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About higher-order thinking skills

Teachers report that their curricula are lacking in materials that help students learn to think critically. This book provides practice applying higher-order thinking skills in English, maths, science, and humanities and social sciences contexts.

What are higher-order thinking skills?

They are not the skills—such as alphabetising or calculating a perimeter—used in specific academic subjects. Rather, they are skills used across all curriculum areas and in non-academic situations; the skills for making use of information.

In this book, higher-order thinking skills are represented by behavioural verbs. Each page focuses on one behavioural verb, which is defined at the top of the page. Each behavioural verb is emphasised in the instructions so students become aware of when and how they are using the thinking skill.

Why is it important to practise higher-order thinking skills?

Teachers may debate which is the most important curriculum area or skill in school, but some things are widely accepted by teachers and academics alike:

- Students need well-developed thinking skills to be successful in the classroom, during assessments and in the real world.
- Students can learn to think better if they’re taught how to do so.
- Critical thinking skills are more important than ever in today’s competitive, rapidly changing, technology-based environment.

Young children naturally use thinking skills. They learn autonomy through exploration, observe their environment using logic and reasoning, try new things and think creatively. As children grow and enter an academic setting, some of their natural curiosity and problem-solving instincts are not engaged as often as they could be.

While all thinking skills are important, students generally get ample practice with recall, recognition, identification and comprehension. Therefore, this book focuses on thinking skills that are more challenging to incorporate. These include analysing, predicting, modelling, composing, organising, evaluating options, designing, critiquing and problem-solving.

People with strong critical thinking skills can accomplish a great deal, whether or not they have background knowledge in a topic. Critical thinkers know how to acquire new knowledge and how to approach problem-solving. They also know how to persevere and use productive struggle to find an answer.

Higher-order thinking categories

Behavioural verb	Page	Page title	Cross-curricular link
analyse	16	At the garage sale	Science
	25	Number pyramids	Mathematics
	79	Synonym mix-up	English
	90	Sweet treats	Mathematics
	105	Colourful spinners	Mathematics
	114	Where am I?	Geography/Mathematics
	145	Rectangle challenge	Mathematics
apply	46	Talent show	Health and Physical Education/Civics and citizenship
	57	Pictures say it all	Geography
	70	Fishy problems	Mathematics
	99	Crack the riddle	English
	114	Active endings	English
	138	A word chain	English
arrange	35	Magnetic sums	Mathematics
assemble	50	Beanbag bop	Mathematics
	64	Rhyme time	English
assess	156	Magic maths	Mathematics
brainstorm	96	A different sense	Science
	126	Twist and shout	Science
categorise	118	Inventions and discoveries	Science
classify	26	Whose responsibility is it?	Civics and citizenship
	26	Playful exercise	Health and Physical Education
	56	Zoo on the loose	Science
	135	Meara's mirrors	Mathematics
compare	63	Mapuche and Atacama	Geography
compile	55	Which house?	Mathematics
compose	14	Sound pairs	English
	49	A triangle poem	English
	58	Making music	Geography/English
	89	Catchy cinquains	English
	159	Lively limericks	English

Behavioural verb definitions

analyse: to look at closely for patterns and relationships

apply: to use what you know in a new way

arrange: to put in place to meet a goal

assemble: to put parts together

assess: to figure out whether something is correct

brainstorm: to think of ways to solve a problem or gather ideas

categorise: to name a group

classify: group by attribute or characteristic

compare: to look for things that are the same or different

compile: to gather information together

compose: to write creatively

connect: to put things together to use them

create: to make something new

critique: to tell what is good and bad about something

decide: to choose after thinking

deduce: to use facts to figure something out

demonstrate: to show how to do something

describe: to tell the features of something

design: to plan how something will look

determine: to figure out using facts or what you observe

distinguish: to tell the difference between things

evaluate: to judge carefully

examine: to look at closely

experiment: to try doing things to see what works

explain: to give good reasons for your thoughts or for what you did

formulate: to produce by thinking carefully

generate: to make something

give an example: to show one thing in a group

group: to put things with the same features together

hypothesise: to make a good guess based on reasons

illustrate: to represent in a picture

imagine: to see an idea or picture in your mind

Talent show

apply: to use what you know in a new way

Read about Glen and Lucy. Then read about and **apply** the talent show rules.

Lucy has received the applications for the school talent show and has to make decisions about which acts are allowed to enter based on the talent show rules. Out of all the applications, there were only three that Lucy wasn't sure about.



Read Robin's, Glen's and Jessica's applications, then **apply** the talent show rules to each application.

Robin—Singing Robin wants to sing a 90-second segment of her favourite song. She printed out and attached the lyrics to her application, which included the opening verse and the chorus. The song was about environmental protection but included some rude words that may offend people.

Glen—Joke telling Glen wants to tell four jokes, each expecting to last 25 seconds. He has a puppet that he will bring along and use to help him tell the jokes. Lucy doesn't like to help him tell the jokes. Lucy doesn't like the jokes he had chosen because although they were appropriate she didn't find them funny.

Jessica and friends—Performing Jessica and her friends want to perform a short play based on *The three little pigs*. The script they provided was divided into five parts—the introduction, the first house, the second house, the third house and the conclusion. Each part is expected to take 30 seconds to perform.

Talent show rules

1. Performance time is a maximum of two minutes.
2. All acts must provide the music/instruments, props and costumes required for their performance.
3. Appropriate and respectful outfits/costumes must be worn.
4. Inappropriate content and/or language will not be tolerated.
5. You must provide a written copy of your speech, jokes, script, lyrics or music notes prior to applications closing.

1. Should Robin be allowed to perform her song? Explain why or why not.

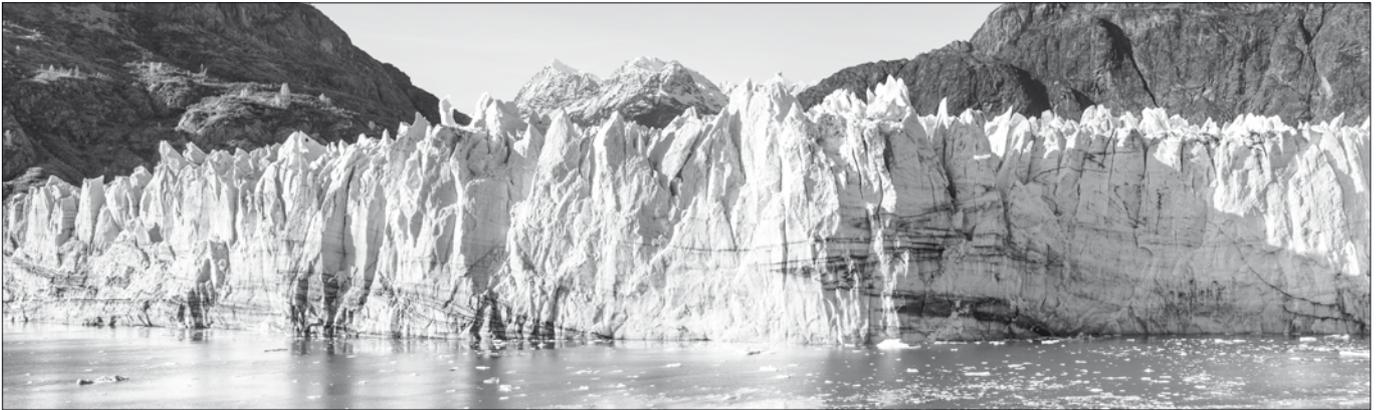
2. Should Glen be allowed to tell his jokes? Explain why or why not.

3. Should Jessica and her friends be allowed to perform their play? Explain why or why not.

The slowest rivers

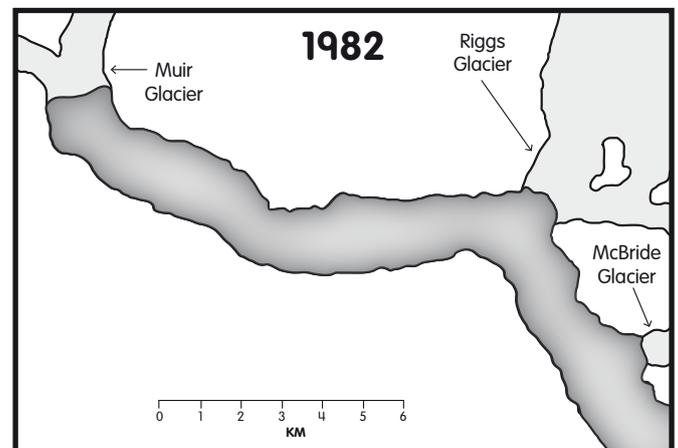
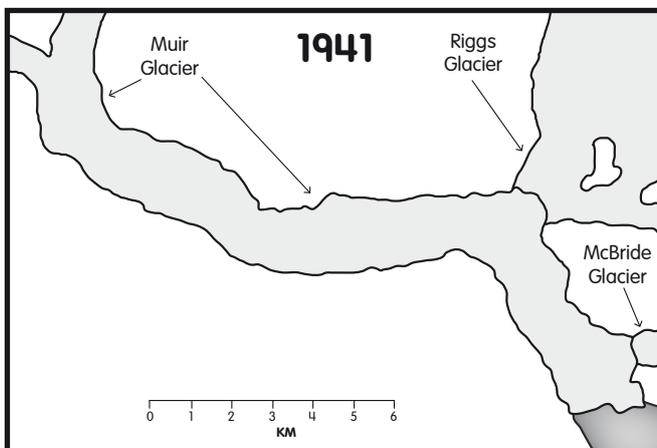
predict: to tell what will probably happen

Read the text, study the maps and complete the items.



Glaciers are rivers of ice that move so slowly that you can't see them move. Most glaciers have been crawling along for thousands of years! Glaciers hold about $\frac{3}{4}$ of Earth's freshwater and cover $\frac{1}{10}$ of Earth's surface. When the river of ice meets a warmer body of water, a big chunk falls off into the water and becomes an iceberg. As bodies of water gradually become warmer, the chunks fall off sooner, which shortens the length of the glacier.

The maps show some glaciers that flow toward Glacier Bay in Alaska.



1. How are the maps different? _____

2. What do you **predict** is happening to the water level of Glacier Bay? _____

3. Think about communities that are near a shore. How do you **predict** they are

affected when glaciers melt? _____

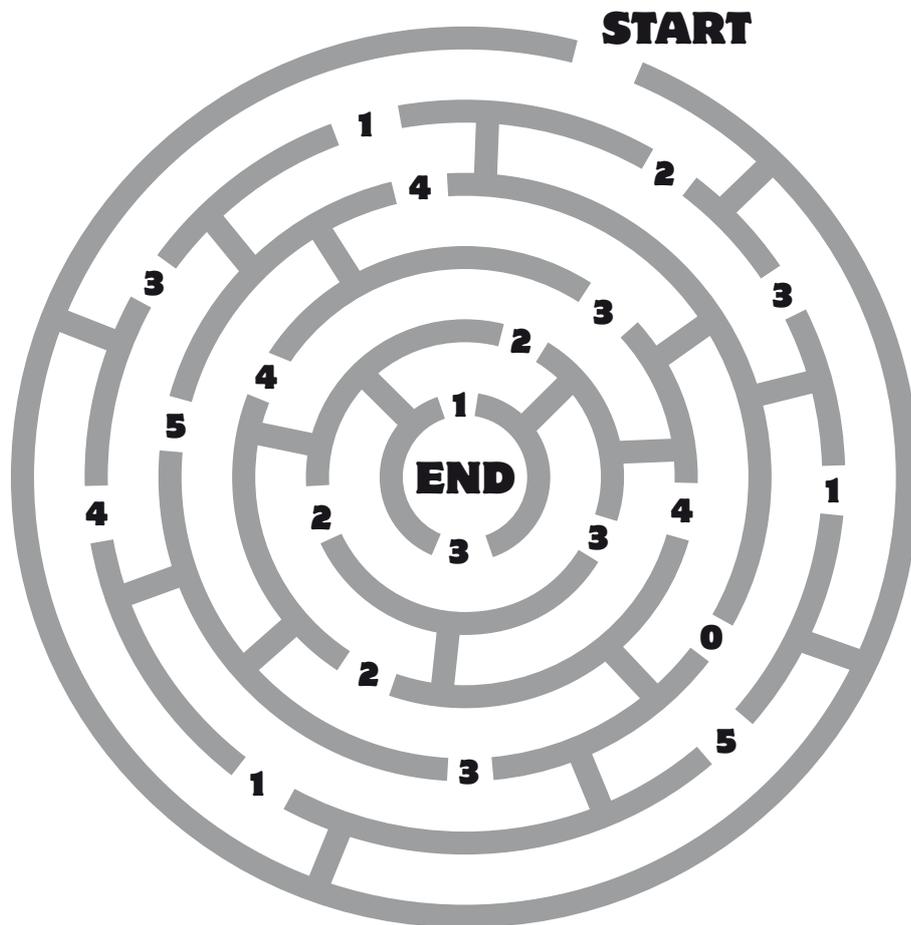
Marble maze

experiment: to try doing things to see their effect

Filbert and Fiona are playing a marble maze game. Read the rules.

Rules

- Put a marble in the 'start' space at the top.
- Turn the game to guide the marble along the maze paths.
- A player can cross through a space only once per turn.
- A player's turn ends when the marble reaches the 'end' space in the middle.
- Multiply the numbers that are in each space the player crossed through for a total score.



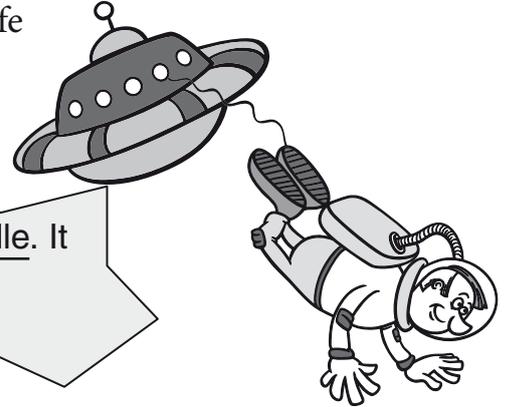
1. Filbert earned 24 points his first turn. Find the path his marble took. Colour the path green.
2. Fiona wants to beat Filbert's score. **Experiment** to find a path that earns more points. Colour it purple.
3. How many points did Fiona earn? _____

Alien reports

describe: to tell the features of something

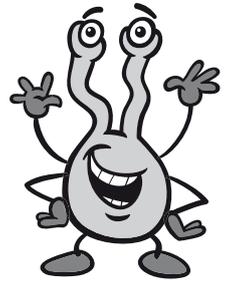
Suppose you were an astronaut on the lookout for alien life forms. You could use similes to **describe** what you see. A simile compares two things using the words *like* or *as*.

Mission Control, I see an alien! It's as big as a poodle. It has a snout that's shaped like a trumpet. It has a bulge on its head that looks like an antenna.



Underline the simile in the sentence.

1. Mission Control, I see an alien with eyes that look like worms.
2. It has six limbs that are as thin as the legs of an insect.
3. Its body is as round as a potato.



Complete the sentence with a simile to **describe** the alien.

4. Its eyes and upper limbs sway in the air _____.
5. I think the alien is friendly because its grin is _____.

Draw your own alien in the space at the right, then **describe** it using at least three similes.

6. _____

