



## **Develop an Exercise to Use a Map accessed with Technology**

### **Developer Guide**

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Midwest Consortium for Hazardous Waste Worker Training

### Acknowledgments

The Midwest Consortium developed this template for Program Directors and facilitators who want to develop an exercise using a map accessed using technology that can be added to the MWC programming. The development and training are conducted under cooperative agreement number U45 ES 06184 from the National Institute of Environmental Health Sciences.

We encourage you to comment on these materials.

### Warning

This is not a 'use now for training' facilitator guide; rather the next pages include the approach to developing an exercise. Follow this guide to create Participant materials and document 'how to pull off this exercise' in a Facilitator Guide for other users. When complete, it may be used, then revised and the Program Director at your training center will send it to the MWC, so that others may use it. In this way, we will increase the training materials available across the Midwest Consortium centers.

This program was updated August 15, 2023 and all web links are active as of that date; if you find an error, please inform the facilitator so that it can be updated.

## **Contents**

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Overall Guidance

Bloom’s Taxonomy for writing learning objectives (adapted for this exercise)

Supporting Documents Guidance

Worksheet

Participant Guide Template

Facilitator Guide Template

# Develop an Exercise

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## Materials

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- Bloom’s Taxonomy (for writing learning objectives, adapted for this exercise)
- Guidance for Supporting Documents
- Worksheet Development
- Template for Participant Guide
- Template for Facilitator Guide

## Approach

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### Select

- Conduct reconnaissance:  
  
What hazards are of interest to this group?  
How can avoidance/minimization of these hazards be addressed with a map exercise?
- Review current MWC exercises
  - If there is an existing exercise or worksheet that could be ‘tweaked’, discuss with Program Director. For example, if the participants want to develop a plan of action, can the template shown in Risk Management exercises be used?
- Discuss ideas for this exercise with peers and the Program Director and follow this guidance to develop a new exercise to share with the Consortium training centers.

### Develop

1. Review existing facilitator-initiated exercises for format and content/guidance
2. Identify the overall topic from those currently available: Per- and polyfluoroalkyl substances (PFAS) and general water quality, air quality, climate/heat, opioids, environmental justice
3. Assure proficiency with the map(s) used in the exercise. This may take a day or more, devoted to understanding how to navigate the map and develop step-by-step directions for finding information of interest to your participants.
4. Review/select supporting resources
5. Review Worksheet, modify as needed

A good Worksheet will include objectives and space to record information.

6. Complete the Participant Guide using the Participant Template provided
7. Complete the Facilitator Guide using the Facilitator Template provided
8. Pilot with one or more persons not involved in development
9. Revise
10. Use in training
11. Revise based on comments--pros/cons/issues

### Share

Forward to Midwest Consortium for posting and use by others

## **Bloom's Taxonomy for writing Learning Objectives**

Note: the examples shown below have been adapted for this exercise. While there are no MWC criteria for 'successful completion' for an individual exercise, each participant should be involved in the completion of the worksheet.

- Knowledge (recall of specific information)  
*Key words:* define, describe, identify, label, list, match, recognize, name  
*Example:* identify relevant information in the map resource
- Comprehension (use information in a predictable way)  
*Key words:* translate, convert, defend, distinguish, estimate, explain, give examples  
*Example:* give three uses of data in the map resource
- Application (use information in an abstract situation)  
*Key words:* change, compute, demonstrate, discover, manipulate, predict, show  
*Example:* for one factor from this map resource, show the difference between two locations
- Analysis (organize information or situation into logical elements)  
*Key words:* diagram, discriminate, illustrate, infer, relate, select  
*Example:* select one factor in this map resource that can be altered to reduce exposure
- Synthesis (putting the parts together)  
*Key words:* categorize, combine, compose, summarize  
*Example:* categorize actions from most likely to least likely to be accomplished with current resources
- Evaluation (make judgments)  
*Key words:* appraise, compare, conclude, explain, support, justify  
*Example:* justify one 'next step' to use this data resource

## Maps and Supporting Resources, by Topic

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Map resources for the following topics are shown below:

- PFAS and general water quality
- Air Quality
- Climate/heat
- Opioids
- Environmental Justice

For each topic, possible uses in MWC programming are shown and relevant maps. Some preliminary notes are shown for most of the maps. The Resources section includes supporting documents including US agency regulations or guidance.

It is recommended that at least a day of effort be scheduled for exploring any map selected in order to write adequate guidance for the exercise. Less may be needed as more Program Directors and staff use the maps and share guidance. Another day of effort may be needed for developing the exercise.

### **Per- and polyfluoroalkyl substances (PFAS) and general water quality**

For use in: REL, PBT, TUR, Community Awareness

#### **PFAS**

[https://www.ewg.org/interactive-maps/2019\\_pfas\\_contamination/map/#.Wt2\\_GDIXTIE.twitter](https://www.ewg.org/interactive-maps/2019_pfas_contamination/map/#.Wt2_GDIXTIE.twitter)

Note: Obtain access to details at a location more quickly if the cursor is dragged from north to south.

<https://www.mlive.com/news/2019/09/map-shows-michigan-schools-daycares-with-pfas-in-the-well-water.html>

Note: Scroll down several pages to use the map.

#### **General water quality**

[https://www.ewg.org/interactive-maps/2019\\_maumee/](https://www.ewg.org/interactive-maps/2019_maumee/)

Note: agricultural runoff and algae blooms

### Resources

Background maps on where water systems are stressed:

<https://www.washingtonpost.com/climate-environment/2019/08/06/mapping-strain-our-water/>

Water quality standards, including link to state-specific requirements and human health criteria: <https://www.epa.gov/wqs-tech>

EPA guidance on PFAS: <https://www.epa.gov/pfas>

CDC guidance on PFAS: <https://www.atsdr.cdc.gov/pfas/pfas-exposure.html>

### **Air quality**

For use in: REL, TUR, Community Awareness

<https://www.ucc.org/breathtothepeople>

Note: Map shows the top 100 emitters by TRI in the US, assessed by the UCC Environmental Integrity Project. Includes rank in top 100, name/location, air releases and releases weighted by toxicity, population within 1 mile of facility (also number < 5 years of age, >64 years of age, % minority, % low income), direct link to TRI details. Download and review report to understand data shown. Includes plants in MI, IL, OH, IN, KY, TN, WI. Provides format for communication with decision maker.

<https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/most-polluted-cities.html>

Note: Includes ranking of cities by ozone, short-term particle exposure, annual particulates.

<https://www.usnews.com/news/healthiest-communities/articles/2019-04-15/counties-where-traffic-air-pollution-hurts-children-most>

Note: Includes county-level data for Williamson County (Cty) TN, Washington Cty MN, Ozaukee Cty WI, Delaware Cty OH, Carver Cty MN, Hamilton Cty IN; enter zip code or county name to use data tool to compare your county to one of these or any other county on about 100 factors.

Note: Background information on how the scales were computed is provided in a separate document. Comparisons may be more useful to participants, rather than raw scores.



<https://eos.org/articles/some-communities-feel-the-effects-of-air-pollution-more-than-others>

Note: map shows how emissions in one state affects others

### Resources

MWC air pollution exercise: <https://mwc.umn.edu/>

MWC TUR manual, instructor materials on anti-idling: <https://mwc.umn.edu/>

EPA air quality standards, with links to other resources including the Clean Power Plan: <https://www3.epa.gov/airquality/>

mobile sources: <https://www.epa.gov/mobile-source-pollution>

location of nuclear power plants: <https://www.bloomberg.com/graphics/2019-nuclear-power-plants-climate-change/>

from twitter: IL. <https://www.forbes.com/sites/johnlippert/2019/11/27/diesel-trucks-swarm-in-chicago-neighborhood-already-plagued-by-pollution-and-racism/?ss=logistics-transport#d4d40326d8fa>

KY, IN, OH. <https://eos.org/articles/some-communities-feel-the-effects-of-air-pollution-more-than-others>

### **Climate/heat**

For use in: Community Awareness, Climate Kit, Risk Management Exercise (green)

<https://www.vox.com/a/weather-climate-change-us-cities-global-warming>

Note: Graphics of summer high, winter lows, precipitation; 1986-2015 and 2036-2065 contrasts. Enter city name.

<https://ucsusa.maps.arcgis.com/apps/MapSeries/index.html?appid=e4e9082a1ec343c794d27f3e12dd006d>

Note: Historical, midcentury and late century projections based on level of action to combat climate change, by county.

<https://www.fastcompany.com/90233731/a-new-use-for-google-maps-calculating-a-citys-carbon-footprint>

Note: Includes only Detroit, Cleveland and Nashville. Can request other cities be added.

<https://www.theverge.com/2019/2/17/18223808/climate-change-sea-level-rising-data-visualization-environment>

Note: May be best used to illustrate effects on coast; less effect on Great Lakes communities. Contrasts 'no action' and 'drastic action' projections.

### Resources

Vector borne illnesses: <https://therevelator.org/march-of-the-ticks/>

Note: graphic display of Lyme Disease in Midwest and East, 2000-2017

US Climate Resilience Toolkit. <https://toolkit.climate.gov/>

### Opioids

For use in: Community Awareness, REL

<https://www.washingtonpost.com/national/2019/07/20/opioid-files/?noredirect=on>

Note: Scroll down to Editor Picks and select a map of interest.

### Resources

NIEHS WTP Clearinghouse:

[https://www.niehs.nih.gov/news/events/pastmtg/hazmat/assets/2019/wtp\\_spring\\_19\\_report.pdf](https://www.niehs.nih.gov/news/events/pastmtg/hazmat/assets/2019/wtp_spring_19_report.pdf); [https://tools.niehs.nih.gov/wetp/public/hasl\\_get\\_blob.cfm?ID=11206](https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=11206)

NIOSH: <https://www.cdc.gov/niosh/topics/opioids/default.html>

Search on the state of interest

### Environmental Justice

For use in: Community Awareness, PBT

<https://www.nih.gov/news-events/news-releases/nih-funded-scientists-put-socioeconomic-data-map#.W2WDyMGqm1w.twitter>

Note: Review the ADI and then click on the Mapping function; then explore the download functions.

### Resources

Background for MI and MN: <https://www.ehn.org/researchers-hand-michigan-officials-a-tool-to-remedy-environmental-injustice-will-they-use-it-2639333250.html>

EPA: <https://www.epa.gov/environmentaljustice/environmental-justice-your-community>; <https://www.epa.gov/environmentaljustice/about-national-environmental-justice-advisory-council>

A worksheet follows on the next page. Note no specific objective(s) are shown; one or more specific objectives will be developed (with help of the facilitator) by the group.

**Worksheet**

Group: \_\_\_\_\_

Learning Objective: \_\_\_\_\_

Learning Objective: \_\_\_\_\_

What do we need reach this objective?

Needed	Available from this resource?	
_____	Yes	No
_____	Yes	No
_____	Yes	No
_____	Yes	No
_____	Yes	No

Can gaps (indicated by 'no' above, be filled?

Next steps to reach your overall learning objective(s) above

# Map Exercise

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## Overview

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Using a map accessed using technology, information about a specific area can be obtained and then compared with other areas or tracked over time.

This exercise was developed for use in training programs where timely information is of interest to participants. After an introduction to the map, small groups or the whole group will develop one or more statements about questions to be explored. These learning objectives are specific to your interests!

## Objectives

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When completed, you will be better able to:

- Use a map accessed using technology to obtain information
- Identify information gaps
- Show next step(s)

## Exercise

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The facilitator will introduce the map and provide some time to explore selected features.

Work in small groups or as one group to develop one or two questions you would like to answer using the map. In addition to gathering information, you may identify gaps and develop a plan to fill the gaps to accomplish the objective.

Use the Worksheet on the next page to organize the thoughts of the group. One person in each small group should be prepared to share with the larger group during a report back.

**Worksheet**

Group: \_\_\_\_\_

Learning Objective: \_\_\_\_\_

Learning Objective: \_\_\_\_\_

What information is needed to reach this objective?

Needed	Available from this resource?	
_____	Yes	No
_____	Yes	No
_____	Yes	No
_____	Yes	No
_____	Yes	No

How can gaps (indicated by 'no' above) be filled?

Next steps to reach your learning objective(s), above

## **Closing**

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- Review the objectives shown for the exercise on page 1. Were they achieved?
- Review the Learning Objectives developed by the group. Were they achieved?
- Based on this Exercise, what takeaways do you have?

Please ask any remaining questions

NOTE: The Midwest Consortium developed this guidance under cooperative agreement number U45 ES 06184 from the National Institute of Environmental Health Sciences.

# Map Exercise

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Time Requirement: <insert number> hours after you develop/pilot

Number of Instructors: 1 for up to 25 participants; more may be needed to help participants navigate use of the technology. See Minimum Criteria

([https://tools.niehs.nih.gov/wetp/public/hasl\\_get\\_blob.cfm?ID=11266&file\\_name=WTP\\_Minimum\\_Criteria\\_062818\\_Final\\_508.pdf](https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=11266&file_name=WTP_Minimum_Criteria_062818_Final_508.pdf)), page 27.

## Materials

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- Student materials (Participant Guide, Worksheet, etc.)
- Internet connection for each participant or small group as appropriate
- Whiteboard or equivalent; markers
- < Insert any other materials needed as a resource for the exercise >

## Objectives

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When completed, participants will be better able to:

- Use a map accessed using technology to obtain information
- Identify information gaps
- Show next step(s)

## Teaching Methods

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- Presentation/discussion
- Small-group activity

## Facilitator Preparation

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- Conduct reconnaissance to identify a topic of interest
- Review the Developer Guide and Participant Guides



- Review integration of exercise into the overall program agenda
- Assure proficiency with map to be used
- Review supporting resources; supplement as needed
- Review Worksheet(s) and copy for each participant to record information
- Prepare all needed materials, including devices and internet connection if necessary
- <insert other items as necessary>

### Minimum Content Requirements

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- Review objectives
- Participate in exercise
- <insert other as appropriate, such as complete worksheet(s)>

### Questions you May be Asked

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Show several questions that might be asked and suggested answers or resources to find answers.

<varies by topic, insert here>

- 1.
- 2.
- 3.

### Presentation of the Session

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This session can be presented as follows:

Review objectives; describe relevance of map to be used

Access the map and introduce key features

Facilitate development of specific learning objectives by the group

Ask: What would you like to know?

Ask: How will you use the information?

### Exercise: <insert name>

Distribute the Worksheet and facilitate use by the entire group or small groups

Discuss results in a report back

### Closing

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- Review the objectives shown for the exercise on page 1. Were they achieved?
- Review the Learning Objectives developed by the group. Were they achieved?
- Based on this Exercise, what takeaways do you have?

Ask if there are any remaining questions; provide answers.

### Follow-up

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Make this exercise better:

- Review and update the Participant and Facilitator Guides you developed from the Templates; your Program Director will send the final versions to UC for others in the Consortium to use.
- Assure that the NOTE regarding funding is shown in the Participant and Facilitator Guides.
- Organize the listing of 'takeaways' and forward to your program director. These are very important impacts to report to NIEHS.

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