Sciences Curriculum Improvement Cycle (CIC)

Development Group Workshop 1

05 February 2026

Summary report

Education Scotland
Foghlam Alba

Introduction

This summary report captures the output from the first in a series of two in-person workshops for the Sciences Curriculum Improvement Cycle (CIC) Development Group. This workshop was held on 05 February in Glasgow. Detailed output and analysis from this workshop can be accessed via the event Padlet.

The Development Group event was attended by 23 participants (including 2 BSL interpreters), representing 11 local authorities alongside key national partner organisations. The Development Group is a smaller, representative subset of the Sciences CIC Collaboration Group and the wider Critical Friends network. Membership of the group was open to all Collaboration Group members, with expressions of interest invited following the group's last in-person meeting in December 2025. Careful consideration was given to achieving balanced representation across sectors and local authorities. Of the 21 participants at this workshop, representation included one from ASN, five from ELC, four from primary, seven from secondary, and four from national partner organisations.

This event formed part of a wider, ongoing programme of work, building on outcomes from the fourth Sciences CIC Core Group Workshop in January 2026.

The objectives of the workshop were to:

- Explore knowledge progression and develop a draft progression pathway for three themed aspects of the sciences curriculum across early to fourth level.

  The work undertaken during this workshop represents an early stage of development. Emerging thinking will inform further discussion, testing, and refinement through subsequent CIC activity. Outputs from this workshop provide an initial foundation and a clear direction of travel for developing coherent approaches to knowledge progression, alongside early exploration of key terminology and language to support skills development across early to fourth level.

When they reconvene in March 2026, the Core Group will refine and consolidate the outputs from the two February CIC Development Group workshops.

Summary of activities and outputs

The two-day workshop was built around several sessions as outlined below.

Thursday 05 February 2026			
Session	**Focus**	**Table groupings**	**Key outputs**
	Cognitive Development Reviewed stimulus materials reflecting on what levels of cognitive development learners might need in terms of spaces, interactions and experiences. Sector groups then reviewed prepared stimulus on current experiences and outcomes (for Properties of Materials, Biodiversity and Interdependence and Waves) highlighting which are abstract/too simple or which of them are pitched right according to the scale on the stimulus	Sector groupings	The outputs from this task fed into later tasks. Fed back around the room and sheets collected.
1	***Knowledge per Sector*** Following personal reading of stimulus derived from international curricular materials, Learned Society publications and current benchmark documentation, sector groupings discussed and suggested high-level knowledge statements for the three identified themes. The secondary sector group worked in mixed subject specialism sub-groups for this task.	Sector groupings	Post it notes containing high-level knowledge (for task 2) and each post-it note captured in document by facilitator.
2	***Knowledge Progression*** Using output from Task 1, three mixed sector groups arranged high-level knowledge statements into a progression framework for each of the themes. Discussions followed and any edits required were made to the post it notes on the display.	Mixed sector groupings	Themed post-it notes sorted on flipchart paper and edits recorded in document by facilitator.

3	***Gallery walk*** Mixed sector groups reviewed the remaining two themes via a gallery walk. Participants were asked to offer feedback using the criteria of something you like, needs more thought and ideas/suggestions.	Mixed sector groupings	Individual responses via post-it notes and captured on flipchart paper as progression. Captured as image for Padlet. ES team will type up and analyse the feedback as part of output process.
4	***Gap task*** Sector groups were issued with knowledge bundle cards, previously used with the Core Group in November 2025. Ahead of the follow-up workshop, participants were asked to discuss these cards within their own settings and professional networks. They were asked to consider, from a sector-specific perspective, whether the cards provided a broad and appropriate picture of what the sciences curriculum should encompass, and to identify any gaps, omissions, or elements that could be removed.	Sector groupings	Participants asked to upload returns to the Padlet ahead of next workshop.

Knowledge Progression

Using prepared stimulus materials, the Development Group was asked to identify high-level knowledge statements for three themes central to the sciences curriculum from early to fourth level: Biodiversity and Interdependence, Properties of Materials, and Waves. As this was the Development Group's first opportunity to develop high-level knowledge statements, it was agreed to focus on themes relevant across all levels, following the same rationale that had been utilised during a previous Core Group workshop. These themes had also emerged from Core and Collaboration events as being well aligned with the developing technical framework.

The Education Scotland Science Team prepared a set of stimulus materials, including the current benchmarks for the three identified themes. The stimulus materials also drew upon four international comparisons—New Zealand, Singapore, the USA (NGSS), and British Columbia—as well as publications from the Learned Societies and the Primary Curriculum Advisory Group (PCAG). From each source, relevant knowledge statements were identified and were aligned with the Scottish CfE levels.

Sector groups were invited to review the stimulus materials for each theme and to identify high-level knowledge statements aligned to their respective levels. The primary group considered both first- and second-level content, while the secondary group focused on third- and fourth-level content. Given its larger size and the inclusion of most partners, the secondary group divided into three sub-groups, with each examining a theme, with each sub-group comprising of mixed subject specialism.

Each high-level knowledge statement was recorded on a Post-it note and captured in a facilitator-populated document. Participants were subsequently reorganised into mixed-sector groups by theme. These groups were tasked with aligning the high-level knowledge statements generated in the earlier phase into a coherent progression pathway.

During this process, some knowledge statements were refined by the mixed-sector groups. All amendments were documented both on the post-it notes displayed and within the accompanying document maintained by the Education Scotland team.

Remaining in their mixed-sector groups, Core Group members then participated in a gallery walk focused on the two remaining themes. During this activity, participants reviewed the draft progression pathways and the associated knowledge statements for each theme, providing individual feedback. To support subsequent analysis of the feedback, participants were asked to continue using the colour-coded post-it notes originally assigned to their respective sectors.

Feedback was invited under three prompts:

- Identification of a particular strength
- An aspect requiring further consideration
- A suggested refinement or addition to an existing statement.

The overall feedback from the gallery walk was collated and documented by the Education Scotland Science Team following the event and is shown below. Photographic records of the final feedback are available on the event Padlet.

Knowledge progression for Waves, Properties of Materials, Biodiversity and Interdependence

Level	Waves		Properties of Materials		Biodiversity and Interdependence	
	Knowledge	**Gallery walk feedback**	**Knowledge**	**Gallery walk feedback**	**Knowledge**	**Gallery walk feedback**
ELC/Early	1. Through play & exploration, I can make sound. 2. Sound happens when something moves. 3. Volume is loud or quiet. 4. Include light e.g. shadows, rainbows, night/day. 5. Sources.	2. ❤️ Cause and effect *(Secondary comment).* 4. ❤️ Light being added to early level. *(Secondary comment).* Do you need rainbows here? Risk of confusing paint colour mixing. *(Secondary comment).* Ideas/Suggestions ⚡ Suggestion to add "Language of waves" *(ELC comment).* ⚡ Add "light" and "dark" as key vocab. *(Secondary comment).* ⚡ "Light comes from natural and	Through play and exploration, I experiment with different materials using our senses. Materials to solve practical challenges.	Not specific to practical – exposure to All materials. *(Secondary comment).* ⚡ + Materials we are exploring + Properties of the materials -Weight -Length etc + links to baking/cooking etc *(ELC comment).*	1. Through investigation, I notice that living things rely on each other and have basic needs. 2. Life cycles. Interdependence. Care of living things. 3. Living/non-living. Habitats. (experiential). 4. Composting.	2. Rely on/depend on (ELC comment). 3. + And non-living and never was alive (ELC comment). 4. + Not sure where this fits from discussions. (ELC comment). Needs to be consistent language across all areas. (secondary comment?). ⚡ Add human have an impact on biodiversity (ELC comment).

		unnatural sources". *(ELC comment).*				
Level 1	1. Light is needed to see objects and be seen. 2. Light can be natural or artificial (sun/torch). 3. Light travels from a source. 4. Reflection – mirrors and sun and moon. 5. Blocking out a light source creates a shadow. 6. Opaque, translucent + transparent materials. 7. Sound travels as a wave through materials. 8. Shaking or vibrating materials makes sound. 9. Pitch – how high or low a	6. How do you contextualise this for solids and gases? Focus on liquids? *(Secondary comment).* This seems quite hard for second level. Maybe should be at third level? *(Secondary comment) – I think they mean too hard for first level.* ❤️ that it links from early level. *(Primary comment)*	1. Shape, texture, size, flexibility of materials. (using senses). Materials can be natural or manufactured. 2. Familiar materials can be sorted in to observable properties – shape, texture, colour, hardness, flexibility, weight. Familiar materials – fabric, wood, plastic, glass, metal/foil, sand. 3. Materials can be sorted in mechanical properties – flexible, elastic, pulled or twisted.	Can we use the words temperature (heat) and others to change how a material looks/behaves? *(Secondary comment).*	1. The role of animals and plants are needed for a healthy ecosystem and for human survival. 2. Living and non-living things requirements. Living things need oxygen. 3. Oxygen is required for some living processes. 4. Different behaviours of different organisms e.g active during the day, nocturnal, solitary or live in a group. 5. All living things need water, air and	

	sound is (pitch). 10. Materials can effect the volume and clarity of sound as it travels.		Solids can keep shape, liquids and gases can change shape. Physical ways of changing materials – warming, cooling, bending, cutting, stirring, mixing. * Chemical ways of changing materials – cooking, burning etc.		resources from the land. 6. Habitats definition. 7. Carnivores, omnivores and herbivores.	
Level 2	1. Everything we see is either a light source or reflected light and is viewed through your eyes. 2. Negative impact of light pollution – effects of UV light on humans. 3. Light travels from a source and can be	5. Too cluttered/too wordy *(Primary comment) - Not sure if this is for all the content or just this card.* 10 + Is this inclusive for the deaf community? *(Secondary comment)*	The density of an object determines if it can float or sink.	♥ Good to see density mentioned. *(Secondary comment).* The word density without context is confusing. Floating and sinking fine but definition of density before context. *(Secondary comment)*	1. Food chains – predator and prey. 2. Recognise some broad groups of living things based on similarities and differences. Plants – flowering and non-flowering. Bacteria. Fungi.	1. Predator and prey – terms used at early – in more depth? (primary comment). 3. ⚡ Add in invertebrates. (secondary comment).

	reflected, scattered or absorbed. 4. Splitting of white light into colours (rainbow). 5. When an object appears to be reflected e.g. in a mirror or water, light has travelled from a light source to the object, then to the reflective surface, then to the eyes. 6. Exploring how animals communicate. 7. The way sound travels through a material depends on the material's properties. 8. How much a material vibrates affects the pitch. 9. The volume of a sound	Not needed as a core element. *(Secondary comment).* Why the inclusion of wellbeing? *(Primary comment).*	Chemistry can be used to make new materials – medicines and materials for clothing and buildings shelters. * Signs of physical changes and chemical reactions. * When two or more different substances are mixed or separated, a new substance with different properties may be formed.	Do you need density at second/third level? *(Secondary comment).* Less detailed, minimal vocab (refers to 'when two or more diff substances' etc..) *(Primary comment)* *Lots of good linking together *(Secondary comment)*	3. Categorising the animal kingdom – mammals, amphibians, reptiles, fish and birds. 4. All organisms in an ecosystem are interdependent and have roles that matter. 5. Adaptations to habitats . 6. The role of microorganisms and soil are needed for a healthy ecosystem and for human survival 7. Ecosystems need to be well-balanced 8. Plants need water, carbon dioxide, light and nutrients to survive. Animals	5. Wording of this? Animal adaptations to their habitats? (secondary comment).

	decreases as the distance from its source increases. 10. The importance of sound for survival, communication and wellbeing. 11. The negative impact of sound pollution.			*Not assigned to any post it note but on photograph*. Friction – response – this is under forces.	need food, water, oxygen and space to survive. 9. Soils are composed of decaying and living organisms. 10. There are environmental factors such as air pollution/quality is a component that can disrupt an ecosystem.	
Level 3	**1. Types of Waves** • Sound. • Light. • Water. • Definitions of waves: Transverse, Longitudinal. **2. Electromagnetic spectrum**	**General comments between second to third level transition** It is a big jump from second to third level. *(Primary comment).* Is this is a very big jump from second	Physical and chemical properties. (Note- these are to help guide the next level down when writing knowledge statements) e.g. Physical – solubility, conductivity (thermal and electric), density, plasticity,	Can we do this (density) in SI units? *(Secondary comment)* Do you need density at second/third level? *(Secondary comment).*	1. Biodiversity is dependent on multiple environmental factors. 2. Definitions of Habitats, ecosystems, biodiversity population, species. Community. Evolution?	2. Do they need this? What is the purpose? (secondary comment). 2. We need to learn definitions for a reason. (Secondary comment). 2. What is evolution at this

	• What it is. • What the different waves do. • Application of the different components of EM spectrum. **3. Properties of a wave (in the context of sound and light)** • Speed. • Amplitude. • Frequency (with relation to pitch). • Wavelength. **4. Properties of waves (Qualitative)** • Reflection. • Refraction. • Normal. • Dispersion. **5. Sound** Hearing range. **6. Light** Colour mixing.	and third level? *(Secondary comment).* Third level comments: "It seems harder than what we currently do" *(Secondary comment).* 2. Electromagnetic spectrum – This is very abstract for third level. *(Secondary comment.)* 4. Properties of waves ❤ *(Secondary comment).* 5. Hearing range. Two ❤ *(Secondary comments)* One comment added "Important to teach real world	elasticity, recyclability, sustainability (links to all of them) chemical e.g. signs of chemical reaction (temp, colour, energy, gas, precipitation), reversible and irreversible chemical reactions specifying chemical NOT physical) (done in a scientific context building on everyday life examples). This is NOT about the formation of compounds / bonding. The relationship between mass and volume is known as density (*link to maths learning about volume and weight).		3. Food webs. 4. What living things need to survive, all traced back to the sun. 5. What each sampling technique is used for and why (quadrats, pitfalls, tree bashing). 6. What adaptations are and why they've evolved. 7. Contextuality. Rewilding (lynx, deer, beavers). Swift bricks. Reforesting.	level? (Secondary comment). 3. Niche? Competition? (Secondary comment). Disruption to an ecosystem? + human impact? (Secondary comment). Should we focus on relationships between

	7. Calculations v= d/t ***(Should this be included in S1?)***	applications and careers". 6. Colour mixing. Two ❤️ *(Secondary comments)*	Knowledge of periodic table, organisation of elements including physical properties, groups, atomic number? NOT atomic structure.			organisms + competition? (Secondary comment). How depth is the progression? Taught at first and second level too.(Primary comment).
Level 4	**Health physics** • Lenses • X-rays • Endoscope etc ***(Should this be included here?)***	❤️ Yes real world applications relate to many careers. *(Secondary comment).*	The structure of atoms and how they join: - Pure substances (elements) - Mixtures - Compounds (making and breaking) - Atomic structure.	⚡ Uses of materials development of new materials. *(Secondary comment).* + Teach what is a model? Limitations of models. *(Secondary comment).* Do conductivity heat/electrical (feedback yes) And friction belong? (feedback no) *(Secondary comment).*	1. Humans can have positive and negative impacts. 2. Definitions of biotic and abiotic. 3. What indicator species are and what they tell us about our environment.	1. ❤️ (secondary comment). 1. this can overarch all levels. (Primary comment). Impact of global warming on environment? (Secondary comment). Should this be more about climate change etc? (Secondary comment).

Any other general comments?		**Misconceptions** 1. Velocity and speed are identical (they are not). 2. Rainbow song and seven colours in ROYGBIV. There are many colours. *(Physically, visible light is a* ***continuous range of wavelengths****. There are* ***infinitely many colours****, not seven fixed bands. Presenting ROYGBIV as "the colours of the rainbow" risks learners believing colours are* ***natural categories*** *rather than* ***human conventions****.)*		Should this be a larger unit with matter? *(Secondary comment).*		Contradictions in flow and language etc. (Secondary comment). BSL signs for different micro-organisms/classes of microorganisms. (Secondary comment). Using applicable resources – are they (?) i.e. microorganisms (microscope experiences). (Secondary comment). Some repetition or is it overlap? (Secondary comment).

		3. Light mixing and paint mixing –colour mixing is different. *(**Misconception:** "Mixing colours always works the same way, whether it's light or paint." This leads learners to expect the **same results** from torches, screens, paints, and inks — which is **physically incorrect**).* 4. Velocity and speed – BSL signs from SSC from BSL glossary help to visualise the difference in velocity and speed.				

Gap Task

At the end of development day 1, a draft plan for development day 2 was shared with the group, and a gap task set to allow time for reflection before the group reconvene on 27th February.

The group were presented with a set of knowledge bundle cards to review. These have been developed through an iterative process involving output from the Collaboration group, Core Group, feedback from children and young people and work completed by our Education Scotland Associates. These cards have been designed to give a broad overall picture of the content we want to include in the sciences curriculum, and as such do not contain detailed knowledge statements. Participants were asked to take time to review the cards prior to the next meeting, and consider the following questions for their sector:

- Does this give a broad picture of what we want to include in the sciences curriculum?
- Is there anything missing?
- Is there anything that shouldn't be there?

Participants were also encouraged to discuss this within their settings and networks to gather views if capacity allowed before the next meeting.

The following draft aims of development day 2 were also shared should participants have time to reflect further.

- To gain a broad agreement of the overall content
- To group cards together to create a skeleton structure for the sciences curriculum
- To flesh out the knowledge progression for some of the more future oriented knowledge cards.

These aims will form the basis of planning for development day 2.

Next steps

The Development Group will reconvene for a further full day on 27 February 2026 to explore progression pathways in a wider sense and also to begin to explore less familiar aspects of the curricular that has emerged from thinking from the CIC process. The outputs from both CIC Development Group workshops will inform and support the work of the Core Group when they reconvene in early March 2026, ahead of a further meeting of the Collaboration Group at the end of March 2026. All CIC groups are focused on developing the knowledge and skills that are central to the future 3–18 sciences curriculum.

In June 2025, Scottish Government published a timeline for the CIC process[1] setting out key dates and milestones. This document sets a timeline for the draft evolved curriculum technical framework for the sciences curriculum to be published in June 2026.

If you have any questions about the sciences CIC process, then please contact Education Scotland's Sciences Team on email: science@educationscotland.gov.scot

[1] In the timeline, Q1 refers to January – March, Q2- April – June etc.