



# Hydrogen Power Study Task Force: Policy and Workforce Development Working Group Meeting #2

Hosted by Strategen Consulting  
October 20, 2022

## Meeting Logistics

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- + Mute Microphone – in order to prevent background noise that disturbs the meeting, if you aren't talking, please mute your microphone or phone.
- + Chat Box – if you aren't being heard, please use the chat box or raise your hand to ask a question. Please try to limit comments in the chat as these may not be officially captured in the record.
- + Recording Meeting – we will record and post the meetings at [www.ctgreenbank.com/hydrogentaskforce](http://www.ctgreenbank.com/hydrogentaskforce) and you can also access meeting dates and dial-in information through Secretary of State.
- + State Your Name – for those talking, please state your name for the record.

## Agenda

- + Welcome and Introductions (5 mins)
- + Review of Working Group Charter (5 mins)
- + Overview of Connecticut Policy Related to Hydrogen (10 mins)
- + International and Regional Policy Best Practices to Facilitate Hydrogen Development (10 mins)
- + Workforce Development and Labor Panel Discussion (25 mins)
- + Next Steps (5 mins)



## Reminder: Strategen's Role

- + The Strategen team will handle meeting logistics including scheduling and recording meeting minutes.
- + The Strategen team will coordinate with Working Group Co-Chairs to develop meeting agendas which will be provided to participants a week before Working Group meetings.
- + The Strategen team will provide technical assistance (including research), where appropriate, for the Working Group.
- + It is expected that this working group will meet on a monthly cadence. Meeting recordings and meeting minutes will be publicly available.

# Introductions

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Please share your name, title, and organization



## Reminder: Working Group Objectives




## Objective

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*The objective of the Policy & Workforce Development Working Group is to review the Connecticut policy and regulatory landscape to understand gaps that would need to be addressed to promote development of a clean hydrogen ecosystem in Connecticut. The Policy & Workforce Development Working Group will also develop recommendations regarding workforce initiatives and policy developments based on best practices that can help support a hydrogen ecosystem.*

# Statutory Responsibilities and Associated Deliverables

*“A review of regulations and legislation needed to guide the development and achievement of economies of scale for the hydrogen ecosystem in the state; Recommendations for workforce initiatives to prepare the state’s workforce for hydrogen-fueled energy-related jobs”*

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1. A set of policy guiding principles that can be used by stakeholders and other workgroup chairs to align their research and recommendations with existing state policy and processes on clean hydrogen.
  2. A hydrogen policy readiness assessment that will identify the current status of hydrogen policy, regulation, and oversight in Connecticut
  3. Coordination with other working group efforts that may impact expected hydrogen policy development
  4. Hydrogen policy best practices assessment, potentially including flags of specific hydrogen policies that could be most relevant for Connecticut’s regulatory framework
  5. An assessment of hydrogen job creation opportunities, based on existing literature, Connecticut-specific opportunities, and best practices on workforce development and transition



# Policy Guiding Principles

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*All final recommendations from working groups should:*

1. Be in compliance with relevant state statutes and regulations, or identify changes that would enable compliance
2. Align with state policy and active regulatory proceedings
3. Identify any fundamental underlying policy or regulatory challenges or potential enablers
4. Identify expected impacts to active policy proceedings
5. Identify or recommend relevant regulatory stakeholder proceedings that could be used to allow for additional review and vetting, or identify the need for new procedural avenues

# Overview of Connecticut Policy and Programs Related to Hydrogen

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## Connecticut policy provides general ecosystem support for the development of clean hydrogen

- + **Public Act 22-5 (2022)** requires 100% zero emission electricity supplied to electricity customers in the state by 2040.
- + **Conn. Gen. Stat. 22a-200a. (2019)** requires greenhouse gas emission reduction of 45% by 2030, 80% by 2050 below 2001 levels.
- + **Renewable Portfolio Standard.** Sets renewable targets for resources including fuel cells, which are included in the definition of Class I Renewable Resource in Conn. Gen. Stat. 16-1.
- + **Conn. Gen. Stat. 22a-174-22e (2016) & Conn. Gen. Stat. 22a-174-22f (2016)** set limits for NOx of emissions from fuel-burning equipment at major stationary sources of NOx (i.e. combustion turbines).
- + **Multi-State Medium and Heavy Duty Zero Emission Vehicle MOU.** Sets goals to achieve 30% ZEVs by 2030 and 100% by 2050.

# Connecticut has limited hydrogen-specific legislation, but there are some policies or programs that reference hydrogen

## General Policy

- + **Special Act 22-8 (2022)** Establishes the Hydrogen Power Study Task Force.
- + **Conn. Gen. Stat. 31-53d. (2022)** States that a developer of a 2 MW or greater project shall take all reasonable actions to ensure that a community benefits agreement is entered into and take appropriate actions to ensure a workforce development program is established.
- + **Conn. Gen. Stat. 16-244y. (2018)** Sets a competitive process for EDCs to acquire new fuel cell electricity generation projects with preference given to projects that 1) utilize equipment manufactured in CT or 2) are sited on brownfields or landfills.
- + **Conn. Gen. Stat. 16a-3f-h. (2018)** States that the DEEP commissioner may solicit proposals from providers of Class I renewable resources (includes fuel cells) to provide a certain percent of EDC load.
- + **Multi-State Medium and Heavy Duty Zero Emission Vehicle MOU.** Sets goals to achieve 30% ZEVs by 2030 and 100% by 2050.
- + **Conn. Gen. Stat. 13b-38dd. (2020)** Directs the development of a zero-emissions buses implementation plan.
- + **Executive Order 21-3.** Directs DEEP to include in the next **Comprehensive Energy Strategy**, a set of strategies to: (1) provide for more affordable heating and cooling (2) achieve reductions in GHG emissions from residential buildings and industrial facilities; and (3) improve the resilience of the state's energy sector.
- + **Integrated Resource Plan (2020).** Discusses hydrogen as a strategy to reduce in-state emissions.

# Within existing legislation there are opportunities for hydrogen to receive funding and incentive opportunities

## Funding and Incentives

- + **Conn. Gen. Stat. 22a-202. (2020)** establishes the Connecticut Hydrogen and Electric Automobile Purchase Rebate Board (CHEAPR) to provide rebates that total at least three million dollars annually. Currently, incentives up to \$9,500 are available for purchases of eligible vehicles.
- + **Conn. Gen. Stat. 16-245hh. (2019)** requires the Connecticut Green Bank to establish a “condominium renewable energy grant program.”
- + **Conn. Gen. Stat. 16-245aa. (2018)** requires the Connecticut Green Bank to establish a renewable energy and efficient energy finance program.
- + **Conn. Gen. Stat. 16-245cc. (2018)** states that demand charges for fuel cells are waived if there is power loss due to a problem at a distribution resource or due to off-peak shutdowns of the fuel cell.
- + **Public Act 18-50 (2018)** established the Shared Clean Energy Facility Program to fund 150 MW of community-based clean power generation.
- + **Conn. Gen. Stat. 32-7f. (2014)** authorizes the Commissioner of Economic and Community Development to establish an economic development grant program to expand hydrogen and fuel cell industries.
- + **Conn. Gen. Stat. 12-81. (2012)** provides property tax exemptions for Class I renewable energy resources and for Level 2 EV charging stations.

## Funding opportunities in Connecticut that are not hydrogen specific may be utilized to support the growth of a hydrogen economy

### Funding and Incentives

- + **Smart-E Loans (CT Green Bank)** provide low-interest financing with flexible terms for home energy performance upgrades.
- + **C-PACE (CT Green Bank)** provides building owners access affordable, long-term financing for qualifying clean energy and energy efficiency upgrades
- + **Brownfield Remediation Grants and Loans (DECD)** provide loan financing or grants to eligible entities for costs associated with the investigation, assessment, remediation and development of a brownfield.
- + **The Manufacturing Innovation Fund Apprenticeship Program (DECD)** supports a combination of on-the-job training and classroom instruction for apprentices in Connecticut's manufacturing industry
- + **The Manufacturing Innovation Fund Voucher Program (DECD)** provides grant-based financial assistance to Connecticut manufacturers.
- + **The Innovative Energy Solutions Program (PURA)** provides funding projects for developers and utilities to test and demonstrate innovative technologies.

## Discussion: Key Connecticut policies and further topics for consideration

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- + Are there any key policies related to hydrogen missing from the prior list?
- + What are key areas for further policy development to encourage the development of a clean hydrogen ecosystem?

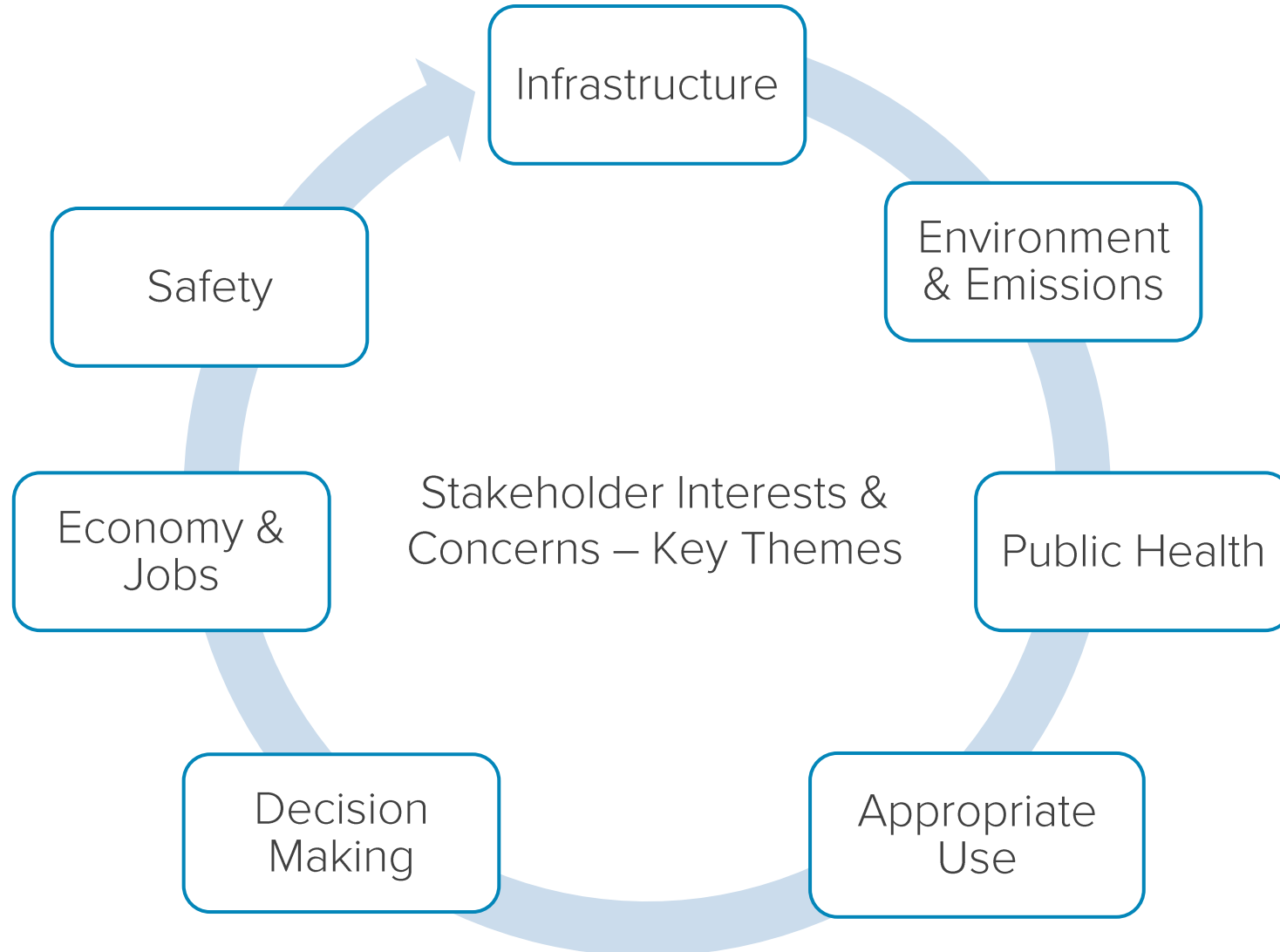
# International and Regional Policy Best Practices to Facilitate Hydrogen Development

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# Stakeholder concerns about hydrogen have been consistent across the nation



# Coordinated policy and regulatory drivers are informing and driving public and private sector investment



## Definitions

States and Countries are defining clean hydrogen eligibility in similar ways.

Increasingly, definitions based on a carbon intensity range are emerging.

Additional specification focuses on feedstock type (i.e., must be renewable or must be non-fossil fuel).



## Legislation

In the last 3 years, hydrogen specific legislation has skyrocketed. Hydrogen bills have typically been focused on a particular end use, such as:

- Mobility
- Gas and Electric Generation
- Industrial Uses

A smaller set of hydrogen related bills provide specific grant funding, authorize specific studies, or address safety provisions



## Market Development

Over 50 public and private renewable hydrogen activities have been identified, with this number growing every week. This includes research studies, pilots, demonstrations, and full-scale deployment.

Key topics include production, pipeline injection and distribution, power generation, and LDES.

# A carbon intensity-based definition removes the ambiguity with the “colors of hydrogen”

From complexity  
(hydrogen colors)



To one indicator based on CI  
(e.g., kgCO<sub>2</sub>e/kgH<sub>2</sub>, gCO<sub>2</sub>e/MJ...)

- A carbon intensity framework is a **technology-neutral approach** to assessing the GHGs associated with hydrogen production. It opens the debate about competition between various hydrogen production routes that meet the required carbon intensity at the least cost.
- A carbon intensity framework can adopt a **threshold** and **certification scheme** to rigorously account for GHGs arising both at the site of production and upstream of production.

## Key Considerations for a Carbon Intensity-Based Definition

- Is it based on a quantifiable methodology?
- What is the hydrogen production CO<sub>2</sub>e threshold?
- Does it consider the lifecycle impacts?
- Does it support technology-neutrality?
- How will it be certified?

Federal guidance from the proposed Clean Hydrogen Production Standard has established “clean hydrogen” as that with less than 4 kg of CO<sub>2</sub>e/kg H<sub>2</sub> on a lifecycle basis (well-to-gate).

# Survey of national and international definitions of clean, renewable, or green hydrogen

	Hydrogen Type (e.g. clean, renewable, green)	Based on a carbon intensity calculation	Technology agnostic (e.g. includes biomass, biogas, electrolysis, nuclear)	Electrolysis with renewables only	Excludes use of fossil fuels
<a href="#">US DOE</a>	Clean	X	X		
<a href="#">Montana</a>	Green		X		X
<a href="#">Washington State</a>	Renewable		X		
<a href="#">Oregon</a>	Renewable		X		X
<a href="#">Australia</a>	Clean		X		
<a href="#">Canada</a>	Green			X	X
<a href="#">Canada</a>	Low Carbon Intensity	X	X		
<a href="#">Chile</a>	Green			X	X
<a href="#">France</a>	Renewable	X		X	X
<a href="#">France</a>	Low Carbon	X	X		
<a href="#">Germany</a>	Green			X	X
<a href="#">Sweden</a>	Renewable/Clean		X		
<a href="#">CertifHy</a>	Green	X	X		X
<a href="#">CertifHy</a>	Low Carbon	X	X		

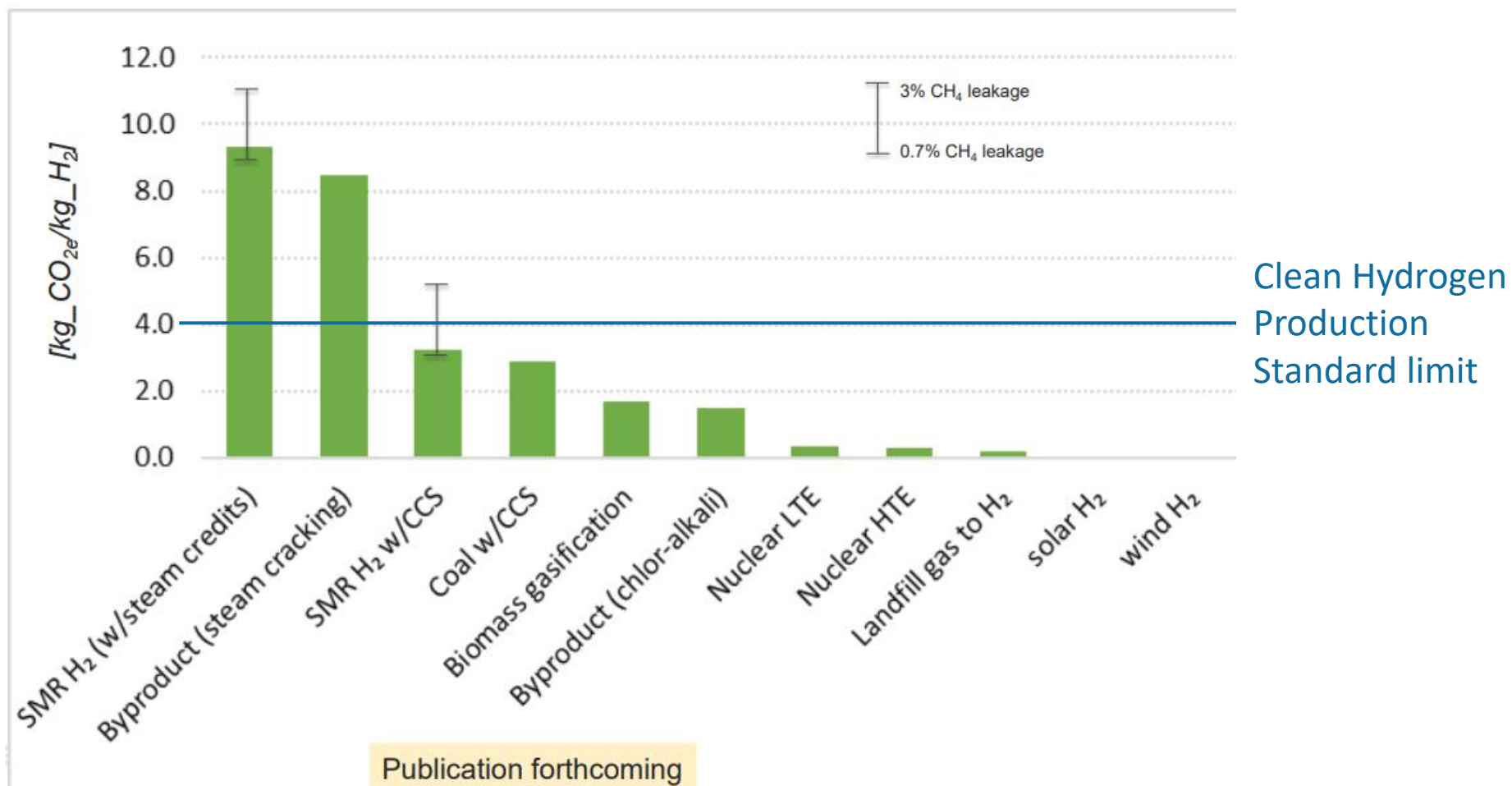
## Defining Clean Hydrogen: Key Takeaways

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- + To date, three US states – Oregon, Washington, Montana – have defined clean hydrogen in statute.
  - + Varying approaches have been taken for defining hydrogen based on a region's climate goals, technology development activities, and geographic considerations.
- + Alignment of a State's definition with Federal guidance from the IIJA and Proposed Clean Hydrogen Standard is important for access to Federal funding opportunities.
  - + Based on Federal guidance, clean hydrogen is defined as hydrogen that is produced through a process that results in a lifecycle greenhouse gas emissions rate of not greater than 4 kilograms of CO<sub>2</sub>e per kilogram of hydrogen and with less than 2 kilograms of CO<sub>2</sub>e per kilogram of hydrogen at the point of production.

# Alignment with the federal definition of clean hydrogen enables production from a diversity of feedstocks

Well-to-Gate GHG Emissions of Hydrogen Production Pathways



# Workforce Development and Labor Panel Discussion

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## Discussion: Hydrogen Workforce Development and Labor Impacts

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- + How is the development of a hydrogen market expected to impact workforce needs?
- + What types of skills will workers need to access hydrogen-related jobs?
- + What types of training or certification programs can support skills related to hydrogen?
- + How can the legislature support workforce development related to hydrogen?



## Next Steps



# Working Group Meeting Schedule

	September	October	November	December
Funding	9/27 4-5pm	10/26 10:30am-12 pm	11/18 10:30am-12 pm	12/15 10:30am-12:00 pm
Infrastructure	9/28 2-3pm	10/24 2-3pm	11/17 3-4pm	12/19 3-4pm
Policy & Workforce Development	9/26 3-4pm	10/20 12-1pm	11/29 12-1pm	12/15 12-1pm
Sources	9/27 1-2pm	10/25 2-3:30pm	11/17 11am-12pm	12/20 1-2:30pm
Uses	9/27 12-1pm		11/22 12-1pm	

# Thank You!

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Feel free to reach out with any questions!

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