

UNIT

1

Forces



Chapter 1A:
Motion and Forces

Chapter 1B:
Magnetism and Electricity



CLYMB has the world's biggest indoor wind tunnel. It is built for indoor skydiving. The wind tunnel is in Abu Dhabi, United Arab Emirates. It uses a force to lift people into the air. The force also keeps people afloat. In the air, skydivers can move in different directions and do special moves. How do you think they control their movement in the air?

Unit Phenomenon Project

Design a wind tunnel to make a handkerchief fly up high. How would you make it fly higher?



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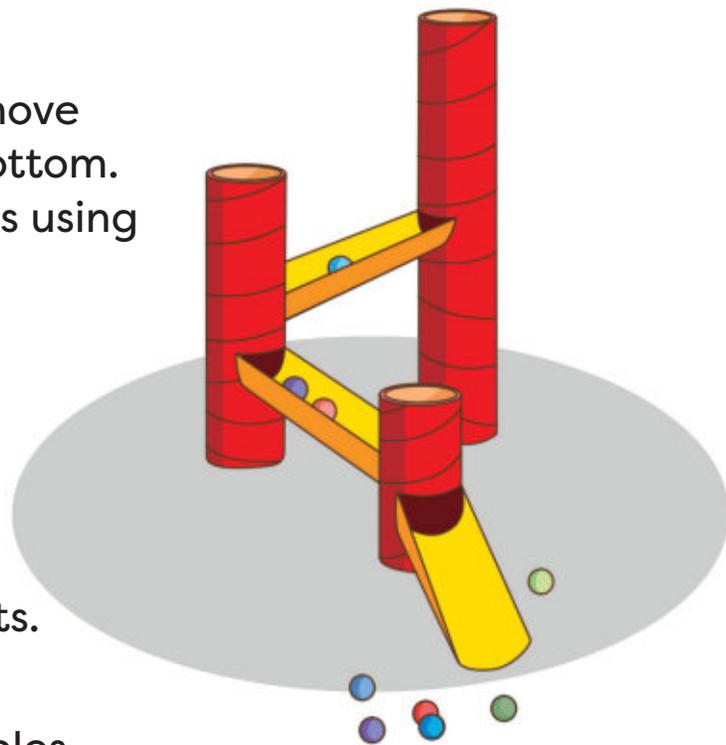
Motion and Forces

? Essential Question
How do objects move?

Chapter Project

A slide is a smooth slope. It can move something from the top to the bottom. Build a slide out of cardboard rolls using the steps below.

1. Cut two of the rolls into halves lengthwise.
2. Cut slits at different heights of the other rolls.
3. Insert the half-rolls into the slits. Secure them with sticky tape.
4. Test the slide using some marbles.
5. Paint the slide using your favorite colors!



Lesson 1

Motion

Key Terms

strength

stationary

Recall

1. A push and a pull are f_____.
2. A force can make an object m_____ or s_____.

Engage



Pushing and Pulling



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1. What is happening in the picture?
2. Which worker is pulling and which worker is pushing the wheelbarrow? What will you observe?
3. What will happen to the wheelbarrow if the workers push and pull harder?



Pushes and Pulls Around You

In **Engage** on page 5, you learned that the wheelbarrow moves in different ways when it is pushed and pulled. Now, you will **Explore** what happens when you apply forces from different directions.

1. Complete each action in the table with a classmate.
2. Write your results in the table.



Action	Did you use a push or pull force?	From which direction did you push or pull?	Did the object move toward you or away from you?
Lift your pencil.	Push and pull	Upward	Toward me
Drop your pencil.			
Lift your chair.			
Open the zip of your bag.			
Close the door of your classroom.			
Open the door of the cupboard.			

Compare the forces you used to lift the pencil and the chair. How are the forces similar and different?



What Happens When You Push or Pull an Object?

You have learned that a force is a push or a pull.

In **Explore**, you pushed or pulled each object to make it move. You applied forces from different directions. Every force has a direction. The direction can be forward, backward, upward, or downward.

When you push an object, you move it away from you.

When you pull an object, you move it toward you.

You draw an arrow to show the direction of a force.



The boy pulls the drawer to open it. The drawer moves toward him. The arrow shows the direction of the force.



The boy pushes the drawer to close it. The drawer moves away from him. The arrow shows the direction of the force.

Think about when you open and close the classroom door. You pull and push the door. Which way does the door move each time? What other objects in your classroom can you open and close?



✓ Check Your Understanding

Draw an arrow to show the direction of the force in each picture.

1. The girl pulls a book from the table.

2. The boy throws a bowling ball onto the bowling lane.



What Happens When You Push or Pull Using Different Strengths?

Forces have different **strengths**. Some forces are very strong. Other forces are weaker. In **Explore**, you used a greater force to lift your chair. You needed a much smaller force to lift your pencil.

To show forces of different strengths, you draw longer and shorter arrows. A longer arrow shows that a greater force is used.



The man is pushing the cart with a smaller force in picture A. He is pushing the cart with a greater force in picture B.

✓ Check Your Understanding

Who is applying a greater force? Tick (✓) the correct box.

