Let's Do SCIENCE

Primary 5

Activity Book **B**

Let's Do Science

Let's Do Science is based on the United States Next Generation Science Standards (NGSS). The series consists of full-color textbooks and full-color activity books for Grades K to 6.

Let's Do Science engages students with a highly visual presentation of the disciplinary core ideas in the textbooks and places an emphasis on applying scientific knowledge using NGSS practices through numerous scientific investigations. Let's Do Science sees engineering as an essential element of science education and as such is tightly integrated into both the textbooks and activity books.

The Let's Do Science activity books include the follow features:

AB Activity

Activities and investigations related to concepts and topics covered in the Let's Do Science Textbook.

Engineer It!

Goes beyond inquiry by encouraging students to design, model and build to engineer solutions to defined problems.

Review

Topical questions at the end of each chapter for formative assessment.

Contents

Activity 6.1

Earth's Spheres

1. Write the things you know about each Earth system. As you progress through this unit, write the things you learn about each system.

Things I know about the geosphere:

Things I learned about the geosphere:

Things I know about the hydrosphere:

Things I learned about the hydrosphere:

Things I know about the atmosphere:

Things I learned about the atmosphere:

Things I know about the biosphere:

Things I learned about the biosphere:

2. Provide an example whereby interactions between two or more Earth systems work together to help the Earth function as a whole.

Activity 6.2

Geosphere – Comprehension

1. Use your textbook to help you fill in the blanks.

   (a) The _____ is all of the rock and the inorganic parts of _____ .

   (b) The geosphere includes all the layers of the _____ from the crust to the _____ .

   (c) The part of the geosphere we are most familiar with are the Earth's rocky _____ and _____ floor.

2. Why is the humus in soil not part of the geosphere?

   _____

   _____

3. Would the coral in the photograph below be considered part of the geosphere? Explain your answer.

   _____

   _____

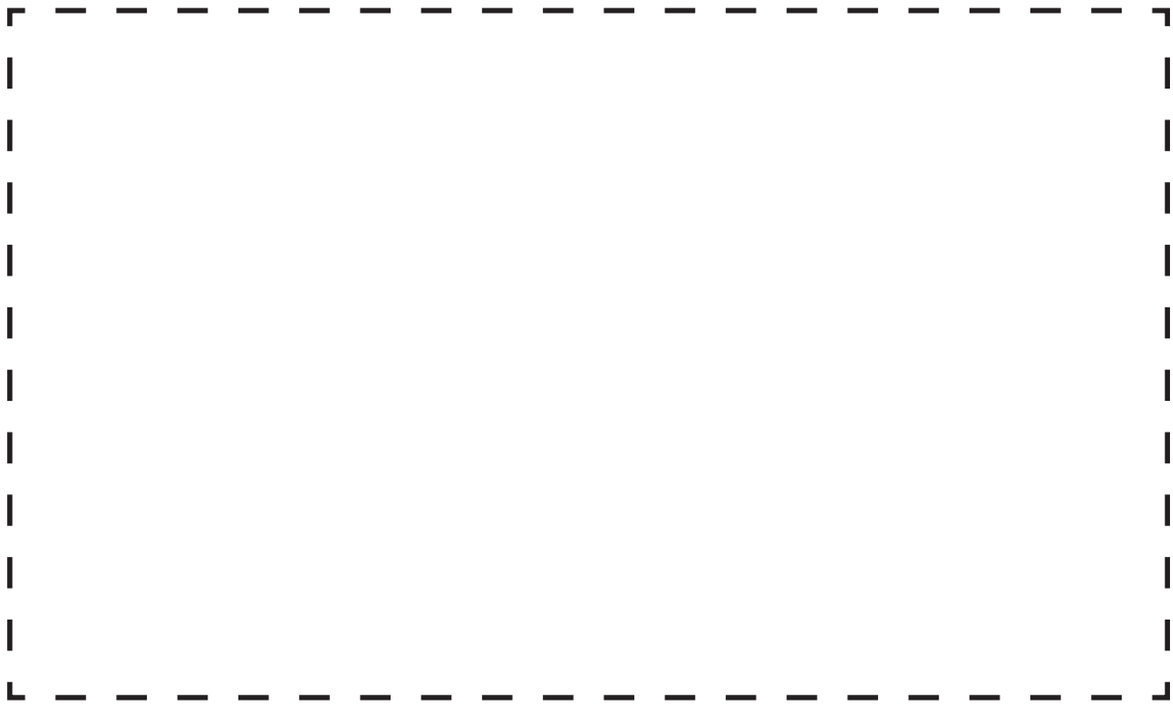
   _____

   _____

   _____

4. Draw a labeled model to show the interactions between the geosphere and the atmosphere.

5. Draw a labeled model to show the interactions between the geosphere and the hydrosphere.



Activity 6.3

Hydrosphere – Comprehension

1. Use your textbook to help you fill in the blanks.

   (a) The hydrosphere is the combined mass of all of the

   _____ on Earth.

   (b) The hydrosphere includes _____ in all three states –

   _____ , _____ and _____ .

   (c) The vast majority of the hydrosphere is _____ in the

   _____ which accounts for about _____
   of all water on Earth.

2. In the space below, draw a labeled graph to show how fresh water is distributed on Earth.

3. Draw a labeled model to show the interactions between the hydrosphere and atmosphere.

4. Draw a labeled model to show the interactions between the hydrosphere and biosphere.

Review

Earth's Systems

1. Riley thinks fish are part of the hydrosphere as they live in water. Do you think Riley is correct? Explain your answer.

2. To which sphere does the sand in a desert belong? Explain your answer.

3. How do animals get the nitrogen they need?

4. Where is most of the water on Earth found? Why is this water not suitable for human consumption?

5. Where is most of the fresh water found on Earth? Why is this water not readily available for human consumption?

6. What is transpiration?

7. What is groundwater? To which sphere does it belong?

8. Describe the interactions that take place between plants and animals in the carbon dioxide–oxygen cycle.

9. Which gases in our atmosphere are needed to support life on Earth?

10. Explain why air pressure increases in the layers closer to the Earth's surface.

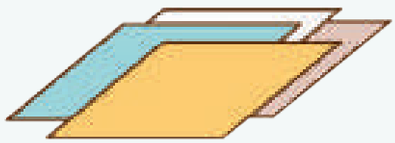
11. Describe how sedimentary rock forms.

Activity 8.1

Paper Airplane Challenge

Materials

- sheets of scrap copy paper



- trundle wheel or measuring tape

- rocks or sticks

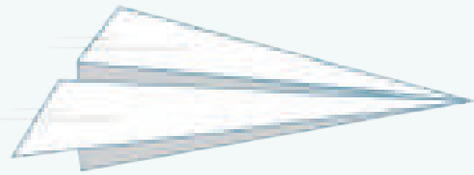
Procedure

1. Work in pairs to design a paper airplane that will travel the longest distance when thrown. You may wish to research designs online.

2. Fold your paper airplane using the scrap copy paper. Follow your design as closely as possible.

3. In the schoolyard, use the trundle wheel to mark out one-meter intervals to a distance of 20 meters. Use rocks or sticks to mark the intervals.

4. Take two turns each throwing the paper airplane. Record the distance it flies each time. Record your results in the table provided.



5. Observe the paper airplanes of other groups. Work with your partner to improve and adjust your design. Repeat Step 4 with your adjusted design.

Observations

Draw a diagram of your paper airplane. Label its features.

	Throw 1 (meters)	Throw 2 (meters)	Throw 3 (meters)	Throw 4 (meters)	Best Throw (meters)
Design 1					
Design 2					

Analyze and Interpret

1. Describe the motion of your paper airplane when it was thrown.

2. Which design produced the longest flight? Explain why you think this design resulted in a longer flight.

3. Compare and contrast your design with that of other groups.

Activity 8.2

Average Speed

1. Calculate the average speed, distance or time.

A car travels 75 kilometers in 2 hours. Find its average speed.

Average speed: _____

How long would it take Riley to hike 12 kilometers at an average speed of 3 km/h?

Time: _____

An airplane traveled at an average speed of 900 km/h for 12 hours. How far did it travel?

Distance: _____

A snail moves at an average speed of 10 cm/min. How long will it take to move 2 meters?

Time: _____

A train travels 225 kilometers in 5 hours. Find its average speed.

Average speed: _____

A fighter jet travels at an average speed of 1,300 km/h for 2.5 hours. What distance did the fighter jet travel?

Distance: _____

2. What is the difference between speed and average speed?

_____

_____

Activity 8.10

Magnet Car Race

Materials

- assorted magnets

- art and craft supplies

- glue

- tape

- string

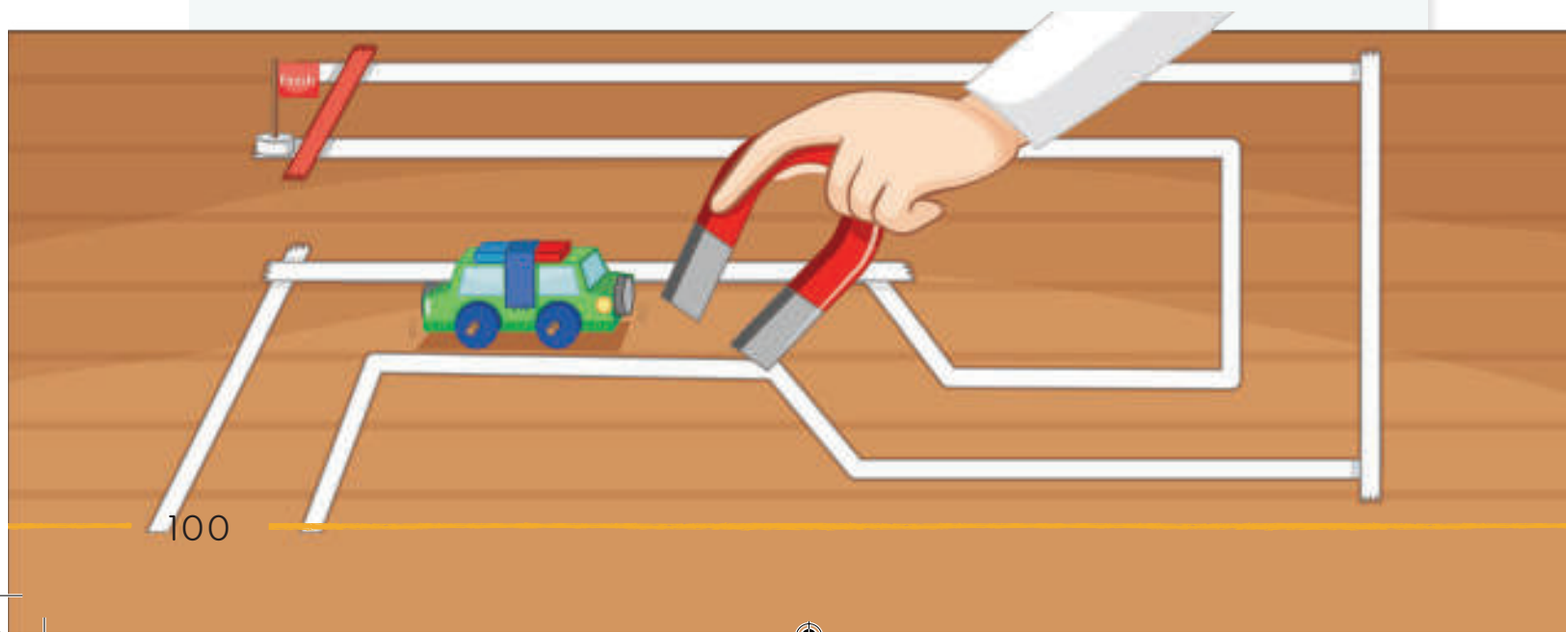
- stopwatch

Procedure

1. In small groups, use the tape to mark out a track on your classroom floor. The track should include corners and turns as show below. Use the art and craft supplies to add obstacles to the track.

2. Use the magnets and art and craft materials to design and build a toy car that can only be moved by non-contact magnetic force.

3. Challenge other groups to a magnet car race. Use the stopwatch to time how long it takes each group to complete the course.



Observations

1. Draw a labeled model of your design. Include the magnets you used to move the toy car.

2. Create a table to record the times taken by each group to complete the course.

Analyze and Interpret

Compare your design with that of other groups. How could your design be improved?

Activity 8.11

Egg Parachutes

In small groups, design and build a parachute that will protect an egg when dropped from different heights.

Materials

- hard-boiled eggs

- sheets of plastic or paper

- baking cups

- scissors

- string

- tape

Procedure

1. Work with your group to design a parachute for your egg. The goal should be to maximize air resistance and reduce the speed of the falling egg as much as possible. The materials used in your construction should also be as light as possible.

2. Use scissors to cut out your parachute from the plastic sheets. Attach the parachute to the baking cup with masking tape and string.

3. Take your parachute and egg outside. Take turns placing the egg into the baking cup and releasing it from heights of 1 m, 2 m and 3 m.

4. Examine your egg for cracks or damage after each drop and replace with a fresh egg if the egg breaks. Record your observations in the table provided.

Observations

Draw and label your parachute design.

Drop Height	Damage Score (0 = no damage, 5 = badly broken)			Overall Score
	Trial 1	Trial 2	Trial 3	
1 m				
	Trial 1	Trial 2	Trial 3	
2 m				
	Trial 1	Trial 2	Trial 3	
3 m				

Analyze and Interpret

1. How effective was your parachute in protecting the egg? From what height was the parachute most effective?

2. In what ways is knowing about the force of gravity and air resistance helpful to people?

3. Compare your parachute design with that of other groups. Which group had the most effective design?

4. In what ways could your design be improved?

5. On the moon, the force of gravity is about one-sixth that of the force of gravity on Earth. There is also no atmosphere on the moon. How do you think your parachute would perform on the moon?

Activity 8.12

Earth and Gravity

In each example below, use your knowledge of the Earth's gravitational force to provide evidence and explain that the Earth is spherical in shape and not flat. You may wish to draw models to assist in your explanations.

1. A sailboat disappears as it sails into the distance.

2. Objects are pulled down towards the center of the Earth.

Activity 8.13

Non-contact Forces – Comprehension

1. Use your textbook to help you fill in the blanks.

   (a) Forces that can act on objects without direct _____ are called _____ forces.

   (b) _____ , _____ and _____ forces are non-contact forces.

   (c) A magnet has _____ force. Magnetic force occurs due to the motion of _____ particles.

   (d) _____ are created when there are unbalanced electrical charges inside an object.

   (e) All objects have an invisible force that _____ on other objects. The force is called _____ .

2. How does the mass of an object affect the magnitude of its gravitational force?

   _____

   _____

3. How does the distance between objects affect the magnitude of the gravitational force between them?

   _____

   _____

Activity 8.14

Mass vs Weight – Comprehension

1. Use your textbook to help you fill in the blanks.

   (a) _____ is a measure of how much _____ is in an object. _____ is a measure of the force of _____ pulling an object.

   (b) On Earth, everything is pulled by the _____ force of the Earth. So, both the _____ and _____ of an object are the same.

   (c) The gravity on the Earth's moon is about one-sixth that of the Earth. This means you would weigh _____ as much when on the surface of the _____ .

   (d) An object in _____ , where there is no observable _____ acting on it, would have the same mass as it does on Earth, but would have no _____ at all.

2. Use your knowledge of forces, motion, mass and gravity to describe how your mass and weight would change on a journey from the surface of Earth to the surface of Earth's moon.

_____

_____

_____

Activity 8.15

Newton's Laws of Motion

Make posters about Newton's Laws of Motion. Write the law in your own words. Give an example by drawing a labeled diagram.

Newton's 1st Law of Motion

Newton's 2nd Law of Motion

Newton's 3rd Law of Motion

Review

Forces and Interactions

1. An airplane flies 2,000 kilometers from City A to City B in a total time of 4 hours. What was the average speed of the airplane?

2. What occurs when an object accelerates in the opposite direction to its motion?

3. How does the magnitude of a force applied to an object affect its motion?

4. How does the mass of an object affect its motion when a force is applied to it?

5. How does the direction of a force applied to an object affect its motion?

6. An object is at rest on a table.
   (a) What can you infer about the forces acting on the object?

(b) The object is set in motion. What can you infer about the forces acting on the object?

7. In terms of force, what must a team do to win a game of tug-of-war?

8. An object is placed on the ground. List two factors that affect the amount of friction between the object and the ground.

9. A skydiver leaps from an airplane.
   (a) What force pulls the skydiver to the Earth's surface?

   (b) How does a parachute slow the skydiver's fall?

10. Why does an astronaut weigh much less on the moon than on Earth?

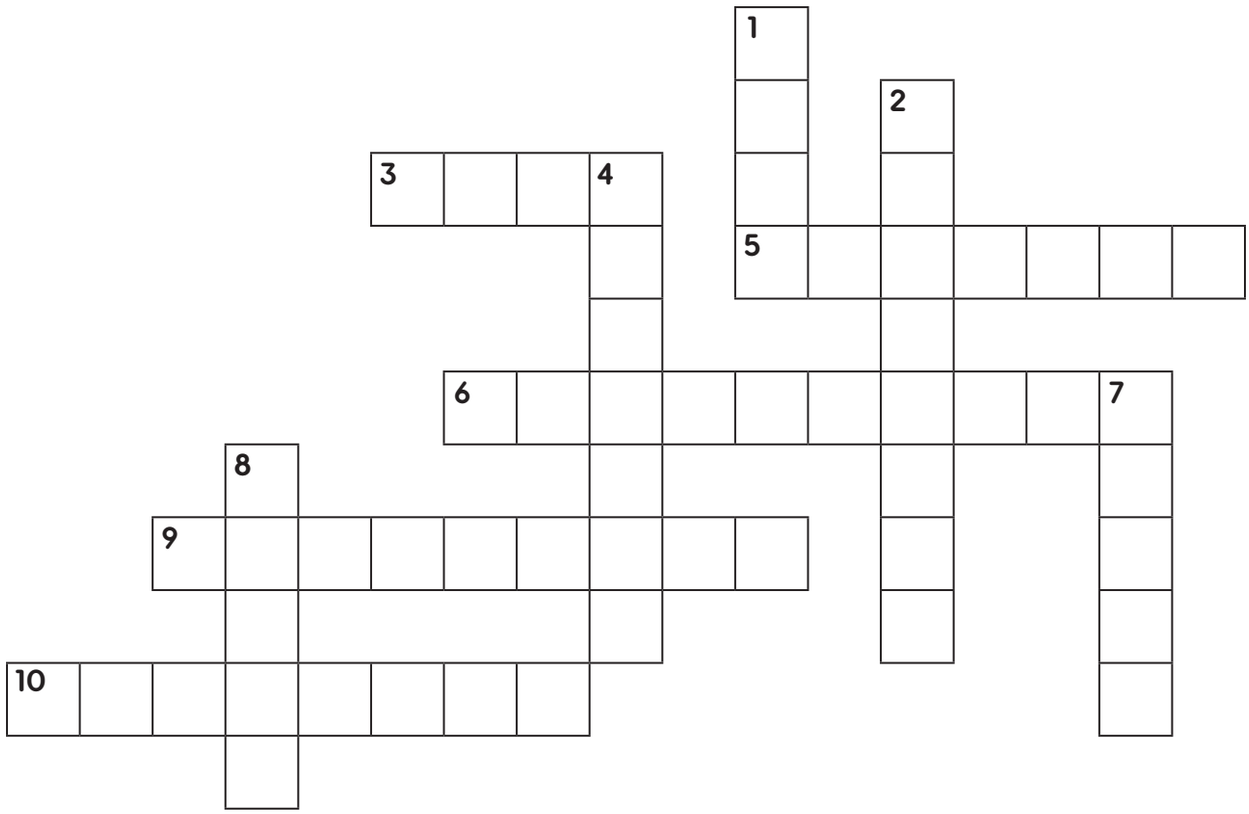
11. The Voyager 1 spacecraft's rockets were last fired more than 40 years ago. Use Newton's laws of motion to explain why Voyager 1 is still in motion today.

Activity 10.1

Forms of Energy

1. Read the clues and complete the crossword.

Forms of Energy



Down

1. The movement of thermal energy.
2. Gasoline is an example of this form of stored energy.
4. Energy of moving objects.
7. This form of energy moves in waves and allows us to see.
8. Energy that moves in pressure waves in the air.

Across

3. Energy is the ability to do _____ .
5. A form of energy related to heat.
6. This form of energy powers your smartphone.
9. Another word for stored energy.
10. Light travels as waves of _____ and electrical fields.

2. List and briefly describe the different forms of energy in each image.