

Ämnesprov, läsår 2016/2017

Mathematics

Lärarinformation

Självbedömning
Instruktioner (elev)
Berättelsen

ENGELSK VERSION

Årskurs

3

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1. Genomförande av delprov A

Delprov A är en muntlig uppgift som genomförs i grupper om 3–4 elever.

Tabell 1: Praktisk information

Delprov/Del	Tidsåtgång	Material
Delprov A	20–30 minuter per elevgrupp inklusive instruktioner	Kopieringsunderlag samt instruktioner Underlag Redovisning av klassens undersökningar Fyra begreppskort Fyra påståenden

Beskrivning av delprovet

Nedan finns instruktioner för genomförandet av delprov A, som handlar om problemlösning och att resonera kring uppgifter inom statistik.

Genom undervisningen i ämnet matematik ska eleverna sammanfattningsvis ges förutsättningar att utveckla sin förmåga att

- formulera och lösa problem med hjälp av matematik samt värdera valda strategier och metoder
- använda och analysera matematiska begrepp och samband mellan begrepp
- föra och följa matematiska resonemang
- använda matematikens uttrycksformer för att samtala om, argumentera och redogöra för frågeställningar, beräkningar och slutsatser.

Uppgifterna kan hänföras till följande delar av kunskapskravet:

- Eleven kan lösa enkla problem i elevnära situationer genom att välja och använda någon strategi med viss anpassning till problemets karaktär. Eleven beskriver tillvägagångssätt och ger enkla omdömen om resultatens rimlighet.
- Eleven har grundläggande kunskaper om matematiska begrepp och visar det genom att använda dem i vanligt förekommande sammanhang på ett i huvudsak fungerande sätt. Eleven kan beskriva begreppens egenskaper med symboler, konkret material och bilder. Eleven kan även ge exempel på hur några begrepp relaterar till varandra. Eleven har grundläggande kunskaper om naturliga tal och kan visa det genom att beskriva tals inbördes relation [...]. Eleven visar grundläggande kunskaper om tal i bråkform genom att dela upp helheter i olika antal delar samt jämföra och namnge delarna som enkla bråk. [...] Eleven kan även använda och ge exempel på enkla proportionella samband i elevnära situationer.
- Eleven kan beskriva och samtala om tillvägagångssätt på ett i huvudsak fungerande sätt och använder då konkret material, bilder, symboler och andra matematiska uttrycksformer med viss anpassning till sammanhanget. Eleven kan dessutom vid olika slag av undersökningar i välkända situationer avläsa [...] enkla tabeller och diagram för att sortera och redovisa resultat. Eleven kan föra och följa matematiska resonemang [...] samt om resultatets rimlighet [...] genom att ställa och besvara frågor som i huvudsak hör till ämnet.

Utrustning för eleverna

Inga hjälpmedel behövs.

Organisation av genomförandet på skola

Eleverna ska arbeta i grupper om 3–4 elever. Tänk igenom på vilket sätt grupperna sätts samman så att eleverna har störst möjlighet att visa sina kunskaper på bästa sätt. Om läraren bedömer att det är lämpligare för någon elev att genomföra delprov A enskilt med läraren är det möjligt. Man bör dock vara medveten om att det begränsar elevens möjlighet att föra resonemang. För att kunna följa elevernas arbete kan enbart en grupp observeras åt gången. Bedömningsunderlaget finns på s. 42 i häftet *Bedömningsanvisningar*. Markera i bedömningsunderlaget för varje elev vad hon/han visar. Använd ett bedömningsunderlag för varje grupp.

Det kan vara svårt att hinna med att skriva ned vad eleverna samtalar om. Ett bra sätt är att spela in elevernas samtal. Om det inte finns möjlighet att spela in är det viktigt att läraren under tiden eller direkt efteråt skriver ned vilket kunnande eleven visat. För att uppmuntra kommunikationen mellan eleverna och ge alla elever möjlighet att komma till tals, är det viktigt att följdfrågor ställs. Exempel på följdfrågor finns under Genomförande vid provtillfället s. 6–7. Det som ska sägas till eleverna står inom citationstecken.

Lärarens förberedelser

Läs igenom *Lärarinformation* och *Bedömningsanvisningar* för delprov A innan delprovet genomförs med eleverna. En förutsättning för delprovets genomförande är att läraren är väl insatt i hur uppgiften ska genomföras och hur elevernas prestationer ska bedömas. Därför kan det vara lämpligt att pröva uppgiften och bedömningsunderlaget tillsammans med kollegor innan den genomförs med elever.

Klipp ut begreppskort och påståenden.

Varje grupp behöver:

- underlag Redovisning av klassens undersökningar
- fyra begreppskort
- fyra påståenden

På följande sidor finns genomförandet beskrivet. Dessa sidor kan med fördel kopieras för att ha med som stöd för läraren vid genomförandet.

Information till eleverna inför provtillfället

“In this task, you are going to work together and reason and discuss with each other. To reason and discuss means that you will be thinking out loud together, describing what it is you are thinking and why. It is important that everyone in the group participates and that you show what you are able to do in mathematics. The pupils in Nova’s and Troj’s class have done various surveys. There are 24 pupils in the class. This is how they present the results of their surveys.”

Genomförande vid provtillfället

I denna uppgift är det viktigaste att eleverna får möjlighet att kommunicera och resonera med varandra, inte att komma fram till rätt svar.

Instruktion till läraren

Moment 1

1. Lägg fram underlaget *Presentation of the class surveys* på bordet.

“Look at the presentations together.” Låt eleverna få tid att samtala med varandra.

Exempel på frågor:

- What do you see?
- Have you seen this before?

2. Dela ut korten med begrepp till var och en av eleverna och läs dem samtidigt högt.

“The presentations have different names. Place the right card under the right presentation.”

Exempel på frågor:

- Explain why you choose to put that card under that presentation.
- Do you all agree?

Moment 2

“To get to know what surveys the class has done, you will be given different statements.”

3. Dela ut påståendena till var och en av eleverna och läs dem samtidigt högt.

“Place your statement next to the survey that you think fits best.”

Om eleverna lägger fler påståenden vid samma undersökning, låt det få vara så tills de beslutar något annat.

“Now you are going to reason and discuss whether the statements are placed by the right surveys. You are going to arrive at a mutual decision.”

Under tiden som eleverna diskuterar ska läraren observera dem för att få underlag till sin bedömning. Om en elev inte deltar eller får tillräckligt med talutrymme i gruppen är det viktigt att detta uppmärksammas och att en fråga riktas direkt till berörd elev. När eleverna har kommit fram till var de har valt att placera påståendena behöver eleverna motivera sina val.

Exempel på frågor:

- Explain why you choose to put that statement under that presentation.
- Do you all agree?

4. Läs påståendena som eleverna placerat vid respektive undersökning.

Exempel på frågor du kan ställa för att stödja eleverna i resonemanget/diskussionen:

- Is that right?
- Is there anything in the statement that allows us to be certain?
- How many are one half?
- How many are one quarter?
- Where can you find 3, 9 and 12?

5. Om mer underlag för bedömning behövs finns följande frågor att använda:

- What could it say below each bar in the bar chart?
- What could it say in the pie chart?
- What was the temperature on Wednesday/Saturday?
- On which days was it the same temperature?
- On which day was the temperature the lowest?
- How many went to school in a way other than bicycling or walking?
- How many pieces of fruit did the pupils eat in total over the whole week?
- Which headings would fit the different surveys?

The story – Speed at Lilla Bromsen!

Introduction

It is theme week at Nova's and Troj's school and the theme is traffic. Their class will go on a trip to a place in town called 'Lilla Bromsen.' They will be there every day for the entire week and can take lunch from school with them. Lilla Bromsen has most things related to vehicles, traffic and speed. They will for example visit a bike repair shop, a scrapyard, Fordonstekniska museet. If they ever get there..., they are starting to get impatient now. They have talked about traffic and vehicles all week. They have learnt about different road signs, how an engine works, how reflectors work and that the traffic rules are different in different countries.

"Imagine if you were in England and had to drive," says Troj. "Then you would have to drive on the opposite side of the road to Sweden."

"Yes, on the left side, in left-hand traffic," answers Nova. "It would probably be very difficult if you are used to driving in right-hand traffic."

"At one point there was left-hand traffic in Sweden," says Troj.

"What?" says Nova surprised. "Really?"

"Yes," says Troj. "Didn't you know that? The change to right-hand traffic was made on a Sunday in September, I think it was in 1967."

"Why did they change from left to right?" wonders Nova.

"Most countries in Europe had right-hand traffic and it was thought that it would be safer for everyone to drive on the same side. The steering was also in the same place as it is now and when people drove on the left side as they did in the past, then they didn't see as well when they overtook other cars. Now you can see much better when you overtake other cars."

"Well, that sounds smart," says Nova.

"Hmm, but that was not actually what the Swedish people thought. They voted no in a referendum," answers Troj.

"What!?" says Nova surprised. "They voted no? And it was still changed to right-hand traffic? Then it must have really been important," says Nova.

"Yes, after all it was about safety," answers Troj. "Otherwise they wouldn't have gone against the referendum."

"No, of course not," answers Nova and tries to imagine what it would be like to wake up one day and suddenly have to bike on the opposite side of the road.

Part B

"Welcome to the scrapyard!" says one man as he opens the gate of Nisse's scrapyard for old cars for the class. The ground is sandy and a little depressing. There is rubbish and scrap everywhere.

"My name is Nisse and this is my scrapyard. Now as you enter I want you to look around and tell me what you can see."

"Rubbish!" screams someone.

“Scrap!” says another.

“Sand!” says a third. And it continues like that; Buildings!... Signs!... Grating!... Cars!

“Do you know what I can see?” asks Nisse. The children shake their heads and shrug their shoulders.

“The same thing...?” suggests Nova.

“I see a world of opportunities! For example, this,” he says and picks up a rim, “could be a pretty ceiling lamp. Or this,” he says, and rummages in one of the scrap heaps. He picks up a small gadget which neither Nova nor Troj have any clue about what it is. “It could be a part of a small, small remote-controlled helicopter. All you need is a propeller, and everything else of course.” The children don’t see scrap anymore. They don’t see an old rusty car – it is in fact a really cool bed. They neither see a broken box nor lots of worn out tyres – they see the start of a soapbox car.

They stay for a long, long time with Nisse at the scrapyard. They get to build and build until they simply can’t continue anymore, and they still build a little more, even though they don’t have the energy, just because it is so much fun and Nisse is so nice.

Part C

You would imagine that on the top floor of the multistorey car park a lot of cars are parked in long rows, but that is not the case. You can’t park on the top floor of the multistorey car park. There is a big park there. A park with grass and bushes and flowers, right in the city centre. Nova and Troj have never seen such a good, secret place. It almost feels like a magical place.

“Look! A fairy ring!” screams Emma.

“What do you mean by fairy ring?” wonders Fadime.

“A ring with mushrooms – a fairy ring. It is magical, because mushrooms don’t grow in such a perfect circle on their own, do they?” Emma explains that you can become invisible if you walk backwards in the fairy ring, or are you supposed to walk outside the fairy ring? Emma doesn’t remember and she can neither remember how many laps you have to walk. The classmates walk lap after lap and Nova and Troj watch until Nova looks as though she is on to something. Then Troj gets an idea and he thinks that Nova has the same idea. They look at each other and nod.

“Maybe it doesn’t work if you are watching!” yells Nova.

“If you shut your eyes then we can try,” suggests Troj.

“But then you will see each other,” says Fadime in a confused tone.

“We can also shut our eyes, we have a good sense of balance,” answers Nova.

“Turn around so that you don’t cheat and peep, otherwise we will never get to know if it works,” says Troj. He goes and stands in the circle, then he shuts his eyes. The classmates turn around and shut their eyes at the same time as Nova, who is already standing in the circle with her eyes closed, starts to walk back.

“Are you ready yet?” asks Oscar after a while.

“Hello?!” yells Emma. Fadime slowly opens her eyes.

“They are gone!” she screams. Everyone else opens their eyes and looks around. Nova and Troj have really disappeared.

“Have you disappeared, are you invisible or are you just hiding?” asks Oscar straight out in the air.

“Wouldn’t you like to know, huh?” teases Troj. Oscar can’t hear where the voice is coming from and turns around.

“Come on!” yells Fadime. “We’re searching!” Then the hunt is on and everyone helps in the search. Everyone except Emma, who says that Nova and Troj are invisible and that they will appear when they walk in the right direction in the fairy ring again. Nova and Troj watch and giggle, but after a while they almost start wondering themselves whether they are just hiding or whether they have actually become invisible.

“It’s probably best that we show ourselves now,” they say to each other.

Part D

Nova is standing in Funpark with her eyes shut. She doesn’t really have the courage to look. Her entire body is tense and her heart is beating fast. It is too exciting. Nova doesn’t know what to do with herself, so she is keeping her eyes shut but she can still hear the entire class counting.

“128! 129! 130!”

Nova peeps through her fingers. Troj is jumping there in front of her on the trampoline. She doesn’t know the names of the tricks he is doing. It looks really cool. Cool but difficult. Now he spins an entire round and does it again. Again and again and again. He has managed to do different jumping tricks 130 times in a row. It must be some sort of record. Nova gets nervous, she closes her eyes and takes two deep breaths. Suddenly she realises that the class is not counting anymore, they are cheering instead. When she opens her eyes again she can see Troj. He is lying on the trampoline and laughing. She can’t stop herself from laughing either. It just bubbles out of her and she can’t stop. “148!” Troj managed to do jumping tricks 148 times in a row. Wow.

“Did you see what I can do?!” laughs Troj who has crawled down from the trampoline and staggered away towards Nova.

“Oh, are you dizzy?!” laughs Nova.

“I think that the world will never stop spinning,” says Troj and shuts his eyes.

“I hope that it doesn’t,” laughs Nova.

“What do you mean?” asks Troj in a confused tone and tries to look at Nova but gets dizzy again and shuts his eyes.

“The Earth must spin,” explains Nova. “I hope that it doesn’t stop.”

“Aah! I meant that I want to stop being dizzy,” giggles Troj. “You’re crazy Nova.”

“You should be talking, you bouncy ball!” she giggles.

“148 jumps in a row,” sighs Troj and smiles.

“148!” says Nova and feels proud of Troj.

Part E

Fordonstekniska museet is big and it takes a long time to walk through the entire museum. The class keeps stopping in the different departments so that they can see everything. There are so many cool things to look at.

“This is a wind tunnel,” says the museum guide and stops in front of a round glass room which is like a cylinder. “Do you know what you can do inside there?” asks the guide. It says “WIND TUNNEL” in capital letters above the entrance. Everyone is thinking but nobody can make any guesses.

“Is there anyone brave who can imagine demonstrating, despite not knowing what it is?” asks the guide after a while. Before Nova has even had the chance to think about it, her arm has flown right up in the air. She raises her hand! Oh no, what if it is something scary? She becomes a bit nervous.

“Great! Come here so that we can prepare a bit,” says the guide and takes Nova to the side. After a while they come dressed in dungarees and helmets which look like old pilot hats and glasses. They step into the round room and suddenly they fly up! They are flying! Another guide says that in the wind tunnel you can try what parachuting feels like. Nova and the other guide fly around in the glass cage and do small tricks but it looks difficult. Nova laughs and laughs. Finally they come out.

“That was really fun!” says Nova. “It felt like we were flying!”

“You were actually flying,” says Josefine.

“Does anyone else want to try?” asks the guide. Almost all the children raise their hand and get in queue along the glass cage so that they can see everyone flying while they are queuing. Nova removes the attire and stands next to Troj to watch when the others in the class try flying in the wind tunnel.

“It was brave of you to raise your hand so quickly Nova, nobody else dared,” says Troj.

“I didn’t have the time to think that it could be something scary before my arm flew up,” answers Nova, “it just ended up being like that and then I thought that it doesn’t matter if it is something scary... Because after all you can’t be brave if you are not a little scared, and I want to be brave,” says Nova.

“You are brave!” answers Troj as Joar is spinning around in the glass cage and howling with laughter. “Everyone laughs with him. It’s soon my turn,” thinks Troj excitedly.

Part F

Troj is standing and looking up at the climbing wall in front of him. He doesn’t tend to be scared of heights, but the climbing wall is so high. Besides, the ground at the bottom seems hard, very hard. You don’t want to fall there, he thinks. He is standing in queue with his classmates to climb and it is his turn soon. He doesn’t know if he will be able to climb up and he can feel his stomach doing somersaults. But when it is his turn to climb then it feels like everything is happening automatically. He can see how he is lifting his arms and grabbing the wall, and just starts climbing. He climbs all the way up without any problems. Until now. Now he has to go down and it doesn’t feel as easy. Nothing seems to be working automatically anymore. He sits at the edge of the top of the climbing wall, with his back towards his classmates and dangles his legs a little.

“Come on Troj!” Eric yells.

Troj wonders how far down it is until the ground on the other side. He looks backwards above the shoulder down on the climbing wall. Nova has just started to climb down there. He counts to himself.

“One...” He takes a deep breath, it is very far down. “Two...” He takes another deep breath before he eventually decides. And then it all goes quickly. “Three - and - GO!” he says, as if it was one word. Then he lets go, leans forward and falls.

“AAAH!” He screams until he thuds down on a thick mattress on the other side of the climbing wall. He almost bounces up from the mattress and jumps down on the ground.

“Woo-hoo!” he screams and jumps around to the other side again, just in time for Nova to reach the top. After hesitating for a few seconds she also disappears down on the other side of the wall. Troj hears her giggling when she lands on the mattress on the other side. When she comes around the corner he walks up to her.

“Let’s do that again!” he says. Nova nods.

Part G

The class is in P. Dahl’s bike repair shop with Yasmin and Jussi who work there.

“How many of you know how to bike?” asks Jussi. Most of the pupils in the class raise their hand, but not everyone.

“How many of you know what a bike always needs to have according to the law?” asks Jussi. Nobody raises their hand. “Can anyone guess?” asks Jussi. Nova raises her hand.

“Yes, tell us,” says Yasmin and smiles to Nova.

“Breaks?” suggests Nova.

“Exactly!” answers Yasmin. “There is one more thing which a bike always needs to have, what is that?” Nahir raises his hand. Yasmin nods at Nahir to answer while Jussi sneaks out from the repair shop.

“A bell maybe?” suggests Nahir, “so that you can warn others that you are coming.”

“That’s a good guess, completely right. Now let’s move on to a more difficult question. If you bike in the dark, then the bike must have some more things, can you guess what they are?” Yasmin asks the class.

“Lights!” some of the children yell at the same time.

“Yes,” Yasmin answers and waits for more suggestions, but nobody says anything else. “Then I will tell you. In the dark a bike must have a headlight at the front with white or yellow light. The light must be so strong that you can clearly see where you are biking and it should be clearly visible at a distance of 300 metres. You also need to have a tail light at the back with red light which is also clearly visible at a distance of 300 metres. You also need to have reflectors. A red reflector at the back, a white reflector at the front and a white or orange on the side. Why do you think there are so many rules for how a bike should be?” Yasmin asks the class.

“So that we don’t get hurt and bike into a pothole or something like that,” answers Alice.

“Yes, the rules exist for our benefit,” Troj agrees, “but also for everyone else’s benefit. Then they can be careful and we can also be careful. We can see clearly and we are also seen clearly with all the lights and reflectors.” Jussi enters the repair shop again nodding.

“Exactly,” answers Yasmin. “Now that you know how a bike should appear, and why, I thought that we could have some fun. I will divide you into five teams so that you can compete on which team can make the most visible bike.” They walk out to the backyard while Jussi continues to talk about the competition.

“Here you have five bikes, one for each team, and you have lots of different things which you can use to make the bike visible. Reflectors, reflector paint, lamps and bulbs of all colours and shapes. The difficult part of the entire competition is that you will have to fix the bike out here where there is light and when you are done then we will all go into the repair work shop together and switch off the light, then we will see which bike is the most visible. The team with the most visible bike will win! How does that sound?”

All the children start to talk over each other and can barely stand still, while Yasmin divides them into teams and Jussi points out which team will have which bike. This will be a tough competition. Nova and Troj end up in the same team and both already know exactly what they want to do. Nova wants to spray reflector paint everywhere and Troj has seen some cool LED bulbs you can attach to the spokes which create patterns when the tyre spins. They look at each other.

“Let’s go,” they say in chorus.

“Ready, get set, GO!” screams Jussi.

Conclusion

Nova and Troj are sitting on the bus on the way home from Lilla Bromsen. They have been there every day the entire week and they are a little sad that they will not return on Monday. They have had a lot of fun in Lilla Bromsen. Today, on the last day, they spent time with everyone they met throughout the week. They organised tables and benches up in the park on the multistorey car park and they ate lunch together.

During the week the class learnt to view traffic and vehicles in a completely new way. It is no longer only about ways of getting from one place to another. It is also about everything else, about what makes the tyres of a bike spin, that the engine of the car starts, the rules which apply and how road safety really works. Suddenly they know so much and they really feel that they are a part of the traffic and can influence it. It is a cool feeling, a large responsibility, but also a great freedom. A feeling which the entire class can share.

On the way home they take turns to talk about what the traffic signs along the road mean, and they are right about almost all of them.



2. Kopieringsunderlag

I det här kapitlet finns följande kopieringsunderlag att använda vid genomförandet av provet.

- **Kopieringsunderlag 1: Self-assessment – Me and mathematics**

Kopieringsunderlag 1

Self-assessment – Me and Mathematic



Paint the clouds with the colour that best matches how you feel when you are going to ...

Green = sure
Yellow = fairly sure
Blue = not sure

... work out something in your head, for example $20 - 13$

... compare different diagrams

... solve a problem

Me and Mathematics

... know how many hundreds, tens and units there are in the number 197

... measure the length of something

... use a written method of calculation

... explain and continue a pattern

... show which arithmetic operation you are going to use in your working

... know which one of the numbers 91, 98, 95 is closest to 90

