

Pupil projections and implications for teacher resourcing needs in Scotland

Education workforce modelling and research

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A WPI Economics Report for the Scottish Government

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1. Summary

Future teacher resourcing needs in Scotland are expected to be affected by a number of factors, including changing demographics, policy commitments, and resource constraints. This comes in the context of the Scottish Government's 2021 commitment¹ to increase teacher numbers by 3,500 by the end of the current Parliamentary term in 2026. There is also a Scottish Government commitment to reduce teachers' contracted class contact time by 1.5 hours per week by 2026 from the current 22.5 hours.

WPI Economics has been commissioned by the Scottish Government to look at the potential impact of demographic change on pupil numbers in Scotland over the next decade, and the implications for the corresponding teacher resourcing needs. We have built an economic model to provide data-based insights on the future trends of pupil populations by different state school types (primary, secondary, and special). We have also considered different scenarios to project the future teacher resourcing need and compare Scotland with other nations within the UK and internationally in terms of pupil-teacher ratios (PTRs) and teachers' class contact time.

In terms of international comparisons, our research findings are:

- Scotland currently has lower PTRs than other UK nations overall and by school type.
- Internationally, Scotland's secondary school PTR was lower than the Organisation for Economic Cooperation and Development (OECD) average and roughly middle of the pack of the G7 countries in 2021, while its primary school PTR was slightly higher than the OECD average.
- Scotland's statutory contact time was higher than the OECD average in 2020, especially at upper secondary level.

Pupil projections, based on population projections from the Office for National Statistics,² show that the school-age population in Scotland is peaking. It is projected to have reached 770,000 in 2022 and is then expected to decline over the subsequent decade. A deeper dive finds that primary school pupil numbers peaked in 2017, while secondary school pupil numbers are expected to continue increasing until 2025, and the number of special school pupils is expected to peak in 2024.

Meanwhile, the headline figures for teacher numbers show a mild contraction in the workforce for two consecutive years to 2023, with the total number of teachers falling slightly by 252 over the two years³. Given the projections for a declining pupil population, it is important to understand the future teacher resourcing needs in this context under

¹ [Scottish Government \(2021\) 'Programme for Government 2021 to 2022](#)

² [Office for National Statistics \(2023\) 'National population projections: 2020-based interim'](#)

³ [School teachers - Summary statistics for schools in Scotland 2023 - gov.scot \(www.gov.scot\)](#)

different scenarios. We have explored a range of scenarios with the following headline findings:

1. **Maintaining a constant teacher stock:** if the size of the teacher workforce held steady over time, with inflows matching outflows, class contact time could be reduced by 1.5 hours by 2028, and the PTR would continue to fall over time as a result of declining pupil numbers. The class contact time reduction could be enabled across all school types by 2028 if the proportions of primary, secondary and special school teachers were allowed to adjust. Without this adjustment, the rate of reduction in class contact time would be enabled quicker in primary schools than secondary schools.
2. **Enabling a reduction in class contact time:** an increase in teacher numbers will be needed in the short term if a reduction of 1.5 hours per week is to be enabled in all school types by 2026, one year after the expected peak in secondary school enrolments. The year-on-year change in teacher numbers could be smoother if the reduction in class contact time was enabled over a longer time period.
3. **Maintaining the current PTR:** this will reduce the demand for teachers over time to proportionately match the decline in pupil numbers as a result of demographic change. However, maintaining the PTR while enabling a reduction in class contact time would be challenging without making other changes, such as exploring whether some of the teachers currently being used for targeted interventions, such as those doing the Scottish Attainment Challenge (SAC), Pupil Equity Funding (PEF) or COVID recovery work, could teach in classes.
4. **Increasing the PTR:** this would lead to a reduced resource requirement for teachers but could increase class contact time, running counter to the policy commitment.
5. **Increasing the number of teachers:** the Scottish Government's commitment to supporting the recruitment of 3,500 additional teachers by 2026 could drive contact time below the 2026 target of 21 hours per week but could have significant implications for cost and sustainability, and raise questions about whether this delivers maximum value for money.

Bringing the implications of these scenarios together can provide useful insight for teacher recruitment. Focussing on the implications from projected demographic changes – and in the context of constrained public sector budgets – our modelling suggests that a constant, rather than increasing, teacher stock could more closely match expected teacher resourcing needs over the next decade. This could avoid sudden excesses in teacher numbers relative to resourcing needs, while meeting the policy commitment to reduce contact time to 21 hours, albeit by 2028, two years later than planned.

This reduction could be enabled across all school types by 2028 if the proportions of primary, secondary and special school teachers are allowed to adjust (even though the overall number of teachers remain constant). Otherwise, the decline in class contact time could be enabled faster in primary (by 2026) and slower in secondary (by around 2031) with the average reduction being 1.5 hours by 2028.

Scotland's PTR would also reduce over time due to the expected decline in pupil numbers.

Focussing on enabling a reduction in class contact time across all school types by 2026 would require a significant increase in the number of teachers in the short term. This increase in teacher numbers could be reduced if the reduction in class contact time was enabled by 2028.

If a multi-pronged approach were considered (for example, exploring changing the role of teachers being used for targeted interventions rather than in standard classes, to increase the number of classroom teachers without significant recruitment) the class contact time commitments could be met without any reduction in the PTR. However, if the PTR was allowed to increase to 13.7 (the level it was in 2015-16) all else equal, this would lead to an increase in class contact time unless a disproportionately large – and likely infeasibly large – number of teachers being used for targeted interventions had their roles changed.

2. Introduction

We have been commissioned by the Scottish Government to look at the potential impact of demographic change in Scotland over the next decade, and the implications for pupil projections and the corresponding teacher resourcing needs, as well as to compare Scotland with the rest of the UK and internationally in terms of PTRs and teacher class contact time. This report analyses a range of scenarios encompassing different PTRs, class contact time and trends in teacher stocks. The focus of the analysis is on state schools only. The report aims to provide an independent, objective assessment to inform policy direction and resource allocation in education workforce planning to ensure that teacher supply aligns with future pupil demand. While the main body of this report focusses on the national level, we have undertaken illustrative analysis at the local authority level in the annex.

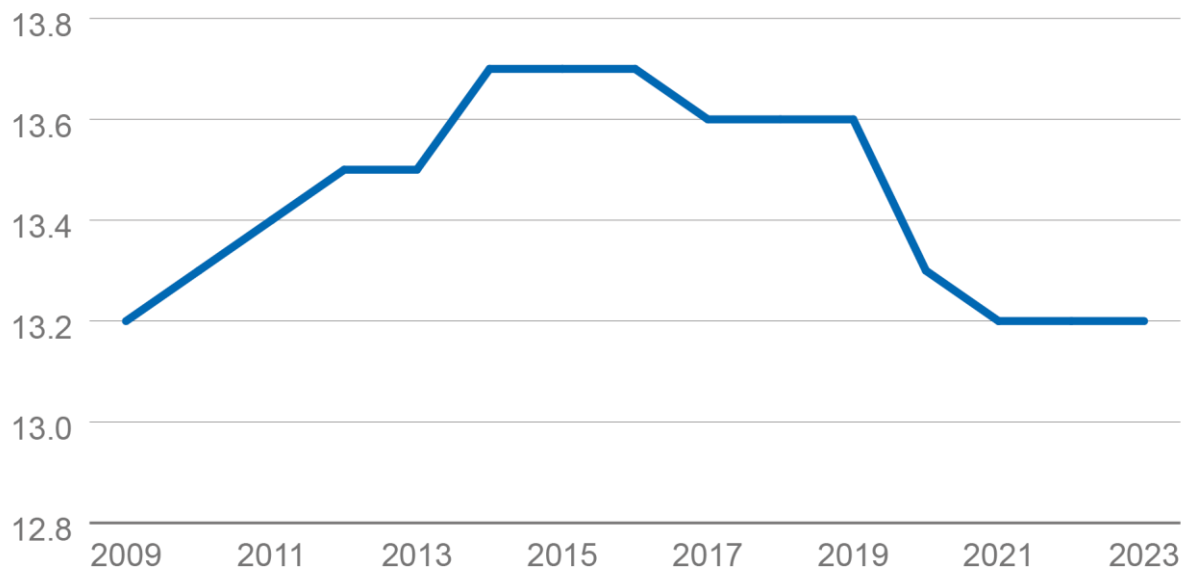
This analysis comes in the context of the Scottish Government's commitment in the Programme for Government 2021: "Over the course of the Parliament, we will provide funding to support the recruitment of at least 3,500 teachers and 500 classroom assistants - over and above the 1,400 recruited during the pandemic - with further funding to enable councils to make these posts permanent. This will give teachers the capacity to reduce contact time by an hour and a half a week which they can use to prepare for lessons, raise standards and undertake professional development."

This work is also set in the context of a challenging financial climate, as set out in the Scottish Government's Medium-Term Financial Strategy⁴ from May 2023: the financial situation facing the Scottish Government continues to be "amongst the most challenging since devolution" with high inflation experienced in recent years expected to have a long-lasting impact on public spending in Scotland.

Meanwhile, the 2023 edition of Summary Statistics for Schools in Scotland shows there are 53,331 full-time equivalent (FTE) teachers (excluding early learning and childcare teachers) in Scotland. Although the number of teachers has fallen slightly for two consecutive years in 2023, the Office for National Statistics' (ONS) 2020-based interim national population projections suggest that the school-aged population (aged 5-17) peaked at around 770,000 in 2022. The overall PTR in Scotland currently stands at 13.2, the lowest level since 2009. This is also the lowest of any of the UK's nations, compared with PTRs of 18 in England, 18.4 in Wales and 17.4 in Northern Ireland.

⁴ [Scottish Government \(2023\) 'Scotland's Fiscal Outlook - The Scottish Government's Medium-Term Financial Strategy'](#)

Graph 2.1: Pupil-teacher ratios in Scotland, 2009-2023

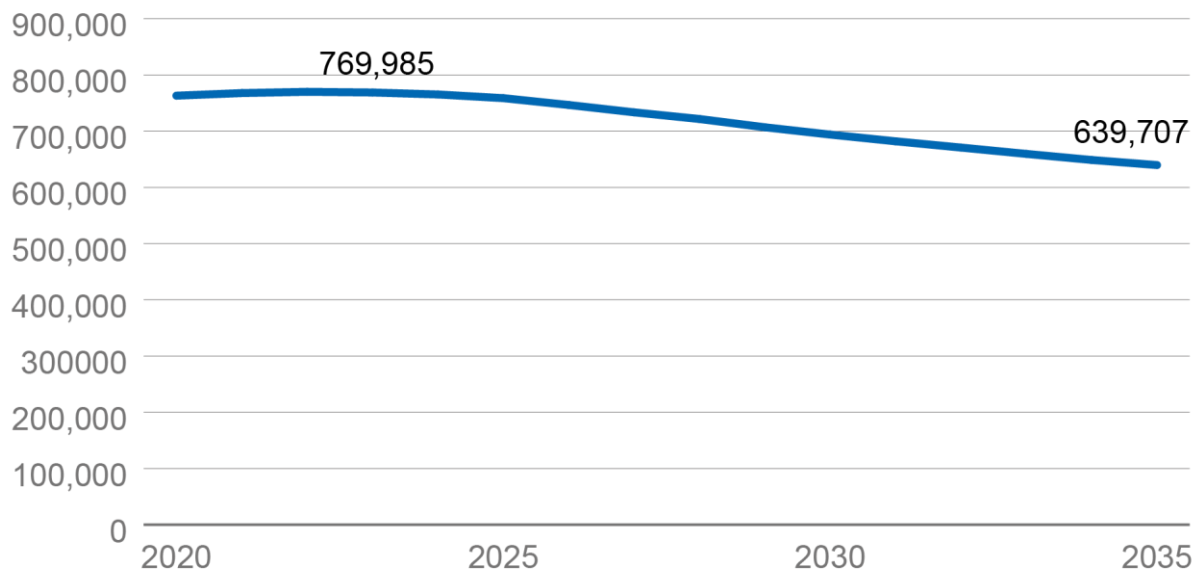


Source: Teacher census, Scottish Government

The school-aged population is expected to continue to fall to around 639,700 by 2035, a decline of around 17% from 2022 (Graph 2.2). In light of this anticipated demographic change, we have built an education workforce model to provide evidence to inform the following questions:

- How does Scotland currently compare internationally in terms of PTR and class contact time?
- How might demographic change affect demand for teacher recruitment?
- What will different scenarios for the size of the teacher workforce mean in the next decade in terms of outputs such as PTRs and class contact time?
- How does the picture change at local authority and subject level? (Covered in the annex.)

Graph 2.2: Population projection for those aged 5-17, Scotland



Source: Office for National Statistics (ONS)

It should be noted that the aim of this study is not to project the “right” level of teacher supply, as that will be informed by a range of factors, but to provide data-based insights into the implications on teacher resourcing needs in different scenarios specifically as a result of demographic changes.

Furthermore, when interpreting the results, it should be recognised that education quality is affected by various factors beyond the number of teachers, the PTR and class contact time metrics. The use of such indicators in the modelling has the advantage that these metrics are easily quantifiable while also providing broad insight into the distribution of resources and teaching time. However, changes in these alone does not necessarily imply a better or worse quality of education.

3. International comparison

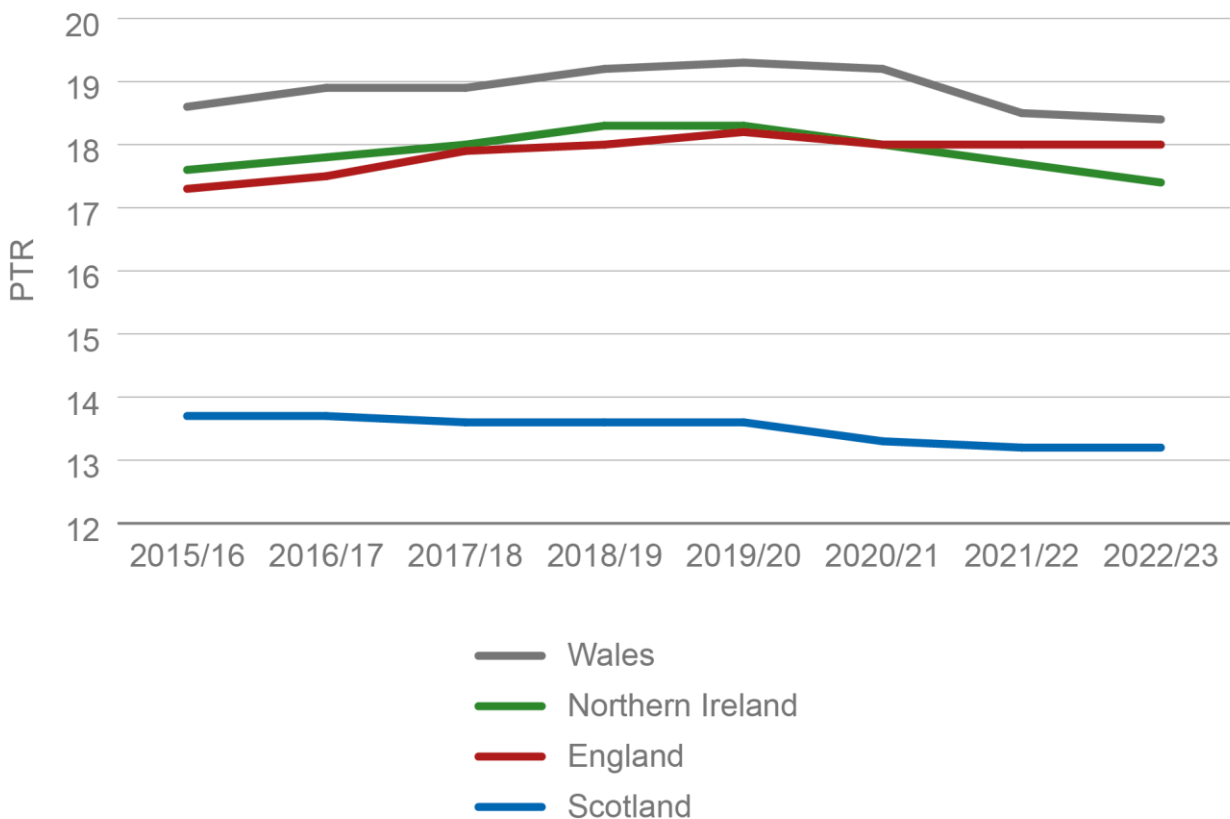
This section provides a comparative analysis of two key metrics of the education system: PTRs and class contact time, comparing Scotland with the rest of the UK and international counterparts. This evidence review provides helpful context for the scenario analysis, which follows later in this report.

Pupil-teacher ratios: Scotland in perspective

Scotland has consistently had a significantly lower overall PTR than the rest of the UK over the last eight years. The overall PTR in Scotland is currently 13.2, the lowest it has been since 2009. This is also the lowest in the UK, compared with PTRs of 18 in England, 18.4 in Wales and 17.4 in Northern Ireland.⁵

Throughout the period, Scotland's PTR has always been at least 3.6 pupils per teacher lower than that of the other nations.

Graph 3.1: Pupil-teacher ratio in the UK

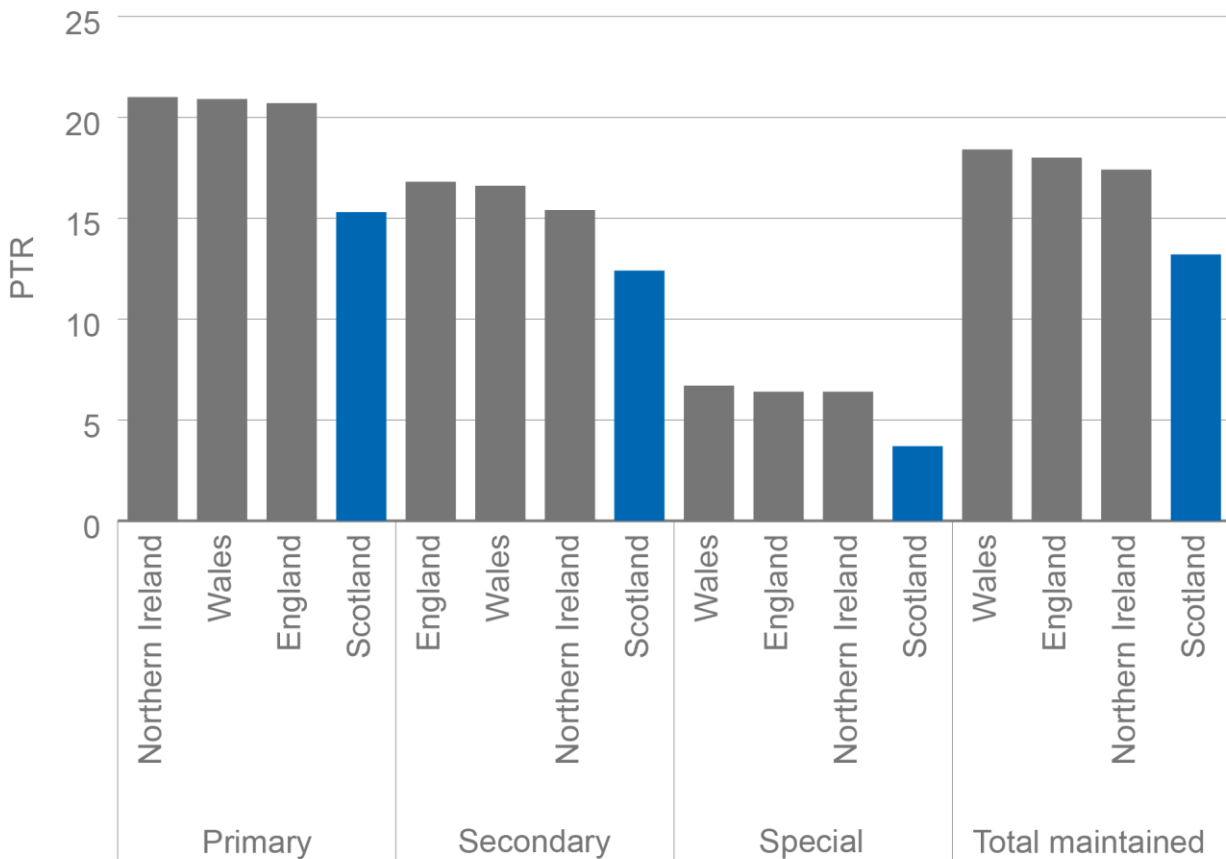


Source: Pupil-teacher ratios (PTRs), Education and training statistics for the UK

⁵ [Department for Education \(2023\) 'Education and training statistics for the UK](#)

It is worth noting that the PTR is typically higher for primary than for secondary, which is the case for all nations. Across all school types, Scotland has the lowest PTR. The PTR for primary schools in Scotland is 15.3 in 2022⁶, compared with between 20.7 and 21 for other nations, while the PTR for secondary schools is 12.4 for Scotland, compared with a range of 15.4 to 16.8 for its UK counterparts.

Graph 3.2: Pupil-teacher ratio in the UK (2022/23) – by school type



Source: Pupil-teacher ratios (PTRs), Education and training statistics for the UK

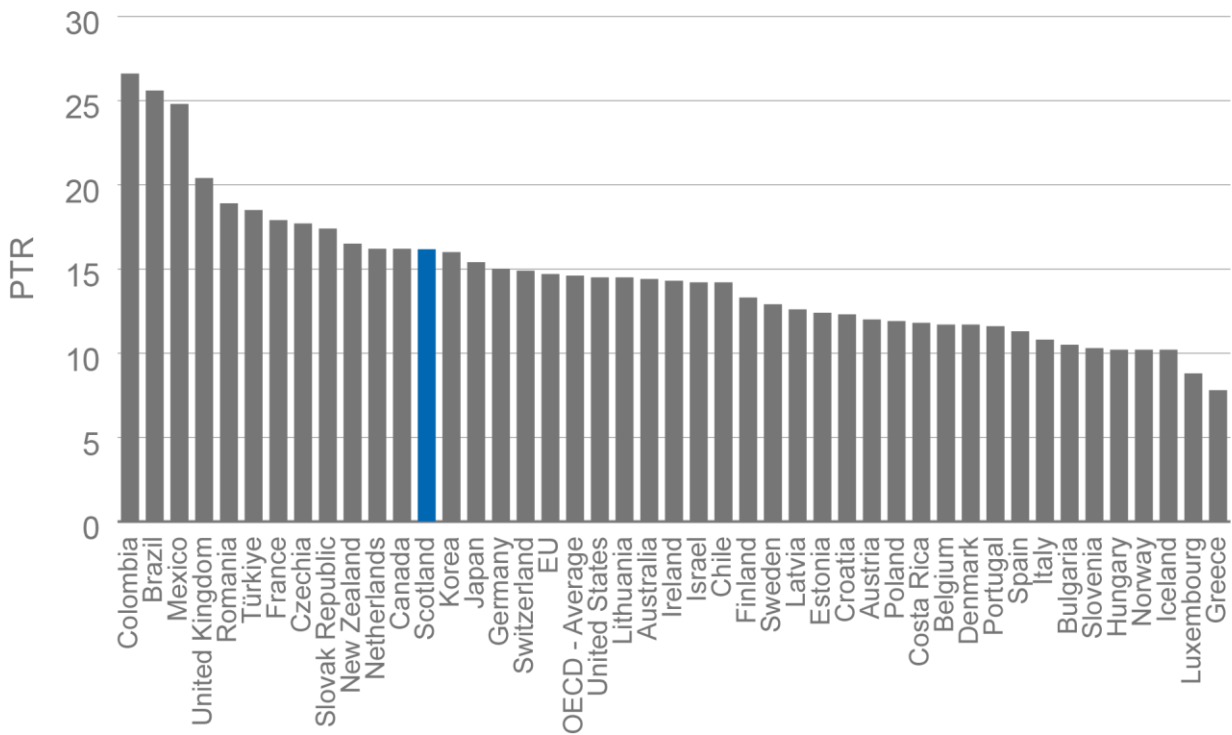
In an international context, the latest OECD data⁷ used to compare PTRs internationally includes teachers who were directly involved in teaching students only. Therefore, to enable the cross-country comparisons that follow, we have adjusted Scotland's 2021/22 PTRs to exclude the number of FTE headteachers not teaching in class. We have not been able to source data on the teaching hours of headteachers in Scotland. However, a

⁶ The data used for comparison are from the year 2022/23 as official statistics for 2023 are only being published for Scotland at the time of writing.

⁷ OECD (2021) 'Ratio of students to teaching staff by type of institutions, Public educational institutions'

report published by the Department for Education⁸ suggests that in 2010 primary headteachers in England spent 7.3% of their time teaching, compared with 1.9% for secondary headteachers. Assuming these figures are relevant for Scotland, after adjustment, Scotland's primary school PTR of 16.2 in 2021 is slightly higher than the OECD average of 14.6, and higher than all G7 countries except France (17.9) and Canada (16.2). On the other hand, Scotland's adjusted secondary school PTR of 12.5 is lower than the OECD average of 13.3 but roughly middle of the pack of the G7 countries.

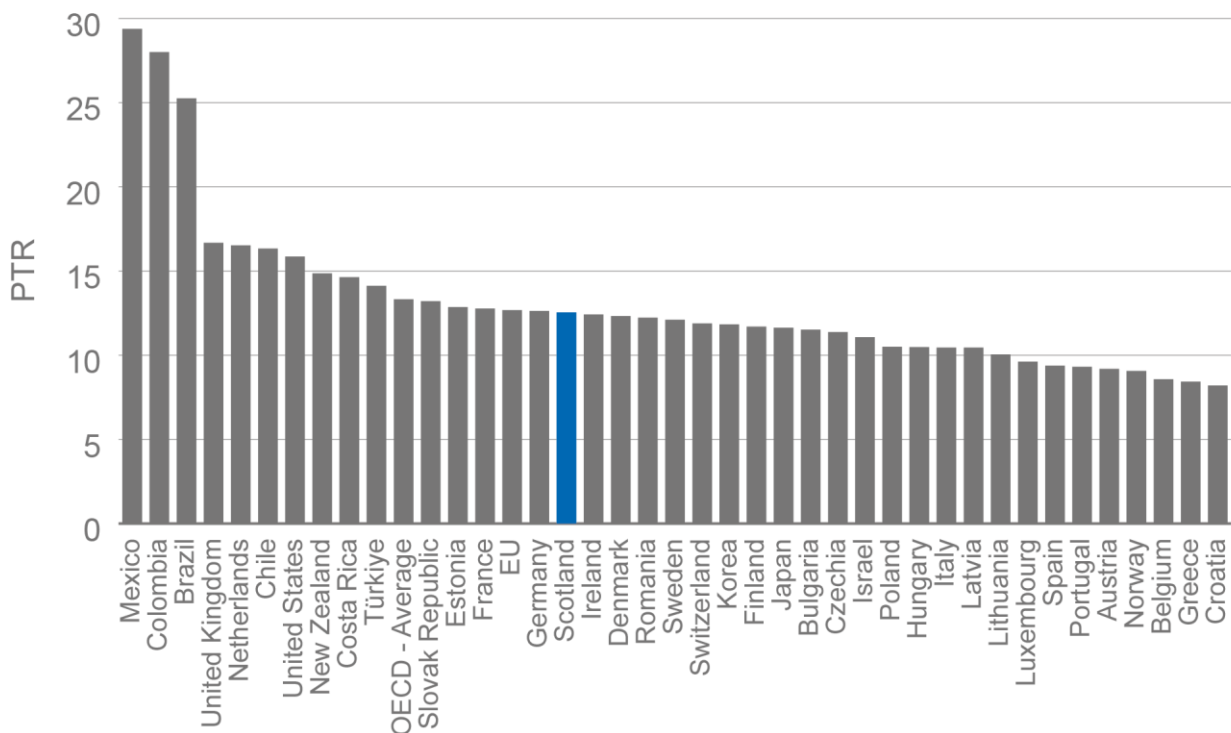
Graph 3.3: International PTRs (public institutions, primary level, 2021)



Source: Ratio of students to teaching staff by type of institutions, Public educational institutions, OECD

⁸ Department for Education (2011) 'Class size and education in England evidence report'

Graph 3.4: International PTRs (public institutions, secondary level, 2021)



Source: Ratio of students to teaching staff by type of institutions, Public educational institutions, OECD

Class contact time: Scotland in perspective

Very recent information about teacher class contact times is not available for the UK nations other than Scotland. The 2019 Teacher Workload Survey⁹ indicated that within England, teachers and middle leaders (salaried staff members who take on extra responsibilities) spent an average of 21.3 hours teaching per week in 2019, slightly lower than 21.6 hours in 2016. For primary teachers and middle leaders, average weekly hours were 22.9, whilst secondary average hours were 19.9.

The 2021 National Education Workforce Survey in Wales¹⁰ suggests full-time school teachers (covering all stages) on average were teaching for 23.3 hours. Meanwhile, albeit not directly comparable, in Northern Ireland, the maximum statutory teaching time is 25 hours for primary and 23.5 hours for post-primary (as of 2021).¹¹

⁹ [Department for Education \(2019\) 'Teacher Workload Survey 2019: Research brief'](#)

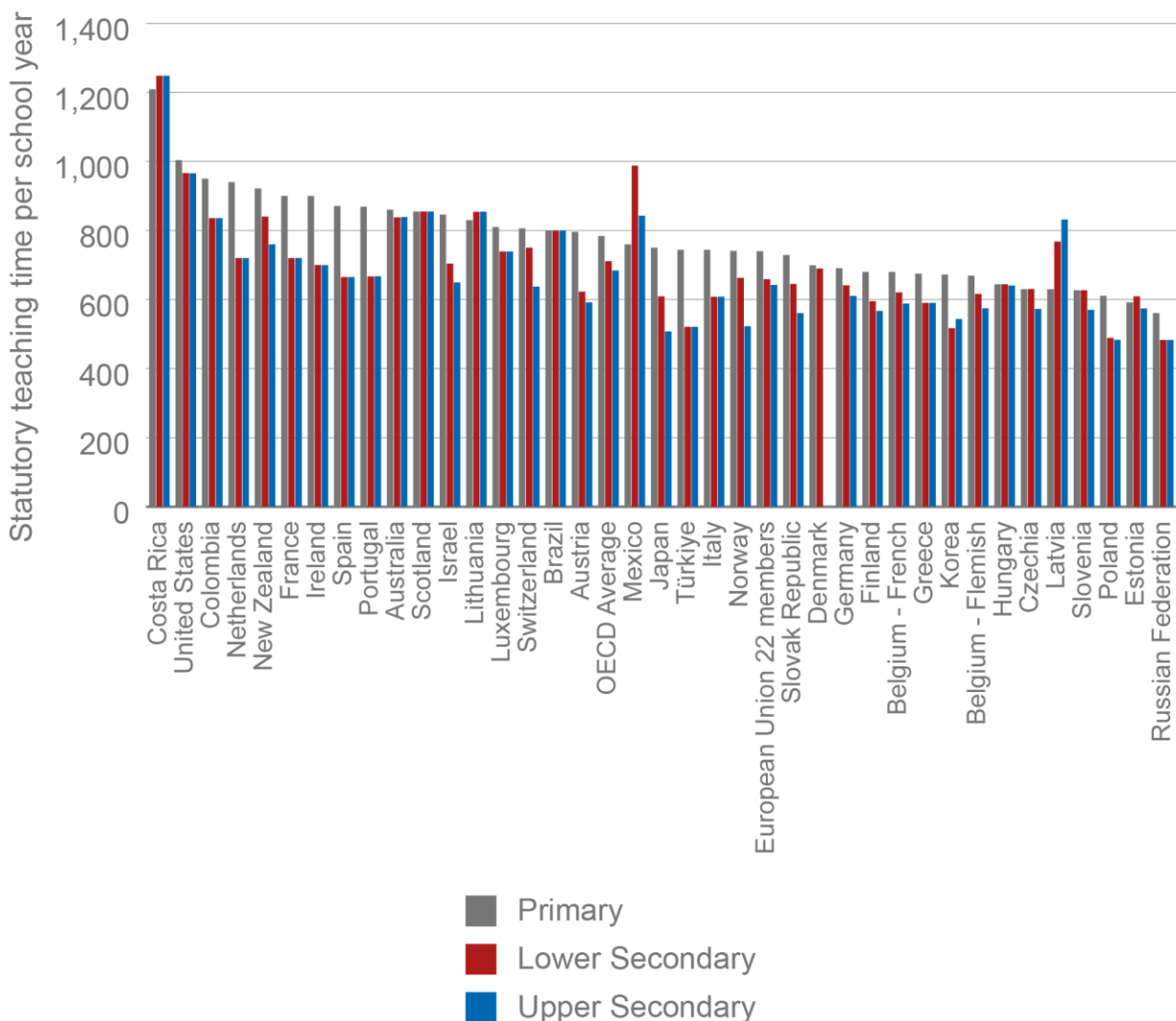
¹⁰ [Education Workforce Council \(2021\) 'National education workforce survey'](#)

¹¹ [NAHT \(2021\) 'NAHT Northern Ireland Guidance: Producing a Time Budget'](#)

According to the OECD data for 2020¹², the statutory net teaching hours per year in Scotland were 855, regardless of whether primary or secondary levels are considered, whereas the typical OECD pattern is for higher statutory teaching times in primary school compared to secondary levels.

Scotland's statutory teaching times are higher than the OECD averages for upper secondary (684 hours) and lower secondary (711 hours) and slightly higher than the average for primary education (784 hours). They are also higher than the G7 countries except for the US and primary schools in France.

Graph 3.5: Statutory net teaching time, hours per school year (2020)

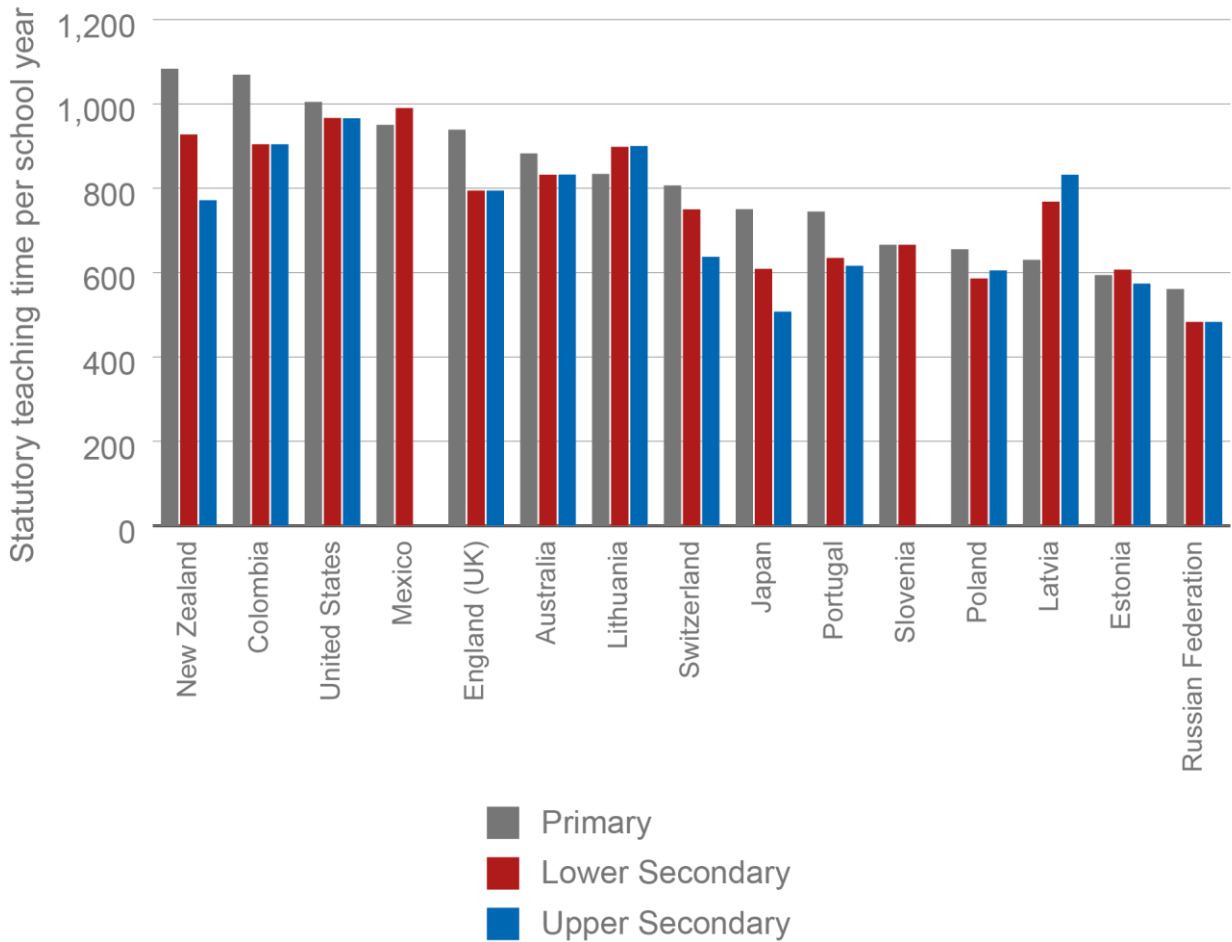


Source: Statutory net teaching time per school year, in hours (teachers), OECD

¹² OECD (2020) 'Statutory net teaching time per school year, in hours (teachers)'

However, data on the actual average teaching hours per school year in Scotland have not been collected, and are likely to differ from the statutory levels. Comparing the actual teaching time in 2020 in the OECD database – albeit not comparing like with like – Scotland’s maximum statutory teaching time of 855 hours is somewhat lower than the 939 hours actually undertaken in England at primary level, but higher than the 794 hours actually undertaken at secondary level.

Graph 3.6: Actual teaching time, hours per school year (2020)

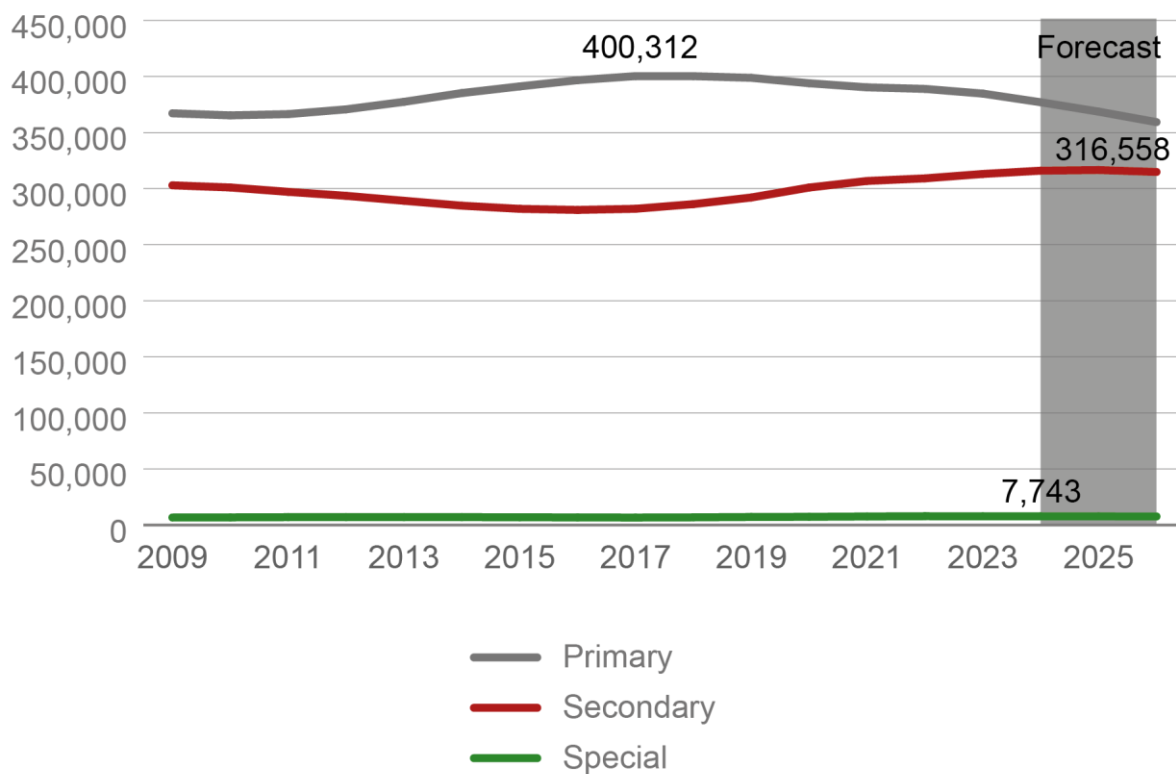


Source: Actual average teaching hours per school year (teachers in public institutions), OECD

4. Pupil projections for Scotland

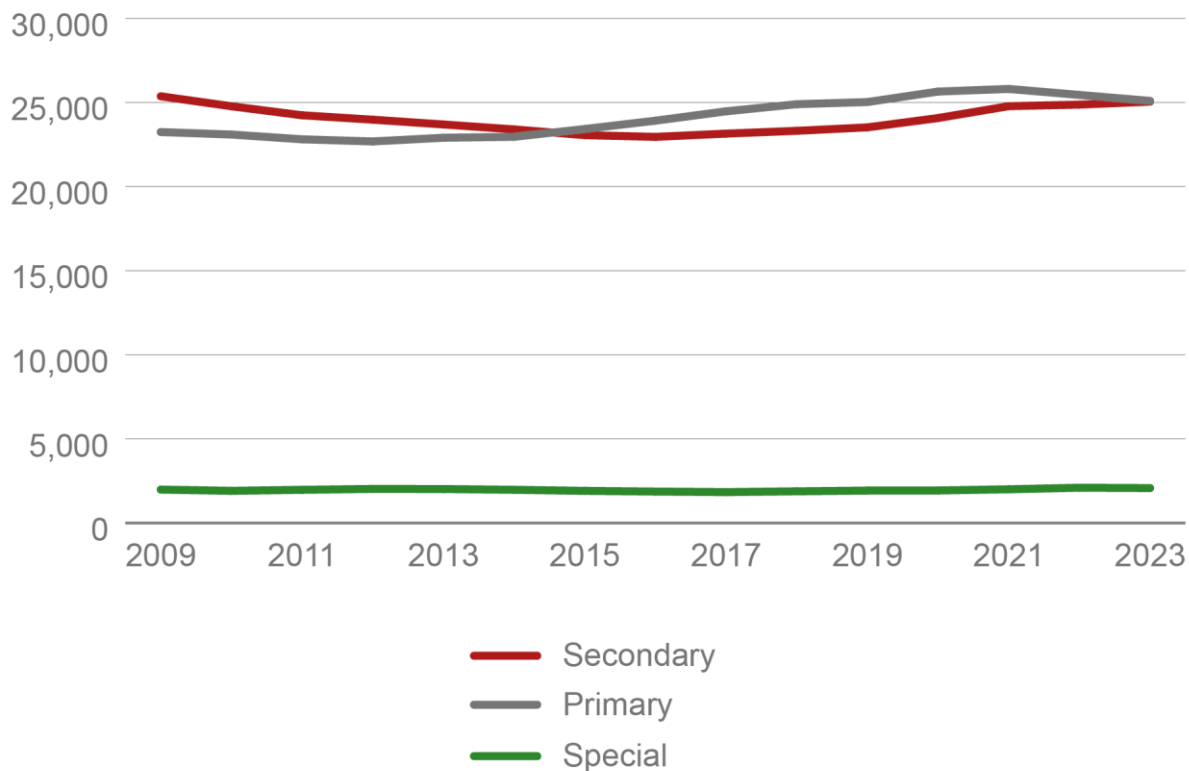
Having built an understanding of the current snapshot of how Scotland compares internationally, it is helpful to explore the projections for numbers of school-age pupils. The Office for National Statistics' (ONS) projections suggest that the school-age population (aged 5-17) peaked at around 770,000 in 2022 (this compares to 705,874 state school pupils in the 2022 Pupil Census, as not all children and young people attend state schools). Looking specifically at pupils in state schools, the dynamics are different between school types: primary school pupils in state schools peaked at over 400,300 in 2017, special school pupils are expected to have peaked at 7,740 in 2024, while secondary school enrolment is expected to continue to increase to 316,600 pupils by 2025 (Graph 4.1).

Graph 4.1: Number of pupils in state schools in Scotland, 2009-2023



Source: Teacher census, Scottish Government

Graph 4.2: Number of teachers in Scotland, 2009-2023



Source: Teacher census, Scottish Government

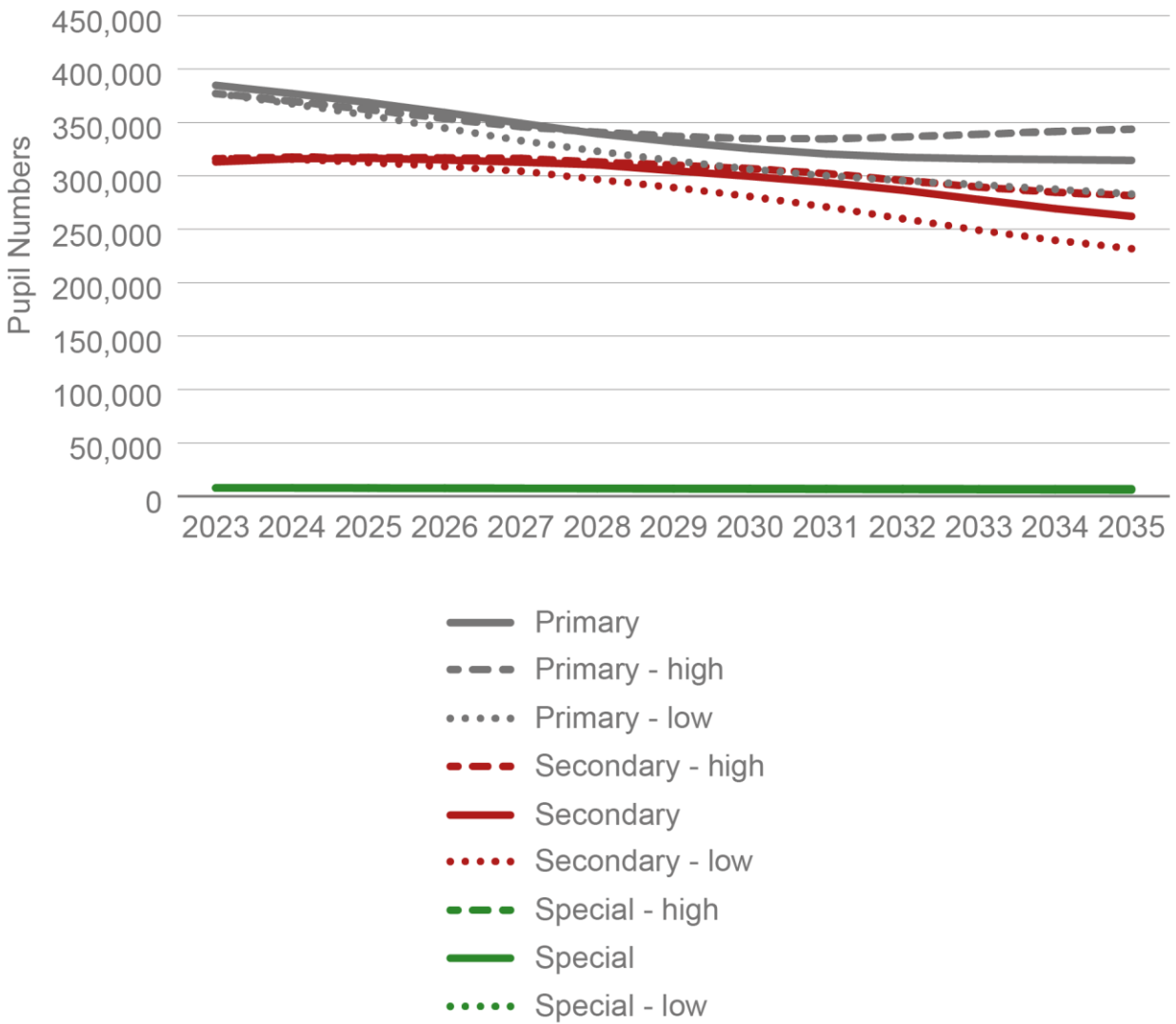
This contrasts with the trends in teacher stocks for different types of schools. Although the headline figure for teacher numbers shows a mildly shrinking workforce for two consecutive years to 2023, the trend is different by school type. The number of primary school teachers peaked in 2021, even though the number of primary pupils was already falling, while the number of special school teachers peaked in the following year, according to the teacher census¹³. However, the number of secondary school teachers continued to rise until 2023, although not as fast as the pupil population grew.

Given the different demographic trends at play, it is important to project the longer-term demand for teachers in Scotland over the coming years. Based on the ONS 2020-based interim national population projections, pupil numbers are expected to decline over our projection period to 2035, reflecting in particular that the expected impact of low fertility rates will outweigh the population growth from migration over time.

Primary school enrolments are expected to fall by 1.7% on average per year between 2022 and 2035, more prominent than the expected decline in secondary school enrolments, which are projected to fall by 1.2% per year, while special school enrolments are expected to fall by 1.3% per year.

¹³ [Scottish Government \(2023\) 'Teacher census supplementary statistics'](#)

Graph 4.3: Pupil projection by school type, 2023-2035



Source: WPI Economics estimates based on data provided by the Office for National Statistics; National Records of Scotland

In order to take account of the uncertainties associated with longer-term population projections, we have also introduced high and low pupil population projections around the ONS projection (the ONS projection and our own high and low projections around this are described in the annex). The spread between low/high and the baseline projection grows to around 8.6% in 2035, reflecting the higher uncertainties as we project further into the future.

5. Teacher resourcing needs under different scenarios

This chapter presents a comprehensive analysis of various scenarios aimed at informing strategic planning in the formulation of education workforce policies, considering the impact of demographic changes. Utilising an economic model as an analytical projection tool, our study examines the potential national implications related to teacher resourcing needs, PTR and teacher class contact time within a projection period out to 2035.

Scenario overview

We consider a range of scenarios to explore the interactions between policy commitments, teacher supply and demand, and resource constraints. The scenarios include:

0. maintaining a constant teacher stock;
1. enabling a reduction in class contact time by 1.5 hours per week, in line with the Scottish Government commitment;
2. maintaining the PTR at the current 13.2;
3. the PTR increasing from its current level to 13.7; and
4. increasing the number of teachers by 3,500 by 2026, in line with the Scottish Government commitment.

The aim of this analysis is not to judge which scenario is “better” or more appropriate for Scotland: we are not trying to project the “right” teacher supply but rather to examine the interactions between different policy commitments and teacher supply and demand, in the context of demographic change and resource constraints.

Our main focus is on the primary, secondary and special school teachers, measured in full-time equivalents (FTE). Centrally employed teachers currently account for around 2% of the teacher stock and we assume that this proportion remains constant throughout our projection period. Meanwhile, we have modelled the results for each scenario with high, low and baseline pupil projections. The graphical results may not include all three cases if the results between them do not differ significantly.

The following table summarises the results under each scenario in the baseline projection:

Table 5.1: Result summary – baseline projection

Scenario	Description	Pupil-teacher ratio (PTR)		Class contact time (number of hours per week)		Teacher workforce requirement (FTE)	
		2026	2030	2026	2030	2026	2030
0	Constant teacher stock	12.8	11.9	21.8	20.3	53,331	53,331
1(a)	Lowering class contact time to 21 hours per week by 2026	12.3	12.3	21.0	21.0	55,400	51,500
1(b)	Lowering class contact time to 21 hours per week by 2028	12.6	12.3	21.6	21.0	53,900	51,500
2(a)	Maintaining the PTR at 13.2	13.2	13.2	22.5	22.5	51,700	48,100
2(b)	Maintaining the PTR at 13.2, with a higher share of teachers in standard classes	13.2	13.2	21.0	21.0	51,500	47,800
3(a)	Raising PTR to 13.7 by 2026	13.7	13.7	23.4	23.5	49,800	46,100
3(b)	Raising PTR to 13.7 by 2026, with a higher share of teachers in standard classes	13.7	13.7	21.0	21.0	49,800	46,100
4	Teacher stocks grow in line with the SG commitment, then remain constant from 2027	12.1	11.2	20.6	19.2	56,400	56,400

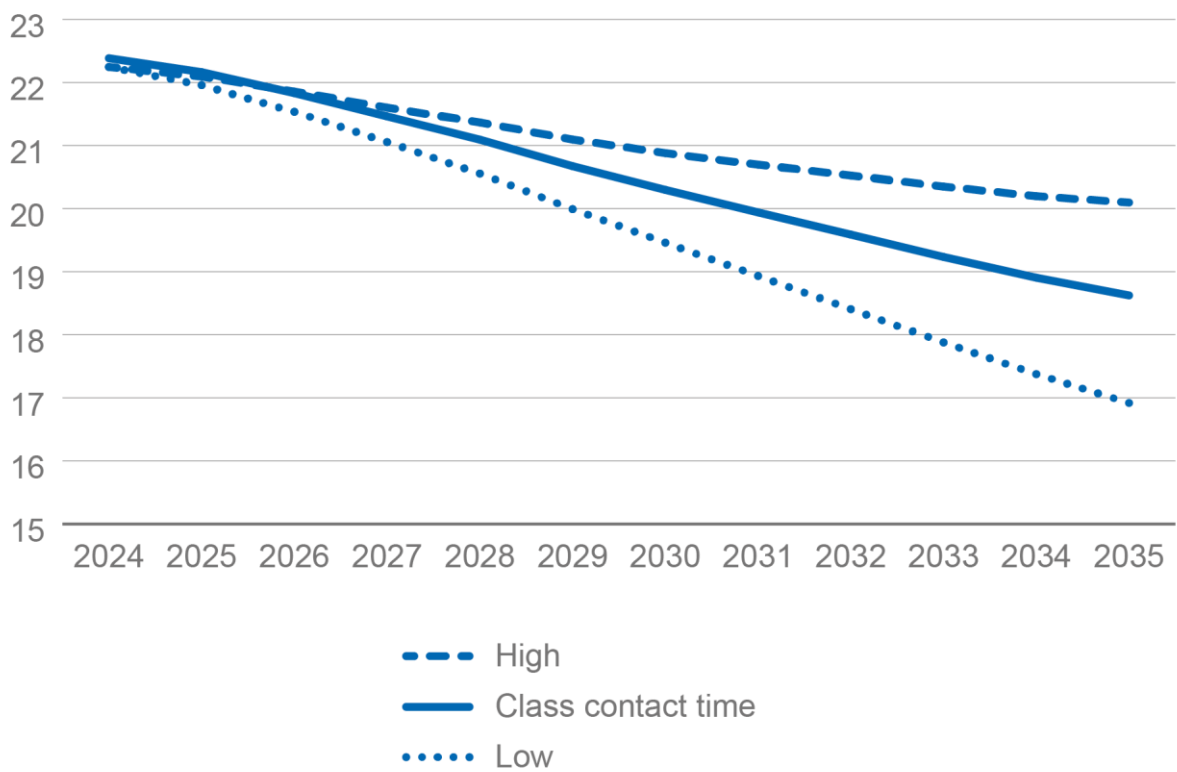
To model the scenarios, we assume that all teachers in all school types currently have 22.5 hours of class contact time per week, i.e. the maximum contracted weekly class contact time¹⁴. In our modelling, we assume that class sizes will remain unchanged until 2035, so a change in the number of teachers relative to pupils will proportionately change teachers' class contact time, as schools will be able to schedule more or fewer classes per teacher. Although this assumption is subject to certain simplifications, it lays the groundwork for further analysis.

¹⁴ The General Teaching Council for Scotland, 'Class contact time'

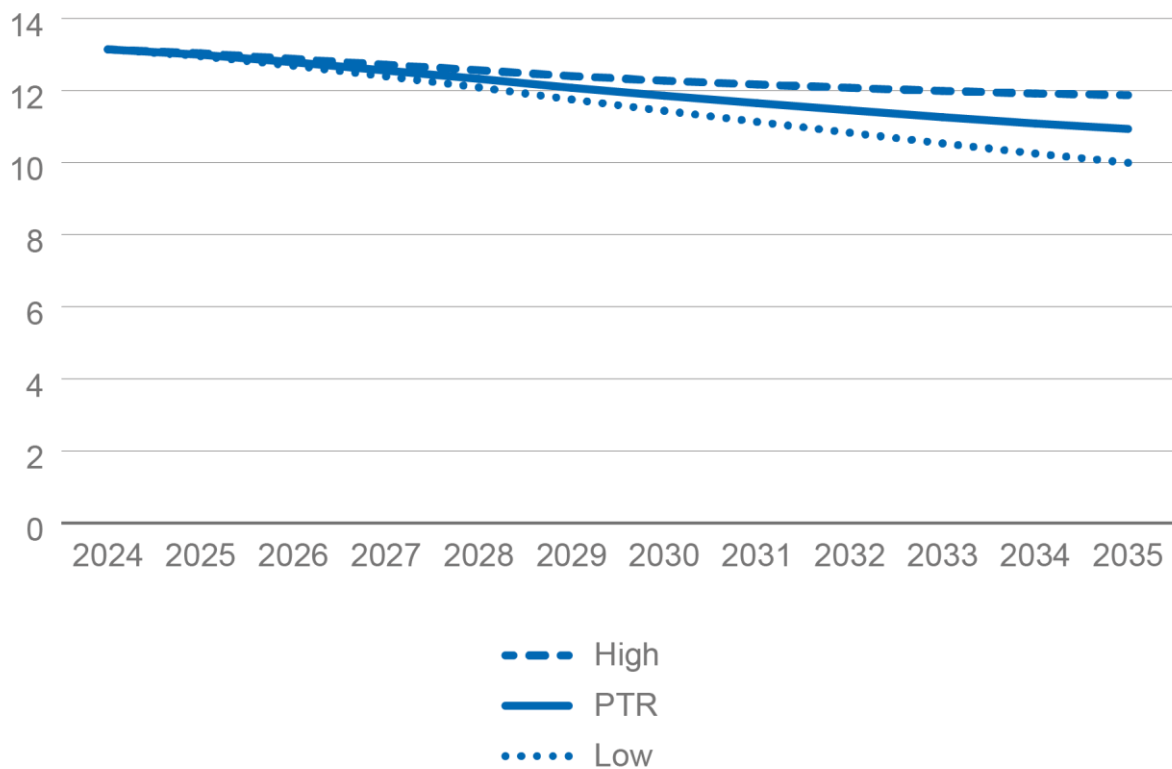
Scenario 0: Constant teacher stock

This scenario examines the implications – in terms of PTR and class contact time – of teacher stocks remaining constant, i.e. to assume that the teacher inflows happen at a rate just sufficient to cover teacher outflows. This helps to assess the current workforce size in light of changing demographics and education workforce policy commitments. Given the downward trend in the average teacher age in Scotland over time and the consequently lower retirement rates, in practice this likely means a reducing number of teachers hired each year just to ‘stand still’ in terms of teacher stock over the projection period.

Graph 5.1: Class contact time (number of hours per week)



Graph 5.2: Pupil-teacher ratio



A constant teacher stock relative to a declining trend in pupil numbers enables a reduction in class contact time of 1.5 hours by 2028 in the baseline projection, although it is possible that the target could be reached a year earlier or later due to the inherent uncertainties in pupil projections. Meanwhile, in the baseline projection, there is a reduction in the PTR to 12.8 in 2026 and a further reduction to 10.9 in 2035. Taking into account the high and low pupil projections, the PTR is expected to range between 10 and 11.9 in 2035.

As such, in this ‘standstill’ scenario, the Scottish Government’s commitment to reduce class contact time by 1.5 hours could be enabled naturally as a result of declining pupil numbers, albeit around two years later than the 2026 target.

It should be noted that the reduction in class contact time of 1.5 hours across all school types by 2028 could be enabled if the proportions of primary, secondary and special school teachers are allowed to adjust (even though the overall number of teachers remain constant).

If we instead assume that the proportions of primary, secondary and special school teachers remains unchanged respectively over the next decade, the decline of class contact time could be enabled faster for primary school teachers, where the reduction of 1.5 hours is projected to be enabled by 2026, while it would be slower for secondary school teachers, enabled by around 2031, with the average reduction being 1.5 hours by 2028.

Scenario 1: Enabling a reduction in class contact time

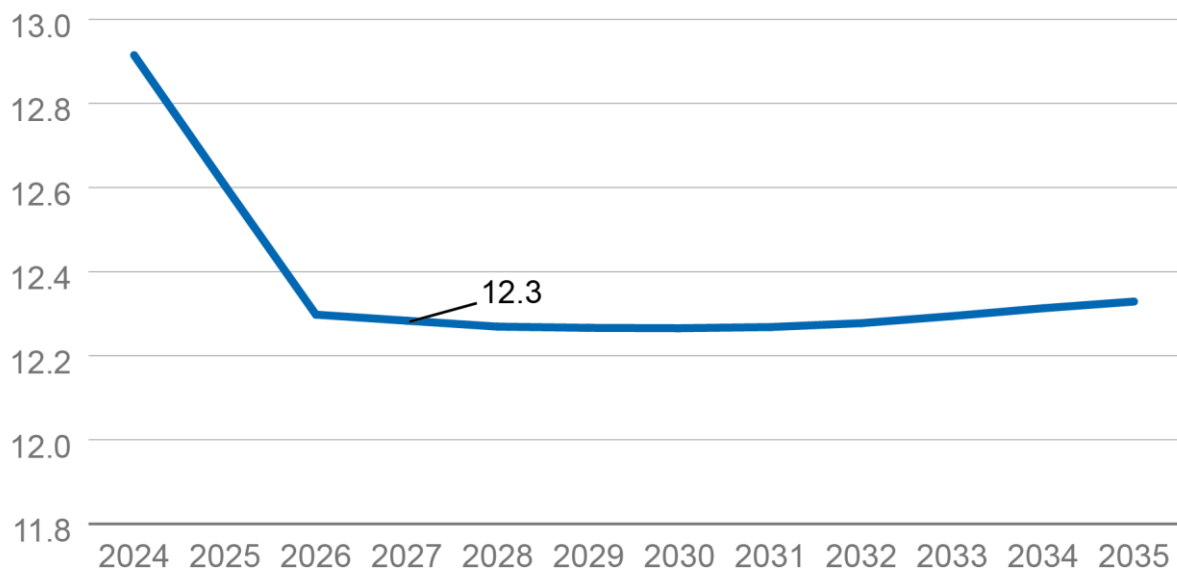
Instead of imposing a particular workforce size and observing the consequential impact on class contact time and PTR (as in Scenario 0), this scenario explores the implications of imposing specific time profiles for a reduction in teachers' class contact time by 1.5 hours per week, as per the Government's 2021 Programme for Government commitment.

Therefore, in the case of a reduction in class contact time, if class sizes and pupil engagement are assumed to remain the same, all else equal, this will effectively imply a need to increase the current number of teachers. The sooner this reduction occurs, the more abrupt the increase in teacher stocks will be.

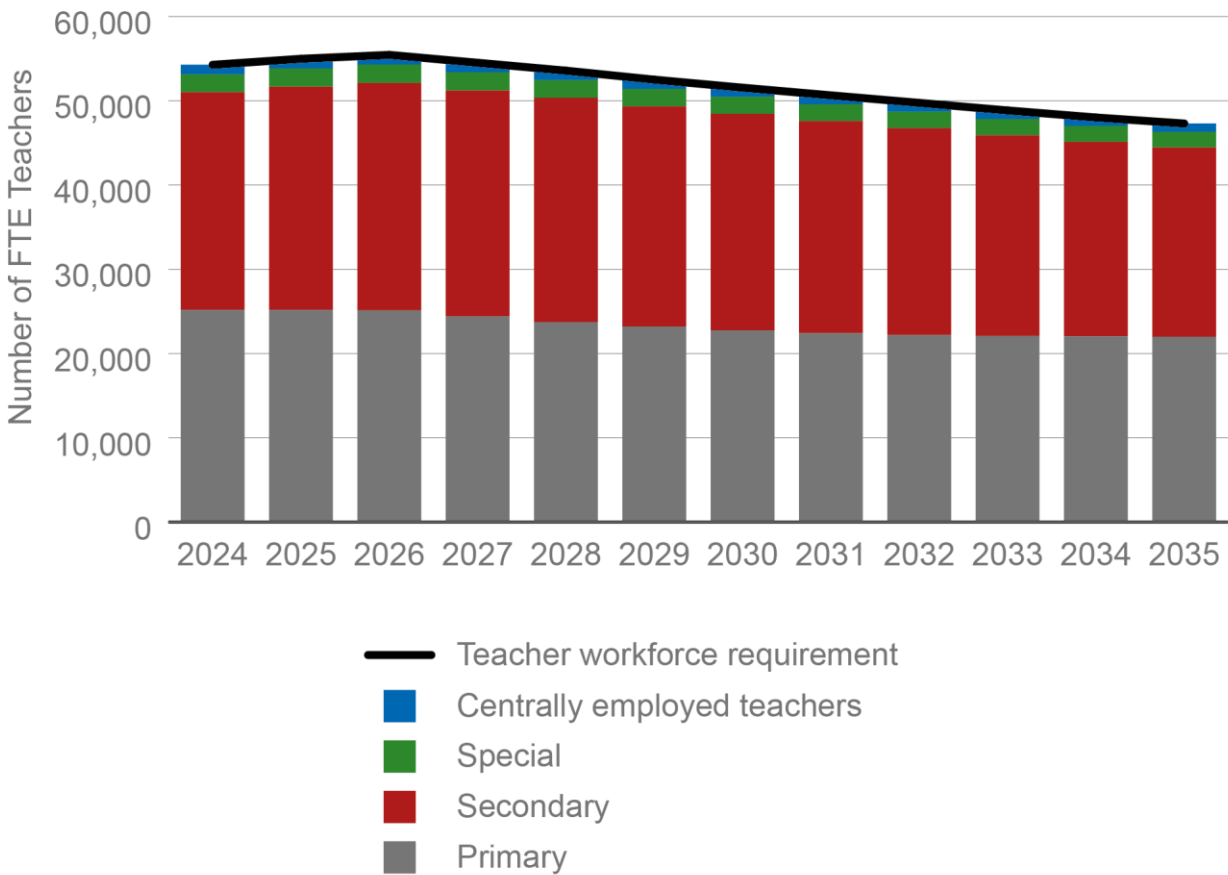
(a) Lowering class contact time to 21 hours per week by 2026

Enabling a 1.5 hour reduction in class contact time by 2026 requires an increase in teachers over that period, despite expected reductions in pupil numbers. Overall teacher demand increases by 2,100 (including centrally employed teachers) between 2022 and 2026 to 55,400 in the baseline scenario, and the national PTR falls by 0.9, from 13.2 to 12.3, over the same period. However, the teacher demand to maintain this class contact time level then gradually decreases to 47,300 by 2035, due to the declining student population.

Graph 5.3: Pupil-teacher ratio



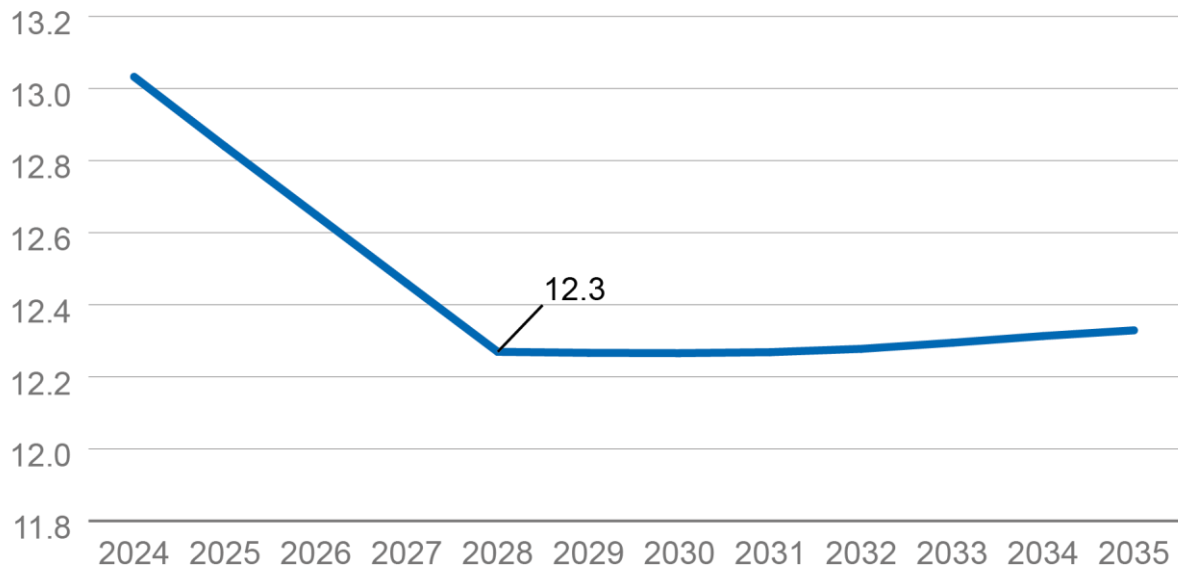
Graph 5.4: Teacher workforce requirement



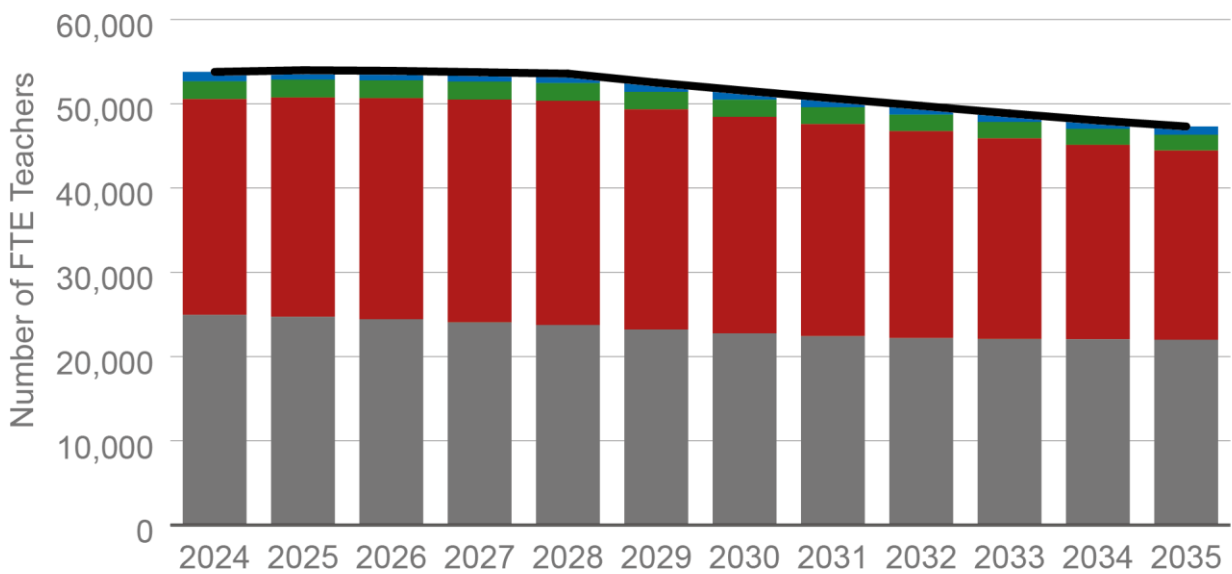
(b) Lowering class contact time to 21 hours per week by 2028

In this alternative sub-scenario, the reduction in class contact time is instead assumed to occur two years later, by 2028. The national PTR still needs to fall to 12.3 in order to achieve a reduction of 1.5 hours, but the reduction and the profile for teacher demand is less abrupt. In the baseline projection, teacher demand only marginally increases by a much more modest 0.4% – fewer than 240 teachers – between 2022 and 2028, to around 53,600. Thereafter, it is expected to gradually decline due to the declining student population (albeit less sharply than in Scenario 1a), reaching 47,300 by 2035.

Graph 5.5: Pupil-teacher ratio



Graph 5.6: Teacher workforce requirement



- Teacher workforce requirement
- Centrally employed teachers
- Special
- Secondary
- Primary

This delay in the reduction in class contact time therefore smooths the profile for the teacher stock. However, it still results in a lower PTR, which is expected to fall to 12.3 in 2028 and remain at this level until 2035.

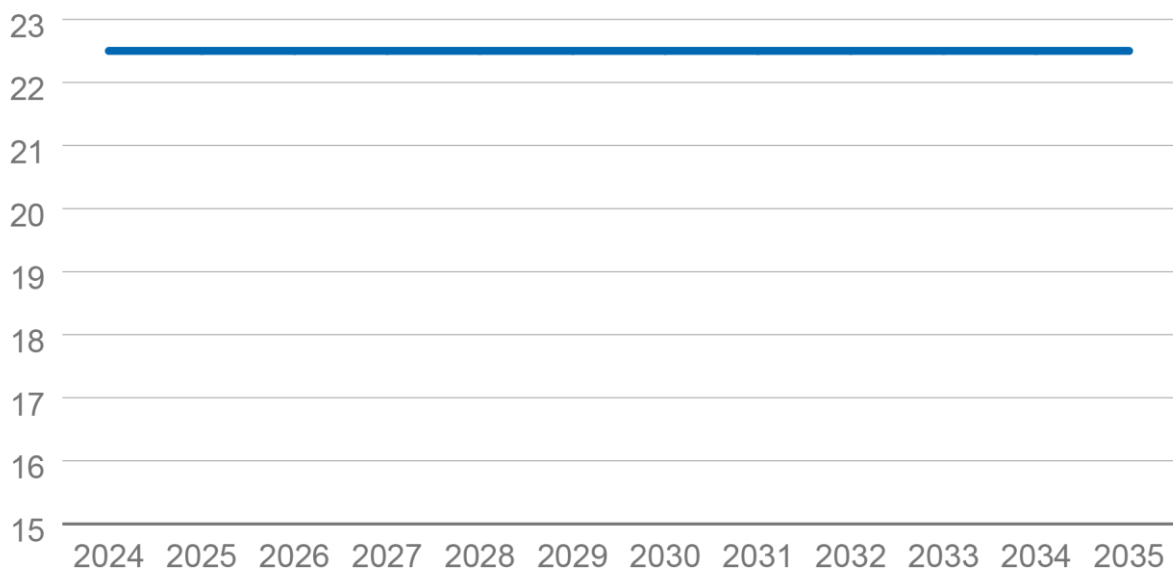
The results of this sub-scenario are very similar to Scenario 0, but Scenario 0 focusses on maintaining a constant teacher stock over time, whereas this sub-scenario looks at what the minimum number of teachers will be needed to achieve a 1.5 hour reduction in class contact time by 2028 and beyond. Therefore, the resulting teacher demand over the next decade differs slightly between the two scenarios.

Scenario 2: Maintaining pupil-teacher ratio (PTR)

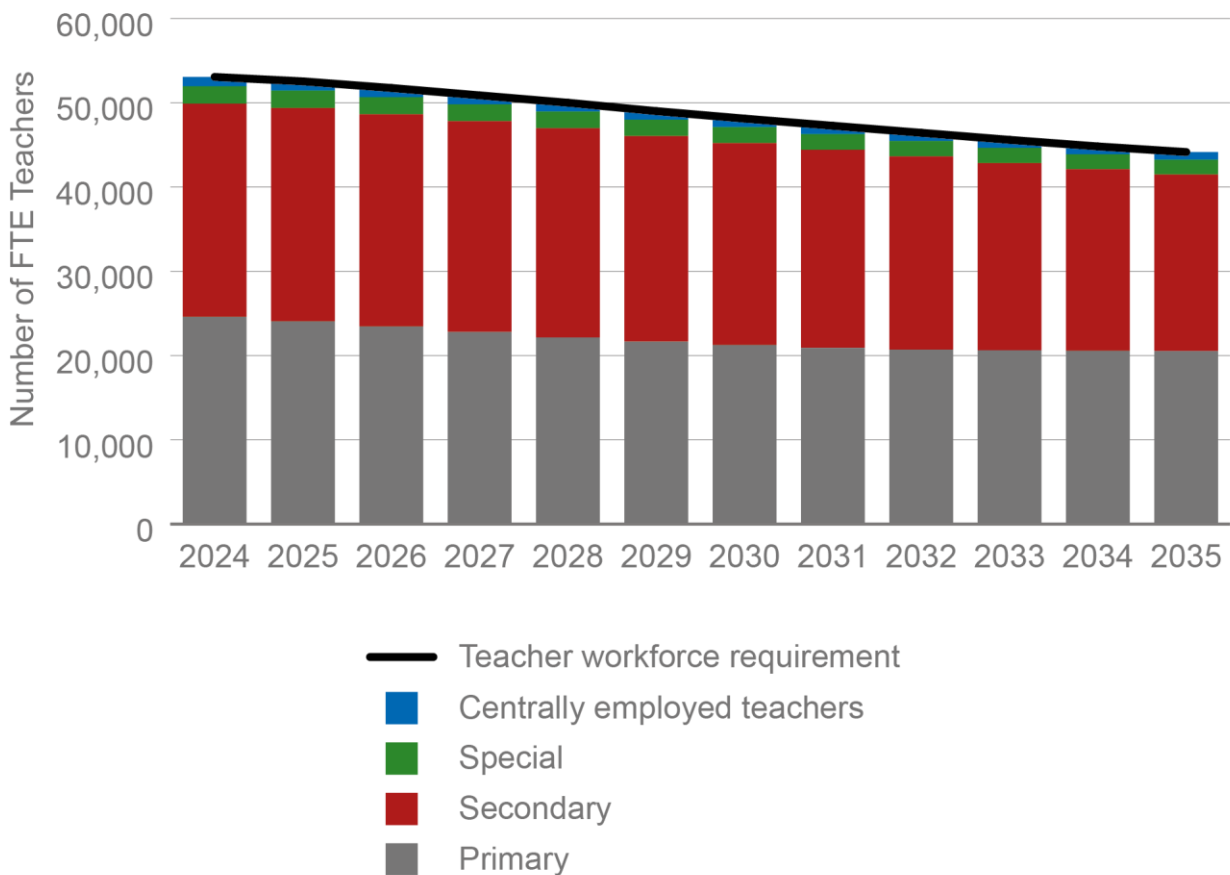
(a) Maintaining the PTR at 13.2

This scenario explores the implications of maintaining the PTR at its current level of 13.2. It is useful to assess the implications of a stable PTR in the future, on the minimum teacher need, in light of expected demographic changes in the pupil population. With a constant pupil number relative to the number of teachers, the class contact time will be consistent throughout the projection period. However, with pupil numbers projected to fall, a constant PTR means a proportionate reduction in the number of teachers needed.

Graph 5.7: Class contact time (number of hours per week)



Graph 5.8: Teacher workforce requirement



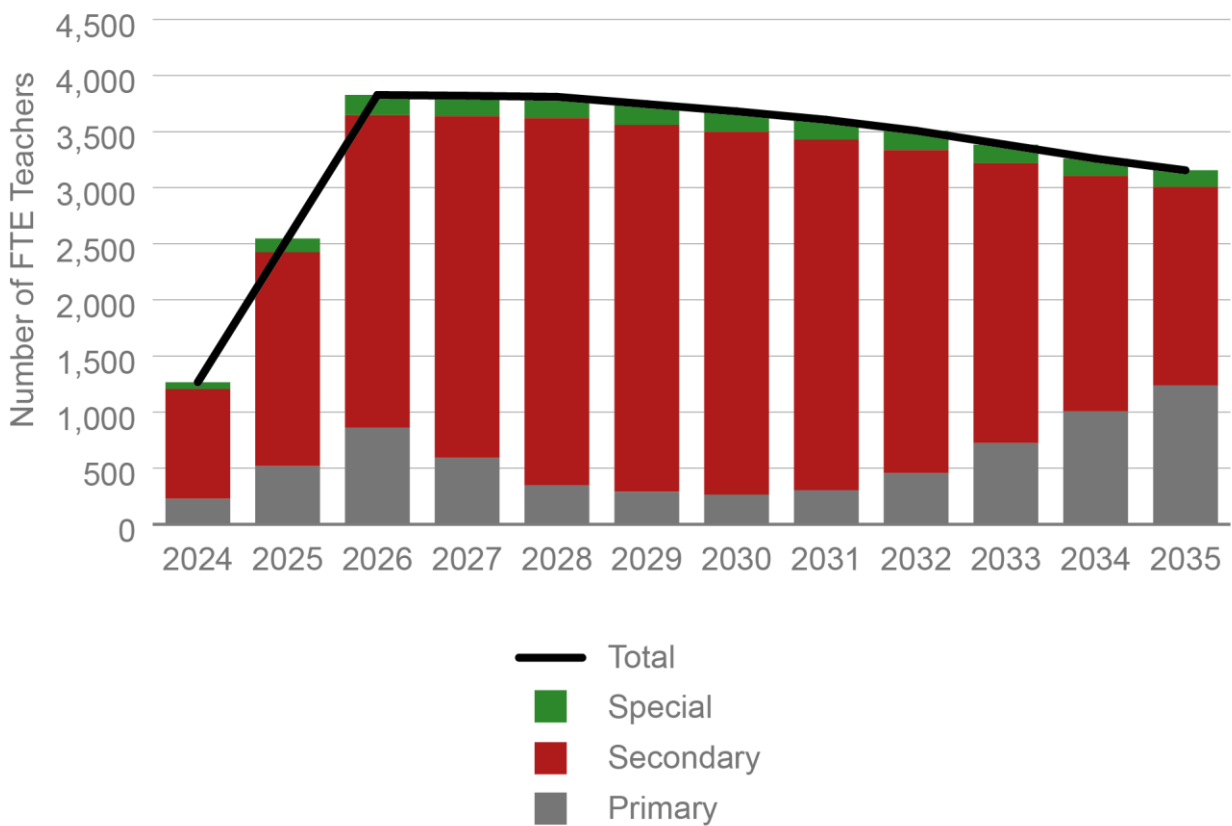
In this scenario, the teacher need will peak at 53,459 (excluding ELC teachers) in 2022 and is set to decline throughout the projection period to 44,100 in 2035. Meanwhile, holding the PTR constant will not change the class contact time in our model. In other words, all else equal, the commitment to reduce teachers' class contact time will be unachievable if the PTR is maintained at 13.2. Therefore, it would necessitate examining alternative or additional approaches to achieve the commitment of reducing teachers' class contact time.

(b) Maintaining the PTR at 13.2, with a higher share of teachers in standard classes

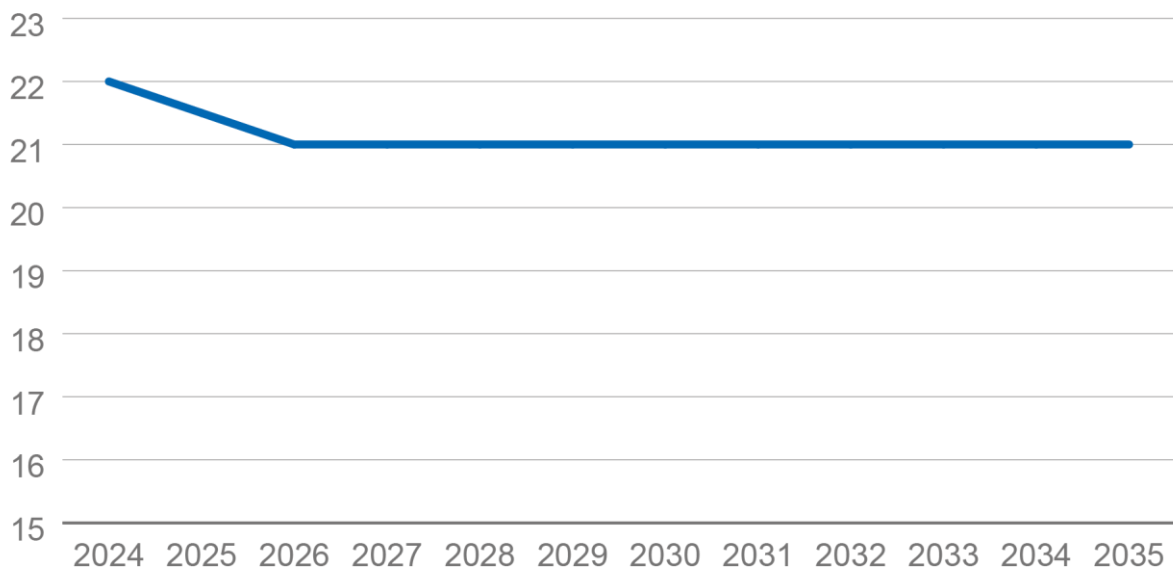
One possibility for maintaining the current PTR while also meeting the commitment of reducing teachers' class contact time by 1.5 hours is to explore the scope for teachers who are currently being used for targeted interventions – such as those doing SAC, PEF or COVID recovery work – to change roles to be deployed in standard classes. Alternatively, there may be opportunities through a reorganisation of teacher deployment (e.g. headteachers spending more time on regular classroom teaching). Such changes would put downward pressure on overall class contact time even if the PTR is held constant.

To illustrate the number of teachers being used for targeted interventions required to change roles, we mimic Scenario 2(a) (i.e. the teacher stock required in Graph 5.8 as a result of a constant PTR of 13.2) and estimate the number of teachers within that stock who would need to change roles to reduce class contact time by 1.5 hours by 2026. The number of teachers currently being used for targeted intervention needing to be deployed in standard classes is expected to peak at 3,730 in 2026 before gradually decreasing over time to around 3,100 by 2035. We have not explored whether there is the potential within the teacher stock for such numbers to have their roles changed in this way – and therefore do not provide comment on how viable such changes might be.

Graph 5.9: Number of teachers required to change roles to become teachers in standard classes



Graph 5.10: Class contact time (number of hours per week)



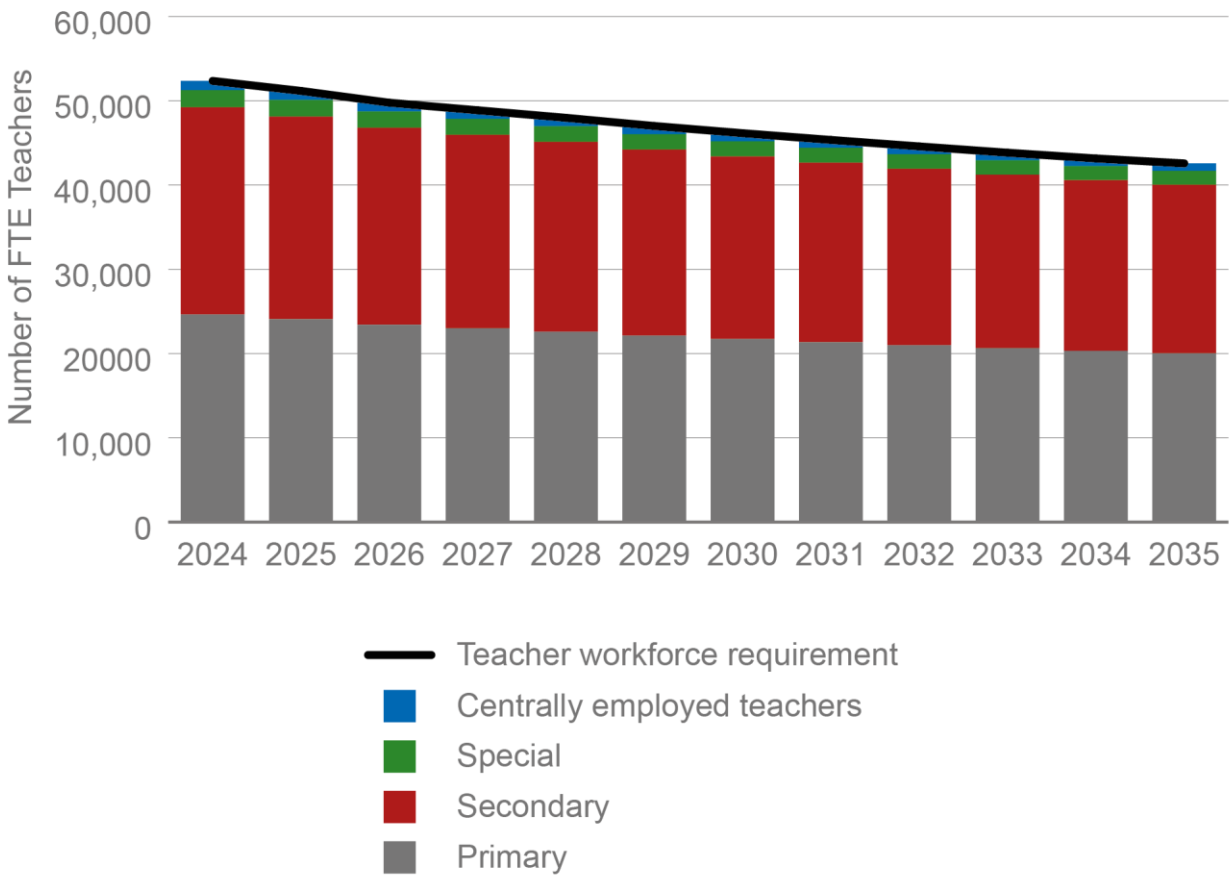
Scenario 3: The PTR increases from its current level to its recent high

This section explores scenarios in which the PTR is allowed to increase. As an illustration, we explore the implications of Scotland's PTR returning to 13.7, the level it was at in 2015-2016. We have modelled what will happen if this is to be achieved by 2026. In addition, we have explored a sub-scenario to estimate the number of teachers currently being used for targeted interventions (rather than in standard classes) that would be required to change roles to reduce class contact time by 1.5 hours.

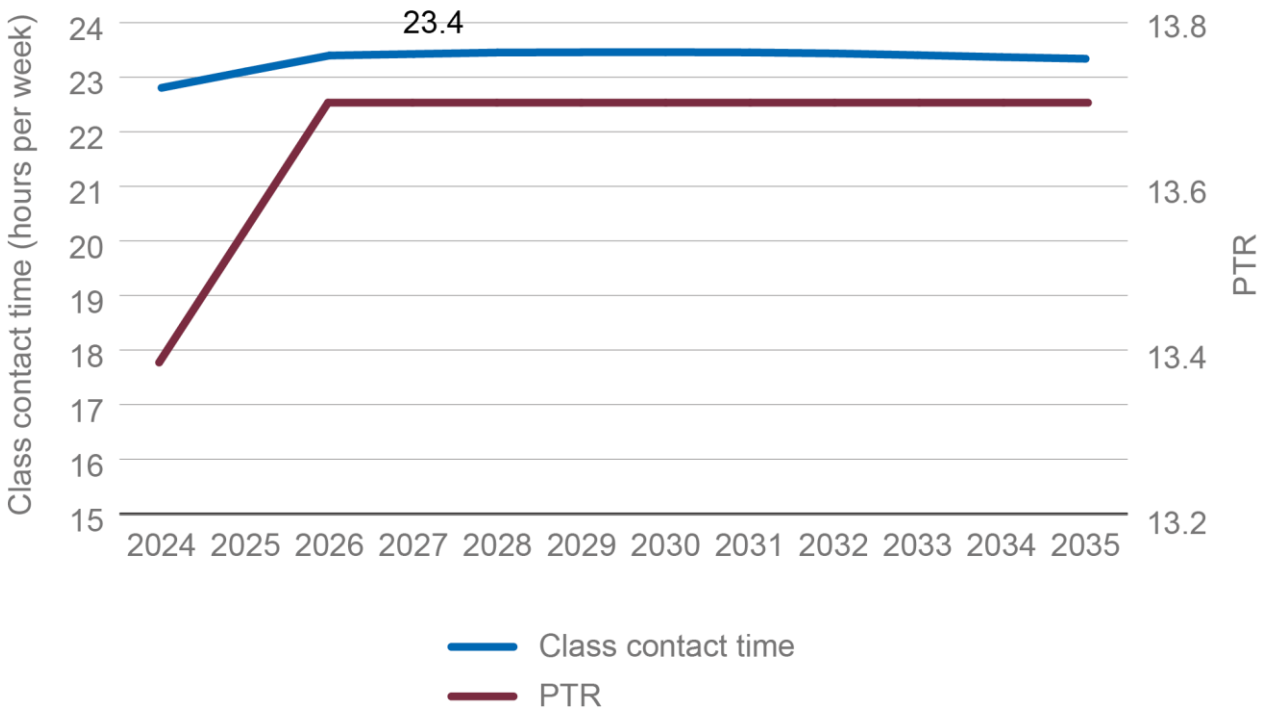
(a) Raising PTR to 13.7 by 2026

Allowing the PTR to increase from 13.2 to 13.7 by 2026 would effectively reduce the teacher resourcing need. Teacher demand falls by 7.1%, or 3,800 over 2022-2026 and continues to fall throughout the projection period to 42,500 in 2035 (assuming class sizes remain constant). As the number of secondary school pupils is expected to continue to rise until 2025, the inflow of teachers needed will come mainly from this school type.

Graph 5.11: Teacher workforce requirement



Graph 5.12: Class contact time (number of hours per week) and PTR



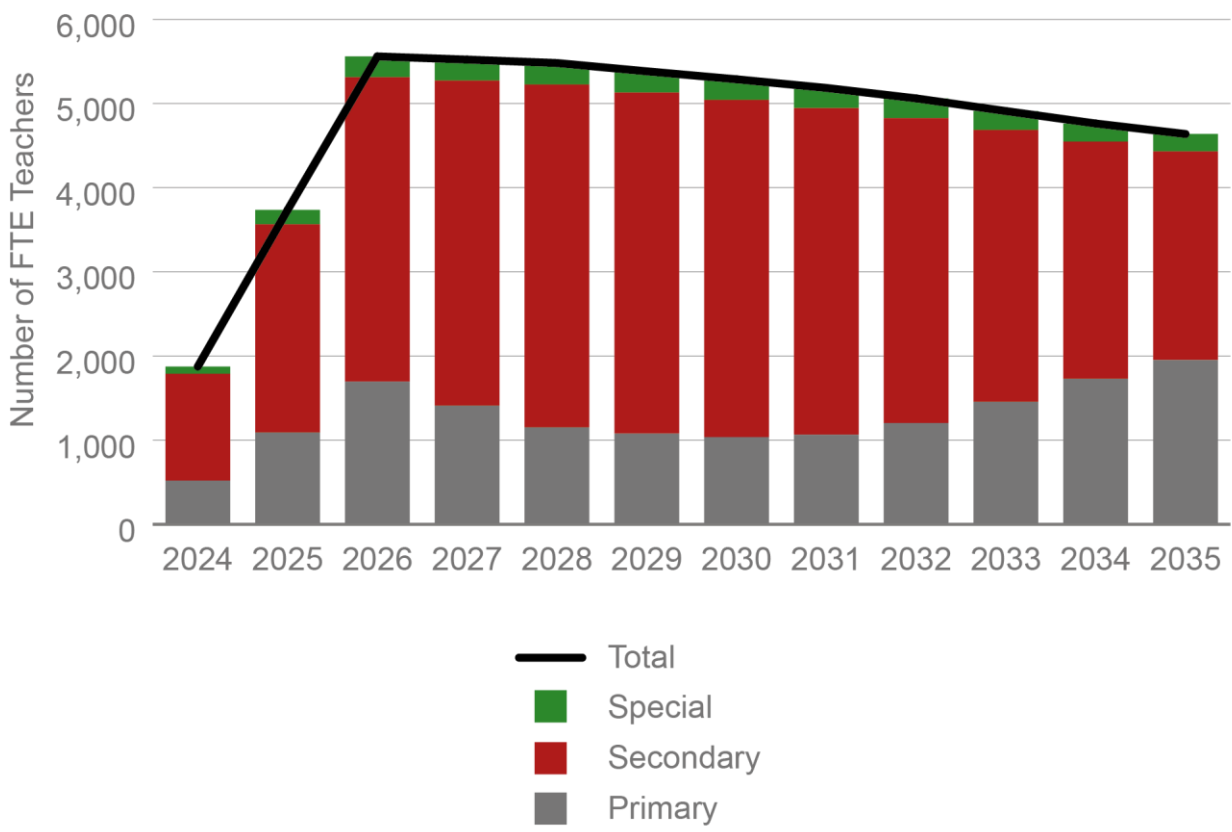
However, in our modelling, class contact time increases as the decline in the number of teachers is now relatively greater than the decline in the number of pupils. Projected class contact time increases to 23.4 hours per week by 2026 before holding steady at this level as a result of the PTR also levelling off.

This runs counter to the policy objective of enabling a reduction in class contact time. We therefore consider an alternative scenario below.

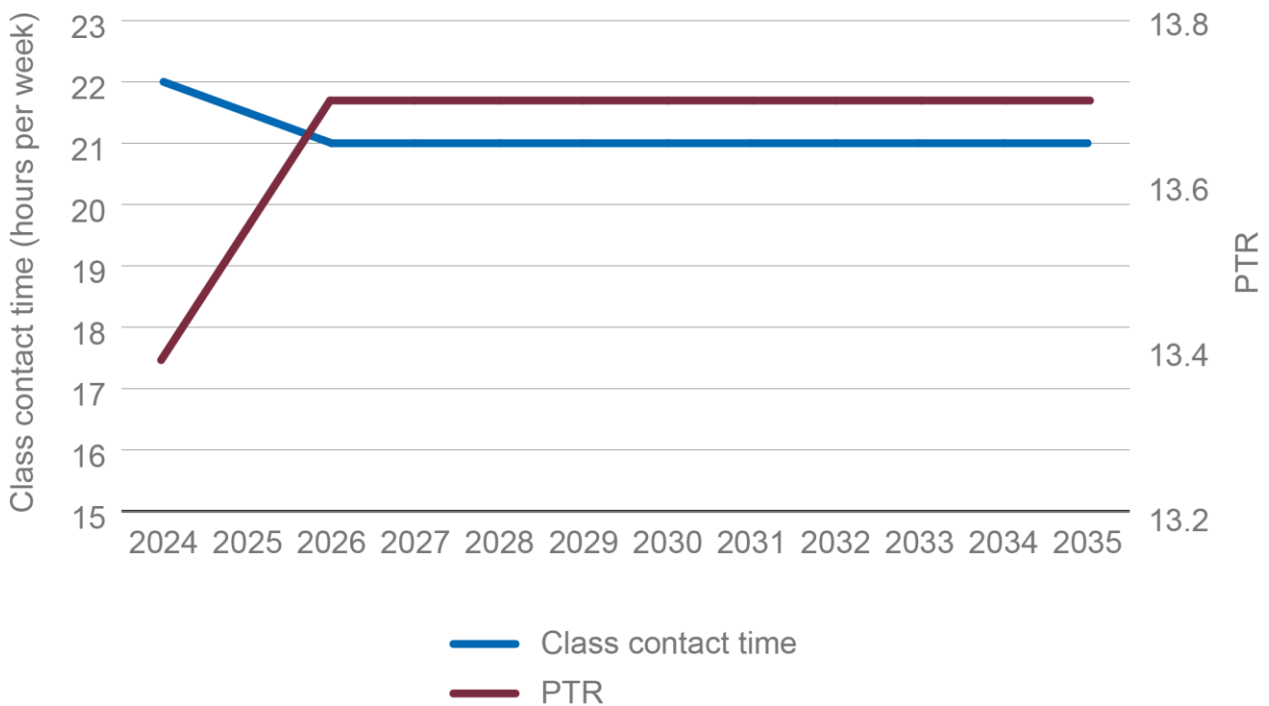
(b) Raising PTR to 13.7 by 2026, with a higher share of teachers in standard classes

In this modelling scenario, enabling a reduction in teaching time of 1.5 hours while allowing the PTR to rise from 13.2 to 13.7 by 2026 will mean that, at the peak, over 5,600 such teachers will have to change roles. We have not explored whether there is potential within the teacher stock for such numbers to change roles, and therefore do not provide comment on how viable such changes might be.

Graph 5.13: Number of teachers required to change roles to become teachers in standard classes



Graph 5.14: Class contact time (number of hours per week) and PTR

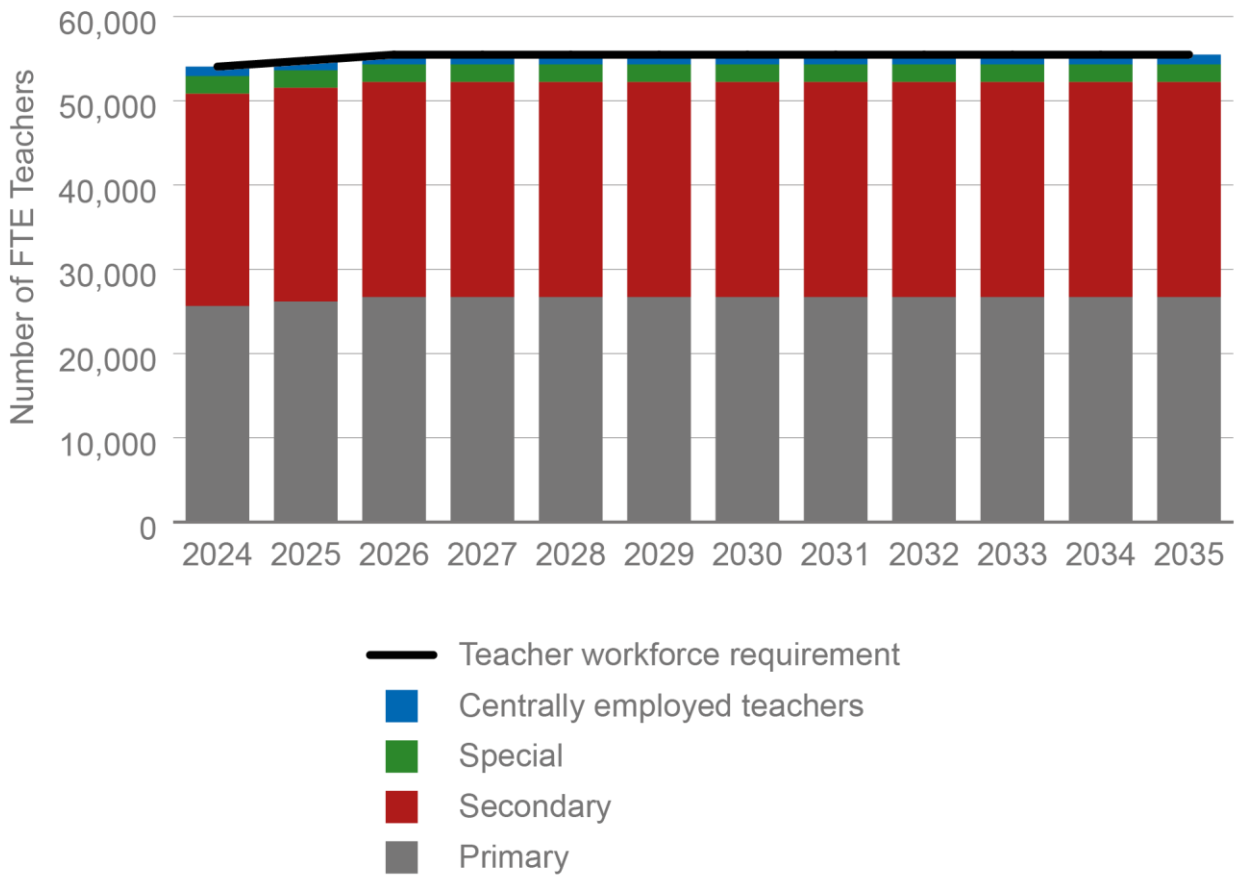


Scenario 4: Increase the number of teachers by 3,500 by 2026, in line with the Scottish Government commitment

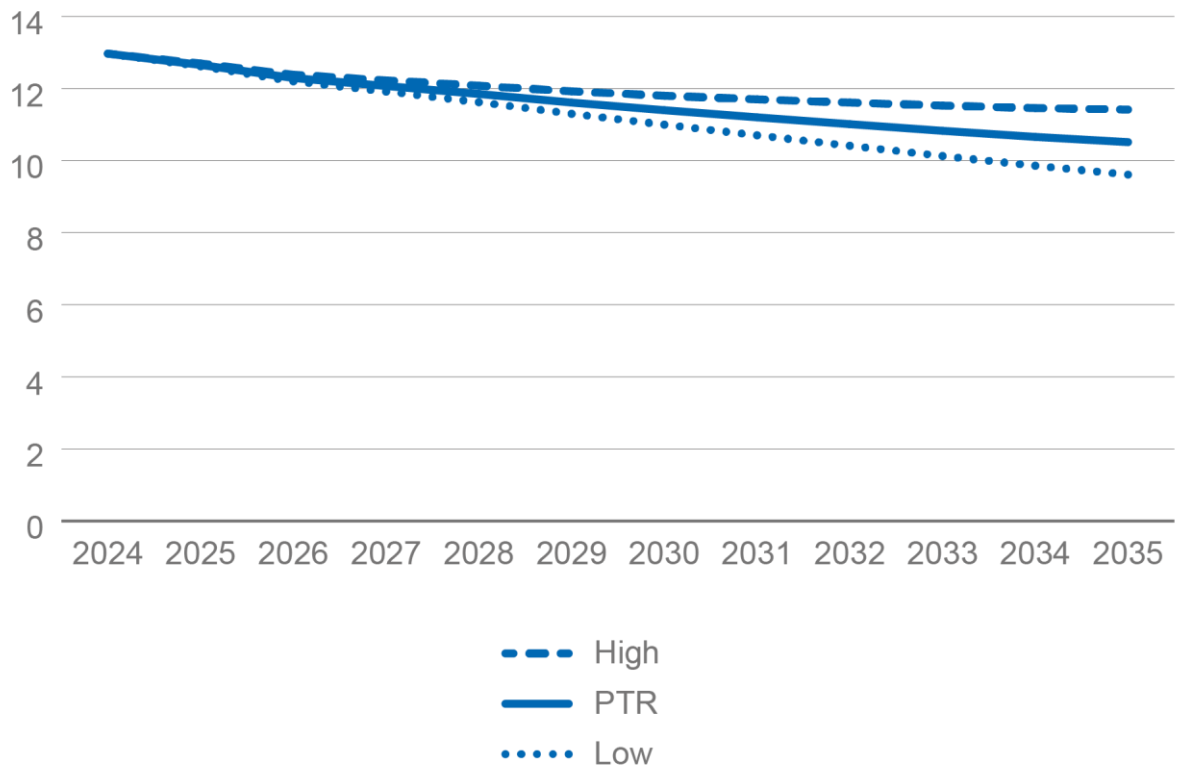
This scenario assesses the impacts of delivering the commitment set out in the 2021 Programme for Government of increasing the number of teachers by 3,500 by 2026 in the context of declining pupil populations over the next decade.

We assume that the number of teachers grows in line with the Scottish Government’s 2021 commitment (essentially an additional 3,500 teachers added to the teacher stock by 2026, which we assume to occur in a smoothed/linear manner) and thereafter assume a constant number of teachers until 2035, and see how this impacts PTRs and class contact time.

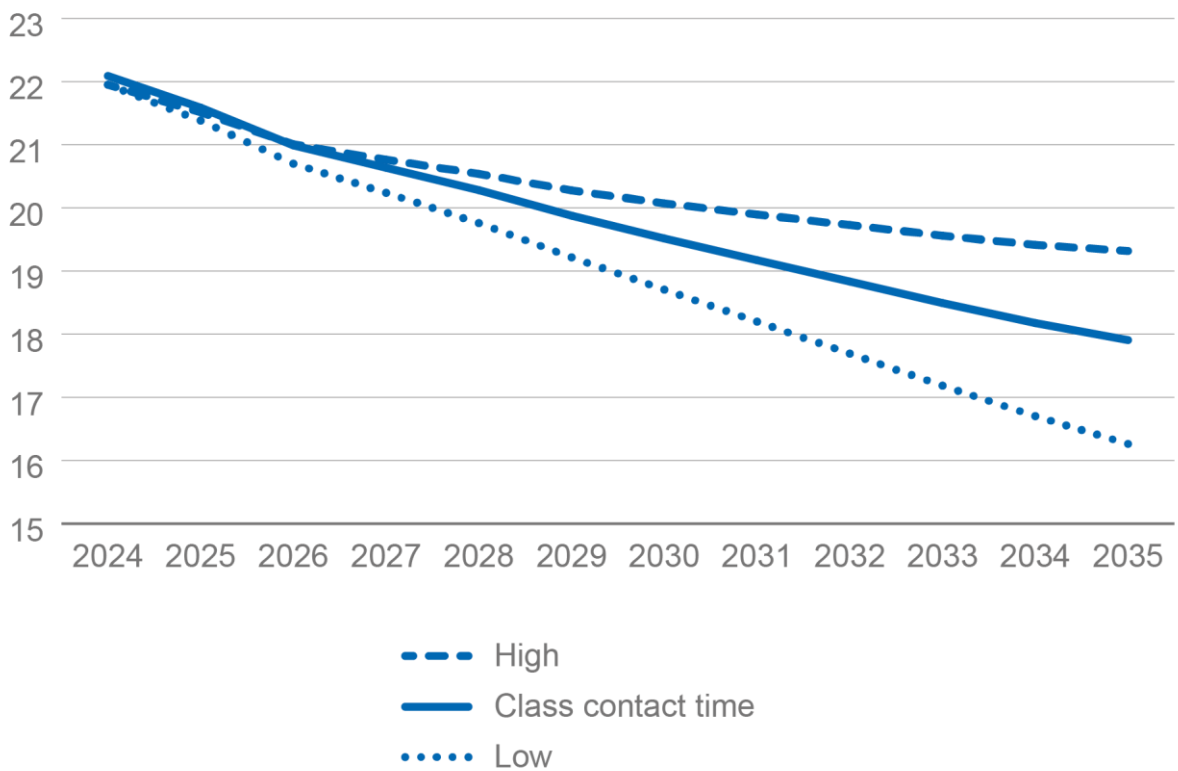
Graph 5.15: Teacher stock



Graph 5.16: Pupil-teacher ratio



Graph 5.17: Class contact time (number of hours per week)



With the increase in the teacher stock, the PTR falls sharply to 12.4 in 2025. Although the teacher stock is then held constant, the PTR continues to fall to a range of 9.5 to 11.2 by 2035 as the expected number of pupils in Scotland declines. Class contact time is expected to be enabled to fall to below 21 hours per week by 2026 in the baseline, high and low scenarios before continuing to fall substantially over the remainder of the projection period. This larger teacher stock runs counter to the demographic trends in pupil numbers and could therefore raise questions around implications for public sector budgets, long-term fiscal sustainability, and whether this delivers maximum value for money.

6. Conclusion

The report highlights the changing landscape of education in Scotland due to demographic shifts and policy choices and puts that in the context of how Scotland currently compares internationally.

Bringing the implications of these scenarios together can provide useful insight for teacher recruitment. Focussing on the implications from projected demographic changes – and in the context of constrained public sector budgets – our modelling suggests that a constant, rather than increasing, teacher stock could more closely match expected teacher resourcing needs over the next decade. This could avoid sudden excesses in teacher numbers relative to resourcing needs, while meeting the policy commitment to reduce contact time to 21 hours, albeit by 2028, two years later than planned.

This reduction could be enabled across all school types by 2028 if the proportions of primary, secondary and special school teachers are allowed to adjust (even though the overall number of teachers remain constant). Otherwise, the decline in class contact time could be enabled faster in primary (by 2026) and slower in secondary (by around 2031) with the average reduction being 1.5 hours by 2028.

Scotland's PTR would also reduce over time due to the expected decline in pupil numbers.

Focussing on enabling a reduction in class contact time across all school types by 2026 would require a significant increase in the number of teachers in the short term. This increase in teacher numbers could be reduced if the reduction in class contact time was enabled by 2028.

If a multi-pronged approach were considered (for example, exploring changing the role of teachers being used for targeted interventions rather than in standard classes, to increase the number of classroom teachers without significant recruitment) the class contact time commitments could be met without any reduction in the PTR. However, if the PTR was allowed to increase to 13.7 (the level it was in 2015-16) all else equal, this would lead to an increase in class contact time unless a disproportionately large – and likely infeasibly large – number of teachers being used for targeted interventions had their roles changed.

Appendix 1: Subject and regional analysis

We have extended our analysis to model pupil projections and teacher demand at the level of subjects and individual Local Authorities (LA). This granularity can provide insights into specific regional trends and challenges, stimulate further discussion, and inform decisions. However, it's important to recognise the limitations of the lower data volume at LA level. Statistical analysis with smaller datasets can introduce greater uncertainty and the potential for biased results. As such, the results should be interpreted with caution.

Pupil-teacher ratios (PTR) comparison across local authorities

Looking at pupil and teacher numbers across LAs paints a varied picture, shaped by population density, urban-rural divides, and demographic trends. In 2023, Shetland Islands had the lowest PTR (10.6), while East Lothian (15.1) held the highest, followed by Edinburgh (14.8). Notably, 19 out of 32 LAs surpassed the national average of 13.2.

At the secondary level, West Lothian (13.7), Fife (13.3), Dumfries & Galloway (13.3), North Lanarkshire (13.1), West Dunbartonshire (13.0) and East Ayrshire (13.0) have the highest PTRs.

Table A1.1: Pupil-teacher ratios (PTR) by local authority by subject (2023)

Area	PTR (2022)					
	Overall	Primary school	Secondary school	Mathematics	English	Sciences
Scotland	13.2	15.3	12.5	9.7	8.8	5.4
Aberdeen City	14.2	17.2	12.8	10.0	9.0	5.3
Aberdeenshire	13.8	15.5	12.2	13.3	10.4	5.3
Angus	13.3	14.5	11.8	10.3	9.0	5.6
Argyll & Bute	12.1	13.0	11.1	8.9	8.0	5.0
City of Edinburgh	14.8	18.3	12.8	10.0	9.4	5.3
Clackmannanshire	12.1	12.9	12.4	9.0	10.6	5.4
Dumfries & Galloway	14.3	15.5	13.3	10.0	9.7	5.2
Dundee City	13.5	15.3	12.6	10.3	9.3	5.7
East Ayrshire	13.8	15.9	13.0	8.8	8.7	5.5

East Dunbartonshire	13.0	15.2	12.1	9.8	8.9	5.2
East Lothian	15.1	17.6	12.8	11.2	9.3	5.7
East Renfrewshire	12.9	15.2	11.6	7.8	8.4	5.6
Falkirk	13.0	14.7	12.0	10.9	8.8	5.7
Fife	14.1	15.4	13.3	11.6	9.7	5.7
Glasgow City	12.9	14.7	12.4	8.9	7.1	5.5
Highland	13.6	15.8	11.8	8.7	8.7	4.7
Inverclyde	12.9	14.8	12.3	9.2	8.9	5.5
Midlothian	13.4	15.4	12.2	9.4	8.2	5.6
Moray	13.5	14.7	12.1	10.3	9.1	5.3
Na h-Eileanan Siar	11.0	11.4	10.2	7.6	10.3	5.5
North Ayrshire	13.0	13.9	12.2	9.6	8.8	5.0
North Lanarkshire	13.6	15.1	13.1	9.0	8.2	5.3
Orkney Islands	11.4	12.7	10.0	8.8	7.2	4.3
Perth & Kinross	13.7	15.3	12.3	9.8	10.0	6.6
Renfrewshire	14.0	16.3	12.9	9.4	8.2	5.5
Scottish Borders	13.9	16.0	12.6	11.4	10.5	5.5
Shetland Islands	10.6	11.6	9.2	8.7	8.4	4.3
South Ayrshire	13.2	14.4	12.3	10.1	9.6	5.8
South Lanarkshire	13.1	15.0	12.3	9.6	9.1	5.4
Stirling	13.5	14.4	12.9	8.6	9.2	5.1
West Dunbartonshire	13.6	15.0	13.0	8.9	8.0	5.3
West Lothian	13.5	14.5	13.7	9.3	9.2	5.4

Subject-specific PTR variations

We only consider subject selections at secondary school level. At the primary level, pupils typically study in a curriculum comprising compulsory subjects, and teachers often cover a broad spectrum of subjects. However, when pupils progress to secondary education, they start to choose specific subjects based on their interests and career aspirations from S3 to S4, while also taking some compulsory subjects such as English

and Mathematics. In our model, secondary school subject selections are estimated based on compulsory S1-S3 courses and National 5 attainment figures for S4-S6.

The PTR calculated for each subject is adjusted with the number of lessons per week for that subject, as found in online secondary school timetables or documents.

Mathematics, English, and a broad "Other" category (encompassing PE, Arts, Music, Geography, and History) exhibit relatively high PTRs compared to other subjects, with a PTR at 9.7, 8.8 and 9.7, respectively, in 2022.

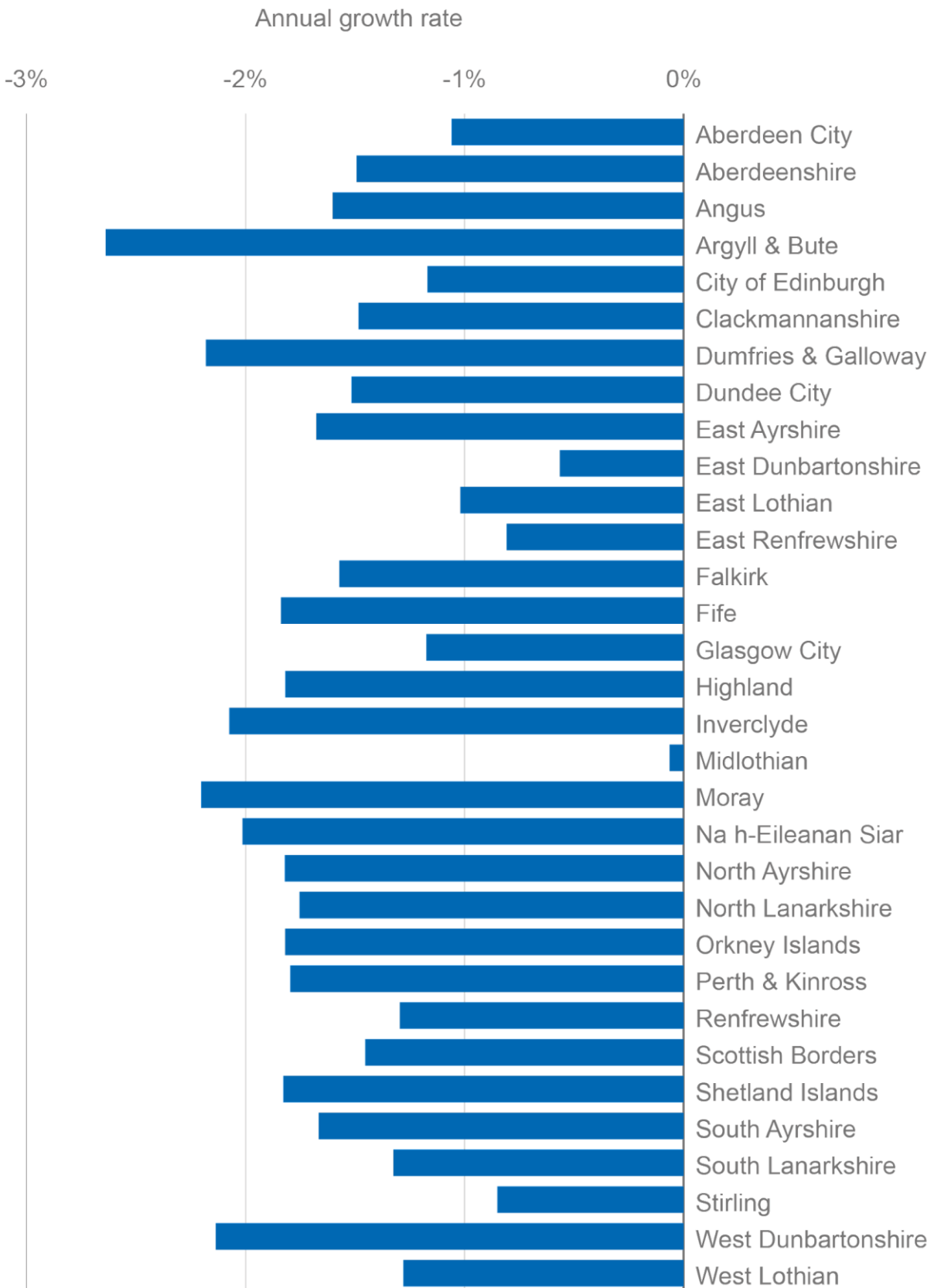
Mathematics, identified as a subject with a high national PTR, has substantial local variations. While Na h-Eileanan Siar and East Renfrewshire had the lowest rates in 2022 (less than 8), Aberdeenshire (13.3), Fife (11.6), Scottish Borders (11.4), and Falkirk (10.9) are areas with the highest PTRs for Maths. This could be due to teacher recruitment challenges and/or higher demand for this subject among pupils in these areas. Understanding these diverse contexts is important for allocating resources and supporting Mathematics education across Scotland's varied landscapes.

Science subjects, on the other hand, presented a more balanced PTR landscape. Perth and Kinross (6.6) and South Ayrshire (5.8) emerged as outliers with the highest PTRs, exceeding the national average of 5.4. It is worth noting that although we have factored in pupil numbers and lesson hours per week for different subject groups, the PTR calculations are based on a number of assumptions (detailed later in the Annex), and caution should be exercised when comparing the PTR between subjects.

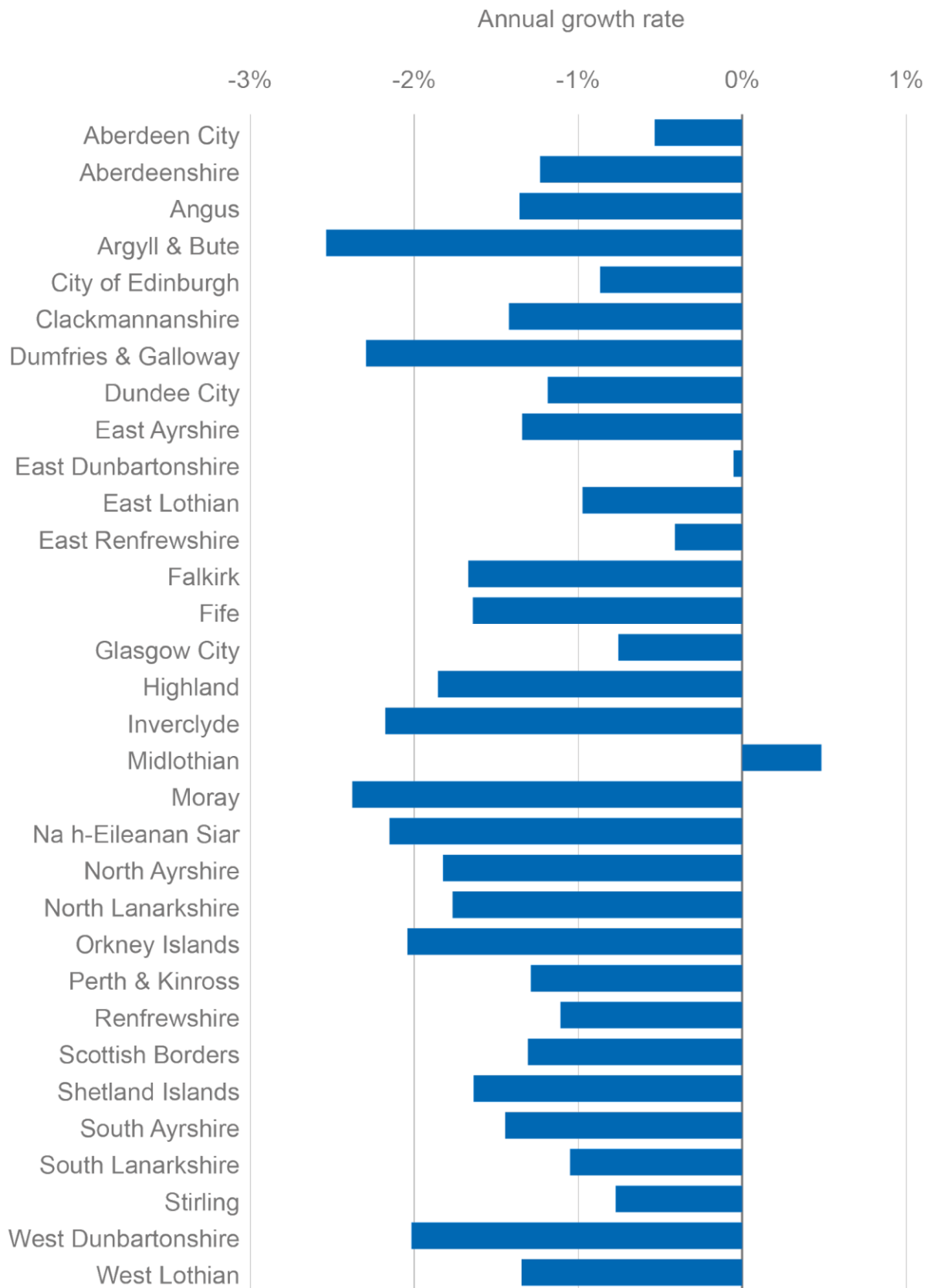
Unevenly distributed pupil population decline across Scotland

The projected decline in pupil population, derived from NRS projections using the 2018-based low fertility scenario (which is the latest local authority level projection available and most closely matches the ONS 2020 projection for Scotland) will impact all LAs, albeit unevenly. Argyll & Bute (-2.7%) and Moray (-2.3%) are expected to experience the steepest declines by 2035, while Midlothian is expected to see the least significant drop. Notably, Midlothian's secondary school population is projected to experience a modest 0.5% increase between 2022 and 2035.

Graph A1.1: Change in total pupil population – baseline scenario (2022-2035)



Graph A1.2: Change in secondary pupil population – baseline scenario (2022-2035)



Teacher resourcing needs under different scenarios

The scenarios covered in the main body of this report have also been analysed at LA level to explore the interactions between policy commitments, teacher supply and demand, and resource constraints. To recap these scenarios, they are:

0. Maintaining constant teacher stock
1. Enabling a reduction in class contact time by 1.5 hours per week
 - (a) Lowering class contact time to 21 hours per week by 2026
 - (b) Lowering class contact time to 21 hours per week by 2028
2. Maintaining the pupil-teacher ratio at 13.2
 - (a) Maintaining the PTR at 13.2
 - (b) Maintaining the PTR at 13.2, with more classroom teachers
3. Raising the PTR from its current level to its recent high
 - (a) Raising PTR to 13.7 by 2026
 - (b) Raising PTR to 13.7 by 2026, with more classroom teachers
4. Increasing the number of teachers by 3,500 by 2026, in line with the Scottish Government's commitment, then it remains constant from 2027

A summary of the LA PTR projections for these scenarios can be found in table A1.2. In the case of reducing class contact time, we assume all teachers across all school types and LAs begin with 22.5 weekly teaching hours. Adjusting the national target effectively reduces class contact time for all teachers across the board. Consequently, LA PTRs exhibit a general downward trend until 2033 for lower target scenarios. Conversely, increasing the national PTR target raises LA PTRs, albeit to varying degrees.

In the case of changing the national PTR, this will effectively change the number of teachers needed at the national level with a changing pupil population. The corresponding change in teacher demand in each LA is determined by that LA's share of national teacher stock in 2022. Due to different retirement rates and demographic patterns in different LAs, holding the national PTR constant will still lead to changes in PTRs at LA level. For example, even if the national PTR is the same, as the pupil population changes, the teacher demand will also change, as the change in pupil population varies across LA, and the change in teacher numbers does not necessarily follow the change in pupil population. This therefore can result in a changing LA PTR.

Demographic shifts highlight East Dunbartonshire, Midlothian, and Stirling as LAs projected to experience the largest PTR increases across most scenarios by 2033. However, in terms of the level of PTR, East Lothian, Edinburgh, and Midlothian stand out. This suggests particular challenges in meeting teacher workforce requirements for these areas.

Table A1.2: Pupil-teacher ratios (PTR) in 2033 by local authority by subject under different scenarios

Area	PTR (2023)	PTR (2033)					
	Overall	Scenario 0	Scenario 1a-b	Scenario 2a-b	Scenario 3a	Scenario 3b	Scenario 4
Scotland	13.2	11.3	12.3	13.2	13.7	13.7	10.8
Aberdeen City	14.2	12.8	13.6	15.0	15.6	15.6	12.3
Aberdeenshire	13.8	11.8	12.7	13.8	14.3	14.3	11.3
Angus	13.3	11.1	12.3	13.0	13.5	13.5	10.7
Argyll & Bute	12.1	9.0	11.2	10.5	10.9	10.9	8.6
City of Edinburgh	14.8	13.0	13.8	15.3	15.8	15.8	12.5
Clackmannanshire	12.1	10.2	11.2	12.0	12.4	12.4	9.8
Dumfries & Galloway	14.3	11.2	13.2	13.1	13.6	13.6	10.7
Dundee City	13.5	11.5	12.6	13.5	14.0	14.0	11.0
East Ayrshire	13.8	11.5	12.7	13.5	14.0	14.0	11.0
East Dunbartonshire	13.0	12.5	12.2	14.6	15.2	15.2	12.0
East Lothian	15.1	13.5	14.0	15.8	16.4	16.4	12.9
East Renfrewshire	12.9	11.9	12.0	14.0	14.5	14.5	11.5
Falkirk	13.0	10.8	12.0	12.7	13.1	13.1	10.4
Fife	14.1	11.5	13.1	13.5	14.0	14.0	11.0
Glasgow City	12.9	11.4	12.1	13.3	13.8	13.8	10.9
Highland	13.6	11.0	12.5	12.9	13.4	13.4	10.6
Inverclyde	12.9	10.2	12.1	11.9	12.4	12.4	9.8
Midlothian	13.4	13.4	12.6	15.8	16.4	16.4	12.9
Moray	13.5	10.4	12.5	12.3	12.7	12.7	10.0
Na h-Eileanan Siar	11.0	8.8	10.1	10.3	10.7	10.7	8.4
North Ayrshire	13.0	10.5	11.9	12.4	12.8	12.8	10.1
North Lanarkshire	13.6	11.1	12.5	13.1	13.6	13.6	10.7
Orkney Islands	11.4	9.3	10.6	10.9	11.3	11.3	8.9

Perth & Kinross	13.7	11.2	12.7	13.2	13.7	13.7	10.8
Renfrewshire	14.0	12.2	13.0	14.3	14.8	14.8	11.7
Scottish Borders	13.9	11.8	13.2	13.8	14.3	14.3	11.3
Shetland Islands	10.6	8.7	9.7	10.2	10.6	10.6	8.4
South Ayrshire	13.2	11.0	12.2	12.9	13.4	13.4	10.6
South Lanarkshire	13.1	11.4	12.2	13.4	13.9	13.9	11.0
Stirling	13.5	12.3	12.4	14.4	14.9	14.9	11.8
West Dunbartonshire	13.6	10.7	12.5	12.6	13.0	13.0	10.3
West Lothian	13.5	11.6	12.6	13.7	14.2	14.2	11.2

Appendix 2: Methodological summary

This chapter dives into the methodologies and assumptions underpinning our analysis of pupil projections and teacher resourcing needs within Scotland's educational landscape.

Pupil Projections: Growth and Distribution

Pupil projections by stage are derived from the growth rate of the national population projection by age (based on the ONS 2020-based interim national population projections), where stage 1 is assumed to grow at the same rate as the population projection for five year olds, and so on. The LA-level projection is split by the national-level projection by using the proportions calculated from the NRS population projections for Scottish areas (2018-based low fertility projection).

High and Low Pupil Population Projections

For each sub-scenario, we consider the impact of both high and low pupil population projections. The high and low pupil population projections are derived from the spread of the pupil-age population between the principal and low fertility projections for Scotland and its local authorities up to 2035. Please note that the spreads used are the same for all school types (primary, secondary, and special).

Subject Uptakes and Lesson Times

Estimating the number of pupils taking each subject involves a two-step approach. For S1-S3, we rely on the prevalence of compulsory subjects across secondary schools in Scotland, obtained from readily available online timetables. From S4-S6, National 5 attainment statistics provide insights into student preferences and course selections. The number of lessons per week for a particular subject is determined from some secondary school timetables and documents published on their websites. This is then converted into number of minutes by assuming that a lesson normally lasts for 50 minutes.

In order to make the PTR more comparable between subjects, we have carefully adjusted the ratios by factoring in the number of pupils in each subject group and the number of lessons per week. However, there are still some limitations due to data availability. For example, we assume that mathematics, English, and physical education are compulsory subjects at the upper secondary level, while for elective subjects, we use the number of entries at the National 5 level in a given year. Pupils studying the same subject may not take the examination at all, and they may not be in the same year group. There may also be a number of subjects in a subject group. For example, general science, physics, chemistry, and biology are all included in the 'Sciences' category, but the number of teachers of these subjects varies considerably. According to the Teacher Census, the number of general science teachers was quite low at 175 nationally in 2022. On the other hand, there were 1,356, 1,004 and 821 teachers of biology, chemistry, and

physics, respectively. This aggregated approach may overlook shortages in specific subjects. However, given the potential overlap in teaching roles (i.e. a biology teacher may also be able to teach general science), we maintained the current approach to calculating the subject PTR.

Teacher Resourcing Needs and Scenarios

Our analysis explores various scenarios for teacher resourcing needs under different class contact time and PTR targets. Each scenario assumes a starting point of 22.5 hours per week for all teachers across school types and LAs. Reducing the national target effectively adjusts class contact time for everyone, impacting teacher deployment across the board. The number of teachers in 2023 is assumed to be the same as the teacher stock in 2022 due to data limitations at the time of modelling.

Calculating Class Contact Time

Determining class contact time (CCT) involves several key steps:

1. Determine the class size.

Only primary school statistics are available for each LA. The secondary and special school class sizes are derived from other sources. For secondary schools, we use the England data as a proxy¹⁵. And with a lack of LA-level data, we assume the class size of secondary / primary schools is the same as the national ratio. For special schools, this is proxied by the class size of moderate learning difficulties, assumed it is the most common type for special schools¹⁶.

2. Determine the number of class hours per week.

The number of hours per week for primary and secondary school pupils is obtained from online sources, where special school is the weighted hours of primary and secondary special school pupils.

3. Apply an adjustment factor.

However, these could not add up to a class contact time of 22.5 hours per week due to the fact that not all teachers are in standard classes. Therefore, an adjustment factor is applied for different school types and different LAs so that all school types and all LAs start with a class contact time of 22.5 hours/week in 2023. The adjustment factors are kept constant throughout the projection period.

Where CCT is reported, it is the average across different school types. However, in scenario 1, the proportions of primary, secondary and special school teachers are adjusted so that the CCT is the same for all school types.

¹⁵ [High School of Glasgow, Class Size and Learning - Everything You Need to Know](#)

¹⁶ [SNCT, Appendix 2.9](#)



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