

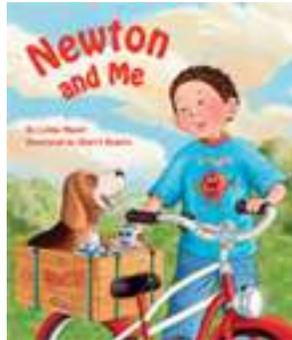
Newton and Me



Teaching
Activity Guide

Teaching Activities

for



Questions to ask before & after reading the book

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- Questions to ask before reading the book
- What do children already know? With charts
- After reading the book – writing prompts & thinking it through
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- Venn Diagram (pushes & pulls)
- Which one needs a harder push (includes reading a chart)

Answers

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- Coloring pages

Teaching Activities are intended for use at home, in the classroom, and during story-times.

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Questions to ask children before reading the book

- What do you think the book is about by looking at the cover (or one or two of the inside illustrations)? *Sometimes it is easy to tell from the cover, other times it is not.*
- Who is Newton?
- What does the cover illustration show?
- How do you think this book might be related to your math, science, or social studies class?

What do children already know?

- Young children are naturally inquisitive and are sponges for information. The whole purpose of this activity is to help children verify the information they know (or think they know) and to get them thinking “beyond the box” about a particular subject.
- The children should write down their “concepts” (or adults for them if the children are not yet writing) on the provided chart found on the next page.
- Use the questions to get children thinking about what they already know. Feel free to add more questions or thoughts according to the child(ren) involved.

What do children already know—activity chart

Ask children to write down what they think they know before reading the book. If the information is verified while reading the book, they check “yes.” If the information is wrong, they mark “no” and cross it off, then write the correct information. Have the children note how the information was verified.

What do I think I know?	Yes	No	Verified
Who was Newton?			Text Illustration Info in FCM Other
What is “force and motion?”			Text Illustration Info in FCM Other
What happens if you push something?			Text Illustration Info in FCM Other
What happens if you try to pull something heavy?			Text Illustration Info in FCM Other
What is friction?			Text Illustration Info in FCM Other
What is gravity?			Text Illustration Info in FCM Other

Use this chart for any other thoughts the children might have.

What do I think I know?	Yes	No	Verified
			Text Illustration Info in FCM Other

After reading the book – writing prompts & thinking it through

- Did the cover “tell” you what the book was about?
- If not, how does the illustration on the front relate to the story?
- Draw your own cover.
- Write a song.
- Can you think of another title for the book?
- Can you find things the illustrator included in the pictures that were not in the story?
- Write a different ending to the story
- Who was the main character? How would you describe the character?

Re-read the book looking for more information

Go back and re-read the book studying each page carefully.

- What facts are mentioned in the text?
- What can be seen or inferred from the illustrations that is not or are not mentioned in the text?
- What, if anything, can be inferred from the text?
- Pause during second readings and ask the child(ren) if they remember what happens next.

As you re-read the story, write down any words that relate to the five senses.

Feel	Taste	See	Smell	Hear

Comprehension Questions

Who was Newton in the story?

Why was the little boy experimenting with pushes and pulls?

Why did his toy truck pick up speed when going downhill?

Why was the empty wagon easy to pull but the wagon filled with rocks too hard to pull?

Why did the ball come back to him when he threw it up in the air?

In the last illustration, why does the boy look upset? What did Newton do and what do you think will happen?

What do children already know—activity conclusion

- Do the children have any more questions about pushes and pulls (force and motion)? If so, write them down on the chart.
- Identify whether the information was verified and how.
- If the concept is correct, make a note of how the information was confirmed (illustration, in text, or the “For Creative Minds” section)
- If the concept was not correct, what IS the correct information – with confirmation notes as above.
- If the concept was neither confirmed nor denied, look the information up in a reliable source and note where it was confirmed.
- Wrap it all up by adding notes with new information that the children learned either through the reading or the research while looking up something else.

Language Arts

Developing a Vocabulary “Word Wall”

If using the book as a way to introduce a topic or subject, this is also a great way to introduce subject-related vocabulary words. If you don't have the time (or the inclination) to develop the “word wall” by playing the Vocabulary Game (below), we have provided a vocabulary list for you.

Vocabulary words for the “word wall” may be written on index cards, on a poster board, or on a chalk board. If writing on poster board or chalk board, you might want to sort into nouns, verbs, etc. right away to save a step later. Leaving the words posted (even on a refrigerator at home) allows the children to see and think about them frequently.

Vocabulary Game

This activity is designed to get children thinking of vocabulary words, which will then be used as the beginning vocabulary list for a science lesson.

Select an illustration and give children a specific length of time (five minutes?) to write down all the words they can think of about the particular subject. *If you do not have classroom sets of the book, it is helpful to project an illustration on a white board. Check our website (www.ArbordalePublishing.com) for book “previews” that may be used for this purpose.*

The children's word list should include anything and everything that comes to mind, including nouns, verbs, and adjectives. At the end of the time period, have each child take turns reading a word from his/her list. If anyone else has the word, the reader does nothing. If however, the reader is the only one with the word, he/she should circle it. While reading the list, one person should write the word on a flashcard or large index card and post it on a bulletin board or wall.

At the end, the child with the most words circled “wins.” And you have a start to your science vocabulary list. *Note if a child uses an incorrect word, this is a good time to explain the proper word or the proper usage.*

Putting it all together

The following activities may be done all together or over a period of several days.

- Continue to add words to the vocabulary list as children think of them.
- Sort vocabulary words into nouns, verbs, adjectives, etc. and write what they are on the backs of the cards. When the cards are turned over, all you will see is “noun,” etc. *(These can then be used to create silly sentences, below.)*
- Now sort the vocabulary words into more specific categories. For example, nouns can be divided into plants, animals, rocks, minerals, etc. They can be divided into living/non-living, or into habitat-related words.
- Have children create sentences using their vocabulary words. Each sentence could be written on a separate slip of paper.
- Have children (individually or in small groups) sort and put sentences into informative paragraphs or a story.

- Edit and re-write paragraphs into one informative paper or a story.

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Suggested Vocabulary List

<u>Word</u>	<u>Definition</u>	<u>Part of Speech</u>
acceleration	the change in speed over time	noun
center	middle of an object	noun
circle	a closed plane curve consisting of all points at a given distance from a point within it called the center, a ring	noun
compare	to look at similarities in properties of two or more objects	verb
direction	the line along which anything lies, faces, moves, etc, with reference to the point or region toward which it is directed	noun
drop	to sink or fall quickly	verb
Earth	the planet on which we live, third planet from the sun	noun
explore	to look into closely, examine to discover something	verb
fast	moving or able to move, operate, function, or take effect quickly; quick; swift; rapid	adjective
force	push or pull that changes the motion, direction, or shape of an object	noun
friction	a force between surfaces that slows or stops motion and can make work harder to do	noun
gravitation	universal force by which every body in the universe attracts every other body	noun
gravity	the force that pulls all objects towards the center of the earth	noun
hard	not soft, solid and firm to the touch	adjective
inertia	tendency of objects to remain in motion or stay at rest unless acted upon by an unbalanced force	noun
location	a position or point in physical space that something occupies on Earths' surface	noun

mass	the quantity of matter which a body contains, as measured by its acceleration under a given force or by the force exerted on it by a gravitational field	noun
motion	a change in an object's position as compared to objects around it	noun
move	to pass from one place or position to another	verb
position	an object's location or place	noun
propel	to push or drive forward or onward by, or as if by, means of a force that imparts motion	verb
pull	the force that moves something towards you	verb
push	to press upon or against (a thing) with force in order to move it away	verb
red	a color	adjective
reference point	a fixed point of comparison	noun
resting position	where an object stays at rest unless acted upon by an additional force	noun
roll	to move along a surface by revolving or turning over and over, as a ball or a wheel	verb
rough	uneven, coarse	adjective
slow	lack of speed, taking a long time	adjective
soft	yielding readily to touch or pressure; easily penetrated, divided, or changed in shape, gentle or mild	adjective
speed	rate of motion, change, or activity	noun
straight	without a bend, angle, or curve; not curved; direct:	adjective
zigzag	a line with sharp turns first to one side and then to the other	adjective

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Silly Sentence Structure Activity

This is a fun activity that develops both an understanding of sentence structure and the science subject. Use words from the “word wall” to fill in the blanks. After completing silly sentences for fun, have children try to fill in the proper words by looking for the information in the book.

A _____ is a force that _____s something toward you.
noun verb

A _____ is a force that moves something away from you.
verb

Something's _____ can be _____ to other things around it.
noun verb

Things can move in lines that can be _____, _____, or in circles.
adjective adjective

Things _____ at different _____s (fast or slow).
verb noun

How _____ or _____ something moves depends on how _____ or _____ the push or pull, and how _____ the object is.
adjective adjective adjective adjective

Forces can change the _____ of something that is moving.
noun

_____ slows or stops _____.
noun noun

_____ pulls things towards the _____ of the
noun noun

_____.
noun

Newton and Me

Word Search

Find the hidden words. Even non-reading children can try to match letters to letters to find the words!
Easy – words go up to down or left to right.

For older children, identify the coordinates of the first letter in each word (number, letter).

	A	B	C	D	E	F	G	H	I	J
1	D	N	A	T	I	A	N	X	L	E
2	O	Y	H	P	S	P	E	E	D	A
3	R	R	O	U	G	H	W	E	A	R
4	O	O	P	S	O	F	T	O	S	P
5	L	A	F	H	U	D	O	W	M	U
6	L	M	O	T	I	O	N	R	O	L
7	H	A	R	D	Y	G	R	A	O	L
8	Z	D	C	G	R	A	V	I	T	Y
9	O	H	E	A	V	Y	E	S	H	I
10	O	M	T	M	I	T	I	G	H	T

NEWTON
MOTION
PULL
HARD
SPEED
DOG
SMOOTH

FORCE
PUSH
GRAVITY
SOFT
HEAVY
ROLL
ROUGH

Science

Force and Motion True/False

1. _____ The only "natural" motion is for an object to be at rest.
2. _____ If an object is at rest, no forces are acting on the object.
3. _____ Objects can move in different directions and at different speeds.
4. _____ Motion is the change in an object's direction and speed relative to objects around it (reference points).
5. _____ Frictional forces are due to irregularities in surfaces moving past each other.
6. _____ Objects move in straight, round, or back-and-forth motions.
7. _____ An object's position can be compared to other objects or to the background.
8. _____ Large objects exert a greater force than small objects.
9. _____ An object's motion can be described by tracing and measuring its position over time.
10. _____ A force is a push or a pull that changes the motion, direction, or shape of an object.
11. _____ A pull moves something towards you.
12. _____ A rigid solid cannot be compressed or stretched.
13. _____ Only animate objects can exert a force. Thus, if an object is at rest on a table, no forces are acting upon it.
14. _____ A push moves something away from you.
15. _____ The position and motion of objects can be changed by pushing/pulling. The size of change depends on the strength of push or pull.
16. _____ Force is a property of an object. An object has force and when it runs out of force, it stops moving.
17. _____ The motion of an object is always in the direction of the net force applied to the object.
18. _____ A force is needed to keep an object moving with a constant speed.
19. _____ Friction always hinders motion. Thus, you always want to eliminate friction.
20. _____ Friction is a force that slows or stops motion.
21. _____ Time is defined in terms of its measurement.

22. _____ The location of an object can be described by stating its distance from a given point (ignoring direction).
23. _____ The terms distance and displacement are synonymous and may be used interchangeably. Thus, the distance an object travels and its displacement are always the same.
24. _____ The force of gravity pulls objects toward the center of Earth.
25. _____ Velocity is another word for speed. An object's speed and velocity are always the same.
26. _____ Acceleration is confused with speed.
27. _____ Acceleration always means that an object is speeding up.
28. _____ Acceleration is always in a straight line.
29. _____ Acceleration always occurs in the same direction as an object is moving.
30. _____ Tools and machines are used to apply pushes and pulls (forces) to make things move.

Science Journal

Have children draw a picture to define the vocabulary word or concept.

Force

Push

Pull

Motion

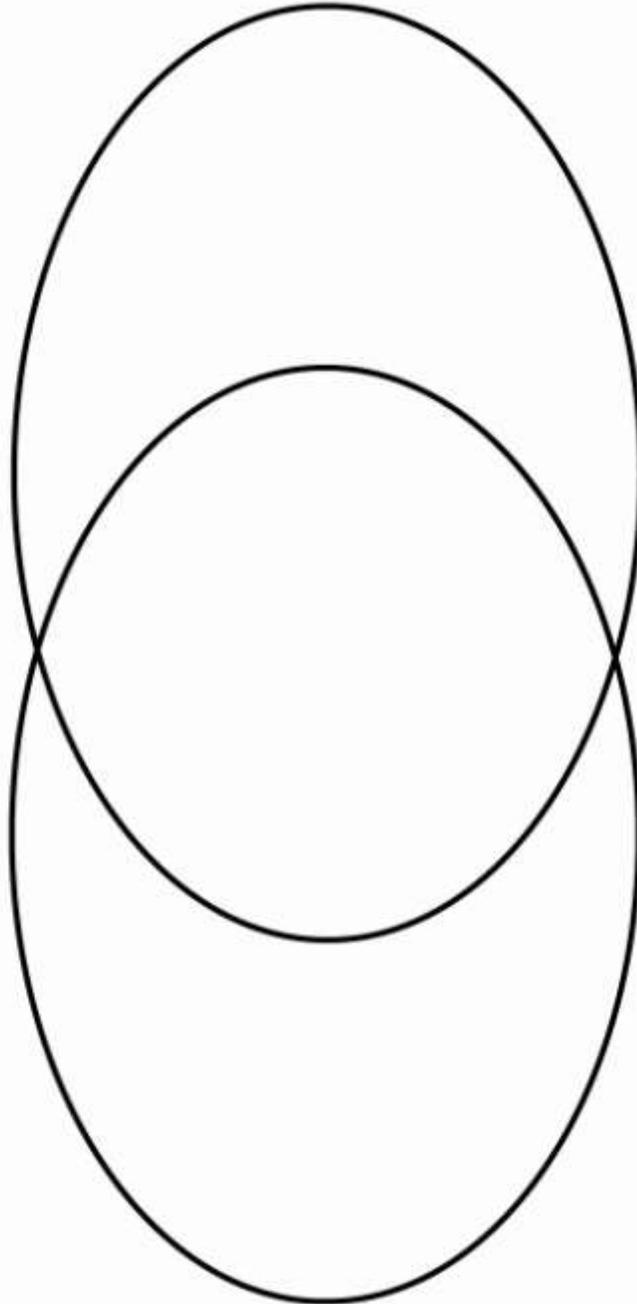
At rest

Gravity

Math

Venn Diagram

**Newton
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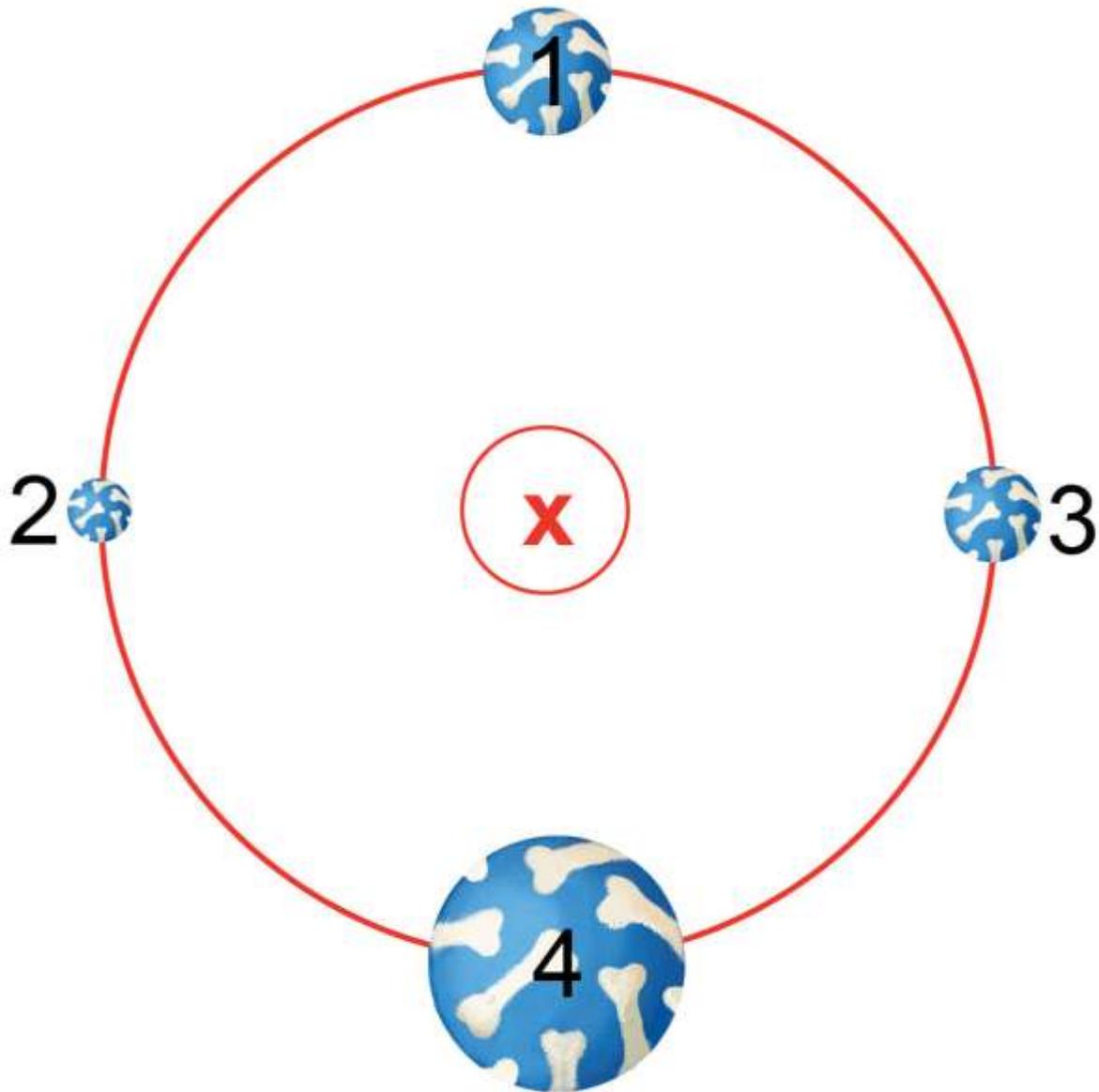


things that I can push

things I push or pull

things that I can pull

Which one needs a harder push?



Each of the four balls is exactly the same distance from the “X” in the middle of the circle. The balls are different sizes and weights (shown in the chart below). Your goal is to push each ball just enough to have it land in the middle of the “X.”

Which ball do you have to push the hardest?

Which ball needs the softest push?

On what variable (size or weight) does the amount of push required depend?

<u>Ball</u>	<u>Weight in Pounds</u>	<u>Diameter</u>
<u>1</u>	5.0	5 inches
<u>2</u>	1.0	2 inches
<u>3</u>	2.5	3.5 inches
<u>4</u>	0.5	10 inches

Answers

Silly Sentence Structure Activity

A pull is a force that moves something toward you.

A push is a force that moves something away from you.

Something's location can be compared to other things around it.

Things can move in lines that can be straight, zigzag, or in circles.

Things move at different speeds (fast or slow).

How fast or slow something moves depends on how hard or soft the push or pull, and how heavy the object is.

Forces can change the direction of something that is moving.

Friction slows or stops motion.

Gravity pulls things towards the center of the Earth.

Word Families/Rhyming Words

ad	ad, add, bad, Brad, Chad, clad, dad , glad , grad, had, lad, mad, pad, plaid, sad, Tad
all	all , ball, brawl, call, crawl, fall , hall, haul, mall, maul, Paul, shawl, small, sprawl, squall, stall, tall, wall,
ar	are, bar, car , char, far , jar, par, scar, star, tar, tzar
ast	blast, cast, fast , last , mast, passed, past, vast
at	at, bat, brat, cat, chat, fat, flat , hat, mat, pat, rat, sat , scat, spat, splat, tat, that, vat
ay	away, bay, clay, day , gray, hay, jay, lay, may, pay, play, pray, ray, say, spray, stay, tray, way
ay	away, bray, bay, clay, day, flay, gay, gray, grey, hay, hey, jay, Kay, lay, lei, may, nay, pay, play, pray, prey, ray, say, sleigh, spray, stay, sway, they, tray, way , weigh
ed	bed , bled, bread, dead, dread, Ed, fed, fled, head , instead, lead, led, Ned, read, red, said, shed, shred, sled, spread, Ted, thread, tread, wed,
ee	be, bee, flea, flee, free, glee, he, key, knee, Lee, pea, plea, sea, see, ski, tea, three, tree , we
est	best , jest, nest, pest, quest, test , vest
ew	blue, boo, brew, chew, clue, crew, dew, do , drew, due, few, flew, glue, goo, grew, knew, mew, new , Pooh, screw, shoe , stew, sue, threw, through, to, too , true, view, who, you, zoo
eye	buy, bye, cry, die, dry, fly, fry, guy, hi, high , I, lie, lye, my, pie, rye, shy, sigh, sky , sly, spy, thigh, tie, try, why
ide	bride, cried, died, dried, dried, eyed, fried, glide, guide, hide, I'd, lied, pride, ride , side , slide, stride, tide, tied, tried, wide
or/ore	bore, core, chore, lore, more , ore, pore, score, shore, sore, store, tore, war , wore
ore	boar, bore, core, chore, door , drawer, explore , floor, for, four, lore, more, oar, or, ore, pore, pour, roar, soar, score, shore, snore, sore, store, tore, war, wore, your
ound	bound, browned, crowned, downed , found , frowned, ground , hound, mound, round, sound, wound
un	bun, fun , done, gun, nun, one, pun, run , shun, stun, sun, ton,
ard	bard, card, charred, guard, hard , lard, regard, retard, scarred, shard, starred, yard
ush	bush , push , tush

up	cup, pup , sup, up
eed	agreed, bead, bleed, breed, cede, creed, deed, feed, freed, greed, heed, indeed, keyed, knead, lead, mead, misdeed, mislead, misread, need, plead, precede, proceed, read, recede, reed, reid, reread, reseed, secede, seed, she'd, speed , stamped, steed, succeed, Swede, tweed, we'd, weed
ull	bull , full, pull , wool
otion	lotion, motion , notion , ocean, potion

Word Search

NEWTON	G,1	FORCE	C,5
MOTION	B,6	PUSH	D,2
PULL	J,4	GRAVITY	D,8
HARD	A,7	SOFT	D,4
SPEED	E,2	HEAVY	B,9
DOG	F,5	ROLL	A,3
SMOOTH	I,4	ROUGH	B,3

Force and Motion True/False

Note to teachers and parents: the "false" phrases were borrowed from a list of children's misconceptions about science compiled by the Operation Physics Elementary/Middle School Physics Education Outreach Project of the American Institute of Physics: <http://amasci.com/miscon/opphys.html>. The "true" phrases were borrowed from a variety of state science curriculum standards.

31. False The only "natural" motion is for an object to be at rest.
32. False If an object is at rest, no forces are acting on the object.
33. True Objects can move in different directions and at different speeds.
34. True Motion is the change in an object's direction and speed relative to objects around it (reference points).
35. False Frictional forces are due to irregularities in surfaces moving past each other.
36. True Objects move in straight, round, or back-and-forth motions.
37. True An object's position can be compared to other objects or to the background.
38. False Large objects exert a greater force than small objects.
39. True An object's motion can be described by tracing and measuring its position over time.
40. True A force is a push or a pull that changes the motion, direction, or shape of an object.
41. True A pull moves something towards you.
42. False A rigid solid cannot be compressed or stretched.
43. False Only animate objects can exert a force. Thus, if an object is at rest on a table, no forces are acting upon it.
44. True A push moves something away from you.
45. True The position and motion of objects can be changed by pushing/pulling. The size of change depends on the strength of push or pull.
46. False Force is a property of an object. An object has force and when it runs out of force, it stops moving.
47. False The motion of an object is always in the direction of the net force applied to the object.
48. False A force is needed to keep an object moving with a constant speed.
49. False Friction always hinders motion. Thus, you always want to eliminate friction.
50. True Friction is a force that slows or stops motion.

51. False Time is defined in terms of its measurement.
52. False The location of an object can be described by stating its distance from a given point (ignoring direction).
53. False The terms distance and displacement are synonymous and may be used interchangeably. Thus, the distance an object travels and its displacement are always the same.
54. True The force of gravity pulls objects toward the center of Earth.
55. False Velocity is another word for speed. An object's speed and velocity are always the same.
56. False Acceleration is confused with speed.
57. False Acceleration always means that an object is speeding up.
58. False Acceleration is always in a straight line.
59. False Acceleration always occurs in the same direction as an object is moving.
60. True Tools and machines are used to apply pushes and pulls (forces) to make things move.

Which one needs a harder push?

Which ball do you have to push the hardest? Ball number 1

Which ball needs the softest push? Ball number 4

On what variable (size or weight) does the amount of push required depend? It is the weight of the ball, not the size.

Note to parents and teachers: this is an easy experiment to set up for kids to try. Draw the two circles with chalk and then provide a variety of different balls with varying weights and sizes, such as:

- Golf ball
- Tennis ball
- Baseball
- Bowling ball
- Beach ball

