Section 2C.
The purpose of this document is to support effective, science instruction that includes student-centered practices. Educators are encouraged to facilitate collaborative sensemaking — a critical component of understanding phenomena and solving problems — in ways that honors student interest and identity.
SECTION 1. Overarching Design Considerations

1A. Essential Learning and Acceleration

Instruction—even in this time of disruption—should be designed to ensure that each student has access to grade-level content so they can progress to the next level of learning and be prepared for college and careers. Leveraging student and family funds of knowledge is critical in connecting student experience to current learning goals and student agency. This year, it is important to account for the range of learning opportunities students encountered during extended school closures and over the summer. Focusing on the most essential content will be critical.

Achieving this goal requires educators to understand the essential knowledge from the current and prior grades. The prior grade’s essential knowledge must be woven into the current year’s grade-level learning. Focusing on essential knowledge for each grade asks educators to resist the temptation to think students need to learn everything from the prior grade before taking on the next grade’s learning. That is not necessary for success. Freeing educators from this inclination will let them focus tightly on the highest-leverage learning.

This fall it will be critical to monitor the potential instinct toward over-remediation. Annenberg Institute for School Reform at Brown University and Results for America’s research brief, “School Practices to Address Learning Loss,” recommends against strategies that compress additional content into an instructional timeframe or that increase tiered interventions that pull students away from core content. Evidence suggests that these practices may deepen learning gaps that already exist for struggling students.

Much of the content in every grade level and subject is accessible for students of that age, even if they missed some prior learning. Thus, the recommendation, supported in the Annenberg research brief, is to focus on grade-level learning to ensure students keep making progress, even in these complex times, with supplemental instruction on prerequisite skills as necessary (See Learning Acceleration Guide: Planning for Acceleration in the 2020-2021 School Year). This year, school districts/school systems must focus on strong formative assessment practices and adjust how students learn grade-level content through comprehensive distance learning and hybrid instructional models.

What remains in all instructional models and content areas:
- Keep care and connection at the forefront.
- Design learning to include students experiencing disability and who are learning English, as they are first and foremost general education students.
- Focus on essential grade-level learning.
- Builds on students’ academic background, life experiences, culture and language to support culturally relevant learning.

This content is situated as a discipline-specific resource and intended to supplement rather than repeat content included in Ready Schools, Safe Learners; Comprehensive Distance Learning; and Ensuring Equity and Access (all of which are available on the Oregon Department of Education website).
1B. Formative Assessment Practices

Formative assessment practices are the most vital aspect of a balanced assessment system, as they increase student learning and agency. Formative practices inform instruction in the moment, on a daily basis, and apply across all instructional areas, from CTE, to visual and performing arts, to mathematics. Please refer to ODE's Formative Assessment Considerations for 2020-21 for information around where to focus formative assessment efforts for the coming school year. The assessment sections below focus on guidelines and content-specific interim assessment resources that are available for Oregon districts, where appropriate.

SECTION 2. Content-Specific Design Considerations

2C. Science

Effective instruction in science engages students in making sense of the world around them, asking questions, exploring and investigating ideas, and collaboratively creating authentic products that demonstrate standards-based learning. There are three distinct and equally important dimensions to learning science. These dimensions are the integration of disciplinary core ideas, science and engineering practices, and cross-cutting concepts. Each dimension works with the other two to help students build a cohesive understanding of science over time.

Science learning should be student-centered and consistently engage students in the practices of science and engineering. Instruction facilitates collaborative sensemaking — a critical component of understanding phenomena and solving problems — in ways that honors student interest and identity.

All students, including elementary students, should experience high-quality science instruction regularly. Ensuring educators have time, resources, and support to engage all students in meaningful science experiences is critical for broadening participation in science and building a scientifically literate population.

<table>
<thead>
<tr>
<th>Focus</th>
<th>Considerations for Comprehensive Distance Learning and Hybrid Delivery Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>Developing Scientific Literacy</td>
</tr>
<tr>
<td>What is the essential learning?</td>
<td>The Framework for K–12 Science Education establishes a vision of science for all students, with a goal of developing a scientifically literate society and preparing students with the skills, habits and understanding to be college, community, and career ready.</td>
</tr>
<tr>
<td></td>
<td>The Oregon Science Standards are built on the notion of learning as a developmental progression. It is designed to help children continually build on and revise their knowledge and abilities, starting from their curiosity about what they see around them and their initial conceptions about how the world works.</td>
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<tr>
<td></td>
<td>Keep science teaching and learning coherent, by considering bundling standards and storylining. Address requisite skills and knowledge in ways that are focused on grade-level learning.</td>
</tr>
</tbody>
</table>
Developing science learning should integrate a focus on leveraging student interests and identity. Chapter 11 of the Framework for K–12 Science Education highlights how "all science learning can be understood as a cultural accomplishment." Cultural perspectives can transform learning experiences to make them more engaging and meaningful for learners.

### Resources

- CSSS Back-to-School Considerations
- Learning progressions
- Science in Early Years
- Vision of Science Education

### Instructional Materials

**Start with what you already have in place:** Build from the curricular content and lesson planning already in use prior to COVID-19. Supplement or re-align the district-adopted curriculum as needed for supporting students in distance learning and for, if applicable, an adapted scope and sequence.

Consider the use of cross-curricular units, particularly at elementary, to bundle standards and maximize learning time.

### Resources

- #Going 3D with Gathering, Reasoning & Communicating
- Adoption Criteria for Science Instructional Materials
- Digital Access of State Adopted Science Instructional Materials
- NextGenTime
- NGSS Lesson Screener
- OpenSciEd Middle School Units
- Oregon Open Learning Hub
- SB 13 Tribal History Grade 4 -- Grade 8 -- High School
- PMSP High School Units
- STEM@Home™
- STEMx Parents Guide to STEM

### Instructional Practices and Student Engagement

**Leverage the expertise and resources of STEM community partners including your local Regional STE(A)M Hub.** Local informal institutions, businesses, and universities can offer resources to support with the design, facilitation, and evaluation of professional learning and increase opportunities for out-of-school STEM engagement. Your local Regional STE(A)M Hub already has established partnerships with many of these community partners and can help you.

**Equitable science learning environments** must include activities that prioritize multiple ways of knowing, doing, and expressing understanding. This includes encouraging students to engage and share at home in meaningful and authentic ways. Some examples could be to anchor units with a justice-centered phenomena where they use science to develop ideas, solutions, and opinions on real world events—connecting science and society.

Science instruction should help students understand “why does this matter to me?” By connecting to high-leverage science teaching and learning practices, such as phenomena, science discourse, and student’s interests and identities, educators create inclusive learning spaces.
In science, evidence-based effective instruction focuses on students engaging in science investigations and design to **explain phenomena** or **develop solutions**. To support student engagement, here is a description of the **cycle of science learning** or routine for effective instruction.

Integration across disciplines can serve as a valuable instructional strategy for providing rich **learning experiences** that reinforce concepts and skills throughout the school year. Certain elements of the practices and related instructional approaches can be beneficial for students learning science while also learning the language of instruction.

**Prioritize safety** when considering which hands-on science activities can be completed at home. Determine which materials and supplies students will require to engage in learning at home and consider which activities can be completed without family guidance.

### Resources

- [Ambitious Science Teaching](#)
- [¡Colorin Colorado! - Science](#)
- [Engaging Emergent Bilingual Students in Science](#)
- [Engaging Student Experiencing Disabilities in Science](#)
- [Learning in Places](#)
- [NSTA Safer Science](#)
- [Phenomena Driven Instruction](#)
- [Regional STEM Hubs](#)
- [Role of E-Learning in Science Education](#)
- [Science Notebooks](#) and [Science Talk Moves](#)
- [STEM Oregon Connections](#)

### Assessment

**How will I measure learning?**

After attending to establishing a class culture of learning, here are some considerations around assessment of science:

- Provide students with multiple opportunities and modalities to showcase their science/engineering practices, cross-cutting concepts, and science content expertise thinking throughout the cycle of learning
- Options to gather evidence of learning can include teacher observation, questioning, and noticing, detailed rubrics, virtual or videotaped laboratory experiences and related reports, projects/experimentation, and interactive websites.

An [OSAS Science Interim Bank](#) that aligns with our summative assessment design and technical features is available for district purchase for 2020-21. Please see the Oregon Department of Education [interim assessment webpage](#) for more information.

Please see formative assessment information in ODE’s [Formative Assessment Considerations for 2020-21](#) for focused considerations and resources.

### Resources

- [NGSS Assessment Portal](#)
- [ODE Official State Scoring Guides and Student Language Scoring Guides](#)
- [Stanford Assessment Project, Uncovering Student Ideas in Life Science](#)
- [Strategies for Collecting Evidence of Learning](#)
- [STEM Teaching Tools](#)
- [The Right Assessment for the Right Purpose Guidance Document](#)