

Mathematics level 3

Measurement and Geometry

Example: Measurement

A rectangular prism has a base of area 12 cm^2 and a height of 2 cm.

A second rectangular prism has a base area equal to the first but is double the volume.

What is the height of the second rectangular prism?

- A 2 cm
- B 4 cm
- C 24 cm
- D 48 cm

ANSWER B: 4 cm

Students select option A: as they may automatically think as the base area is the same, so is the height OR they misread the problem and think the 2 cm, means double the height.

Students select option C: as they may find the volume of the first prism OR may find double the area of the base.

Students select option D: as they may find double the volume of the prism.

COMMENTARY

Students are required to read and interpret a word problem for a 3D model. Students could approach the problem by drawing a diagram (if required), finding the volume of the first prism and then doubling to find the volume of the second prism. They then need to divide by the base area to find the new height.

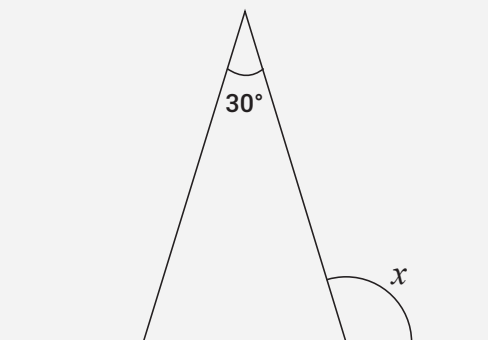
Alternatively, students may have an understanding that if the volume doubles, and the base area remains the same, then the height must double.

Example: Geometry

This triangle is isosceles.

What is the value of angle x ?

- A 75°
- B 105°
- C 150°
- D 180°



ANSWER B: 105°

Students select option A: as they find the value of the two unknown interior angles.

Students select option C: as they may find $180^\circ - 30^\circ$.

Students select option D: as they may think all angles around a straight line equal 180° , so that is the missing value.

COMMENTARY

Students are required to understand the term isosceles. They need to find the value of the missing internal angles, $180^\circ - 30^\circ = 150^\circ$ and then divide by 2. Students then need to find the missing angle around a line, $180^\circ - 75^\circ = 105^\circ$, to find the missing angle.

Mathematics level 3
Number and Algebra

Example: Number

What number is exactly halfway between

$\frac{1}{4}$ and $\frac{7}{12}$?

- A** $\frac{4}{8}$
B $\frac{4}{12}$
C $\frac{5}{12}$
D $\frac{11}{12}$

ANSWER C: $\frac{5}{12}$

Students select option A: as they may think $\frac{7}{12} - \frac{1}{4} = \frac{6}{8}$ and half of $\frac{6}{8}$ is $\frac{3}{8}$. Therefore $\frac{1}{4} + \frac{3}{8} = \frac{4}{8}$

Students select option B: as they may find the difference between $\frac{1}{4}$ and $\frac{7}{12}$ as $\frac{4}{12}$. But not find halfway.

Students select option D: as they may find the difference between $\frac{1}{4}$ and $\frac{7}{12}$ and add this to $\frac{7}{12}$.

COMMENTARY

Students are required to understand the term 'halfway'. They need to recognise that the fractions have different denominators. Students then need to find the difference between the fractions $\frac{4}{12}$, and then halve this amount $\frac{2}{12}$ and then add to the smallest fraction $\frac{1}{4}$.

Example: Algebra

What rule do the values in this table follow?

- A** $y = 2x + 4$
B $y = x + 1$
C $y = 3x - 1$
D $y = x + 3$

x	y
1	2
2	5
3	8
4	11
5	14

ANSWER C: $y = 3x - 1$

Students select option A: as they may substitute the value $x = 5$ into the equation, and find that it is equal to 14, and they don't check any other pairs of values.

Students select option B: as they may substitute the value $x = 1$ into the equation, and find that it is equal to 2, and they don't check any other pairs of values.

Students select option D: as they may substitute the value $x = 2$ into the equation, and find that it is equal to 5, and they don't check any other pairs of values.

COMMENTARY

Students are required to identify the correct rule for the table. Students could either substitute values into the equations, such as $x = 1$, to check if $y = 2$, and they should do this for a number of pairs of values.

Mathematics level 3

Statistics and Probability

Example: Statistics

The average (mean) height of Andrew, Bryan and Calum is 157 cm.

Andrew's height is 152 cm.

Bryan's height is 153 cm.

What is Calum's height?

- A 153 cm
- B 154 cm
- C 157 cm
- D 166 cm

ANSWER D: 166 cm

Students select option A: as they may think Calum's height will be the same as Bryan's height (the tallest given).

Students select option B: as they may think Calum's height is 1 cm more than the tallest given height OR may add the 3 numbers given and divide by 3.

Students select option C: as they may think Calum's height is the average height OR misread the question.

COMMENTARY

Students are required to read and understand the word problem about average (mean) height. Students could reason that as the two given heights are less than the average then Calum's height must be greater than the average.

Alternatively, students could use the formal calculation, $\frac{152 + 153 + \text{Calum}}{3} = 157$ and solve to find the missing value.

Example: Probability

Alice has a bag containing 24 counters of different colours

The chance of drawing a red counter from the bag is $\frac{1}{2}$

She removes some of the red counters and replaces them with counters of a different colour.

The chance of drawing a red counter from the bag is now $\frac{1}{6}$

How many red counters did Alice remove from the bag?

- A 3
- B 4
- C 8
- D 12

ANSWER C: 8

Students select option A: as they may find $6 \div 2$ (from the fractions).

Students select option C: as they may find $\frac{1}{6}$ of the total number of counters.

Students select option D: as they may find $\frac{1}{2}$ of the total number of counters.

COMMENTARY

Students are required to read and interpret a worded problem. They need to find the number of red counters, initially $\frac{1}{2}$ of 24, and finally $\frac{1}{6}$ of 24, and then find the difference between the two.

Reading level 3

Critique and Review

Snowboarding

The following texts are taken from an Internet blog on winter sports.

Post by Kat

8:27 pm

In his earlier post, Thom argued that snowboarding should be restricted to special areas of ski resorts because it is dangerous. The statistics he presented may appear to add weight to his argument, but they fail to give the whole picture.

The increase in accidents involving snowboarders is predominantly due to the sheer popularity of the sport. Although I do not have the figures to back this up, I am sure all users of this blog would agree that the participation rate in snowboarding has increased massively in the last ten years. A natural consequence of this is more incidents on the slopes involving snowboarders.

Another reason is the increase in traffic in general. As the world gets richer, more and more people can afford to spend their money on holidays in the mountains. This means there are now more people on the slopes than ever before; accidents, unfortunately, are inevitable. I agree that something needs to be done to make the slopes safer, but singling out snowboarders is not the answer. A more sensible approach would be for ski lift operators to offer discounted ticket prices to encourage people to visit the slopes at off-peak times. This, perhaps, would reduce the number of people on the slopes at any one time.

Although I do not dispute the accuracy of the statistics presented in Thom's post, I believe he has interpreted them in a way that is most convenient to him.

Post by Stefan

8:35 pm

Another explanation for the statistics is the increasing number of skiers who try out snowboarding because they think it looks cool. They have lots of confidence on snow but very little idea about how to handle a snowboard, and their inexperience and reckless approach often puts them into tricky situations from which they lack the skills to safely escape. Accidents involving these code-switchers distort the statistics and give genuine snowboarders a bad name. And it is often these people who, because of bad personal experiences, harp on about how dangerous the sport is. I suspect that Thom is one of these people.

Stefan tries to persuade his readers by

- A providing objectivity.
- B focusing on the bigger picture.
- C making a personal attack.
- D encouraging debate.

Answer: C. making a personal attack.

Explanation

This question requires students to recognise a subtle rhetorical device used in a persuasive text. The rhetorical technique used is often referred to as *argumentum ad hominem*: an argument that attacks a person instead of arguing against the position that person has taken on an issue. Stefan's post is attempting to persuade readers to dismiss Thom's previous post about snowboarding safety because, in Stefan's opinion, Thom is likely to be a 'code-switcher' with 'inexperience' and a 'reckless attitude'.

In order to recognise this subtle persuasive device used by Stefan, the student must first identify that Stefan's argument is based on negatively stereotyping 'skiers who try out snowboarding because they think it looks cool.' Stefan labels these people 'code-switchers' and claims they give 'genuine snowboarders a bad name'. This deliberate negative stereotyping is evident in the divisive language Stefan uses and the generalisations he makes about this alleged sub-category of people who 'harp on about how dangerous the sport is' only because of their 'bad personal experiences'.

After the student has recognised this negative stereotyping, the student must reflect on this information to identify that Stefan is using a personal attack strategically in order to persuade the reader. This realisation leads the student to the only correct answer to the question.

Text complexity

This text takes the form of two comments on a blog about winter sports. Depending on a student's experiences, blogs and winter sports may be unfamiliar contexts. There is additional complexity in the vocabulary and style of the writing. The tone of the first comment is quite formal, and there are many complex sentences. The post is also a persuasive text and is structured accordingly. The second post is less formal, but still includes difficult vocabulary and complex sentence structures. The vocabulary of the whole text is not technical but it is difficult, for example: 'predominantly', 'participation rates', 'code-switchers' and 'inevitable'.

An additional complexity is that the two comments are presented without the context of the original post that they are refuting. They refer to an earlier post by Thom, but the reader can only infer that post's content from what these two comments say about it.

Reading Level 3

Reflecting on the Text

Reflect on form

The following passage come from a children's story book version of Peter Pan, called Peter and Wendy, written by J.M. Barrie and published in 1911. In the passage, Mr and Mrs Darling are considering whether they may need to offer their newborn baby – Wendy – up for adoption, as was common at the time.

For a week or two after Wendy came it was doubtful whether they would be able to keep her, as she was another mouth to feed. Mr. Darling was frightfully proud of her, but he was very honourable, and he sat on the edge of Mrs. Darling's bed, holding her hand and calculating expenses, while she looked at him imploringly. She wanted to risk it, come what might, but that was not his way; his way was with a pencil and a piece of paper, and if she confused him with suggestions he had to begin at the beginning again.

"Now don't interrupt," he would beg of her.

"I have one pound seventeen here, and two and six at the office; I can cut off my coffee at the office, say ten shillings, making two nine and six, with your eighteen and three makes three nine seven, with five naught naught in my cheque-book makes eight nine seven—who is that moving?—eight nine seven, dot and carry seven—don't speak, my own—and the pound you lent to that man who came to the door—quiet, child—dot and carry child—there, you've done it!—did I say nine nine seven? yes, I said nine nine seven; the question is, can we try it for a year on nine nine seven?"

"Of course we can, George," she cried. But she was prejudiced in Wendy's favour, and he was really the grander character of the two.

Mr Darling is presented as being

- A intentionally cruel.
- B hopelessly optimistic.
- C bossy and patronising.
- D fussy, but well-meaning.

Answer: D. fussy, but well-meaning

Explanation

The skill this question requires is to link pieces of related but potentially competing and contradictory information about a character to form an accurate impression of him. Mr Darling's tone, behaviour or intentions could – at various, isolated moments in the text – plausibly be interpreted in any of the ways suggested in the options above. However when taken together, and when certain clues as to his relationship and manner with his wife are taken into account, his conduct is revealed to be little more than nervous, well-intentioned worry, and so (D) is correct.

Text complexity

With some exceptions, (e.g. 'imploringly'), the vocabulary demands of the passage are relatively low for this level. However the meaning of words like 'honourable', and certain phrasing such as 'frightfully proud' or 'the grander of the two', reduces the stylistic familiarity of the passage. Mr Darling's long, densely-worded calculation of pre-decimal currency – interspersed with un-narrated references to his being interrupted – could be difficult for the reader to follow or derive meaning from. Yet this long paragraph of disjointed monologue adds importantly to the author's characterisation of him.

Reading level 3

Finding Information

Wild Food Guide: Dandelions



Many people today are interested in learning more about the wild foods their forebears used to gather when times were hard. One plant that Europeans and early settlers in America knew how to get full value from was the dandelion. The flowers, leaves and roots are all edible and can be used in a variety of ways. The blossom can be fried like a fritter and the petals and leaves can be added to salads. The leaves can also be boiled and served hot or added to soups and stews. The root can be dried, roasted, ground and used as a substitute for instant coffee. Dandelions are a good source of vitamin C and potassium.

Why, you might ask, did such a nutritious and versatile plant fall out of favour? One theory is that people associated foraging for wild food with being poor, but the answer is more likely to be that dandelions have a very bitter taste. The bitterness is contained in the milky white juice found in all the green parts of the plant. You can leach this out by boiling the leaves in water for several minutes and then draining the water away. Picking new leaves also helps because these contain less bitter juice than the older leaves. Plants that grow in damp, shady conditions are often less bitter than plants growing in full sun.

Some people used to disguise the bitter flavour by rolling the leaves in fatty pieces of bacon or by cooking them in olive oil. (Fat tends to coat the tongue and helps to stop the bitter flavour getting to the taste buds.) People also vary greatly in their sensitivity

to bitterness. It all depends on the number of bitter taste buds they have on their tongue. For some people, the taste of dandelion leaves is so bitter nothing can ever hide it, but for others, bitterness is a taste they barely notice. If you are interested in eating dandelions, there are many recipes and helpful hints available from modern dandelion foragers on the Internet.

FRITTERED FLOWERS**Ingredients:**

- 24 dandelion blossoms – remove all the green parts
- 1 cup plain flour
- ½ teaspoon each of thyme, marjoram, sage and paprika

1. Mix flour and seasonings in a bowl.
2. Rinse the dandelion flowers in water and cover them in the flour mixture.
3. Coat the bottom of a frying pan in oil and set over medium heat. Fry the flowers in the oil. Turn them until they are golden brown on all sides.

The fritters taste best served fresh and hot.

Note:

Be careful where you pick dandelions to eat. Do not pick dandelions that have been sprayed with weed killer or that are growing on roadsides or in polluted areas.

According to the text, how is the dandelion root used?

- A It is grated to make a salad.
- B It is powdered to make a drink.
- C It is boiled to make a soup.
- D It is fried to make fritters.

Answer: B. It is powdered to make a drink.

Explanation

This question requires students to locate and recognise a reworded version of information in the text, while dealing with ambiguity. The relevant part of the text is located in the first paragraph: 'The root can be dried, roasted, ground and used as a substitute for instant coffee.' The sentence can potentially be misinterpreted as four different ways of using the root, instead of a sequence of processes. The key for the student is to recognise that the writer's choice to use the conjunctive 'and' instead of the disjunctive 'or', helps to resolve the ambiguity.

Once the any ambiguity is resolved, the student has to equate 'dried, roasted, [and] ground' with 'powdered'. This relies on the student's familiarity with 'powder' as a verb, but this level of vocabulary knowledge is expected for students performing at this level.

In addition, there is low-level competing information from the uses of the other parts of the plant in the same paragraph. However, at Band 12, this type of competing

information is unlikely to significantly contribute to the question's difficulty.

Text complexity

There are familiar aspects to this text along with substantial complexities. There are two sections with familiar structures: a prose information section, and a recipe. However, there is no transition between the sections, and understanding the link between them requires linking explicit information between the two texts that is not in a prominent position.

Dandelions may not be a familiar plant, or a student may know the plant by a different name. Even if the student knows the plant, eating it may be new, unfamiliar information. There is also some vocabulary that may be unfamiliar, for example: 'foraging' and 'foragers', 'forebears', 'taste buds', 'fritter', or 'leach'. Unfamiliar content and vocabulary add to the complexity of texts at this level.

Reading level 3

Finding Information

Wild Food Guide: Dandelions



Many people today are interested in learning more about the wild foods their forebears used to gather when times were hard. One plant that Europeans and early settlers in America knew how to get full value from was the dandelion. The flowers, leaves and roots are all edible and can be used in a variety of ways. The blossom can be fried like a fritter and the petals and leaves can be added to salads. The leaves can also be boiled and served hot or added to soups and stews. The root can be dried, roasted, ground and used as a substitute for instant coffee. Dandelions are a good source of vitamin C and potassium.

Why, you might ask, did such a nutritious and versatile plant fall out of favour? One theory is that people associated foraging for wild food with being poor, but the answer is more likely to be that dandelions have a very bitter taste. The bitterness is contained in the milky white juice found in all the green parts of the plant. You can leach this out by boiling the leaves in water for several minutes and then draining the water away. Picking new leaves also helps because these contain less bitter juice than the older leaves. Plants that grow in damp, shady conditions are often less bitter than plants growing in full sun.

Some people used to disguise the bitter flavour by rolling the leaves in fatty pieces of bacon or by cooking them in olive oil. (Fat tends to coat the tongue and helps to stop the bitter flavour getting to the taste buds.) People also vary greatly in their sensitivity

to bitterness. It all depends on the number of bitter taste buds they have on their tongue. For some people, the taste of dandelion leaves is so bitter nothing can ever hide it, but for others, bitterness is a taste they barely notice. If you are interested in eating dandelions, there are many recipes and helpful hints available from modern dandelion foragers on the Internet.

FRITTERED FLOWERS**Ingredients:**

- 24 dandelion blossoms – remove all the green parts
- 1 cup plain flour
- ½ teaspoon each of thyme, marjoram, sage and paprika

1. Mix flour and seasonings in a bowl.
2. Rinse the dandelion flowers in water and cover them in the flour mixture.
3. Coat the bottom of a frying pan in oil and set over medium heat. Fry the flowers in the oil. Turn them until they are golden brown on all sides.

The fritters taste best served fresh and hot.

Note:

Be careful where you pick dandelions to eat. Do not pick dandelions that have been sprayed with weed killer or that are growing on roadsides or in polluted areas.

According to the text, what is one problem with eating dandelions today?

- A Too much potassium is not good for you.
- B Too many people are allergic to dandelions.
- C Some dandelions are exposed to chemicals.
- D Some types of dandelions are poisonous.

Answer: C. Some dandelions are exposed to chemicals.

Explanation

The key information to answer this question appears in a note below the information section of the text:

Note: Be careful where you pick dandelions to eat. Do not pick dandelions that have been sprayed with weed killer or that are growing on roadsides or in polluted areas.

The complexity comes from the student having to deal with extensive competing information because the relevant information is not in a prominent location. Notes might be overlooked when scanning a text because their function is often to provide extra information or clarification rather than main ideas. Students may focus on scanning the main text for the information. Not only will they be unsuccessful in locating the answer there, they will also find only competing information.

Depending on the student, the vocabulary may also add some complexity, however, matching 'weed killer' and

'pollution' to 'chemicals' is a level of complexity consistent with this Band.

Text complexity

There are familiar aspects to this text along with substantial complexities. There are two sections with familiar structures: a prose information section, and a recipe. However, there is no transition between the sections, and understanding the link between them requires linking explicit information between the two texts that is not in a prominent position.

Dandelions may not be a familiar plant, or a student may know the plant by a different name. Even if the student knows the plant, eating it may be new, unfamiliar information. There is also some vocabulary that may be unfamiliar, for example: 'foraging' and 'foragers', 'forebears', 'taste buds', 'fritter', or 'leach'. Unfamiliar content and vocabulary add to the complexity of texts at this level.

Reading level 3

Interpret Meaning

Wild Food Guide: Dandelions



Many people today are interested in learning more about the wild foods their forebears used to gather when times were hard. One plant that Europeans and early settlers in America knew how to get full value from was the dandelion. The flowers, leaves and roots are all edible and can be used in a variety of ways. The blossom can be fried like a fritter and the petals and leaves can be added to salads. The leaves can also be boiled and served hot or added to soups and stews. The root can be dried, roasted, ground and used as a substitute for instant coffee. Dandelions are a good source of vitamin C and potassium.

Why, you might ask, did such a nutritious and versatile plant fall out of favour? One theory is that people associated foraging for wild food with being poor, but the answer is more likely to be that dandelions have a very bitter taste. The bitterness is contained in the milky white juice found in all the green parts of the plant. You can leach this out by boiling the leaves in water for several minutes and then draining the water away. Picking new leaves also helps because these contain less bitter juice than the older leaves. Plants that grow in damp, shady conditions are often less bitter than plants growing in full sun.

Some people used to disguise the bitter flavour by rolling the leaves in fatty pieces of bacon or by cooking them in olive oil. (Fat tends to coat the tongue and helps to stop the bitter flavour getting to the taste buds.) People also vary greatly in their sensitivity

to bitterness. It all depends on the number of bitter taste buds they have on their tongue. For some people, the taste of dandelion leaves is so bitter nothing can ever hide it, but for others, bitterness is a taste they barely notice. If you are interested in eating dandelions, there are many recipes and helpful hints available from modern dandelion foragers on the Internet.

FRITTERED FLOWERS**Ingredients:**

- 24 dandelion blossoms – remove all the green parts
- 1 cup plain flour
- ½ teaspoon each of thyme, marjoram, sage and paprika

1. Mix flour and seasonings in a bowl.
2. Rinse the dandelion flowers in water and cover them in the flour mixture.
3. Coat the bottom of a frying pan in oil and set over medium heat. Fry the flowers in the oil. Turn them until they are golden brown on all sides.

The fritters taste best served fresh and hot.

Note:

Be careful where you pick dandelions to eat. Do not pick dandelions that have been sprayed with weed killer or that are growing on roadsides or in polluted areas.

Anya ate some dandelion leaves that were covered in olive oil. They still tasted very bitter. The most likely explanation for this is that Anya

- A did not wrap the leaves in fatty bacon pieces.
- B should have covered the leaves in flour as well.
- C did not coat her tongue with oil first.
- D has many bitter taste buds on her tongue.

Answer: D. has many bitter taste buds on her tongue.

Explanation

This question requires students to identify where one idea is a generalised version of another. The relevant information in the text spans three sentences in the second paragraph:

‘People also vary greatly in their sensitivity to bitterness. It all depends on the number of bitter taste buds they have on their tongue. For some people, the taste of dandelion leaves is so bitter nothing can ever hide it, but for others, bitterness is a taste they barely notice.’

To arrive at the correct answer, the student must make the connection between the main idea of these sentences, which is the general form, and an altered form of the same idea: the specific case of Anya. The main idea of the three sentences above is that people sensitive to bitterness will always taste bitterness because they have many bitter taste buds. Anya tastes the bitterness despite trying to

mask it with oil, so she must be sensitive to bitterness and so have many bitter taste buds. It is the same idea, but presented differently.

Text complexity

There are familiar aspects to this text along with substantial complexities. There are two sections with familiar structures: a prose information section, and a recipe. However, there is no transition between the sections, and understanding the link between them requires linking explicit information between the two texts that is not in a prominent position.

Dandelions may not be a familiar plant, or a student may know the plant by a different name. Even if the student knows the plant, eating it may be new, unfamiliar information. There is also some vocabulary that may be unfamiliar, for example: ‘foraging’ and ‘foragers’, ‘forebears’, ‘taste buds’, ‘fritter’, or ‘leach’. Unfamiliar content and vocabulary add to the complexity of texts at this level.

Reading level 1

Vocabulary

While on his holiday, James had acquired a camera.

What had James done?

- A fixed a camera
- B lost a camera
- C bought a camera
- D dropped a camera

Answer: C. bought a camera

Reading level 3

Vocabulary

Finish this sentence by selecting the correct option.

Something that is incontrovertible

- A is beyond doubt.
- B cannot be changed from its original form.
- C has been weakened.
- D is difficult to make a decision about

Answer: A. is beyond doubt.

Level 2

Vocabulary

Three of the words below have almost the same meaning. One word has a **different meaning**. Select the word that has a **different meaning** from the other three words

- A commission
- B order
- C request
- D receive

Answer: D. receive

Level 2

Vocabulary

The words below mean that something **lasts for a long time**, or **lasts for a short time**.

Drag each word to the appropriate box.

lasts for a long time

lasts for a short time

temporary - transitory - enduring -
momentary - durable - constant

Answer:

lasts for a long time

lasts for a short time

enduring
durable
constant

temporary
transitory
momentary