelerates to the right.

Your turn. Use the picture.



Net force ☐ **N**

☐ **left** ☐ **right** ☐ **none**

☐ **balanced** ☐ **unbalanced**

I know because...

PREVIEW

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My name _____ Date _____

Balanced or Unbalanced?

Look at the arrows. Is it balanced? Will it accelerate?

Look at the size and direction of every arrow. Forces are in newtons (N) and are made up.

1



☐ balanced ☐ unbalanced

Will it accelerate? ☐ yes ☐ no

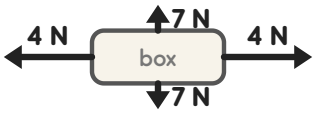
2



☐ balanced ☐ unbalanced

Will it accelerate? ☐ yes ☐ no

3



☐ balanced ☐ unbalanced

Will it accelerate? ☐ yes ☐ no

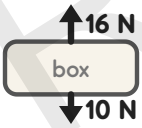
4



☐ balanced ☐ unbalanced

Will it accelerate? ☐ yes ☐ no

5



☐ balanced ☐ unbalanced

Will it accelerate? ☐ yes ☐ no

6



☐ balanced ☐ unbalanced

Will it accelerate? ☐ yes ☐ no

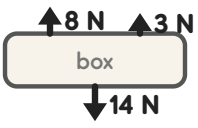
7



☐ balanced ☐ unbalanced

Will it accelerate? ☐ yes ☐ no

8



☐ balanced ☐ unbalanced

Will it accelerate? ☐ yes ☐ no

PREVIEW

Preview - Bright Path Sped

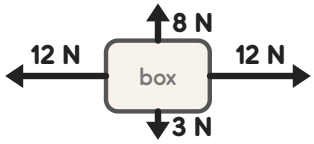
My name _____ Date _____

Two Directions 1

Find the net force both ways. Will it accelerate?

Find the net force left-right, then the net force up-down. Forces are in newtons (N) and are made up.

1

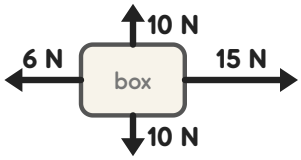


Left-right ☐ N ☐ left ☐ right ☐ none

Up-down ☐ N ☐ up ☐ down ☐ none

Will it accelerate? ☐ yes ☐ no

2

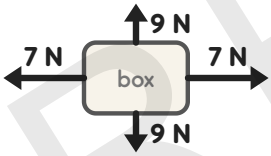


Left-right ☐ N ☐ left ☐ right ☐ none

Up-down ☐ N ☐ up ☐ down ☐ none

Will it accelerate? ☐ yes ☐ no

3

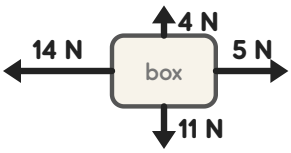


Left-right ☐ N ☐ left ☐ right ☐ none

Up-down ☐ N ☐ up ☐ down ☐ none

Will it accelerate? ☐ yes ☐ no

4

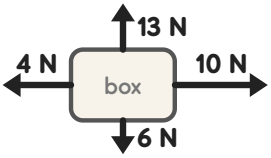


Left-right ☐ N ☐ left ☐ right ☐ none

Up-down ☐ N ☐ up ☐ down ☐ none

Will it accelerate? ☐ yes ☐ no

5



Left-right ☐ N ☐ left ☐ right ☐ none

Up-down ☐ N ☐ up ☐ down ☐ none

Will it accelerate? ☐ yes ☐ no

PREVIEW

My name _____ Date _____

Word Problems 1

Read each problem. Show your work. Find the net force.

The forces are made up. Think of the arrows, then find the net force.

1 A wagon is pulled to the right with 18 N. Friction pushes to the left with 6 N.

Show your work

Net force ☐ **N**

☐ **left** ☐ **right** ☐ **up** ☐ **down** ☐ **none**

Will it accelerate? ☐ **yes** ☐ **no**

2 In a tug of war, Team A pulls the rope to the left with 150 N. Team B pulls it to the right with 150 N.

Show your work

Net force ☐ **N**

☐ **left** ☐ **right** ☐ **up** ☐ **down** ☐ **none**

Will it accelerate? ☐ **yes** ☐ **no**

3 Two students push a cart to the right, one with 25 N and one with 10 N. Friction pushes to the left with 15 N.

Show your work

Net force ☐ **N**

☐ **left** ☐ **right** ☐ **up** ☐ **down** ☐ **none**

Will it accelerate? ☐ **yes** ☐ **no**

4 A crate slides to the right at a steady speed. The push is 40 N to the right and friction is 40 N to the left.

Show your work

Net force ☐ **N**

☐ **left** ☐ **right** ☐ **up** ☐ **down** ☐ **none**

Will it accelerate? ☐ **yes** ☐ **no**

PREVIEW

My name _____ Date _____

Fix It 1

Is it true or false? Fix each false one.

Some of these are true. Some have a mistake. Rewrite each false one so it is true.

1. Balanced forces are equal in size and point in opposite directions. ☐ true ☐ false

   If false, fix it: _____

2. If the net force on an object is 0 N, the object must be standing still. ☐ true ☐ false

   If false, fix it: _____

3. To find the net force of two forces in opposite directions, add them. ☐ true ☐ false

   If false, fix it: _____

4. Unbalanced forces change an object's motion. ☐ true ☐ false

   If false, fix it: _____

5. A 10 N force to the right and a 4 N force to the left make a net force of 14 N to the right. ☐ true ☐ false

   If false, fix it: _____

PREVIEW

My name _____ Date _____

Claim, Evidence, Reasoning 1

Read the facts. Write your claim, evidence and reasoning.

The sled (invented numbers)

A sled is pulled to the right with 30 N. Friction pushes to the left with 12 N. Will the sled accelerate? Which way?

Claim

Evidence: use the numbers

Reasoning: why does the evidence fit the claim?

The tug of war (invented numbers)

Two teams pull on a rope. Team A pulls to the left with 220 N. Team B pulls to the right with 220 N. Will the rope accelerate?

Claim

Evidence: use the numbers

Reasoning: why does the evidence fit the claim?

PREVIEW

Preview - Bright Path Shop

My name _____ Date _____

Short Answer

Answer each question in your own words.

Useful words **net force** **balanced** **unbalanced** **add** **subtract** **accelerate** **newtons**

1. Explain how to find the net force when two forces push in opposite directions.

2. Explain how to find the net force when two forces push the same way.

3. A box has a net force of 0 N. Does that mean it is not moving? Explain.

4. Forces of 9 N to the right and 14 N to the left act on a cart. Describe the net force and what the cart will do.

5. Why does a heavy object change its motion less than a light object when the same net force acts on both?

PREVIEW

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My name _____ Date _____

Cut and Sort 2

Cut out the pieces. Paste each one in its box.

Find the net force of each pair. Paste two pieces in each box.

0 N balanced	6 N unbalanced	12 N unbalanced

PREVIEW

Cut on the dashed lines: one cut across and two down.

13 N up and 7 N down	9 N up and 9 N down	8 N right and 20 N left
2 N right and 4 N right	30 N right and 30 N left	5 N down and 7 N down

Answer Key: Net Force, Balanced and Missing Force

Right and up are positive. Same direction: add. Opposite directions: subtract the smaller from the larger. Balanced item 3 has forces both ways: 7 up, 7 down, 4 right, 4 left.

Find the Net Force 1 page 12

#	Forces	Net force	Which way
1	12 N right and 5 N left	7 N right	right
2	9 N right and 9 N left	0 N	none
3	6 N right and 8 N right	14 N right	right
4	4 N right and 15 N left	11 N left	left
5	20 N right and 20 N left	0 N	none
6	7 N left and 5 N left	12 N left	left
7	18 N right, 6 N left and 4 N left	8 N right	right
8	3 N right, 2 N right and 10 N left	5 N left	left

Find the Net Force 2 page 13

#	Forces	Net force	Which way
1	14 N up and 6 N down	8 N up	up
2	16 N right and 22 N left	6 N left	left
3	5 N up, 12 N down and 8 N down	15 N down	down
4	11 N right, 11 N right and 22 N left	0 N	none
5	30 N up and 18 N down	12 N up	up
6	25 N right, 7 N left and 6 N left	12 N right	right

Balanced or Unbalanced? page 14

#	Net force	Balanced?	Accelerates?
1	0 N	balanced	no
2	6 N right	unbalanced	yes
3	0 N	balanced	no
4	12 N left	unbalanced	yes
5	6 N up	unbalanced	yes
6	0 N	balanced	no
7	2 N right	unbalanced	yes
8	3 N down	unbalanced	yes

Find the Missing Force page 15

#	Missing force	Direction
1	14 N	left
2	9 N	left
3	15 N	up
4	15 N	right
5	15 N	down
6	14 N	right

PREVIEW

Answer Key: Worked Example, Word Problems and Sorts

Every value was computed from the forces on the student page. In the sort keys, r1 c1 is the top left piece.

Worked example and Your Turn

- Worked example: 15 - 6 = 9, so the net force is 9 N to the right, unbalanced, it accelerates right.
- Your Turn: 8 + 4 = 12 pushing right and 5 pushing left; 12 - 5 = **7 N to the right**, unbalanced.

Word Problems 1 page 18

#	Net force	Accelerates?
1	12 N right	yes
2	0 N	no
3	20 N right	yes
4	0 N	no

Word Problems 2 page 19

#	Net force	Accelerates?
1	15 N up	yes
2	0 N	no
3	15 N right	yes
4	6 N up	yes

Cut and Sort 1 page 26

Piece	Piece shows	Box
r1 c1	10 N right and 10 N left	Balanced
r1 c2	15 N right and 5 N left	Net force right
r1 c3	7 N right and 18 N left	Net force left
r2 c1	8 N right, 4 N right and 12 N left	Balanced
r2 c2	6 N right and 16 N left	Net force left
r2 c3	22 N right and 9 N left	Net force right

Cut and Sort 2 page 27

Piece	Piece shows	Box
r1 c1	13 N up and 7 N down	6 N
r1 c2	9 N up and 9 N down	0 N
r1 c3	8 N right and 20 N left	12 N
r2 c1	2 N right and 4 N right	6 N
r2 c2	30 N right and 30 N left	0 N
r2 c3	5 N down and 7 N down	12 N

Cut and Sort 3 page 28

Piece	Piece shows	Box
r1 c1	15 N right, 6 N left	Will accelerate
r1 c2	net force 0 N	Will not accelerate
r1 c3	9 N up, 9 N down	Will not accelerate
r1 c4	unbalanced forces	Will accelerate
r1 c5	4 N left, 9 N left	Will accelerate
r2 c1	12 N right, 12 N left	Will not accelerate
r2 c2	balanced forces	Will not accelerate
r2 c3	net force 8 N up	Will accelerate
r2 c4	steady speed, straight line	Will not accelerate
r2 c5	speeding up	Will accelerate

PREVIEW

Net Force Tracker

One student, every scored page. Filled example: page 38.

Student _____ Teacher _____ Month _____

Page	Page type and set	Items	Right	Date	Notes
6	Force Words	6			
7	Read: Net Force	5			
8	Read: Balanced Forces	5			
9	Read: Unbalanced Forces	5			
10	Read: Forces and Motion	5			
11	Worked Example	3			
12	Find the Net Force 1	8			
13	Find the Net Force 2	6			
14	Balanced or Unbalanced? (set A)	8			
15	Find the Missing Force	6			
16	Two Directions 1	5			
17	Two Directions 2	5			
18	Word Problems 1	4			
19	Word Problems 2	4			
20	Fix It 1	5			
21	Fix It 2	5			
22	Claim, Evidence, Reasoning 1	6			
23	Claim, Evidence, Reasoning 2	6			
24	Quiz	10			
25	Short Answer	5			
26	Cut and Sort 1	6			
27	Cut and Sort 2	6			
28	Cut and Sort 3	10			

How to fill this in

Write how many items the student got right with no prompt, and the date. A blank means not tried yet, never wrong. There are 134 items on the 23 scored pages. Answer keys: pages 29 to 33. Filled example: page 38.

This month we are working on (your own standard or wording)

PREVIEW

Team Note

Use this page between team meetings or when a student moves classes, to hand off what changed without writing a note from scratch. Everything below is observable, with a blank for the number or the wording your team already uses.

Student _____ Team member _____ Date _____

Page type	Covered since last note (Y/N)	Items right	Still blank
Words and readings			
Find the net force			
Balanced or unbalanced; missing force			
Two directions			
Word problems; fix it; claims			
Sorts			

What I saw (observable, not a conclusion)

- Found the net force correctly on ___ of ___ items without a prompt.
- Said whether the forces were balanced on ___ of ___ items.
- Used a number of newtons as evidence: yes / no / with a reminder.
- Used the comparison page (page 5): yes / no / with a reminder.

Next step

- Next page or set: ___, because ___ (what you saw).
- What to try in another class or at home: ___.
- What to keep doing because it is working: ___.
- Anything for the team meeting to decide: ___ (this page records what happened, never a label or a plan).

Summary, in one or two sentences, for whoever reads this next

A filled-in line, for reference

"Found the net force on 7 of 8 items on Find the Net Force 1 without a prompt on 11/5. Next step: ask whether the arrows point the same way or opposite ways before choosing add or subtract." That is the level of detail this page is built for. It matches the filled example on page 38.

PREVIEW

Marcus's Tracker (Invented Student)

Marcus T. is invented; nothing on this page describes a real student. The blank tracker is on page 34.

Student: Marcus T. (an invented student)

Teacher: Ms. Alvarez (invented)

Month: November

Page	Page type and set	Items	Right	Date	Notes
6	Force Words	6	5	11/3	Mixed up net force and force
7	Read: Net Force	5	5	11/4	-
8	Read: Balanced Forces	5	-	-	-
9	Read: Unbalanced Forces	5	-	-	-
10	Read: Forces and Motion	5	-	-	-
11	Worked Example	3	-	-	-
12	Find the Net Force 1	8	7	11/5	Added two forces that pointed opposite ways
13	Find the Net Force 2	6	-	-	-
14	Balanced or Unbalanced? (set A)	8	6	11/6	Called a 0 N pair unbalanced
15	Find the Missing Force	6	5	11/10	Subtracted when the arrows pointed the same way
16	Two Directions 1	5	-	-	-
17	Two Directions 2	5	-	-	-
18	Word Problems 1	4	-	-	-
19	Word Problems 2	4	-	-	-
20	Fix It 1	5	-	-	-
21	Fix It 2	5	-	-	-
22	Claim, Evidence, Reasoning 1	6	-	-	-
23	Claim, Evidence, Reasoning 2	6	-	-	-
24	Quiz	10	-	-	-
25	Short Answer	5	-	-	-
26	Cut and Sort 1	6	6	11/12	-
27	Cut and Sort 2	6	-	-	-
28	Cut and Sort 3	10	-	-	-

How to read it

Marcus T. has done **6 of 23** scored pages and got **34 of 39** items right with no prompt. **2** pages were all right and **4** carry a note. Every number comes from the table.

What the table points to

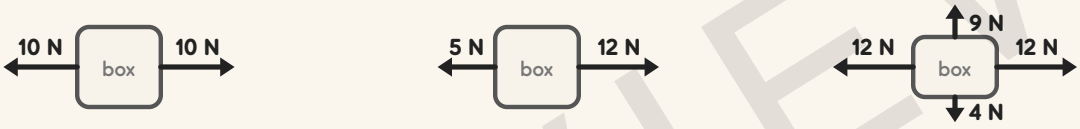
The lowest page is Balanced or Unbalanced? (6 of 8). That is where the next practice goes. The 17 pages left blank are not tried yet, never wrong.

PREVIEW

Binder Cover

Slide this into the front of a binder. The divider tabs and a spine label to cut out are on the next page (page 41).

Science - Physical Science



NET FORCE

Balanced and Unbalanced Forces

Learn | **Practice** | **Check**

Teacher _____

Class or student _____

PREVIEW