# Unit 2-J

# EXPLORING

# CAREER CLUSTERS:

# Transportation, Distribution & Logistics

# UNIT 2-J:
# EXPLORING CAREER CLUSTERS:
# Transportation, Distribution, and Logistics
## *Suggestions for the Instructor*

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### Pg. 2J-14 - 15 -- What Do You Already Know? Job Titles in Transportation, Distribution, and Logistics

In small groups, discuss each of the job titles in the **Transportation, Distribution, and Logistics** career cluster. What do you think these workers do? What kind of environment do they work in? What tools and equipment do they use? What kind of skills do they need to have?

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### Pg. 2J-16 – 19 -- Transportation, Distribution, and Logistics JOB TITLES: Research

In small groups, look up the job titles below on **MyCareerShines** (www.mycareershines.kuder.com) and write the definition on the lines on the handout. (Other websites or a dictionary may be used if this is not accessible.) Ask students to discuss how their research compares with their prior knowledge.

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### Pg. 2J-20 -- Transportation, Distribution, and Logistics Job Description Match-up

On this handout, have students match the letter of the job from this career cluster with the description of the job duties.

| | Transportation, Distribution and Logistics Career Cluster | | Description of Job Duties |
|---|---|---|---|
| *A* | *Automotive Body Repairer* | ***E*** | *Arrange, coordinate, and track shipments and payments for shipment.* |
| *B* | *Diesel Engine Mechanic* | ***C*** | *Inspect and monitor aircraft components for damage and wear in accordance with regulations and manufacturer specifications.* |
| *C* | *Aircraft Mechanic and Service Technician* | ***M*** | *Load transport vehicles with inventory in accordance with delivery, warehousing, and manufacturing needs.* |
| *D* | *Administrative Service Managers* | ***A*** | *Identify, repair, and test automobiles, using appropriate power/hand tools and chemicals.* |
| *E* | *Cargo/Freight Agent* | ***D*** | *Plan and monitor budgets, procedures, schedules, and equipment.* |

| | | | |
|---|---|---|---|
| *F* | *Customs Broker* | ***O*** | *Monitor transportation systems by tracking inventory, evaluate transportation costs, and recommend improvements to systems.* |
| *G* | *Postal Service Clerk/Carrier* | ***F*** | *Arrange for payments of taxes and fees (duties/tariffs) on goods being imported or exported.* |
| *H* | *Commercial Pilot* | ***L*** | *Arrange and monitor costs, schedules, and documentation of all inventory shipped between different locations.* |
| *I* | *Tractor-Trailer Truck Driver* | ***B*** | *Use appropriate tools to test, repair, and adjust equipment on buses, trucks, and diesel engines.* |
| *J* | *Transportation Engineer* | ***N*** | *Monitor, analyze, and improve system of procuring and moving supplies through the manufacturing process.* |
| *K* | *Transportation Planner* | ***G*** | *Sort mail to prepare for delivery, obtain signatures for certain mail items, deliver mail to homes and businesses, and assist customers.* |
| *L* | *Freight Forwarder* | ***H*** | *Operate and monitor aircraft controls, communicate with ground crews and air traffic controllers, choose safest and most efficient routes, and perform safety checks.* |
| *M* | *Tank Car, Truck, or Ship Loader* | ***I*** | *Inspect and maintain vehicle (3+ ton trucks), secure cargo, safely transport cargo, and maneuver truck for loading and unloading.* |
| *N* | *Supply Chain Manager* | ***K*** | *Use traffic monitoring/modeling software and databases to develop plans for infrastructure such as roads, pedestrian crossings, and bus facilities.* |
| *O* | *Logistics Analyst* | ***J*** | *Design transportation facilities such as streets, airports, bridges, and commuter trains, and provide estimates of costs and impact on traffic, environment, or existing facilities.* |

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## Pg. 2J-21 -- Alphabetical Order

ANSWERS:

1. **Administrative Service Managers**
2. **Aircraft Mechanic and Service Technician**
3. **Automotive Body Repairer**
4. **Cargo/Freight Agent**
5. **Commercial Pilot**
6. **Customs Broker**
7. **Diesel Engine Mechanic**
8. **Freight Forwarder**
9. **Logistics Analyst**
10. **Postal Service Clerk/Carrier**
11. **Supply Chain Manager**
12. **Tank Car, Truck, or Ship Loader**
13. **Tractor-Trailer Truck Driver**
14. **Transportation Engineer**
15. **Transportation Planner**

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## Pg. 2J-22 - 23 -- STRETCH your VOCABULARY

Have students make new words from the **Transportation, Distribution, and Logistics Job Cluster** vocabulary. They may work in small groups to use their own knowledge and a dictionary to see how many forms of the words they can find. (They will not be able to fill in all the categories for some terms.) The first four are done for them.

Have them write a story about a day in the life of a person who works in the **Transportation, Distribution, and Logistics career** cluster. Have them use at least ten of the words (in addition to the job titles!)

## ANSWERS:

| JOB TITLE | RELATED NOUN | Present-tense VERB | ADJECTIVE | ADVERB |
|---|---|---|---|---|
| *Automotive Body Repairer* | Repair | Repairing | Repaired | |
| *Diesel Engine Mechanic* | Mechanization | Mechanize | Mechanical | Mechanically |
| *Aircraft Mechanic and Service Technician* | Technology | | Technical | Technically |
| *Administrative Service Managers* | Management | Manage | Managerial | Managerially |
| *Cargo/Freight Agent* | Cargo<br>Freight<br>Agent<br>Agency | | | |
| *Customs Broker* | Broker | Broker | Brokered | |
| *Postal Service Clerk/Carrier* | Carriage | Carry | Carried | |
| *Commercial Pilot* | Commerce<br>Pilot | Pilot | Commercial<br>Piloted | |
| *Tractor-Trailer Truck Driver* | Driver | Drive | Driven | |
| *Transportation Engineer* | Transport<br>Transportation<br>Engineer | Transport<br>Engineer | Transported<br>Engineered | |
| *Transportation Planner* | Transport<br>Transportation<br>Plans | Transport<br>Plan | Planned | |

| | | | | |
|---|---|---|---|---|
| *Freight Forwarder* | Forward<br>(e.g., sports) | Forward | Forward | Forward |
| *Tank Car, Truck, or Ship Loader* | Loader<br>Ship | Truck<br>Load<br>Ship | Trucked<br>Loaded<br>Preshipped | Loads |
| *Supply Chain Manager* | Management | Manage | Managed | |
| *Logistics Analyst* | Analysis | Analyze | Analytical | Analytically |

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**ANSWERS:**

## Pg. 2J-24 -- Transportation, Distribution, and Logistics Job Cluster Crossword Puzzle

**ANSWERS:**

### Across

3. Another word for inventory or goods being shipped. **FREIGHT**
4. The procedures required for importing and exporting goods. **CUSTOMS**
5. The type of engine in a tractor-trailer truck. **DIESEL**
7. Someone who maintains or repairs machinery. **MECHANIC**
8. Person responsible for the operation of an aircraft. **PILOT**
9. Someone who arranges for payments or sales. **BROKER**

### Down

1. The steps required for the movement of goods or people. **LOGISTICS**
2. The type of work required to run an office environment. **ADMINISTRATIVE**
6. The mind behind the design. **ENGINEER**

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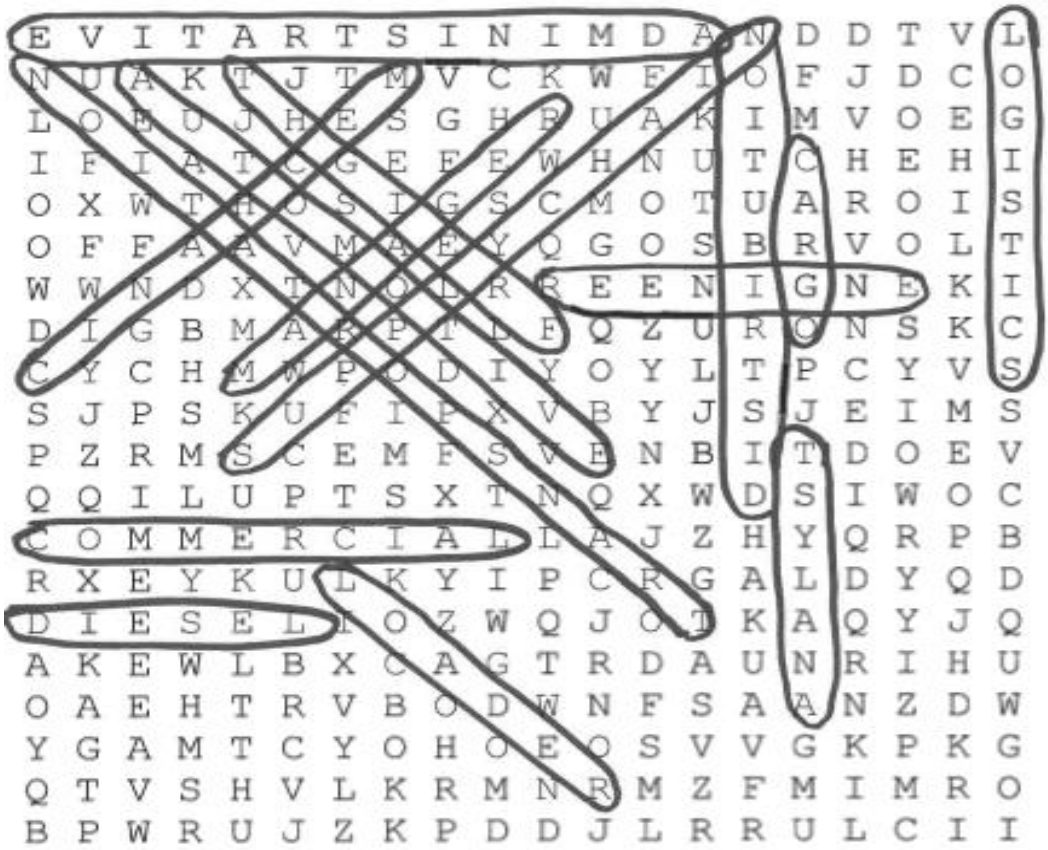
## Pg. 2J-25 -- Transportation, Distribution, and Logistics Job Cluster Word Search

**ANSWERS:**

**Transportation, Distribution and Logistics Career Cluster Word Search**



ADMINISTRATIVE
AUTOMOTIVE
COMMERCIAL
DISTRIBUTION
FREIGHT
LOGISTICS
MECHANIC
TRANSPORTATION
ANALYST
CARGO
DIESEL
ENGINEER
LOADER
MANAGER
SUPPLYCHAIN

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## Pg. 2J-26 - 34 -- SCIENCE in the Transportation, Distribution and Logistics Career Cluster: Using the Scientific Method to Compare Paper Airplane Flight

**Fly Baby Fly**

Have students read the handout with its description of the role paper airplanes played in the development of aviation, then answer the comprehension questions which follow.

**ANSWERS:**

1. When were the first paper airplanes built? **Around 400 BCE**
2. What is origami? **Paper folding**
3. What role did paper airplanes play in the development of modern aviation? **The Wright brothers built numerous paper model of gliders and planes and tested them within their wind tunnel.**
4. What did the system of "wing warping" allow the Wright brothers to do? **It gave them the ability to control and maneuver their aircraft.**
5. Wing warping on early aircraft is similar to what technique used in making paper airplanes? **It is similar to the technique that is used to control the flight of a paper airplane by curling the paper at the back of its wings.**

Have students work in pairs or small groups to follow one of the three paper airplane directions on the pages that follow (The Dart, the Stealth, and The Bumble.)

Students should use the Scientific Method Bookmarks to acquaint themselves with the language and study the steps of the scientific method.

After building each of the three model paper airplanes and reviewing the steps of the scientific method, have them perform an experiment to determine which one is best designed for flight.

Before, during, and after launching the three paper airplanes, have them use the scientific method handout to document their results and draw a conclusion about which one is best designed for flight.

**(continued)**

**Scientific Method Crossword Puzzle**

**ANSWERS:**

**Across**

5. An answer to the question: Was your hypothesis supported or not? **Conclusion**
6. A test of your hypothesis **Experiment**
7. Facts and statistics collected together for analysis **Data**
8. An educated guess about the answer to your question. **Hypothesis**
9. The variable that is being studied and measured in the experiment **Dependent**

**Down**

1. Something that you want to figure out or measure **Question**
2. The act of watching **Observation**
3. The system of observation, measurement, experiment, and testing of a hypothesis, then drawing a conclusion. **Scientific Method**
4. The variable whose change isn't affected by any other variable in the experiment **Independent**

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## Pg. 2J-35 – 39 -- MATH in the Transportation, Distribution and Logistics Career Cluster: Math Skills for the Trucker

Have students read the article and the charts and maps on the handout, then work in small groups to solve the word problems, follow direction and answer reading comprehension questions.

**Overview of the Trucking Industry**

**ANSWERS:**

1. If a tractor-trailer truck driver makes median pay and works a 40 hour week, how much would she make in gross earnings (before taxes and deductions) in a week?
   **$816.80**
2. If 25% of her income is deducted for taxes, how much would she receive in net (take home) pay?
   **$612.60**
3. If a tractor-trailer truck driver makes median pay, how much would he make in gross earnings (before taxes and deductions) over the course of five years?
   **$212,400**
4. If 23% of his income is deducted for taxes, how much would he receive in net (take home) pay over the course of five years?
   **$163,548**

**(continued)**

5. If employment change is steady, how many jobs could be expected to be added between 2016 and 2021?
   **54,200**
6. If there were 1,673,200 jobs in this industry in 2015, what was the increase in one year?
   **198,500**
7. A driver's GVW is 15.5 tons. How many more pounds is that over the minimum required to be considered a long-haul driver?
   **5,000**
8. How much more, on average, do generalized freight drivers earn than wholesale truckers?
   **$2,820**
9. Approximately how many women truck drivers are there today?
   **203,000**
10. If 350,000 women were employed as truck drivers today, what percent would that be of the total number of drivers?
    **10%**

**Reading a Map**

Have students read about the key sections of a road map, then follow the directions and answer the questions that follow.

**ANSWERS:**

**A legend** – Read and discuss the legend information as a group.

**A compass rose** – Have students label the intermediate directions NE, SE, SW, and NW on the compass rose. Check to make sure they have labeled the directions correctly.

**An index** -- On the map, have students use a pencil and a straight edge (side of a book, paper ruler, or a folded piece of paper) to connect the letters and extend the numbered lines to make boxes on the grid, then use the grid they have created to write the number – letter coordinates of the box on the grid that correspond with each city below:

- **Orlando_____E9__** **Cape Coral __H8___**
- **Tallahassee__B5__** **Pensacola____B1___**
- **Clearwater__F7___** **Palm Bay____F10___**

**Scale** – Have students use the scale on the National Geographic map of the U.S. to find approximate distance between the cities listed.

**1. Washington, DC to New Orleans, LA in miles:___1,100 +/-__ in kilometers:___1,500 +/-**
**2. Denver, CO to Philadelphia, PA in miles:_____1,400 +/-__ in kilometers:___2,200 +/-**
**3. New Orleans, LA to Houston, TX in miles:_____300 +/- __ in kilometers:____450 +/-**
**4. Seattle, WA to Chicago, IL in miles:_____1,600 +/- __ in kilometers:___2,200 +/-**
**5. Phoenix, AZ to Atlanta, GA in miles:_____1,600 +/- __ in kilometers:___2,200 +/-**
**6. Chicago, IL to St. Louis, MO in miles: _____300 +/- __ in kilometers:____450 +/-**

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## Pg. 2J-40 -- What Does a Transportation Engineer Do?
## EDITING PRACTICE

Have students rewrite the paragraph on the handout. They will edit for complete sentences, correct subject / verb agreement, punctuation, and capitalization.

**ANSWERS:**

As time passes, cities often need to repair old roads, sidewalks, bus stops, or other infrastructure. Sometimes, they may even need to build new roads where previously there were none, make existing roads larger, or change the routes of particularly busy streets. All of this work requires transportation engineers to consider a number of factors at the same time, to make sure that they don't create new problems as they solve old ones.

The first consideration that transportation engineers make is how their project will affect traffic flows – will it make it easier for people to move through a city or space, or more difficult? As cities grow, it is important that people are able to get where they need to go quickly and safely. This can be a difficult job, as there are sometimes obstacles to changing the routes of roadways or increasing their size. When these changes are often made in crowded urban areas, for instance, engineers often have to work around existing structures. Unfortunately, sometimes this also means that existing structures – including homes – are destroyed.

Engineers have to account for how the changes they make will affect the surrounding area in other ways, too. They have to be sure that their changes will not have a negative impact on the environment, for example. They must also consider how not just air pollution, but also sound pollution will affect people near their projects.

Finally, transportation engineers must ensure that their plans follow important laws about safety. This is perhaps the most important job that engineers have. After all, would you want to drive over a bridge that had not been checked for safety?

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## Pg. 2J-41 -- Talk About Jobs! Small Group Dialogue

Have students pick one of the jobs in the Transportation, Distribution, and Logistics Career Cluster. In small groups, complete the dialogue on the handout, using at least ten of the words from the previous lessons. Have him write in such a way that the audience learns about the job duties, the work environment, and the qualities a person should possess who holds one of these jobs. Then they can perform the dialogue for the class.

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## Pg. 2J-42 – 43 -- A Day in the Life: Danielle Fielding, Commercial Airline Pilot

**ANSWERS:**

1. What did Danielle do to prepare for her job as a commercial pilot?

**She learned to fly (not stated explicitly). She flew "short haul" trips to prepare for longer routes.**

2. What qualities or skills do you think Danielle has that make her an effective pilot?

**__x__ leadership skills**
**____ mechanical expertise**
**__x__ ability to make decisions**
**____ artistic ability**
**__x__ knowledge of equipment and supplies**
**____ financial skills**
**__x__ communication skills**
**__x__ planning and organizational skills**
**__x__ responsibility**
**____ medical skills**

3. What other workers in the Transportation, Distribution and Logistics Career Cluster does Danielle work with as part of her job?

**Aircraft Mechanic and Service Technician, Administrative Service Managers, Cargo/Freight Agent**

4. What are some of the things that Danielle likes most about her job?

**Seeing new places, working on a team**

5. What parts of Danielle's job as a commercial pilot do you think you would enjoy? Which would you find challenging?

**Answers will vary. (Have students refer to specific examples from the text.)**

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## Pg. 2J-44 -- Career Cluster Research

Ask students to use three resources to research and complete the information pertaining to job titles in the career cluster they have chosen to explore. (For example: MyCareer Shines: https://mycareershines.kuder.com, another on-line resource, an interview with a career counselor.)

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## Pg. 2J-45 - 46 -- Post-Secondary Catalogue Exploration & Presentation

For this activity, students will choose a program at one of the local educational or vocational institutions that interests them, based on what they have learned about their interests, skills and talents as well as what they now know about post-secondary options. (For example: they might select a certificate program from the local technical center, an Associate of Arts degree program, a community college certificate program or Associate of Science degree, or a four–year college degree.) They will go to the website of the institution which offers a program that interests them to answer the following questions. If they do not have internet access, if possible bring in print catalogues from the local college and vocational / technical center. Have students then prepare to present their information to the class.

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## Pg. 2J-47 - 49 -- Transportation, Distribution, and Logistics Occupation Presentation

Have students study the occupational vocabulary on the handout. Then they can use **MyCareer Shines** (https://mycareershines.kuder.com) and the **Occupational Outlook Handbook** (http://o*netonline.com) to explore in greater depth one of the jobs in the Transportation, Distribution, and Logistics Career Cluster and prepare to present the information to the class.

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*Image from Creative Commons www.pixabay.com/en/vehicles-truck-car-bus-trailer-146444/*

# EXPLORING CAREER CLUSTERS:

# Transportation, Distribution & Logistics

## Student Activities

# What Do You Know?

## Job Titles in Transportation, Distribution, and Logistics

*In small groups, discuss each of the job titles in the Transportation, Distribution and Logistics career cluster. What do you think these workers do? What kind of environment do they work in? What tools and equipment do they use? What kind of skills do they need to have?*

Automotive Body Repairer _____

_____

_____

Diesel Engine Mechanic _____

_____

_____

Aircraft Mechanic and Service Technician _____

_____

_____

Administrative Service Manager_____

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Cargo/Freight Agent _____

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Customs Broker _____

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Postal Service Clerk/Carrier _____

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Commercial Pilot _____

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Tractor-Trailer Truck Driver _____

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Transportation Engineer _____

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Transportation Planner _____

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Freight Forwarder _____

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_____

Tank Car, Truck, or Ship Loader _____

_____

_____

Supply Chain Manager_____

_____

_____

Logistics Analyst _____

_____

_____

# Transportation, Distribution and Logistics

## JOB TITLES: Research

*In small groups, look up the job titles below on **MyCareerShines** (www.mycareershines.kuder.com) and write the definition on the lines below. (Other websites or a dictionary may be used if this is not accessible.) How does your research compare with your prior knowledge?*

**********

### Automotive Body Repairer

_____

_____

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_____

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### Diesel Engine Mechanic

_____

_____

_____

_____

**********

### Aircraft Mechanic and Service Technician

_____

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## Administrative Service Manager

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## Cargo/Freight Agent

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**********

## Customs Broker

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## Postal Service Clerk/Carrier

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## Commercial Pilot

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## Tractor-Trailer Truck Driver

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## Transportation Engineer

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_____

_____

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## Transportation Planner

_____

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_____

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**********

## Freight Forwarder

_____

_____

_____

_____

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## Tank Car, Truck, or Ship Loader

_____

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_____

**********

## Supply Chain Manager

_____

_____

_____

**********

## Logistics Analyst

_____

_____

_____

_____

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# Transportation, Distribution and Logistics

## Job Description Match-up

*Match the letter of the job from this career cluster with the description of the job duties.*

| | Transportation, Distribution and Logistics Career Cluster | | Description of Job Duties |
|---|---|---|---|
| A | Automotive Body Repairer | | Arrange, coordinate, and track shipments and payments for shipment. |
| B | Diesel Engine Mechanic | | Inspect and monitor aircraft components for damage and wear in accordance with regulations and manufacturer specifications. |
| C | Aircraft Mechanic and Service Technician | | Load transport vehicles with inventory in accordance with delivery, warehousing, and manufacturing needs. |
| D | Administrative Service Managers | | Identify, repair, and test automobiles, using appropriate power/hand tools and chemicals. |
| E | Cargo/Freight Agent | | Plan and monitor budgets, procedures, schedules, and equipment. |
| F | Customs Broker | | Monitor transportation systems by tracking inventory, evaluate transportation costs, and recommend improvements to systems. |
| G | Postal Service Clerk/Carrier | | Arrange for payments of taxes and fees (duties/tariffs) on goods being imported or exported. |
| H | Commercial Pilot | | Arrange and monitor costs, schedules, and documentation of all inventory shipped between different locations. |
| I | Tractor-Trailer Truck Driver | | Use appropriate tools to test, repair, and adjust equipment on buses, trucks, and diesel engines. |
| J | Transportation Engineer | | Monitor, analyze, and improve system of procuring and moving supplies through the manufacturing process. |
| K | Transportation Planner | | Sort mail to prepare for delivery, obtain signatures for certain mail items, deliver mail to homes and businesses, and assist customers. |
| L | Freight Forwarder | | Operate and monitor aircraft controls, communicate with ground crews and air traffic controllers, choose safest and most efficient routes, and perform safety checks. |
| M | Tank Car, Truck, or Ship Loader | | Inspect and maintain vehicle (3+ ton trucks), secure cargo, safely transport cargo, and maneuver truck for loading and unloading. |
| N | Supply Chain Manager | | Use traffic monitoring/modeling software and databases to develop plans for infrastructure such as roads, pedestrian crossings, and bus facilities. |
| O | Logistics Analyst | | Design transportation facilities such as streets, airports, bridges, and commuter trains, and provide estimates of costs and impact on traffic, environment, or existing facilities. |

# Alphabetical Order

*Put the following Transportation, Distribution and Logistics job titles in alphabetical order.*

Automotive Body Repairer
Aircraft Mechanic and Service Technician
Administrative Service Managers
Postal Service Clerk/Carrier
Commercial Pilot
Transportation Engineer
Tank Car, Truck, or Ship Loader
Logistics Analyst
Diesel Engine Mechanic
Customs Broker
Cargo/Freight Agent
Freight Forwarder
Tractor-Trailer Truck Driver
Transportation Planner
Supply Chain Manager

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____

# STRETCH YOUR VOCABULARY

*Make new words from the **Transportation, Distribution and Logistics Career** Cluster vocabulary. Work in small groups to use your own knowledge and a dictionary to see how many forms of the words below you can find. (You will not be able to fill in all the categories for some terms.) The first four are done for you.*

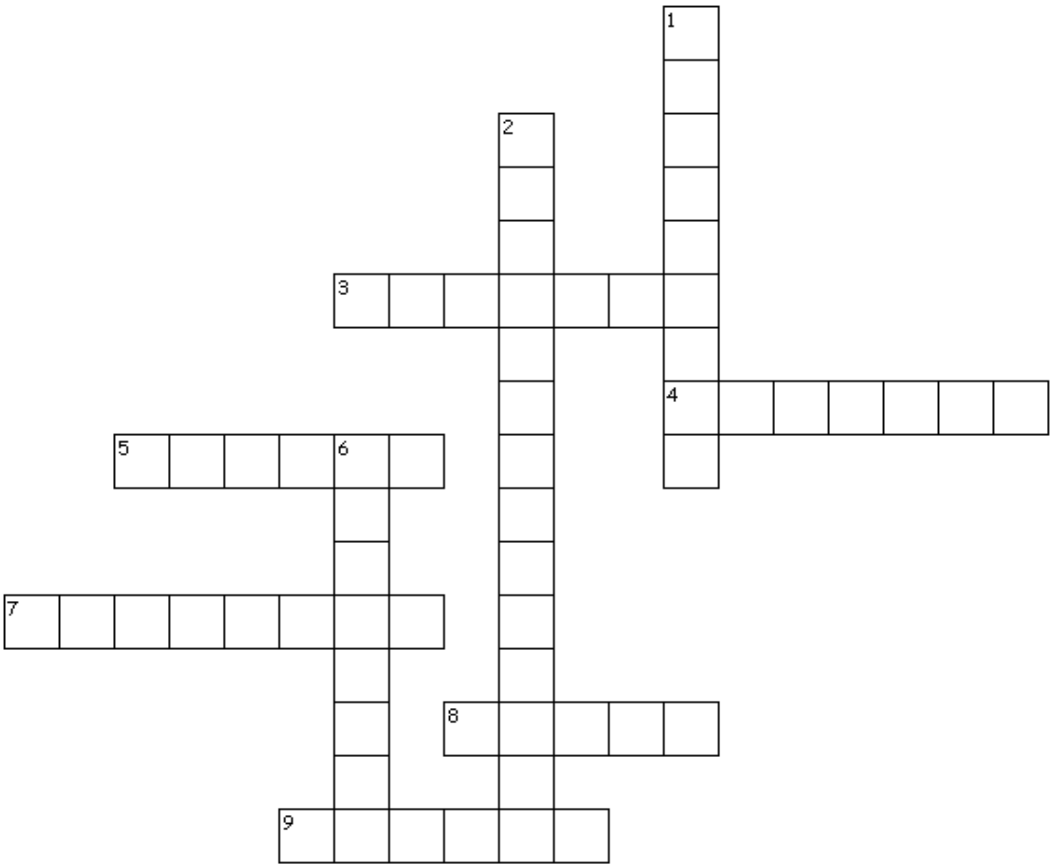
| JOB TITLE | RELATED NOUN | Present-tense VERB | ADJECTIVE | ADVERB |
|---|---|---|---|---|
| *Automotive Body Repairer* | Repair | Repairing | Repaired | |
| *Diesel Engine Mechanic* | Mechanization | Mechanize | Mechanical | Mechanically |
| *Aircraft Mechanic and Service Technician* | Technology | | Technical | Technically |
| *Administrative Service Managers* | Management | Manage | Managerial | Managerially |
| *Cargo/Freight Agent* | | | | |
| *Customs Broker* | | | | |
| *Postal Service Clerk/Carrier* | | | | |
| *Commercial Pilot* | | | | |
| *Tractor-Trailer Truck Driver* | | | | |
| *Transportation Engineer* | | | | |
| *Transportation Planner* | | | | |

| | | | | |
|---|---|---|---|---|
| *Freight Forwarder* | | | | |
| *Tank Car, Truck, or Ship Loader* | | | | |
| *Supply Chain Manager* | | | | |
| *Logistics Analyst* | | | | |

## SMALL GROUP STORY

*Now write a story about a day in the life of a person who works in the career cluster of* ***Transportation, Distribution and Logistics****. Use at least ten of the words above (in addition to the job titles!)*

# Transportation, Distribution and Logistics Career Cluster
# Crossword Puzzle




**Across**

3. Another word for inventory or goods being shipped.
4. The procedures required for importing and exporting goods.
5. The type of engine in a tractor-trailer truck.
7. Someone who maintains or repairs machinery.
8. Person responsible for the operation of an aircraft.
9. Someone who arranges for payments or sales.

**Down**

1. The steps required for the movement of goods or people.
2. The type of work required to run an office environment.
6. The mind behind the design.

# Transportation, Distribution and Logistics Career Cluster Word Search

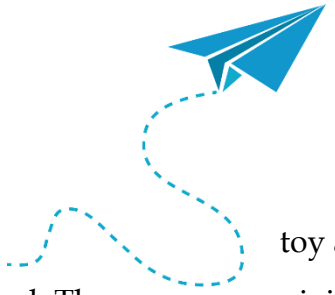
E V I T A R T S I N I M D A N D D T V L
N U A K T J T M V C K W F I O F J D C O
L O E U J H E S G H R U A K I M V O E G
I F I A T C G E F E W H N U T C H E H I
O X W T H O S I G S C M O T U A R O I S
O F F A A V M A E Y Q G O S B R V O L T
W W N D X T N O L R R E E N I G N E K I
D I G B M A R P T L F Q Z U R O N S K C
C Y C H M W P O D I Y O Y L T P C Y V S
S J P S K U F I P X V B Y J S J E I M S
P Z R M S C E M F S V E N B I T D O E V
Q Q I L U P T S X T N Q X W D S I W O C
C O M M E R C I A L L A J Z H Y Q R P B
R X E Y K U L K Y I P C R G A L D Y Q D
D I E S E L I O Z W Q J O T K A Q Y J Q
A K E W L B X C A G T R D A U N R I H U
O A E H T R V B O D W N F S A A N Z D W
Y G A M T C Y O H O E O S V V G K P K G
Q T V S H V L K R M N R M Z F M I M R O
B P W R U J Z K P D D J L R R U L C I I

ADMINISTRATIVE
ANALYST
AUTOMOTIVE
CARGO
COMMERCIAL
DIESEL
DISTRIBUTION
ENGINEER
FREIGHT
LOADER
LOGISTICS
MANAGER
MECHANIC
SUPPLYCHAIN
TRANSPORTATION

**SCIENCE in the Transportation, Distribution and Logistics Career Cluster:**

## Using the Scientific Method to Compare Paper Airplane Flight

# Fly Baby Fly



A paper airplane is a toy aircraft, usually a glider made out of folded paper or paperboard. The origin of paper gliders is generally considered to be Ancient China, where manufacturing of paper on a widespread scale took place in 500 BCE. Origami (paper folding), and possibly paper gliders, became popular within a century of this period.

For over a thousand years, paper aircrafts were studied to design larger machines. The most significant use of paper models in aircraft designs were by the Wright brothers between 1899 and 1903, the date of the first powered flight from Kill Devil Hills, by the Wright Flyer.

The Wrights used a wind tunnel to gain knowledge of the forces which could be used to control an aircraft in flight. They built numerous paper models, and tested them within their wind tunnel.

Their paper models were very important in the process of moving on to progressively larger models, kites, gliders and ultimately on the powered Flyer. In this way, the paper model plane remains a very important key in the graduation from model to manned heavier-than-air flight.

*Image from Creative Commons www.pixabay.com/en/graphic-plane-plane-paper-symbol-1552354/*

***SCIENCE in the Transportation, Distribution and Logistics Career Cluster, cont.***

One of the Wright brothers' major breakthroughs was the ability to control and maneuver their aircraft through the system of wing warping. Wing warping was an early system for lateral (roll) control of a fixed-wing aircraft. The technique consisted of using a system of pulleys and cables to twist the edges of the wings in opposite directions. This is similar to the technique that is used to control the flight of a paper airplane by curling the paper at the back of its wings.

In recent times, people are developing more sophisticated paper model aircraft with better flight performance far removed from their early origami origins.

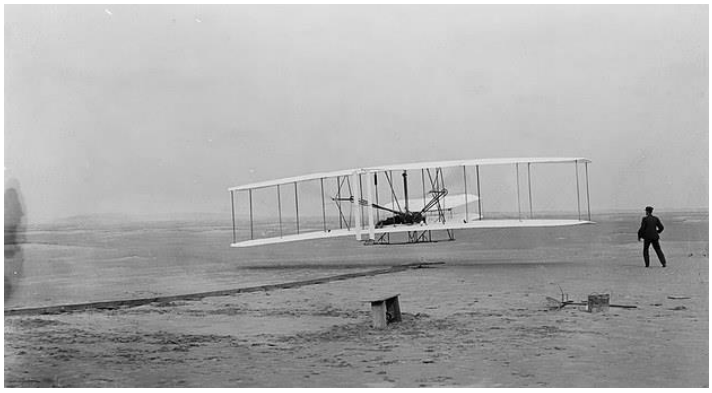


*Image from Creative Commons*
*www.pixabay.com/en/wright-brothers-aeroplane-airplane-1386238/*

## Comprehension Questions

1. When were the first paper airplanes built?

2. What is origami?

3. What role did paper airplanes play in the development of modern aviation?

4. What did the system of "wing warping" allow the Wright brothers to do?

5. Wing warping on early aircraft is similar to what technique used in making paper airplanes?

*Work in pairs or small groups to follow one of the three paper airplane directions below, then do an experiment, using the scientific method, to launch the airplanes and observe which design works best.*

# The Dart

1. Fold the paper in half vertically.

2. Unfold the paper and fold each of the top corners into the center line.

3. Fold the top edges into the center line.

4. Fold the plane in half toward you.

5. Fold the wings down, matching the top edges up with the bottom edge of the body.

6. Add double stick tape to the inside of the body. The finished plane should look like this:

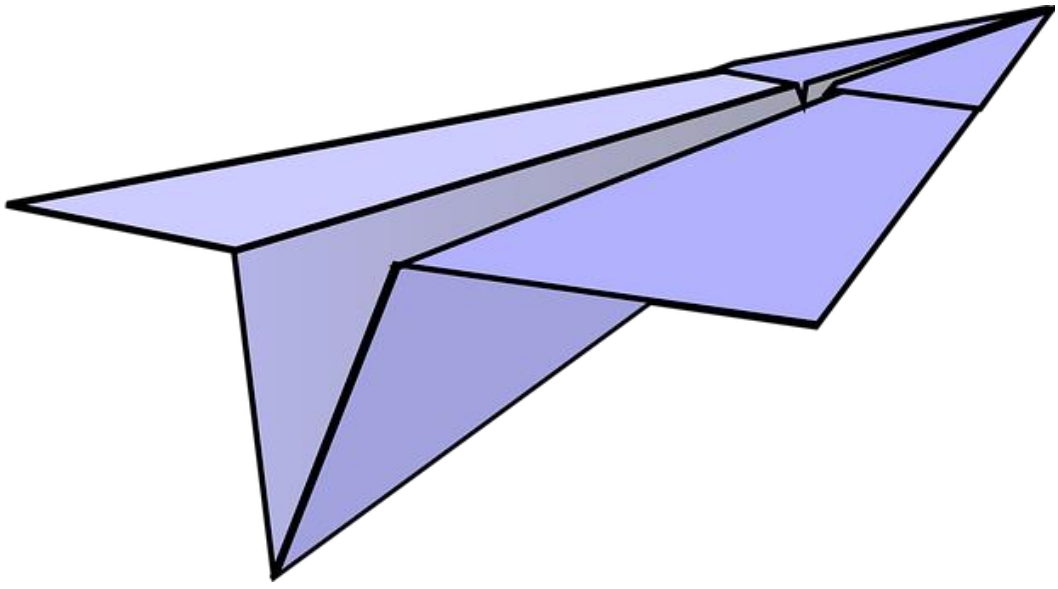


*Image from Creative Commons www. pixabay.com/en/paper-plane-paper-dart-149424/*

*Work in pairs or small groups to follow one of the three paper airplane directions below, then do an experiment, using the scientific method, to launch the airplanes and observe which design works best.*

# The Stealth Glider

1. Fold the paper in half vertically.
2. Unfold the paper and fold each of the top corners into the center line.
3. Fold the peak toward you and 3/4″ from the bottom of the paper.
4. Fold both top corners into the center line.
5. Fold the remaining tip over the two flaps at the center line to lock them in place.
6. Fold the plane in half away from you.
7. Fold the wings down 1″ from the bottom of the plane.
8. Fold up the sides of each wing 1/2″ tall.
9. Cut two small slits at the back of each wing. Fold up the tabs. The finished plane should look like this:

*Image from www.youtube.com/watch?v=FdsUp4rpkXA*

*Work in pairs or small groups to follow one of the three paper airplane directions below, then do an experiment, using the scientific method, to launch the airplanes and observe which design works best.*

# The Bumble

1. Fold the paper in half horizontally.
2. Unfold the paper and fold each of the top corners into the center line.
3. Fold the peak down to meet the edge of the previous fold.
4. Fold the upper sides into the center line.
5. Fold the top edge 1/2″ away from you.
6. Fold the plane in half towards you.
7. Fold the wings down 1/2″ from the bottom of the plane. The finished plane should look like this:

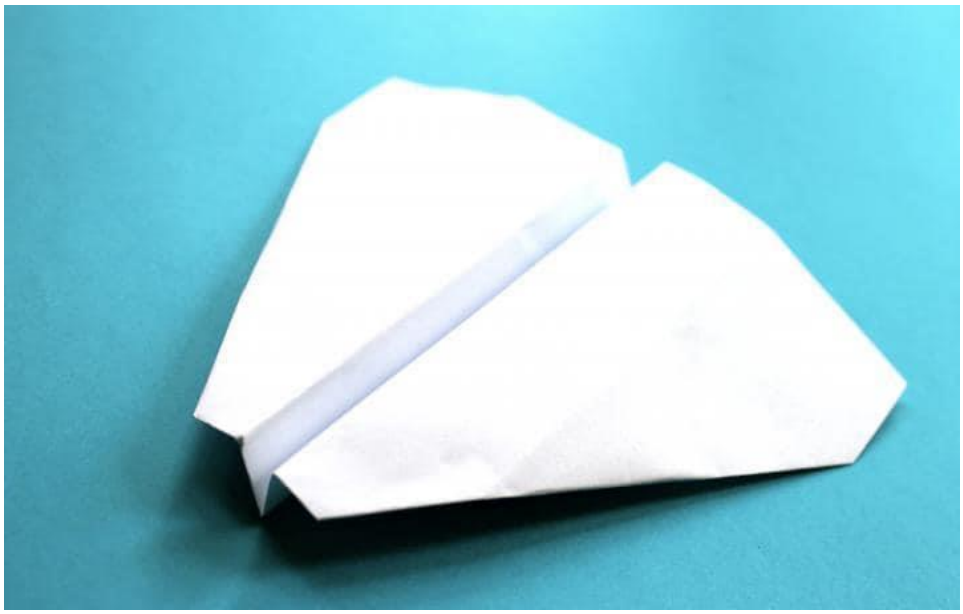


*Image from www.kidspot.com.au/things-to-do/activity-articles/how-to-make-a-nakamura-lock-paper-plane/news-story/a11884cdff19f65c3820c6d9f8e1aa08*

# Scientific Method: STEPS

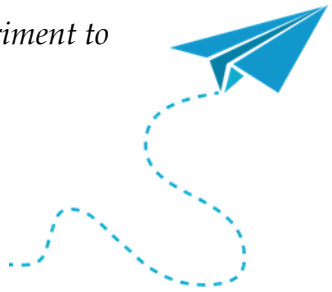
*Study the bookmarks to review the steps of the scientific method.*

| SCIENTIFIC METHOD | SCIENTIFIC METHOD | SCIENTIFIC METHOD |
|---|---|---|
| **Question**<br>*Formulate a question about something that you can measure.*<br>  | **Question**<br>*Formulate a question about something that you can measure.*<br>  | **Question**<br>*Formulate a question about something that you can measure.*<br>  |
| **Data**<br>Research the topic you are investigating or use observable facts.<br>  | **Data**<br>Research the topic you are investigating or use observable facts.<br>  | **Data**<br>Research the topic you are investigating or use observable facts.<br>  |
| **Hypothesis**<br>*Make an educated guess about the answer to your question.* | **Hypothesis**<br>*Make an educated guess about the answer to your question.* | **Hypothesis**<br>*Make an educated guess about the answer to your question.* |
| **Experiment**<br>Test your hypothesis and record your data.<br>  | **Experiment**<br>Test your hypothesis and record your data.<br>  | **Experiment**<br>Test your hypothesis and record your data.<br>  |
| **Conclusion**<br>*Was your hypothesis supported or not?* | **Conclusion**<br>*Was your hypothesis supported or not?* | **Conclusion**<br>*Was your hypothesis supported or not?* |

***Images from Creative Commons www.pixabay.com/en/photos/beaker/, www.pixabay.com/en/magnifying-glass-magnifier-glass-189254/***

# Fly Baby Fly:

## Using the Scientific Method to Compare Paper Airplanes in Flight



*After building each of the three model paper airplanes, perform an experiment to determine which one is best designed for flight.*

*Before, during, and after launching the three paper airplanes, use the scientific method handout below to document your results and draw a conclusion about which one is best designed for flight.*

### BEFORE FLIGHT:

**Question:**_____

_____

_____

**Background data:**_____

_____

_____

**Independent Variable:** *A variable is something you're trying to measure. The independent variable isn't affected by any other variable in the experiment.*

_____

_____

_____

**Dependent Variable:** *The dependent variable is what is being studied and measured in the experiment.*

_____

_____

_____

**Hypothesis:**_____

_____

_____

**Description of Experiment:** _____

_____

_____

## DURING FLIGHT:

**Data Table**

| The Dart | | The Stealth | | The Bumble | |
|---|---|---|---|---|---|
| Trial | Distance | Trial | Distance | Trial | Distance |
| **1** | | **1** | | **1** | |
| **2** | | **2** | | **2** | |
| **3** | | **3** | | **3** | |
| Average | | Average | | Average | |

## AFTER FLIGHT:

Conclusion:

_____

_____

_____

_____

_____

_____

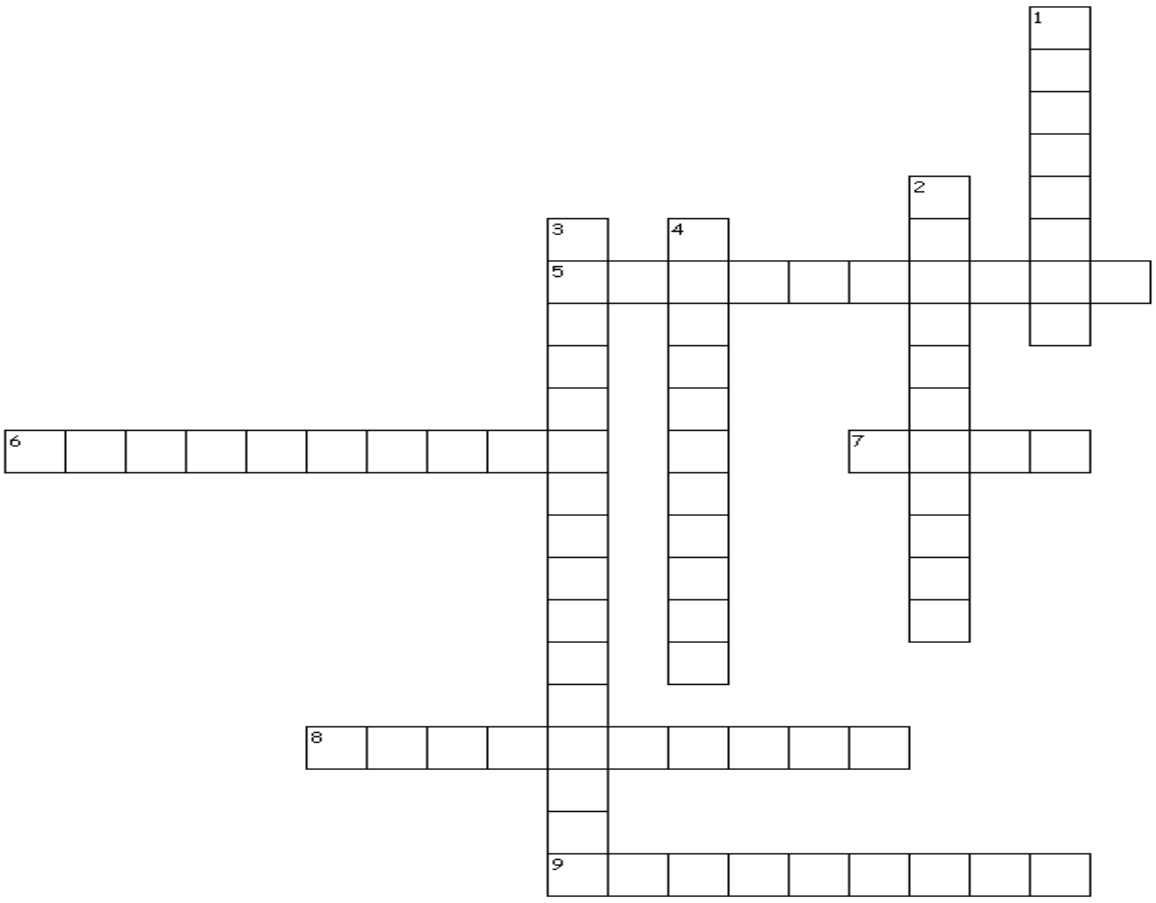
_____

_____

_____

_____

# Scientific Method Crossword Puzzle



**Across**

5. An answer to the question: Was your hypothesis supported or not?
6. A test of your hypothesis
7. Facts and statistics collected together for analysis
8. An educated guess about the answer to your question.
9. The variable that is being studied and measured in the experiment

**Down**

1. Something that you want to figure out or measure
2. The act of watching
3. The system of observation, measurement, experiment, and testing of a hypothesis, then drawing a conclusion.
4. The variable whose change isn't affected by any other variable in the experiment

# MATH in the Transportation, Distribution and Logistics Career Cluster

## Math Skills for the Trucker

*Read the article below about the skills needed by people in the trucking industry, then solve the world problems that follow each section.*

### Overview of the Trucking Industry

Read the chart below from the Bureau of Labor Statistics Occupational Outlook Handbook for an overview of the quick facts about job prospects, median pay, training requirements and job outlook for Heavy and Tractor-trailer Truck Drivers. Does any of the information in the chart surprise you?

| **Quick Facts: Heavy and Tractor-trailer Truck Drivers** (*www.bls.gov/ooh/transportation-and-material-moving/heavy-and-tractor-trailer-truck-drivers.htm*) | |
|---|---|
| **2017 Median Pay** | $42,480 per year / $20.42 per hour |
| **Typical Entry-Level Education** | Postsecondary non-degree award |
| **Work Experience in a Related Occupation** | None |
| **On-the-job Training** | Short-term on-the-job training |
| **Number of Jobs, 2016** | 1,871,700 |
| **Job Outlook, 2016-26** | 6% (As fast as average) |
| **Employment Change, 2016-26** | 108,400 |

1. If a tractor-trailer truck driver makes median pay and works a 40 hour week, how much would she make in gross earnings (before taxes and deductions) in a week?

2. If 25% of her income is deducted for taxes, how much would she receive in net (take home) pay?

3. If a tractor-trailer truck driver makes median pay, how much would he make in gross earnings (before taxes and deductions) over the course of five years?

4. If 23% of his income is deducted for taxes, how much would he receive in net (take home) pay over the course of five years?

5. If employment change is steady, how many jobs could be expected to be added between 2016 and 2021?

6. If there were 1, 673,200 jobs in this industry in 2015, what was the increase in one year?

*Excerpted from Bureau of Labor Statistics Occupational Outlook Handbook*
*(https://www.bls.gov/ooh/transportation-and-material-moving/heavy-and-tractor-trailer-truck-drivers.htm)*

## What Heavy and Tractor-trailer Truck Drivers Do

Heavy and tractor-trailer truck drivers transport goods from one location to another. Most tractor-trailer drivers are long-haul drivers and operate trucks with a gross vehicle weight (GVW) capacity—that is, the combined weight of the vehicle, passengers, and cargo—exceeding 26,000 pounds. These drivers deliver goods over intercity routes, sometimes spanning several states.

## How to Become a Heavy or Tractor-trailer Truck Driver

Heavy and tractor-trailer truck drivers usually have a high school diploma and attend a professional truck driving school. They must have a commercial driver's license (CDL).

## Median Annual Pay

The median annual wage for heavy and tractor-trailer truck drivers was $42,480 in May 2017. Many truckers, however, do not earn hourly wages. Instead, shippers pay them per mile and offer higher rates to truckers who transport more valuable cargo or drive under difficult conditions.

Truckers who own their vehicles, or work for companies with profit sharing programs, can earn a portion of the shipping revenue. This includes distant deliveries. Truckers' pay also varies by industry, with wholesale truckers earning $39,500 per year on average. Specialized freight drivers earn $40,840 a year. Generalized freight drivers earn an average of $42,320 a year.

## Women in Trucking

Long-distance truck driving has traditionally been a male-profession, but more and more women are becoming drivers. Women make up approximately 5.8% of the 3.5 million drivers in the U.S. today.

1. A driver's GVW is 15.5 tons. How many more pounds is that over the minimum required to be considered a long-haul driver?

2. How much more, on average, do generalized freight drivers earn than wholesale truckers?

3. Approximately how many women truck drivers are there today?

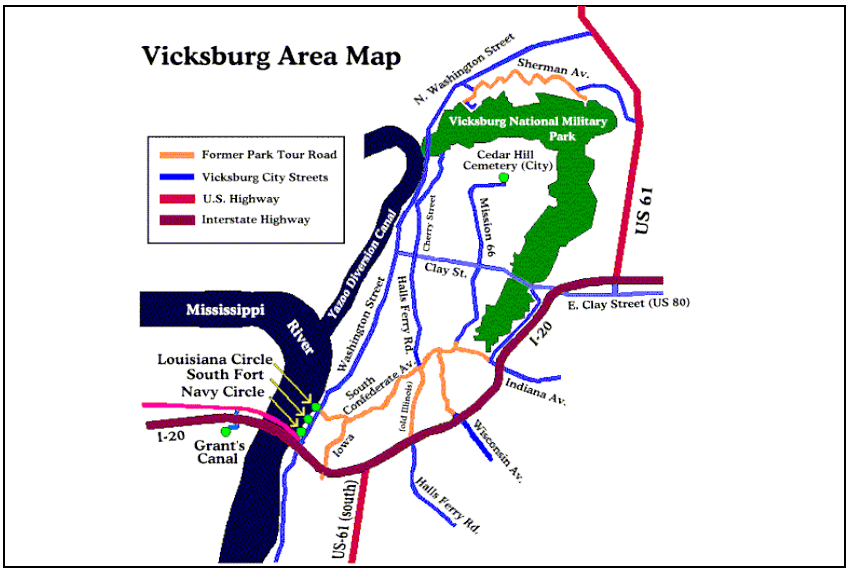
4. If 350,000 women were employed as truck drivers today, what percent would that be of the total number of drivers?

# Reading a Map

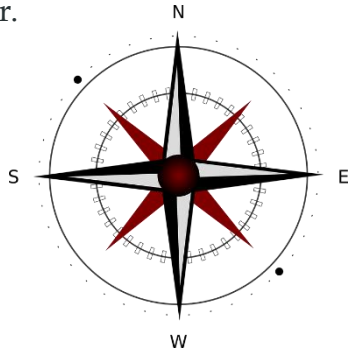
Truck drivers rely on GPS systems to help them navigate the road. But road maps are still important. Sometimes car-based satellite mapping systems don't work or don't take into account important things that come up, like restricted routes, low clearance, and the location of weigh stations.

*Read about the key sections of a road map, then follow the directions and answer the questions that follow.*

**A legend** is a small box that shows examples of the roadways listed on the map. It will include major roadways, such as highways and interstates, as well as streets in residential areas. It may also include landmarks, transportation centers, hospitals, and places of interest.




**A compass rose** is a drawing, usually in the corner, of a map. It shows the four cardinal directions (north, south, east, and west.) On most paper maps, north points up and south points down. East is to the right and west points left. (Some people use the pneumonic phrase **N**ever **E**at **S**hredded **W**heat, going clockwise, to help them remember. You may also have heard **N**ever **E**at **S**oggy **W**affles!)




If the direction you want to find is between two cardinal directions, find the point in between and say the direction is northeast or southeast, southwest or northwest. These are called intermediate directions.

*Label the intermediate directions NE, SE, SW, and NW on the compass rose.*

*Images from Creative Commons www.pixabay.com/en/compass-east-south-north-west-354861/, and www.nps.gov/vick/planyourvisit/directions.htm*

**The index** is a list of all of the cities listed on a map in alphabetical order. The location of each is represented by which section of a grid system the city is in. On the map below, the bottom of the grid is numbered 1, 2, 3, etc. The left side is labeled A, B, C, etc. So, for example, if Jacksonville is located in section B 8 on a Florida map, you find the spot on the map where B and 8 meet in order to locate Jacksonville.

*On the map below, use a pencil and a straight edge (side of a book, paper ruler, or a folded piece of paper) to connect the letters and extend the numbered lines to make boxes on your grid. Use the grid you have created to answer the questions that follow.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|

A___ B___ C___ D___ E___ F___ G___ H___ I___ J___


A___ B___ C___ D___ E___ F___ G___ H___ I___ J___

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|

*Write the number – letter coordinates of the box on the grid that correspond with each city below:*

Orlando_____ Cape Coral _____

Tallahassee_____ Pensacola_____

Clearwater_____ Palm Bay_____

**Scale** on a map is used to roughly estimate the distance between one place and another. The scale is a small line labeled with distances (on a road map the distances will be in miles.)

Use your finger, a paper ruler, or a small piece of paper to mark the length of the scale. To roughly estimate the distance between two points, measure how many times the length of the scale will fit. Then, multiply this number by the distance that the scale represents to find the approximate actual distance.

*Use the scale on the National Geographic map of the U.S.to find approximate distance between the cities listed.*


*www.nationalgeographic.org/activity/measuring-distances-map/*

1. Washington, DC to New Orleans, LA in miles:_____ in kilometers:_____

2. Denver, CO to Philadelphia, PA in miles:_____ in kilometers:_____

3. New Orleans, LA to Houston, TX in miles:_____ in kilometers:_____

4. Seattle, WA to Chicago, IL in miles:_____ in kilometers:_____

5. Phoenix, AZ to Atlanta, GA in miles:_____ in kilometers:_____

6. Chicago, IL to St. Louis, MO in miles:_____ in kilometers:_____

# What Does a Transportation Engineer Do?

## EDITING PRACTICE

Adapted from www.floridashines.org

*Rewrite the paragraph below. Edit for spelling, complete sentences, correct subject / verb agreement, punctuation, and capitalization.*

as time passes, cities often need to repair old roads sidewalks bus stops, or other inferstructure. Sometimes, they may even need too build new roads where previously their were none, make existing roads larger, or change the routes of particularly buzy streets all of this work require's transportation engineers to consider a number of factor at the same time, too make sure that they dont create new problem's as they solve old ones

the first consideration that transportation enginears make is how there project will affect traffic flows – will it make it easier for people too move threw a city or space, or more difficult as cities grow, its important that people are able to get where they need two go quickly and safely this can be a difficult job, as there are sometimes obstacles to changing the roots of roadway's or increasing there size. When these changes are ofen made in crowded urban areas for instance engineers often have to work around existing structures. Unfortunately, sometimes this also means that existing structures – including homes – are destroy

Engineer's have to account for how the changes they make will affect the surrounding area inn other ways, to. they have be sure that they're changes will not have a negative impact on the environment, for example. they must also consider how not just air pollushion, but also sound pollootion will affect people near their projects

finally, transportation Engineers must ensure that there plans follow important law about safety This is perhap the most important job that engineer's have. After all, would you want to drive over a bridge that had not been checked for safety!

*Image from Creative Commons www.pixabay.com/en/cars-building-city-gas-station-2022804/*

# Talk About Jobs!

## Small Group Dialogue

*Pick one of the jobs in the Transportation, Distribution and Logistics Career Cluster. In small groups, complete the dialogue below, using at least ten of the words from the previous lessons. Write in such a way that the audience learns about the job duties, the work environment, and the qualities a person should possess who holds one of these jobs. Then perform the dialogue for the class.*

**Joe**: I love being a _____

**Sarena:** Me, too! My favorite part of this job is _____

_____

**Joe:** Really? My favorite part is_____

_____

**Sarena:** I got my training for the job _____

_____

**Joe:** I got my training _____

_____

**Sarena:** I love the tools! I love the fact that every day I get to use _____

_____

**Joe**: And the work environment is so _____

_____

**Sarena:** And you have to be a special sort of person to do this! You have to be _____

_____

**Joe:** _____

_____

**Sarena:** _____

_____

# A Day in the Life:
# Danielle Fielding, Commercial Airline Pilot

*(Adapted from pilotcareernews.com via Sokanu.com, with additional information from usatoday.com)*

There are a seemingly infinite number of ways that a commercial pilot might spend his or her day. Depending on experience, airline, and home base location, a pilot's tasks and schedules can vary a great deal. Over the years, I have found that with more experience comes a more enjoyable schedule.

The first thing you should know about life as an airline pilot is that the days can be *long*. In the United States, most pilots are scheduled for duty periods of around 11 hours. Any longer could be unsafe for not just the pilots, but everyone on board! How a pilot spends those 11 hours can vary quite a bit though, too.


When I was first starting out, I mostly flew "short haul" trips, or short, connecting flights. When flying these shorter flights, I might make 6 or 8 trips in a single day! Most often, these trips would be back and forth between the same airports. Later, many pilots move up to "long haul" flights. These flights are more challenging, not just because they require a pilot's intense concentration for longer periods, but also because they involve changing time zones and even flying through the night, which can make getting rest very difficult.

While the pilot has important jobs that everyone can see and feel, like guiding the plane through takeoff and landing, the pilot's job doesn't start when the wheels leave the runway. Before a flight, pilots meet with the crew to discuss the route, as well as any anticipated obstacles such as weather or heavy air traffic during the trip or at the destination. The long the trip, of course, the more planning that has to take place first.

Whichever route you take as a pilot, you will quickly learn that the world of flying is a global community. You don't simply get to travel to a wide variety of places – you meet people from all over as well! As I have learned a great many things along the way, I've also got to share my knowledge with the many teams I've worked with. This has made flying quite a rewarding experience!

*Image from www.upload.wikimedia.org/wikipedia/commons/1/18/Women_in_History%2C_Lt._Jeanine_Menze_130125-G-KL864-028.jpg*

# A Day in the Life:
# Danielle Fielding, Commercial Airline Pilot

1.What did Danielle Fielding do to prepare for her job as a Commercial Airline Pilot ?

2. What qualities or skills do you think Danielle has that make her an effective pilot?

____ leadership skills

____ mechanical expertise

____ ability to make decisions

____ artistic ability

____ knowledge of equipment and supplies

____ financial skills

____ communication skills

____ planning and organizational skills

____ responsibility

____ medical skills

3. What other workers in the Transportation, Distribution and Logistics Career Cluster does Danielle work with as part of her job?

4. What are some of the things that Danielle likes most about her job?

5. What parts of Danielle's job as a commercial pilot do you think you would enjoy? Which would you find challenging?

# Career Cluster Research

*Use three resources to research and complete the information pertaining to job titles in the career cluster you have chosen to explore. (For example: MyCareer Shines: https://mycareershines.kuder.com, another on-line resource, an interview with a career counselor.)*

**Name of career cluster:**_____

| **Job Title** | | | |
|---|---|---|---|
| **Educational level needed:**<br><br>(On-the-job training, apprenticeship, 2-year technical school or community college, 4-year college/university?) | | | |
| **Salary/Wages:**<br><br>(Beginning, Median, Experienced?) | | | |
| **Environment:**<br><br>(Outdoors / indoors, school, office, hospital, business?) | | | |
| **Qualities needed to be successful in this occupation:**<br><br>(Special skills, personal qualities, etc.) | | | |

# Post-Secondary Catalogue Exploration & Presentation

*Based on what you have learned about your interests, skills and talents as well as what you now know about post-secondary options, choose a program at one of the local institutions that interests you (for example: you might select a certificate program from Lively Technical Center, a TCC Associate of Arts degree program, TCC certificate program, or a FAMU four–year degree.) Go to the website of the institution which offers a program that interests you to answer the following questions. If you do not have internet access, use the print catalogues from the local college and vocational / technical center. Prepare to present your information to the class.*

**1.** What is the name of the website?_____

**2**. What is the name of the program of study that interests you?_____

_____

**3.** How many credit hours or clock hours is the program?_____

**4.** How long will it take in weeks, months or years to complete the program?_____

_____

**5.** What does the program cost?_____

**6.** Does the program accept financial aid?_____

**7.** What are the entrance requirements of the program? (TABE scores? GED? ACT or SAT? Other tests or requirements?)

_____

_____

**8.** What are some of the classes you will have to take in this program?

_____ _____

_____ _____

_____ _____

**9.** What do graduates of this program typically earn?_____

_____

**10.** What questions would you ask of a student who is currently involved in this program?

_____

_____

_____

_____

**11.** What questions would you ask of a counselor in student services about this program?

_____

_____

_____

_____

**12.** If this program is right for you, what do you need to do to prepare for it so that you can be successful? (Be specific: what do you need to accomplish academically, financially and personally before you apply?)

_____

_____

_____

_____

_____

_____

_____

# Transportation, Distribution and Logistics
## Occupation Presentation

Study the occupational vocabulary below. Then use **MyCareer Shines** (https://mycareershines.kuder.com) and the **Occupational Outlook Handbook** (http://o*netonline.com) to explore in greater depth one of the jobs in the Architecture and Construction Career Cluster. Prepare to present the information to the class.

**DEFINITIONS:**

- **occupational outlook:** the chance you have of getting a job in a certain field in the current economy. Occupational outlook is related to how many jobs are available in this field and how many workers are needed.
- **occupational hazards:** working conditions that can lead to illness or death. Often, but not always, people in high-risk jobs are paid more than similar but less risky jobs to compensate for the danger involved.
- **certification:** evidence that an individual has acquired the skills and knowledge needed to do a job, given by a school or authority after an evaluation or test
- **mandatory:** required or commanded by authority; obligatory
- **job prospects:** the range of career opportunities available to a person having a particular combination of skills, knowledge, qualifications, etc.
- **median earnings:** the middle salary out of all the people in a group (often used to describe people doing a similar job), half having incomes above the median, half having incomes below the median

**********

**Occupation** _____

1. What are the typical job duties of this occupation?

_____

_____

_____

2. What is the typical environment where this work takes place?

_____

3. What are the typical hours worked by a person doing this job?

_____

_____

4. Are there occupational hazards? What are they?

_____

_____

5. What education and / or training are required to enter this occupation?

_____

_____

6. What licenses or certifications are mandatory for this occupation?

_____

_____

7. What skills should a person in this occupation possess?

_____

_____

_____

8. What is the total number of jobs in this occupation today?

_____

9. What is the projected change in the number of jobs in this occupation?

_____

10. What are the job prospects for this occupation in Florida?

_____

11. What are the median earnings for workers in this field?

_____

12. In your opinion, what are the major advantages of this occupation?

_____

_____

_____

_____

13. In your opinion, what are the major disadvantages of this occupation?

_____

_____

_____

_____

14. Does this job suit you and your talents and interests? How?

_____

_____

_____

_____

15. If you decided to pursue work in this occupation, what steps would you need to take?

_____

_____

_____