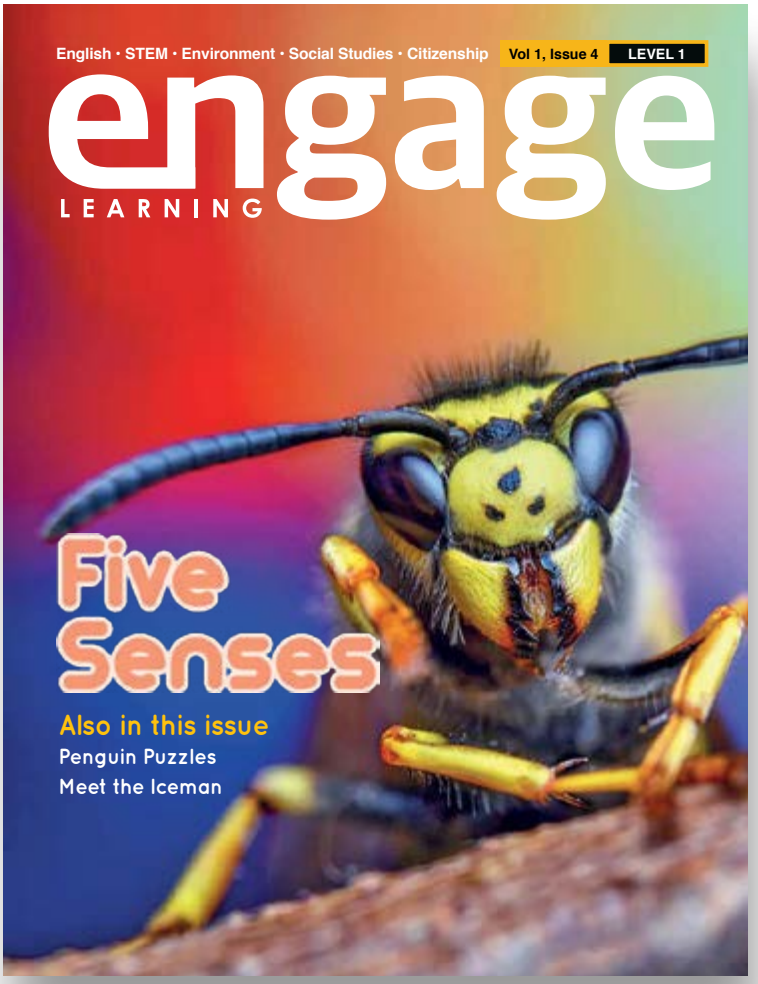
English • STEM • Environment • Social Studies • Citizenship

engage LEARNING



TEACHING GUIDE

Vol 1 • Issue 4 • Level 1

Ages 3–6 years

Dear Educator,

We are delighted to bring you Issue 4 of **engage** magazine. We are dedicated to offering you the best in educational value. With this issue, we have updated our teaching guide. We realize that this guide is vital to the success of **engage** in your classroom.

So, with this issue we are improving our science instruction program. Through the magazine, we have given students unparalleled depth in content, exposure to real scientists doing real science and connections to the real world. As important as reading about science is, it is not doing science. Starting with this issue, the teaching guide will give you an instructional plan that incorporates hands-on activities and experiments. You will find that these activities provide real-life experiences with science and will help your students become even more successful.

In this issue, you will find three new stories. The first story, 'The Five Senses,' looks at how different kinds of animals use the five senses humans have. Some animals use their sensory organs in different ways than humans do. They also have some different sensory organs.

After looking into the eye, students will travel the world to look at different kinds of penguins. The penguins in the story allows students to learn about the variety of living things that live on Earth. Penguins have a variety of external body features and behaviours that allow them to live in different habitats.

Our last story is based on the water batteries that Sonam Wangchuk invented. You might remember him as the inspiration for the Bollywood film, *3 Idiots*. Wangchuk used basic math and science to fight the effects of global warming in Ladakh. Students will see how he used science to solve real-world problems.

Your next issue will be available at the beginning of January 2018!

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MEET THESE STANDARDS

✓ **LANGUAGE ARTS**
— Students will identify the main idea of the story, and use two out of the five senses to create a story of their own.
— Students will describe the connection between two ideas in the text.
— Students will analyze textual information to understand how man-made inventions can solve real-life problems.

✓ **LIFE SCIENCE**
— Students will understand that the senses enable animals and humans to learn about the world around us.
— Students will understand that the form of an animal and its body part determines its function.
— Students will understand that asking questions and making observations are important parts of the scientific process.

✓ **MATH**
Students understand that solid geometric shapes have different properties.

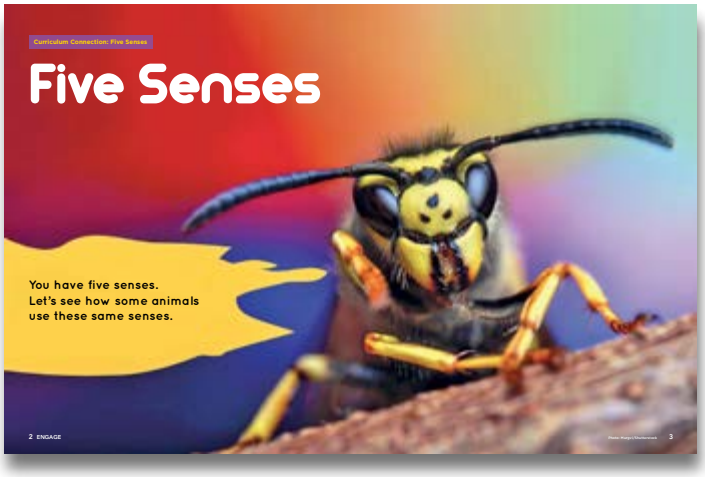
FIVE SENSES

LANGUAGE ARTS OUTCOME

Students will identify the main idea of the story, and use two out of the five senses to create a story of their own.

SCIENCE OUTCOME

Students will understand that the senses enable animals and humans to learn about the world around us.



CURRICULUM CONNECTIONS

'Five Senses' will help students develop their skills in identifying the main idea in a piece of writing. When reading informational texts, identifying a main idea is one of the most important skills they must learn. By pinpointing the main idea, students will improve their comprehension and know to look for ideas that support the main idea. This will improve their reading skills.

BUILD BACKGROUND

Hold up a copy of **engage** magazine so that students can see the cover. You may want to walk around the classroom so that all students can see it. Ask students to look at the image on the cover, identify the creature and then describe it. The teacher can ask guiding questions about the image. For example, is this a familiar image? Do you see this where you live? Do you see any creatures such as this where you live?

The image on the cover is of a hornet hoverfly, one of the largest and most impressive flies in Britain. The hoverfly looks like a dangerous, stinging hornet but is actually harmless.

Ask questions about flies – how many kinds of flies do students know about. There are houseflies, and fruit flies. What distinguishing features do flies have? By looking at this image, how many of the five senses can the students talk about? The eyes for sight, the mouth, and the legs are the three most obvious. Students may point out the long antennae with segments. Some students may comment on the yellow colour, which is actually part of the stripes on the body. The fly may look ferocious, but it is harmless, unlike many kinds of hornets. It is named after the hornet because of its body colouring, which keeps predators away. Use this background to introduce the five senses in humans, and then the five senses in different species of animals.

You can use this story and all the stories in this issue for guided reading. That way you can prompt and support students as they read the article. You can also check their comprehension as they read.

'Five Senses' builds background knowledge about animal and human biology as part of the curriculum. By reading the article, students will learn that different animals have senses just like we do, but the senses they have prepare them for the environment in which they live.

MAKE A MIND MAP

To help students identify the main ideas in the story, have them create a visual mind map of the five senses. Have students discuss the main ideas under the following prompts. The first few are done for you, fill in the table after reading pages 2-13. When students are finished, ask therm what the overarching main idea is. (Humans have five senses.)

Hearing	Smell	Touch	Taste	Sight
An elephant hears with large ears and its feet	A snake has two ways to sniff…			
A fennec fox has big ears to cool it…	A komodo dragon…			
I hear with my ears. My ears are…	Set far back			

ACTIVITY 1: Sense Organiser

This activity will help children understand how their five senses work.

1. Do a quick review of all the five senses, using the prompts from **engage** magazine, and have the class identify their own five senses. Make a list on the board and use the prompts below to discuss the five senses.

Discussion Prompts

- The Five Senses: We learn about the world through our five senses.
- The sense of sight helps us recognize each other and we learn about color, movement and distance.

Hearing	Two ears
Smelling	One nose
Touching	Skin - how can I measure that?
Tasting	One tongue
Seeing	Two eyes

- The sense of hearing helps us learn from each other through communication. Sound can produce patterns.
- The sense of touch helps us learn about our world by feeling it and learning about the size, texture and shape of things.
- The sense of smell helps us enjoy life and helps us learn about unsafe conditions.
- Taste helps us, among other things, to select and enjoy food.

Use certain common physical objects, and ask the class to identify which senses they use to perceive the object. Some examples:

- Flower
- Crayon
- Clay
- A piece of music
- A piece of chocolate

(To expand this activity, add your own objects.)

Discussion point: It is quite possible that we perceive an object using more than one sense at a time. Did any of the students talk about more than one sense for the same object? This can lead to understanding that we have different ways in which we perceive the world. For some of us, one sense may work more than the others.

ACTIVITY 2: What's In The Box?

Making sound boxes is a fun experiment that requires students to concentrate on their sense of hearing. All you need for this simple activity is a variety of small objects and empty boxes, cans, or other containers. Place one or more objects (for example, pennies, marbles, rice, paper clips) inside the container without showing your students, and ask them to identify the objects inside by their sound as you move the container.

To simplify the experiment or to have your students work with each other in pairs, give the students identical sets of objects. They may then take turns placing a group of objects inside the container for a partner, and the partner may examine the objects he or she has while listening in order to guess which one might be inside.

ACTIVITY 3: More Than One At A Time

We can learn more about the world if we use our five senses at the same time.

You need:

- pieces of orange, carrot, celery, melon, grapefruit, potato, apple, pear, banana, with the peel of each cut off; wrap each piece of fruit in a piece of paper napkin; write the name of each fruit or vegetable on cards
- blindfolds for ⅓ of the children in the class

To do:

1. Do not show the students the food or tell students which foods you are using; tell them that they are to identify each food using only one sense at a time.
2. Blindfold one group of students (about ⅓ of the class) and give them a combination of three wrapped pieces of food (for example, apple, pear, potato) to identify by smell only.
3. After identifying the foods by smell, the children pick out the cards with the names of the foods they guessed, open the packages and check the results.
4. Next, blindfold another group (about ⅓ of the class) and give them another combination of three wrapped pieces of food to identify by touch only.
5. After identifying the foods by touch, and selecting the appropriate name cards, the children open the packages and check the results.
6. The last group does not wear blindfolds. Give this group the three wrapped pieces of food to identify by touch, smell and appearance. They, too, select the appropriate name cards. They may consider tasting the food as well.

Discussion

- Which group of children was able to identify the foods most easily? Why?
- If this had been a contest, would it have been fair to award the prize to the last group? Why?
- What does this activity tell you about the way we learn if we use our five senses?
- Which foods were the easiest to guess? Why?
- Which foods were the hardest to guess? Why?

ACTIVITY 4: Write A Story

After completing all the activities, use **engage** magazine to help the students build their own story. In the magazine there are pictures of different animals. Ask the students to identify which animals use two senses together in their environment. For example, the elephant hears the leaves on the ground in the forest with large ears, and feels the ground with its feet. The butterfly tastes the food on a flower with its feet. But it also lands on a colourful flower which it sees as it flies above.

There are ten beautiful animal pictures in the magazine. Use these pictures, and divide the class into ten groups. Let them look at the picture and create a story about the animal. They must tell a story in which the animal uses at least two of its senses. Can they then relate this to how they use two senses themselves? Ask them to underline the story's main idea.

LIST OF ANIMALS

PAGE NO.	ANIMALS
2-3	Hornet hoverfly
4	Elephant
5	Fennec Fox
6	Snake
7	Komodo dragon
8	Crocodile
9	Spider
10-11	Butterfly
12	Chameleon
13	Zebra

EXTENSION

Have the students bring pictures of animals or draw animals, and create a "sense wall" in five different parts of the classroom. Talk about the overlap or the use of more than one sense at a time.

HOW YOUR EYE WORKS

https://www.youtube.com/watch?v=ZH8L3i-qxuE

One option is to play the video above, and have the class follow how the eye works by placing their fingers on pages 14 and 15 of the magazine.

ACTIVITY 5: Eye Care

Objective: Students list different ways of caring for their eyes.

You need:

Magazine photos of people wearing glasses

To do:

1. Use magazine photos to make a display showing people wearing glasses.
   - — Are there famous entertainers or politicians shown?
   - — How does wearing glasses change how people look? What do glasses make them look like?

2. Discuss how we can take good care of our eyes. List examples, such as using protective gear during sports and on the playground, and avoiding dangerous toys and pointed objects. Students can brainstorm a list of ways to keep eyes safe.

3. Organize an eye examination for your class. Ask the school nurse for her assistance.

PENGUIN PUZZLES

LANGUAGE ARTS OUTCOME

Students will describe the connection between two ideas in the text.

SCIENCE OUTCOMES

Students will understand that the form of an animal and its body part determines its function.

CURRICULUM CONNECTION

Scientific investigation

Many different kinds of organisms live in different habitats. This story introduces students to one of these animals, penguins. The story tells students about some of the different kinds of penguins and the body features that have in common.

BUILD BACKGROUND

Ask students to discuss what they already know about penguins. Be sure to guide the conversation so that students understant that penguins are a kind of bird. You could discuss that penguins cannot fly, but use their wings as flippers to swim in water. You could also discuss the similarities and differences between penguins and other kinds of birds with which students are familiar. Then copy and hand out the Crack the Code - Penguin Facts worksheet and have students complete it.

READY TO READ

After building background, read the article with students. Depending on their reading abilities, you can use guided reading or assign students to read the story independently.

AFTER READING

One of the ways in which **engage** can be effectively used with young readers is with the help of the many pictures that complement the text. Use the worksheet below as a first understanding. This will also give you an insight as to what the students are most interested in learning.

https://ecdn.teacherspayteachers.com/thumbitem/Penguins-FREEBIE-Read-Respond-2921919-1489962809/original-2921919-3.jpg

ACTIVITY 1: Body Shape

After students finish reading, prompt them to answer the following questions. After they have finished, ask them if they had any other questions that were not answered in the text.

1. How do penguins move on land? What does the author say about how they look? Do you agree? Why or why not?
2. How do penguins move in water? Why do they need to go into the water? What does the author say about how they look? Do you agree? Why or why not?
3. How are penguins different from each other? Teacher prompts for this would be shape, size, colour and habitat.

Have the students open **engage** to page 22. Allow them to investigate the body parts labeled in the picture, and talk about how the penguin's body parts can help the penguin swim in the water.

Extension: Students can investigate the different penguins on pages 20 and 21 and verify the body parts. The teacher can bring pictures of different species of penguins and make a visual display of form and function of body parts. Add the fact that some penguins live in icy environments and hence the body can also be used for sliding on ice.

Body Part	Form	Function	Land or Water
Shape of the body	Tapered and streamlined	Swimming	Water
Tail	Short and wedge-shaped	Maintains streamlined shape for swimming	Water
Webbed feet	Set far back	Upright position for walking	Land
Wings	Look like flippers	Modified for swimming	Water
Eyes	Sharp on either side	Hunt fish	Water
Beak	Long	To eat fish	Land

ACTIVITY 2: How Do Penguins Stay Dry?

A. Young children relate better when the discussions are linked to their own lives. Begin this part of the investigation with the following introduction.
ASK:

- How many of you swim?
- What do you wear for swimming?
- What is the material made up of?
- Why don't you swim in a T-shirt, school uniform, jeans?
- How much time do we spend in the water?
- What happens to our bodies?

B. Conduct an inquiry in the classroom with the question:

- How much time do you think penguins spend in the water?
- How do you think penguins stay dry?

Divide students into groups and have them think about these two questions. Take responses and have a little discussion first.

Some facts for the teacher to build on the discussion:

— The average amount of time a penguin spends on land varies by species. Estimates say some penguins spend up to 75% of their time in the water.
— For a young child, talk about 75% as being a part of the day: if you sleep 8 hours in a day, then you are awake for 16 hours, and 75% of that is 12 hours. You come to school for an average of six hours in a day.
— Imagine being in the water for double the amount of time that you are in school. You would have to work real hard at staying dry.

C. Explain to students that they will do an activity to find out how penguins stay dry.

Instruct students to turn to page 23 of their copies of the magazine and follow the instructions. Make sure to hand out the items that students will need to conduct the activity. You may want to have students work in pairs or small groups.

Crack the Code - Penguin Facts

Name: _____ Date: _____

Crack the Code to find the answer to the questions about penguins.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

1.) What do penguins eat?

11	18	9	12	12	,	19	17	21	9	4	, and	6	9	19	8

2.) What is the smallest species of penguin called?

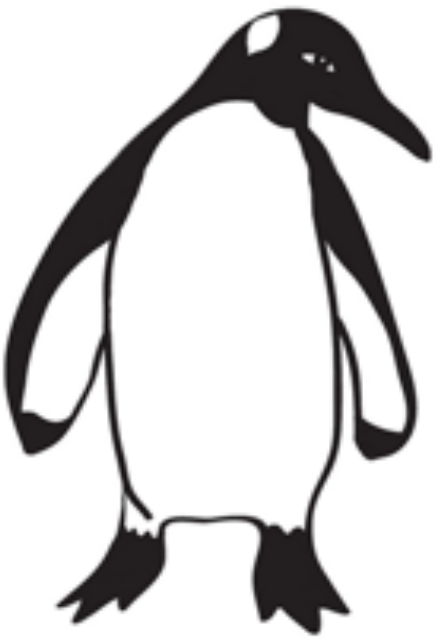
12	9	20	20	12	5		2	12	21	5		16	5	14	7	21	9	14

3.) How fast can some penguins swim?

6	9	6	20	5	5	14		13	16	8

4.) How many different species of penguins are there?

14	9	14	5	20	5	5	14



Name: _____

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I.7

Penguins

Directions: Draw and write about how you used the illustrations in the text.

I read	I saw

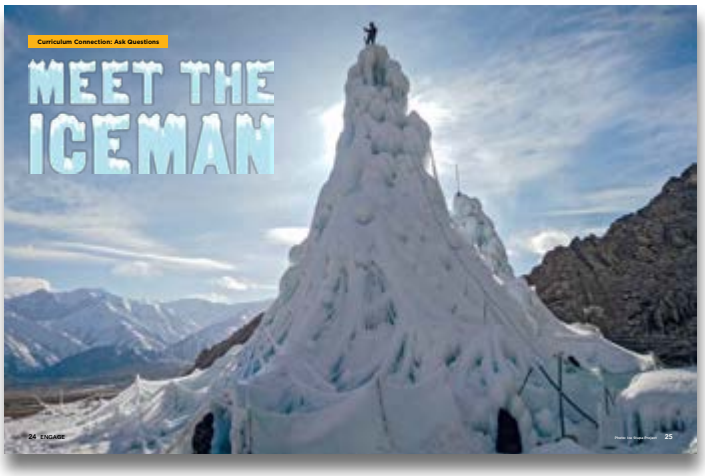
I Learned

MEET THE ICEMAN

LANGUAGE ARTS OUTCOME
Students will analyze textual information to understand how inventions can solve real-life problems.

MATH OUTCOME
Students understand that solid geometric shapes have different properties

SCIENCE OUTCOME
Students will understand that asking questions and making observations are important parts of the scientific process.



CURRICULUM CONNECTION

Students will practice their critical reading skills to carefully read text for comprehension. The text they will read supports your math and science curriculum. They will learn that different solid geometric shapes have different properties, and that these shapes can be used for different purposes. They will also learn that asking questions and making observations are part of the scientific process. Finally, students will learn that science can be used to solve problems.

BUILD BACKGROUND

Direct students to turn to pages 24-25 of **engage**. This spread is a wonderful way to begin an inquiry lesson by looking at the image. Ask the students to raise questions about this spread:

- What does the main image look like?
- What is it made up of?
- How large is it?
- Who is on the top?
- Who is an "iceman"?
- Would you like to meet him?
- What did the iceman do and why?

You can use the links below to show students two short videos about how the ice stupas were built. Both these videos are less than a minute long and can engage young children effectively. It is important to show these videos in class so that the students understand that there was a problem caused by climate change, and hence Sonam Wangchuk decided to find a solution for this problem.

— **Ice stupa, a Solution for Water Storage** https://www.youtube.com/watch?v=09SHwyp75rQ

— **The Science Behind Ice Stupas** https://www.youtube.com/watch?v=I7bH8A2EyxI

There is also a 4-minute video, **Can Ice Stupas Solve the Water Crisis in the Himalayan Desert?** https://www.youtube.com/watch?v=kptgonELj00

READY TO READ

After showing the videos, direct students to read pages 26-31 in their copies of the magazine. Have the students read the text and ask questions about a problem, and how one solution was found using local resources.

When reading the text, use the following prompts:

1. Describe the landscape in Ladakh.
2. What was the area like in the past?
3. Identify what the problem is – climate change reduced the number of glaciers, and these are mainly on the top.
4. Think about the solution that Sonam Wangchuk found. What did he do? He first observed what was happening, then he used pipes to carry water. He then found a way to make the water freeze in the cold climate.
5. Have the students perform a role-play using material from the text. Characters: Sonam Wangchuk, farmers, people who live in Ladakh who want the food, tourists, government.
6. Sonam Wangchuk has received a Global Award for sustainable architecture in 2017, along with other awards. Do you think he deserves such an award? Why?

7. Ask students draw a picture in which they meet Sonam Wangchuk.

AFTER READING

ACTIVITY 1: Geometric Shapes

In this activity, students will learn about different solid geometric shapes.

Question: Why did Sonam Wangchuk use a conical shape to build his ice stupa?

Show students pictures of the following shapes: a cylinder, a cube, a cuboid, a cone and a sphere.

Ask students:

- Which of the shapes roll?
- Which shapes do not roll?
- How are the shapes similar and how are they different?
- Can you point to the corners, sides and faces of each solid figure? (*Response for cone*: It is round at one end and comes to a point at the other. It has only one corner and one edge.)
- Why is this important for the design of the ice stupa?

If you have large models of each of these shapes, they can be placed together, and you can put a drop of water on top of each solid shape. The water will roll down only from the top of the cone. It may roll down from the sphere, but then the sphere is not a stationary structure – it rolls. Since the sphere rolls, it is not an ideal shape to store water. The cone is.

ACTIVITY 2: Solid Shapes in the Classroom

Ask students to look around the classroom to find examples of the 3-dimensional shapes they have been studying. Have the students label each object to show its geometric shape. They can make labels on index cards by drawing a simple outline of the shape, writing the name of the solid on the card, or pasting the matching name and shape cards from the 'Shape Cards Sheet' and 'Name Cards Sheet'.

ACTIVITY 3: Solid Shapes Outside the Classroom

Take the class on a walk around the school to identify space figures in the environment. For each one they find, have them say whether it's man-made or natural. If they have a camera, students can take photographs to record the location of each figure and use these photos to make a bulletin board display.

Picture	Name	Corners	Edges