GUIDE TO **UNIVERSAL DESIGN FOR LEARNING** IN

SUPPLY CHAIN & TRANSPORTATION

Driving Efficiency and Streamlining Tomorrow's Transport

CTE TECHNICAL ASSISTANCE CENTER OF NY

ABOUT THIS GUIDE

Universal Design for Learning (UDL) is a framework for designing learning experiences that are inclusive, accessible, and engaging for all students. UDL is not a checklist of required practices, but a mindset of continuous improvement. By increasing flexibility and options, UDL helps teachers proactively remove barriers, meet students where they are, and provide everyone with an equal opportunity to learn.

This document is part of a series that illustrates how UDL principles can be applied in each of Advance CTE's 14 career clusters. The series extends and tailors the tips provided in two prior publications, Supporting All Students in New York State CTE Programs [PDF] and Supporting Special Populations in New York State CTE Programs [PDF], available on the CTE TAC's website.

Photo: Orange-Ulster BOCES

With its emphasis on relevant, authentic, hands-on learning, UDL is a natural fit for CTE classrooms!

5 REASONS WHY UDL WORKS FOR CTE SUPPLY CHAIN & TRANSPORTATION

1. UDL encourages the use of **hands-on, project-based learning**. It allows students to develop their technical expertise in real-world contexts, helping them become career-ready.
2. Transportation and supply chain tasks can be physically demanding and technically complex. UDL ensures that **students with disabilities or other barriers to learning are appropriately included and involved**.
3. **Flexible learning strategies** help students develop key skills sought in the transportation and supply chain industries, including the ability to think critically, work in teams, and adapt to new challenges.
4. UDL's emphasis on supporting **multiple pathways to achieve goals and solve problems** enhances students' ability to tackle complex problems in fast-paced, rapidly evolving industries.
5. Systems thinking is essential in occupations involving global transportation and supply chain networks. UDL helps students **understand connections to see the big picture**.

QUICK REFERENCE GUIDE TO UDL FOR CTE

Universal Design is the process of creating objects, environments, and experiences that can be accessed, understood, and used to the greatest extent possible by people with a wide range of abilities, needs, and characteristics. Universal Design for Learning (UDL) applies the concept of Universal Design to learning contexts.

UNIVERSAL: UDL is a framework for **creating learning experiences that work for *everyone***. Proactively identifying and removing barriers to learning creates a more inclusive environment where all students have equitable opportunities to learn.

DESIGN: There is no one approach to learning that is optimal for every student in every situation. The UDL principles guide teachers to **plan for learner variability by offering flexibility and options**.

FOR LEARNING: Rather than a one-size-fits-all approach, **UDL empowers students to tailor the learning experience** for their individual needs, goals, and preferences. By discovering how they learn best, students develop into self-directed, resourceful, and skillful learners.

THE UDL PRINCIPLES*

	ENGAGEMENT	REPRESENTATION	ACTION & EXPRESSION
What is it?	The **WHY** of learning	The **WHAT** of learning	The **HOW** of learning
Why is it important?	Students differ in **what interests them** and **what motivates them to learn**.	Students differ in how they **perceive and make meaning from information**.	Students differ in how they **navigate learning environments and express what they know**.
What does it look like in practice?	Students engage in authentic, hands-on learning. Learning is relevant to students' identities, personal interests, and career goals. Students collaborate, co-create, and build community with peers. Students feel safe, included, and welcome. Fun and creativity are encouraged.	Course materials are accessible for all learners. Multiple media are used to present information. Language and symbols are clarified and decoded. The curriculum and course materials represent diverse individuals and perspectives. Learning is structured to help students build knowledge.	Learning activities and assessments are accessible for all learners. Students are guided to organize information, manage time, set goals, and plan their learning. Students communicate and express themselves in different ways. Students participate in class activities and demonstrate their learning in different ways.

** Abridged and adapted from the CAST UDL Guidelines.*

SAMPLE LESSON

Let's look at a sample lesson to see how the general principles described on page 2 can be applied in a CTE classroom.

Examples abridged and adapted from the lesson "Vehicle Lift Controls, Arms and Adaptors" by Robert Thayer: https://ctetac.us/supplychainlesson

Key to abbreviations:
R = Representation, **A = Action & Expression**, **E = Engagement**

Photo: Ulster BOCES

ELEMENT	WHY DOES IT WORK?	GO FURTHER WITH UDL
Learning goals Students will identify lift controls, demonstrate features and functions of lift arms and adaptors, and safely and accurately position arms and adaptors.	Allows teachers to envision multiple ways students can achieve and demonstrate learning **(A)**. Identifies the prior knowledge and skills students will need to complete the lesson **(R)**.	Share the learning objectives for each lesson with students to **set expectations and short-term goals (A)**. Identify the academic, Common Career Technical Core, and cluster-specific industry standards to **illustrate the lesson's relevance** to students' career goals **(E)**.
Hook: "Can They Do It?" Student volunteers use trial and error to identify and verify the buttons and levers that raise and lower the empty lift, under close teacher supervision.* ***Teacher note:** Ensure all students comply with shop safety protocols in accordance with school policies and guidelines. [see lesson]*	Curiosity promotes engagement and focuses attention **(E)**. Provides insight into students' prior knowledge and misconceptions to inform teaching **(R)**. Encourages critical thinking and problem-solving **(A)**. Safety measures are followed by both volunteers and observers, including eye protection and staying clear of moving parts **(E)**.	Have students direct the teacher to manipulate lift controls if hands-on operation would not **comply with safety policies and guidelines (E)**. To **gain more insight into students' prior knowledge**, ask all students to write an "entry ticket" briefly explaining how they would operate the lift **(R)**. Explain the challenge before recruiting volunteers to **minimize "risk" and encourage participation (E)**. Facilitate a "What Would You Do?" scenario or poll so **all students can attempt the challenge interactively (E)**. Provide **positive feedback for effort**, regardless of outcome **(E)**.

ELEMENT	WHY DOES IT WORK?	GO FURTHER WITH UDL
Demonstration: "Identifying Lift Controls" The teacher points out the look and features of the lift controls, arms and adapters in the shop.	Ensures all students have the prerequisite background knowledge to complete the hands-on activity **(R)**. Teacher demonstrates for small groups, helping students see and hear clearly **(R)**. Pace and delivery can be adjusted or adapted for student needs (e.g., pause, repeat, slow down) **(R)**. Pre-recorded demos provide an alternative format and illustrate using multiple media **(R)**.	Worksheet **supports generalization and transfer of knowledge (R)**, **checks for comprehension (R)**, and **provides a reference for later review (A)**. After the students submit their worksheets for scoring, review the correct answers as a class to **provide immediate feedback (E)** and **address any misunderstandings (R)**. Offer a diagram(s) students can label to **provide multiple means of expression (A)** and **proactively address language barriers (R)**. Follow the demonstration with a **low-stakes quiz or review game (E)** to **practice recall (A)**. After the lesson, label the controls to **serve as a job aid** and **encode information in long-term memory (A)**. Labels could be bilingual to **support language acquisition (R)**.
Hands-on practice Groups or pairs of students collaborate to manipulate the lift.	Students choose their own groups or partners **(E)**. Facilitates independent action as well as teamwork **(A)**. Rehearsal minimizes "risk" before graded tasks and promotes safe operation of equipment **(E)**.	Physically performing tasks **builds students' kinesthetic memory (A)**. Observation of peers **models possible approaches and solutions (A)**. **Encourage active participation** by asking students to record peer observations in a lab notebook or worksheet **(E)**. Teacher **provides immediate feedback** on task performance **(E)**.
Summative assessment Students perform a series of tasks to operate the lift and are graded on their performance.	Assignment is broken down into three component tasks to provide graduated support and feedback **(A)**. Assessment rubric clarifies specific expectations for performance **(A)**.	Explain how these skills will be used in the next lesson to help students **understand the big picture (R)** and **support planning and strategy development (A)**. Use the rubric to facilitate a peer review activity to **promote collaboration (E)** and **engage critical thinking (A)**.

TRY-IT ACTIVITY 1

Apply the framework above to a supplemental activity of your choice. Identify examples of UDL principle(s) and/or practices the activity addresses and propose two or three ways you could adapt the activity to go even further with UDL. Refer to the **UDL Principles** in the **Quick Reference Guide** on *page 2* for ideas.

EXTENSION ACTIVITY (CHOOSE 1)	UDL PRINCIPLES/PRACTICES ADDRESSED	WAYS TO GO FURTHER WITH UDL
Student-created job aid or demo video on lift controls		
Peer review activity		
Guest speaker		
Field trip or site visit		
Participation in a SkillsUSA event or industry competition		
Other:		

TRY-IT ACTIVITY 2

How could you make the lesson and/or extension activity more meaningful for the students in *your* CTE Supply Chain & Transportation course by:

Tip: Refer to the table on page 6 for information on student demographics and special populations within CTE and CTE Supply Chain & Transportation in New York State.

Ensuring students see images and examples of people like themselves working in supply chain and transportation?

Addressing specific barriers they might encounter (e.g., disabilities, access to resources, language skills)?

Making the lesson or activity more relevant to their identities, interests, local context, and/or career goals?

WHO ARE OUR STUDENTS IN CTE SUPPLY CHAIN & TRANSPORTATION?

POPULATION	All U.S. CTE	All NYS CTE	NYS CTE TRANSPORTATION, DISTRIBUTION & LOGISTICS
Female	46.7%	42.6%	**12.1%**
Nonbinary	*no data*	0.1%	***no data***
Students of Color	51.0%	59.0%	**51.9%**
American Indian or Alaskan Native	*0.9%*	*0.8%*	***1.0%***
Asian	*4.6%*	*12.3%*	***12.4%***
Black or African American	*13.1%*	*13.9%*	***6.7%***
Hispanic/Latino	*28.0%*	*29.4%*	***29.2%***
Native Hawaiian or Other Pacific Islander	*0.4%*	*0.3%*	***0.3%***
Two or More Races	*4.0%*	*2.3%*	***2.2%***
Individuals from Economically Disadvantaged Families	45.3%	59.7%	**60.5%**
Individuals Preparing for Nontraditional Fields	24.3%	18.0%	**12.1%**
Individuals With Disabilities (ESEA/IDEA)	10.7%	18.6%	**24.3%**
Homeless Individuals	1.4%	3.5%	**2.7%**
English Learners	5.4%	3.5%	**3.5%**
Youth in Foster Care	0.2%	0.2%	**0.2%**
Youth With Parent in Active Military	1.0%	0.3%	**0.4%**
Migrant Students	0.3%	0.02%	**0.07%**

Sources: PCRN National Enrollment Profile, 2021-22; NYSED Enrollment Data, Secondary CTE Concentrators, 2022-23

GUIDED APPLICATION
GETTING STARTED WITH UDL IN CTE

Implementing UDL doesn't require special pedagogy or training. In fact, you're probably using UDL principles in your teaching without even knowing it! Here are a few ways you can build upon the good teaching you already do.

Complete a printed worksheet by hand or populate a digital copy to share with your principal, consultant teachers, or others who can support your UDL journey. If you share the sheet, don't forget to fill in your information below!

My name:

My CTE program(s) or course(s):

STRATEGY 1: IDENTIFY OPPORTUNITIES

For ***each*** of the three UDL principles, list one or two examples of strategies you're not currently using in your teaching, but you'd like to learn about or try. Indicate any resources, information, or support you need in order to be successful.

Refer to the **UDL Principles** in the **Quick Reference Guide** on page 2 for ideas.

ENGAGEMENT	REPRESENTATION	ACTION & EXPRESSION
[Example: I want to use polls or games to introduce lessons]	*[Example: I want to learn how to enable auto-captions in Google Slides]*	*[Example: I want to create graphic organizers to help students take notes]*
Resources required:	**Resources required:**	**Resources required:**

Remember that UDL is not a checklist! You don't need to implement every practice to have a positive impact. Start with one or two small changes. See how they work for you and your students before adding others.

STRATEGY 2: THE PLUS ONE (+1) APPROACH

Plus one (+1) means adding one option to each resource, activity, or assignment in a lesson or course, as appropriate. Start with options that require a minimal investment of your time and effort to build your momentum.

Choose a specific lesson or learning activity from your course. List each element of the lesson or activity, then propose a +1 for each element. Identify which UDL principle your +1 reflects and briefly explain how that principle is reflected.

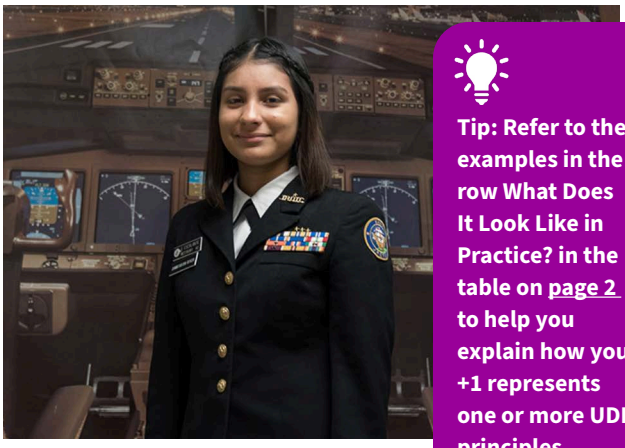

Photo: Nassau BOCES

Tip: Refer to the examples in the row What Does It Look Like in Practice? in the table on page 2 to help you explain how your +1 represents one or more UDL principles.

For example:

- Add a short video to a traditional lecture for **multiple means of representation**.
  Bonus: *Make sure the video you select has captions or a transcript to double your impact!*
- Allow students to submit a video, podcast, infographic, or other creative product instead of a written essay, lab report, or research paper to provide **multiple means of action and expression**. Or, offer a choice of a multiple-choice quiz or an open-ended essay question to check students' comprehension.
  Bonus: *Foster critical thinking by inviting students to co-create assignment guidelines and grading criteria, propose quiz questions, and/or participate in peer assessment activities.*
- Offer **multiple means of engagement** by allowing students to choose whether to complete some learning activities individually or in teams. Or, let them choose their own topics and/or formats for assignments.
  Bonus: *Permitting a choice of formats is a UDL double-dip of boosting engagement AND providing options for action and expression!*

Lesson or activity title/topic:

WHAT YOU DO NOW	YOUR +1	WHICH UDL PRINCIPLE(S) DOES YOUR +1 REFLECT? HOW?