

DECISION MAKING FOR INITIAL COMPANY OPERATIONS

UNIT 5: THE ANALYTICAL SIZEUP PROCESS

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OBJECTIVES

The students will:

- **Discuss the scientific method.**
- **Describe the primary sizeup factors and determine their impact on objectives and strategies.**
- **Analyze the Command Sequence Action Planning Cycle.**

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THE SCIENTIFIC METHOD

- Observe the facts (sizeup).
- Test accuracy of facts through observation.
- If facts are accurate, a logical hypothesis can be deduced.
- If these hypotheses are proven true, outcomes may be predicted in similar situations.
- These hypotheses are called principles.

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THE PRIMARY FACTORS CHART

Set up in Columns

- Column 1--Primary Factors
- Column 2--Incident Objectives
- Column 3--Incident Strategies
- Column 4--Evaluate Strategies

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COLUMN 1: PRIMARY FACTORS

- **Step 1: Analyze the Primary Factors**
- **Step 2: Establish Major Incident Objectives**
- **Step 3: Identify Incident Strategies**
- **Step 4: Assign Incident Strategies**
- **Step 5: Evaluate Incident Strategies**

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MAKING DECISIONS

Example: Effective ventilation facilitates the advancement of hoselines, yet ineffective stretching or laying of hoselines nullifies the effectiveness of ventilation. Ineffective stretching or laying of hoselines can be harmful if it results in spreading the fire before a line is ready to operate.

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MAKING DECISIONS (cont'd)

Strategies can affect:

- Extent of fire after arrival
- Heat and smoke conditions
- Exposure requirement hazards
- Duration of operation
- Requirements to operate

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MAKING DECISIONS (cont'd)

Each of the primary factors has an effect on strategies:

- We determine objectives and strategies based on sizeup we conduct evaluating primary factors.
- When we implement actions to meet our objectives, these actions affect primary factors. This is a circular process.

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LIMITS

For practical purposes, there are two limits:

- Life hazard for occupants--risks to firefighters may be warranted.
- If there is no life hazard for occupants, personnel are never to be jeopardized unnecessarily.

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EVALUATING PRIMARY FACTORS

Life hazard for occupants

- Rescue work
 - Forcible entry
- Covering exposures
 - Becomes more difficult and may delay attack on fire itself

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EVALUATING PRIMARY FACTORS (cont'd)

Life hazard for firefighters--Acceptance of warranted risks is essential for good results in carrying out fire activities.

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EVALUATING PRIMARY FACTORS (cont'd)

Location of fire--entry

- Preferable to force entry near fire location, especially when the area involved is large.
- Enables firefighters to get water on the fire more quickly and minimizes physical hardship of advancing hoselines.

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EVALUATING PRIMARY FACTORS (cont'd)

Location of fire--ventilation

- Localize the fire to stop horizontal spread.
- Example:
 - Fire is extending into a cockloft via pipe recess or similar channel, the roof should be opened.
 - If this were done in the wrong place, it could be disastrous.

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EVALUATING PRIMARY FACTORS (cont'd)

Location of fire--removal of occupants

- Location of fire is critical. Fire on first floor of five-story building could endanger all occupants.
- However, if fire started on fourth floor, it may be different.

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EVALUATING PRIMARY FACTORS (cont'd)

Location of fire--checking for extension of fire

- Fire near vertical or horizontal structure channel will spread readily.
- Officers assigned to check for fire extension should note location of fire and keep in mind how heat travels.

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EVALUATING PRIMARY FACTORS (cont'd)

- Placement and use of hoselines
 - The location of the fire determines the amount of hoseline to be stretched and, in some cases, the size.
- Use of special equipment
 - High-level fires may require standpipe systems, ladder pipe, or other high-caliber streams.
 - Fire may influence use of sprinkler systems.

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EVALUATING PRIMARY FACTORS (cont'd)

- Heat transfer
 - Radiation
 - Conduction
 - Convection
- Extent of fire after arrival
- Construction: ordinary, wood frame, fire resistive (modern highrise)

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What effect would the extent of the fire have on objectives and strategies?

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What is the effect of ordinary construction on the objectives and strategies?

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What is the effect of wood-frame construction on objectives and strategies?

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What is the effect of fire-resistive construction on objectives and strategies?

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What effect would noncombustible construction have on your objectives and strategies?

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What is the effect of buildings under construction on objectives and strategies?

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What is the effect of buildings under demolition on objectives and strategies?

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EVALUATING PRIMARY FACTORS (cont'd)

Occupancy and contents

- Ventilation
- Placement of hoselines
- Selecting an extinguishing agent
- Overhauling

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EVALUATING PRIMARY FACTORS (cont'd)

Height

- Ventilation
- Placement of hoselines

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EVALUATING PRIMARY FACTORS (cont'd)

Area

- If fire can be confined to small room, total floor area hardly matters.
- Proximity of exposures
 - Alone, doesn't make exposure vulnerable.
 - Must be considered with other contributing factors.

Structural collapse

- Carefully consider type of construction.

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EVALUATING PRIMARY FACTORS (cont'd)

Weather

- Low temperatures retard initial development of fire
- High temperatures generally are classified as temperatures in the 80s or 90s
- Humidity
- Rain
- Wind
- Visibility

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EVALUATING PRIMARY FACTORS (cont'd)

Resource requirements--Water, apparatus, equipment, personnel, and special extinguishing agents are required and available for an effective fire operation.

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EVALUATING PRIMARY FACTORS (cont'd)

Auxiliary appliances

- Sprinkler systems
- Pressurization of stairways or other building areas

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EVALUATING PRIMARY FACTORS (cont'd)

Topography

- When operating at a fire on steeply-graded streets, it may be advisable to position aerial trucks or tower ladders on the high side of the fire to ensure maximum reach.
- Effective use of wedges to level portable ladders to allow for safe climbing on hilly terrains.
- Streets that are one-way, congested by vehicular traffic, or covered by snow or ice tend to delay response of the fire department.

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EVALUATING PRIMARY FACTORS (cont'd)

Explosions

- **Smoke explosions or backdrafts**
- **Bomb explosions**

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EVALUATING PRIMARY FACTORS (cont'd)

Duration of operations

- Longer duration, generally difficult to deal with
- Heavy involvement and structural collapse
- Maximize exposure hazard
- Consider relief for personnel

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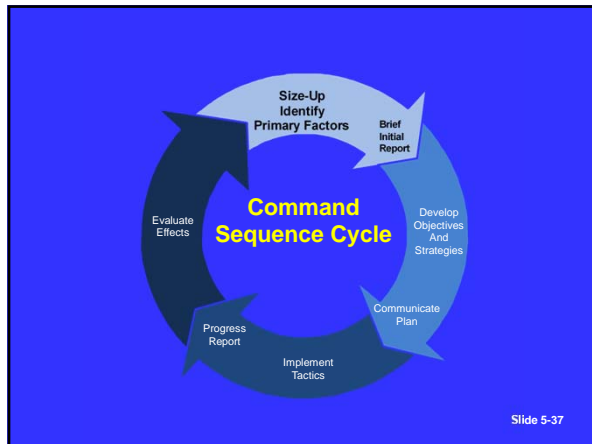
Column #1 Primary Factor		Column #2 Incident Objectives Attainable Measurable Flexible	Column #3 Activities (Strategies)	Column #4 Evaluate Effect of Activities (Outcomes) Every 10 Minutes Effective Ineffective
Situation Awareness Chart Check appropriate boxes Potential Sub-Factors (P)				
Life Hazard Risks	<p>Disasters</p> <p>Fire Building or Aerial Run Time</p> <p>Explosion</p>	<p>1. Safe Removal of All Occupants within 10 minutes</p> <p>2. Control and Control Fire is Rebounding of Origin within 10 minutes</p> <p>3. Control, Center and Limit Fire in Escalation within 10 minutes</p> <p>4. Other:</p>	<p>D1 Rescue</p> <p>D2 Evacuation/Protection</p> <p>D3 Evacuation/Protection</p> <p>D4 Confinement/Containment</p> <p>D5 Haze Line Placement</p>	
Location/Fire	<p>Explosion in the Room Run Time</p> <p>Fire Spread Characteristics</p> <p>Building Construction</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>	<p>1. List Incident Objectives:</p>	<p>D6 Overhaul</p> <p>D7 Evacuation/Protection</p> <p>D8 Ventilation</p> <p>D9 Removal of Occupants</p> <p>D10 Fire Control</p>	
Construction	<p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D11 Salvage</p> <p>D12 Water - Run Off</p> <p>D13 Apply Foam</p> <p>D14 Firefighting Entry</p> <p>D15 Ventilation</p> <p>D16 Special Equipment</p> <p>D17 Imaging Camera</p>	
Occupancy (Contents)	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D18 Incident Strategies</p> <p>D19 Incident Strategies</p>	
Height	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D20 Incident Strategies</p> <p>D21 Incident Strategies</p>	
Air	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D22 Incident Strategies</p> <p>D23 Incident Strategies</p>	
Structural Collapse	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D24 Incident Strategies</p> <p>D25 Incident Strategies</p>	
Weather	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D26 Incident Strategies</p> <p>D27 Incident Strategies</p>	
Resource	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D28 Incident Strategies</p> <p>D29 Incident Strategies</p>	
Fire Protection Systems	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D30 Incident Strategies</p> <p>D31 Incident Strategies</p>	
Topography	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D32 Incident Strategies</p> <p>D33 Incident Strategies</p>	
Black Data	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D34 Incident Strategies</p> <p>D35 Incident Strategies</p>	
Time	<p>Explosion in the Room</p> <p>Fire Building - Type 1-3-4-5</p> <p>1. Different Occupancy</p> <p>2. Different Occupancy</p> <p>3. Fire Building - Part Load</p>		<p>D36 Incident Strategies</p> <p>D37 Incident Strategies</p>	

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THE COMMAND SEQUENCE CYCLE

- **Critical factors of incident operations often are overlooked (or are not given enough emphasis).**
- **This can result in:**
 - **Poor use of resources.**
 - **Inappropriate strategies and tactics.**
 - **Safety problems.**
 - **High-incident costs.**
 - **Lower effectiveness.**

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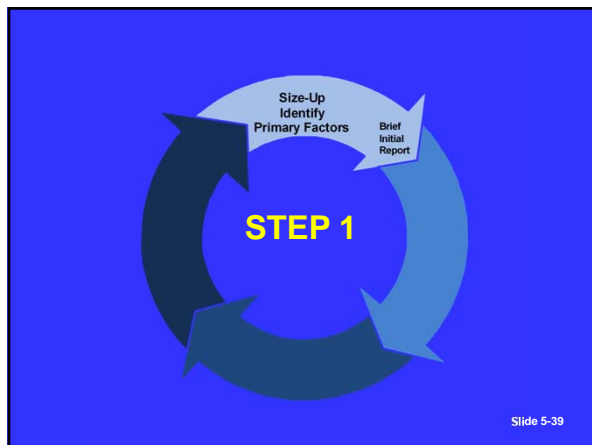


THE COMMAND SEQUENCE CYCLE (cont'd)

Consists of these sequential steps:

1. Sizeup: identify primary factors
 - Brief Initial Report (BIR)
2. Develop Incident Objectives and Strategies
 - Communicate plan
3. Implement Tactics
 - Progress report
4. Evaluate effects of Strategies

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SIZEUP: IDENTIFY PRIMARY FACTORS

Involves knowing:

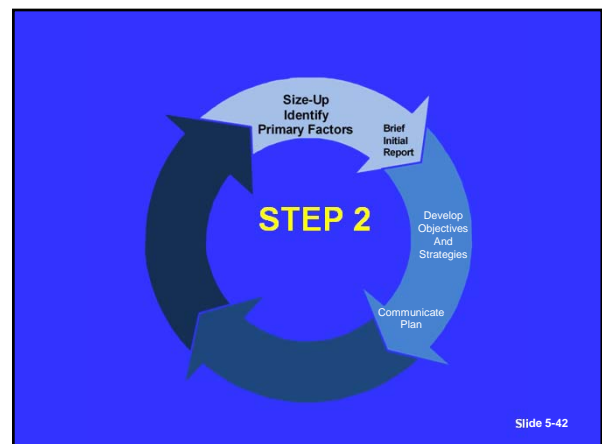
- What has occurred
- If the incident will expand (or get smaller)
- Present (and future) resources and organizational needs

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PRIMARY FACTORS

- Life hazard
- Location of incident/fire
- Construction
- Occupancy (contents)
- Height
- Area
- Structural collapse
- Weather
- Apparatus/Personnel
- Auxiliary appliances
- Explosions/Backdraft
- Topography
- Time

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What is an Incident Objective?

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ESTABLISH INCIDENT OBJECTIVES

An Incident Objective answers the question of what can be accomplished when all allocated resources have been deployed effectively.

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ESTABLISH INCIDENT OBJECTIVES (cont'd)

- Specific
- Measurable
- Attainable
- Realistic
- Time specific

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What is an Incident Strategy?

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DEVELOP INCIDENT STRATEGIES

Incident Strategies answer the following questions about what needs to be done and what methods (activities) should be employed to accomplish the objective.

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DEVELOP INCIDENT STRATEGIES (cont'd)

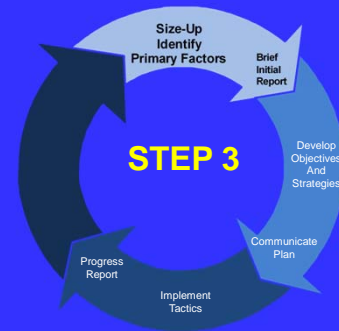
- For small incidents: This is a sole responsibility of the Incident Commander (IC)/Company Officer (CO).
- For large incidents: Members of the General Staff will contribute Incident Strategies to this process:
 - Rescue.
 - Exposure protection.
 - Confinement.
 - Extinguishment.
 - Overhaul.
 - Ventilation.
 - Salvage.

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COMMUNICATION

- Communicate assignments clearly
- Ensure assignments are understood
- Obtain timely feedback

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What is a Tactic?

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ESTABLISH INCIDENT OBJECTIVES (cont'd)

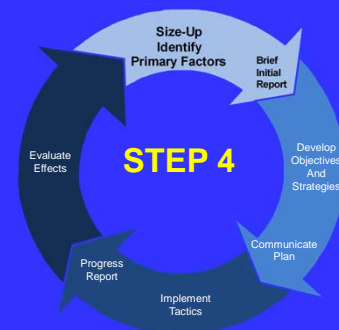
A Tactic answers the question of how we are going to accomplish the strategy.

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TACTICAL DIRECTION

- Tactical direction includes determining Tactics necessary for selected strategy and assigning appropriate resources.
- Developed around specific operational periods.
- Large incidents may last for some time.
- Tactical directions should be realistic.
- Resource assignments will be made for each of the specific tasks.

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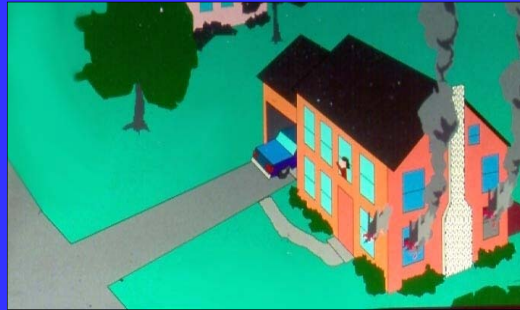


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EVALUATE EFFECT OF STRATEGIES

- Is the Strategy attaining the overall Objectives?
- Are the appropriate Tactics facilitating the Strategy?
- Does the plan need to be modified or adjusted?
- Continue the sizeup and evaluate the effectiveness of the Incident Action Plan (IAP) (evaluate every 10 minutes).
- Identify alternative plans for firefighter safety when occupant safety has been determined not to be a primary factor.

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EXAMPLES OF OBJECTIVES

Occupied house fire: Two-story occupied dwelling, 20 by 40 foot ordinary construction, fire located in living room area first floor, Side D, report of occupants trapped in second-floor bedroom, Side A. No external exposures.

Objectives

1. Safe removal of occupants within 10 minutes.
2. Contain and control fire to room/building of origin.

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EXAMPLES OF STRATEGIES

Example of Strategies for Objective #1--safe removal of occupants:

- Strategy #1: rescue occupants
- Strategy #2: confinement/extinguishment
- Strategy #3: ventilation

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EXAMPLES OF TACTICS

For Objective #1 the Strategy and Tactics may be

- Rescue
 - Tactic #1: deploy search/rescue group to upper floors
 - Tactic #2: deploy hoseline to first floor for stairwell/occupant protection
- Ventilation
 - Tactic #3: ventilate stairwell (if possible) and Side A to support occupant removal

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EXAMPLES OF STRATEGIES (cont'd)

Example of Strategies for Objective #2--contain and control fire to room/building of origin:

- Strategy # 1: confine/extinguish
- Strategy # 2: ventilation
- Strategy # 3: salvage

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EXAMPLES OF TACTICS (cont'd)

For Objective #2 the Strategies, the Tactics might be

- Confine/Extinguish
 - Tactic #1: deploy hoseline to first floor, Side D, for confinement/extinguishment
 - Tactic #2: deploy hoseline to second floor, Side D, for interior exposure protection
- Ventilation
 - Tactic #3: vertical ventilation of roof apertures and horizontal ventilation of first and second floors

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EXAMPLES OF TACTICS (cont'd)

Salvage

- Tactic #4: positive-pressure ventilation with proper use of fans
- Tactic #5: use of salvage covers and control of water runoff

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SUMMARY

- Scientific method of sizeup
- Using the Primary Factors Chart
- Making decisions
- Evaluating primary factors
- Command Sequence Cycle

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Activity 5.1 Primary Factors Chart Exercise

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