SAND2014-1066C

Workshop on Biosecurity Curriculum Development in Yemen

Day 2: Analyze, Design and Develop for Biosecurity Curriculum in Yemen Universities

24 February 2014

Addis Ababa, Ethiopia

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Outline of the Day

- Present educational resources such as the Global Biorisk Management Curriculum,
- Present and use teaching design approaches such as the ADDIE model
- Identifying educational priorities: students, context, learning objectives

Action Plan

By the end of this session, I would like to:					
KNOW		FEEL		BE ABLE TO DO	

Your learning doesn't stop with this course. Use this space to think about what else you need to do or learn to put the information from this course into practice.

What more do I need to know or do?	How will I acquire the knowledge or skills?	How will I know that I've succeeded?	How will I use this new learning in my job?

Objectives

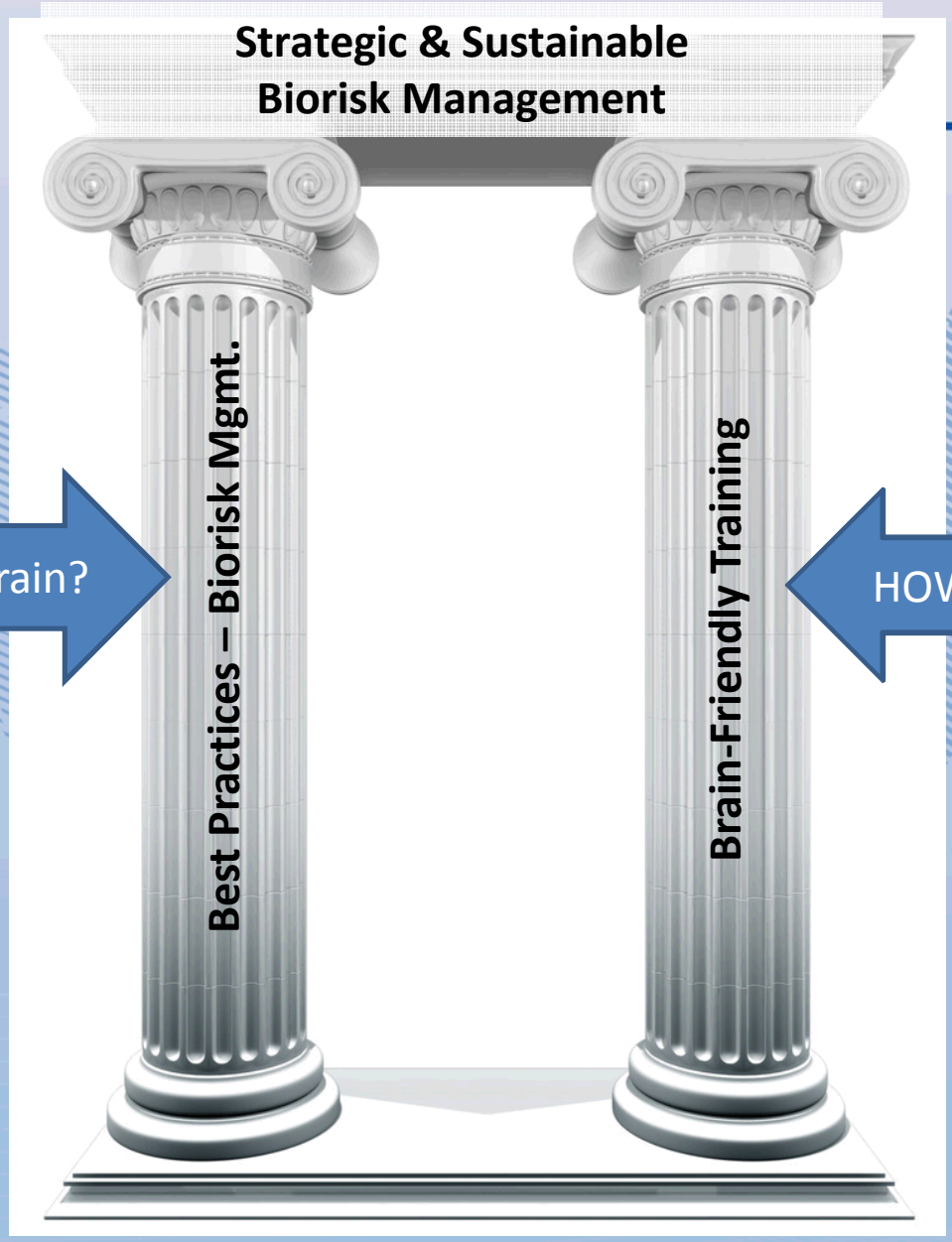
- ***Know:***
  - Know the GBRMC and available resources
  - Know the ADDIE model for designing teaching
  - Identify target students (audience)
  - Identify format, teaching time, restrictions
  - Identify learning objectives
- ***Feel:***
  - Confident in identifying, design and develop features for relevant biosecurity/biorisk management education in Yemeni universities
- ***Be Able to Do***:
  - Design examples of outcome based, topic-focused teaching materials

GBRMC

GBRMC = Global Biorisk Management Curriculum

Mission

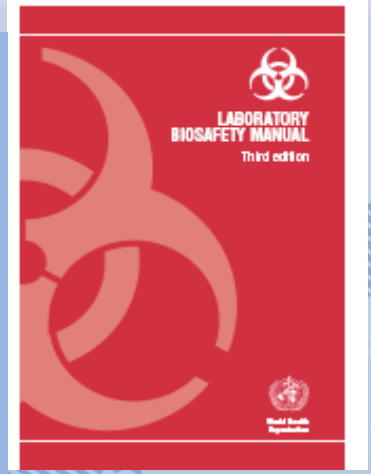
- Biosafety & Biosecurity training materials. . .
  - Strategic
  - Sustainable
  - Anywhere, anytime
  - Well-branded
  - Well-managed

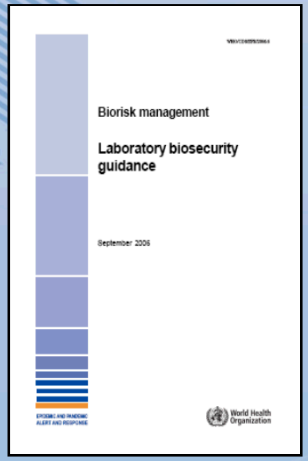

Strategic & Sustainable
Biorisk Management
Best Practices – Biorisk Mgmt.
Brain-Friendly Training
WHAT do we train?
HOW do we train?

Terminology and Definitions

- Biosafety: the containment principles, technologies and practices that are implemented to prevent unintentional exposure to biological agents and toxins or their accidental release' (WHO, 2004)

- Biosecurity: Protection, control and accountability measures implemented to prevent the loss, theft, misuse, diversion, or intentional release of biological agents and toxins and related resources, as well as unauthorized access to, retention, or transfer of such material' (WHO, 2006)[2]





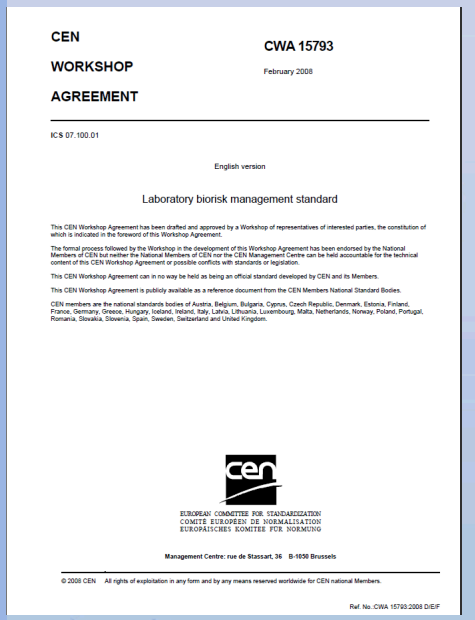
- [1]Laboratory biosafety manual, Third edition (World Health Organization, 2004)

- [2] Biorisk management - Laboratory biosecurity guidance (World Health Organization, 2006)

Definitions, continued

- The practices of **biosafety and biosecurity** are combined into an **integrated effort** known as **biorisk management** where the goals are, concurrently, to work safely and to keep the work secure.

  Biorisk management (BRM) can be further defined as the actions taken (by laboratories or facilities which handle, store, or dispose biological agents or toxins) to control or minimize biorisk to acceptable levels in relation to employees, the community and others, as well as the environment, which could be directly or indirectly exposed to biological agents or toxins (adapted from CWA 15793:2011[1]).


CEN

CWA 15793

WORKSHOP

February 2008

AGREEMENT

ICS 07.100.01

English version

Laboratory biorisk management standard

This CEN Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties, the constitution of which is indicated in the foreword of this Workshop Agreement.

The formal process followed by the Workshop in the development of this Workshop Agreement has been endorsed by the National Members of CEN but neither the National Members of CEN nor the CEN Management Centre can be held accountable for the technical content of this CEN Workshop Agreement or possible conflicts with standards or legislation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. CWA 15793:2008 D/E/F

[1]Laboratory biorisk management standard (CWA 15793:2011)

Definitions, continued

- "Dual Use" are legitimate goods and technologies that have the potential to be misappropriated and misused to cause harm
  - Dual Use Research of Concern: "Research that…can be **reasonably anticipated** to provide knowledge, products, or technologies that could be ***directly*** misapplied by others to **pose a threat** to public health and safety, agricultural crops and other plants, animals, the environment, or material" [National Science Advisory Board on Biosecurity]

Biorisk Management Resources

- CWA 15793:2011 – Laboratory biorisk management standard (+ CWA 16393 guidance)
- CWA 16335 - BioSafety Professional (BSP) Competences
- World Health Organization Laboratory Biosafety Manual
- World Health Organization Laboratory Biosecurity Manual
- OECD Best Practice Guidelines for Biological Resource Centres
- Guidelines for Biosafety Laboratory Competency (*MMWR* Supplement Vol. 60)
- NSABB Proposed Framework for the Oversight of Dual Use Life Sciences Research: Strategies for Minimizing the Potential Misuse of Research Information
- Biological and Toxin Weapons Convention
- Local guidelines & regulations
- Current best practices
  - example: U.S. Biosafety in Microbiological and Biomedical Laboratories

Global Biorisk Curriculum Library, 1

Basic Track

Audience: all personnel involved in biorisk management

- Biorisk Management Basics
  - Orientation to biorisk management
  - Bioethics
  - Introduction to Dual Use Research of Concern
  - Biorisk Characterization & Evaluation
  - Biosafety Risk Assessment
  - Biosecurity Risk Assessment
  - Biorisk Mitigation Strategies
  - Introduction to Incident Management & Response

Laboratory-Level Track

Audience: Biorisk Management Advisors, Scientific/Laboratory Management, Lab Workforce

- Lab-Level Administrative Controls
  - Human Performance for Biorisk Management in the Laboratory
  - Developing, Evaluating, Validating, and Communicating Standard Operating Procedures
  - Hazard & Risk Communication in the Laboratory

Laboratory-Level Track, continued

- Lab-Level Operational Controls
  - Biocontainment Facility Features
  - Engineering Controls and Laboratory Equipment
  - Good Laboratory Work Practices
  - Personal Protective Equipment
  - Decontamination
  - Biological Waste Disposal
  - Laboratory Biosecurity
  - Field Biosecurity
  - Shipping Infectious Substances and Biological Specimens
- Reporting, monitoring, and Response
  - Incident Recognition and Response in the Laboratory

Global Biorisk Curriculum Library, 2

Management & Leadership Track

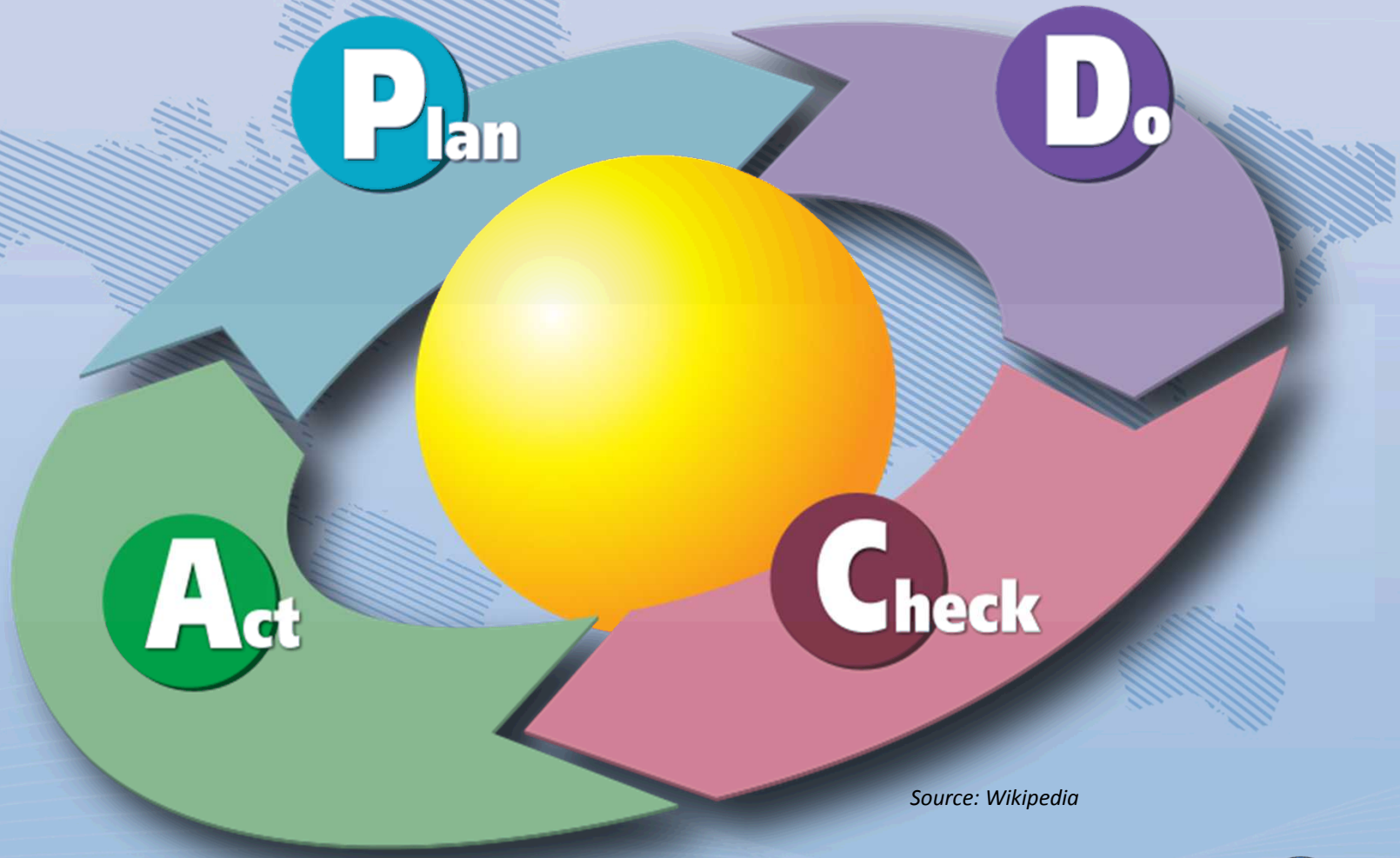
Audience: (Policy Makers) Top Management, Biorisk Management Advisors, Scientific/Laboratory Management

- Policy, Planning, and Assessment
  - Writing and Communicating Biorisk Management Policy
  - Considerations for Training in Biorisk Management
  - Developing, Conducting, and Maintaining a Hazard Inventory
  - Identifying Legal Requirements that Impact BRM
  - Establishing Work Program Review & Approval
  - Establishing and Communicating Biorisk Management Goals, Objectives, Roles, and Responsibilities
- Developing and Maintaining Human Capacity for Biorisk Management (Managing People)
  - Managing Human Performance in the BRM Workforce
  - Establishing and Maintaining Formal and Informal BRM Mentoring Programs
  - Establishing and Maintaining Worker Health Programs
  - Developing and Maintaining Roles & Responsibilities for Risk-based Access to, Control of, and Accountability for Biological Agents and Toxins.

Management & Leadership Track, continued

- Developing and Maintaining Physical Infrastructure for Biorisk Management
  - Understanding & Maintaining Facilities & Equipment for Biorisk Management
  - Basic Features & Maintenance for Physical and Information Security Measures
- Incident Management & Response
  - Incident Response Planning and Preparation
  - Incident Response & Investigation
  - Incident Response Evaluation & Improvement
- Measuring and Improving Biorisk Management Performance
  - Measurement and Analysis of Biorisk Management System Performance
  - Conducting Audits and Inspections to Assess Biorisk Management Performance
  - Revising and Improving a Biorisk Management System based on Performance Results
  - Establishing and Using Performance Indicators

Biorisk Management – Continuous Improvement



Source: Wikipedia

Biorisk Management: AMP Model *(World Health Organization)*

Biorisk Management =

Assessment, Mitigation, Performance

Hazard ID
Risk Assessment

Biorisk Control Measures
Risk Management

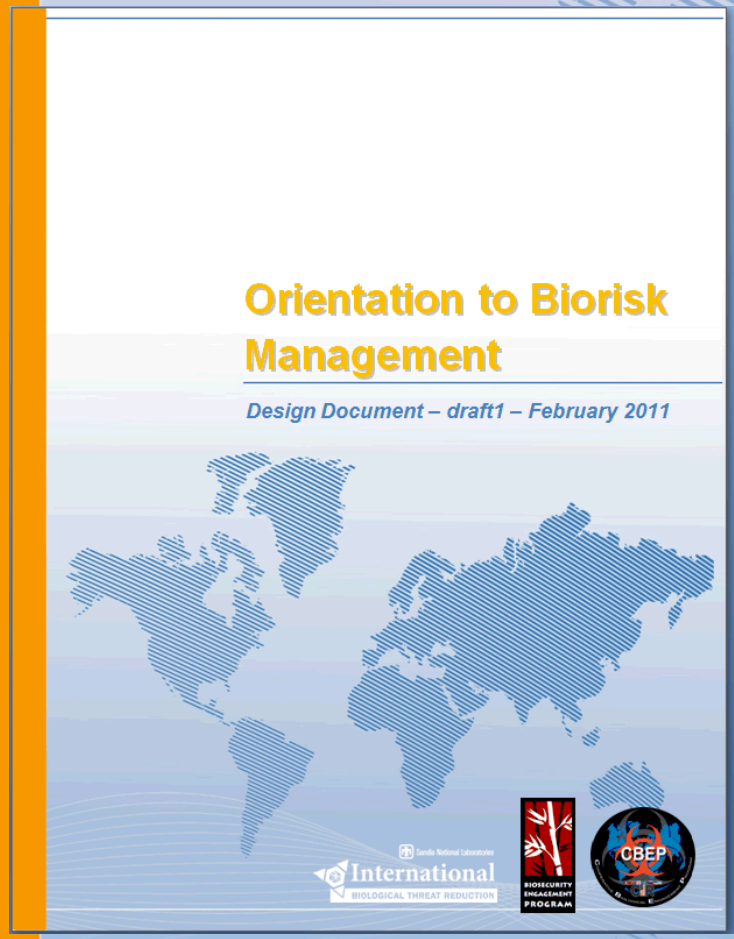
Metrics
Indicators
Review/Revision

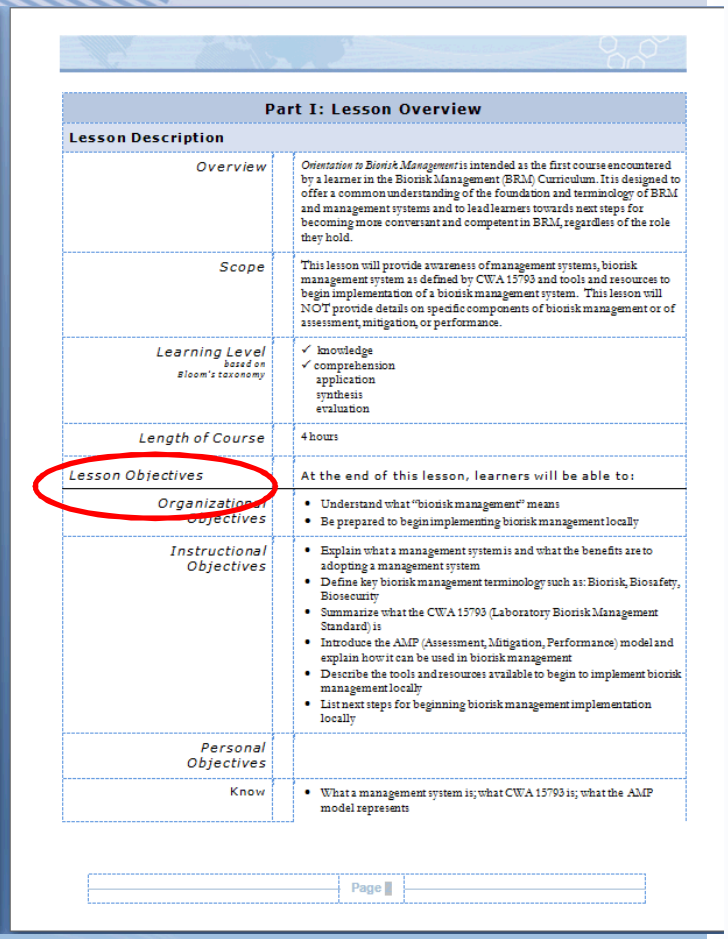
GBRMC Course Components

- Design Document
  - Course objectives, pre-requisites (for students & trainers), course outline, etc.
- Instructor's Guide
  - Detailed notes
  - Instructions and materials for interactive exercises
  - Handouts, if used
- Slide Deck

- Student Guide
  - Student workbook
  - References & resources
- Instructor and Student Evaluation materials
- References & resources
- Other materials as needed

GBRMC Components: Design Document (DD)





Part I: Lesson Overview	
Lesson Description	
Overview	*Orientation to Biorisk Management* is intended as the first course encountered by a learner in the Biorisk Management (BRM) Curriculum. It is designed to offer a common understanding of the foundation and terminology of BRM and management systems and to lead learners towards next steps for becoming more conversant and competent in BRM, regardless of the role they hold.
Scope	This lesson will provide awareness of management systems, biorisk management system as defined by CWA 15793 and tools and resources to begin implementation of a biorisk management system. This lesson will NOT provide details on specific components of biorisk management or of assessment, mitigation, or performance.
Learning Level based on Bloom's taxonomy	✓ knowledge ✓ comprehension application synthesis evaluation
Length of Course	4 hours
Lesson Objectives	At the end of this lesson, learners will be able to:
Organizational Objectives	• Understand what "biorisk management" means • Be prepared to begin implementing biorisk management locally
Instructional Objectives	• Explain what a management system is and what the benefits are to adopting a management system • Define key biorisk management terminology such as: Biorisk, Biosafety, Biosecurity • Summarize what the CWA 15793 (Laboratory Biorisk Management Standard) is • Introduce the AMP (Assessment, Mitigation, Performance) model and explain how it can be used in biorisk management • Describe the tools and resources available to begin to implement biorisk management locally • List next steps for beginning biorisk management implementation locally
Personal Objectives	
Know	• What a management system is; what CWA 15793 is; what the AMP model represents

Page

- Part I:
  - Lesson Overview
  - Student Description
  - Instructional Environment,
  - Resources
- Part II:
  - Course Outline

GBMRC Components: Slide Deck (SD)

GBRMC Components: Instructor Guide (IG)

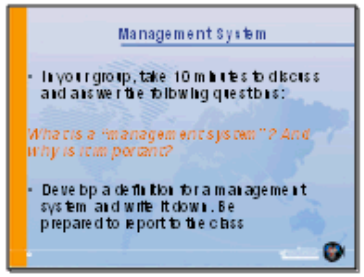
What is biorisk management?

Slide 11

Background Information for Instructor

Explain that they have just created a biorisk management system that we call the AMP model. Explain that this model will be used repeatedly throughout training and in future modules that they will participate in.

Slide 12



What is biorisk management?

Small group activity (15 minutes).

Activity instructions (to students)

1. How do we organize these ideas/items?
2. Pick a post-it not from the previous exercise and place them in one of the three columns: Assessment, Mitigation, and Performance.

You have 10 minutes to complete this activity

Directions for Instructor:

- Now that they have created a biorisk management system, ask what is a "management system?" and why is it important?
- Allow about five minutes for individual groups to develop a definition
- Allow another five minutes to discuss the benefits of a management system and why they are important.
- Have each group report their definitions to the whole class. (five minutes)

Plenary Discussion (10 minutes).

Question to consider:

Why are management systems important?

Directions for Instructor:

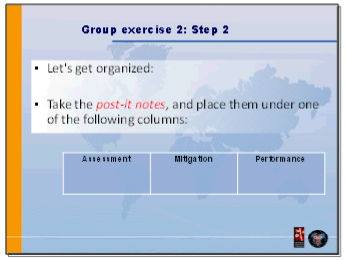
- Pool ideas on the definition of a management system
- Try to adopt a definition that everyone in the group can agree to and write this consensus definition down on a flip chart.

Capture on a flip chart:

- Be prepared to record answers on a blank page.

GBRMC Components: Student Guide (SG)

Orientation to Biorisk Management | *Components of Biorisk Management*

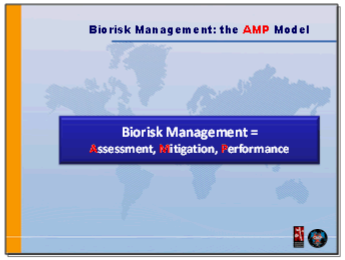


Assessment

Mitigation

Performance

Orientation to Biorisk Management | *The AMP Model*



Define biorisk management system (the next activity may help you construct your definition):

Describe an AMP model:

GBRMC Components: Evaluations (Level 1 – Level 2)

General

Course Specific
Know, Feel, Do

Level 1 General Evaluation
(Course or Training Event Name)

1.	I am satisfied with the training event.			
Strongly Agree	Agree	Neutral	Disagree	Strongly Agree

Level 2 General Evaluation
(Course or Training Event Name)

1	Were the prerequisites and the course description adequate for the course? If not what would you change?
2	How were the trainees identified for the course? Based on facility staffing plans was this course appropriate for students or were there trainees in attendance that did not require the course?
3	Do you believe the course matched the trainee's expertise and knowledge base?
4	Were there any cultural limitations associated with the training? Language or translation issues? Jargon problems?
5	Based on your assessment of the training event would you recommend any follow-ups for the cohort or any individual students?
6	Were there any additional materials used for demonstration or instruction that were useful to the course?
7	Were there any issues with CBEP approved training curriculum? Content errors? Partner Nation applicability?
8	Were there any unexpected events that altered the flow of the training event, if so what were the effects on the course? What steps were taken to reduce the impact of specified events?
9	Did the students stay energized and attentive throughout the majority of the class? If no, what sections of the course lagged? What activities were more successful than others? Less successful?

Level 1 Know-Feel-Do Evaluation
Personal Protective Equipment

After this course, I know:

14	***Know Objective 1*** — **What PPE is and what each type of PPE is used for**

Strongly Agree | 1

Level 2 Know-Feel-Do Evaluation
Personal Protective Equipment

Level 2 Evaluation Measurement of Learning (as specified by course objectives) during course (completed by instructor(s)).		**Completed by: [Instructor(s)]**				
Know, Feel, Do	**Demonstrated by**	**Was this demonstrated by all students*?**				
Know		All 100%	Most 75%	Many 50%	Few 25%	None 0%
What PPE is and what each type of PPE is used for	Participation in course exercises and debrief activities					
Which types of PPE are appropriate for different settings and risk levels	Participation in course exercises and debrief activities					
Specific procedures for use and maintenance	Participation in course exercises and debrief activities					
How to integrate the use of PPE into current laboratory procedures	Participation in course exercises and debrief activities					
Feel						
Confident that suitable PPE has been chosen for laboratory procedures and activities	Questions on Level 1 evaluation plus participation in summary debrief					
Confident that proper PPE use and maintenance is understood by all those in the laboratory	Questions on Level 1 evaluation plus participation in summary debrief					
Do						
Demonstrate different types and uses of PPE	Participation in course exercises and debrief activities					
Write laboratory procedures that include the use and maintenance of PPE appropriate to that procedure	Participation in course exercises and debrief activities					

*If instructor(s) feel that there is a student(s) who did not demonstrate the stated learning objectives, please list the names and reasons for concern regarding demonstration below (names will not be published to the Trainers' Network):

Name of student	Comments regarding demonstration of learning objectives

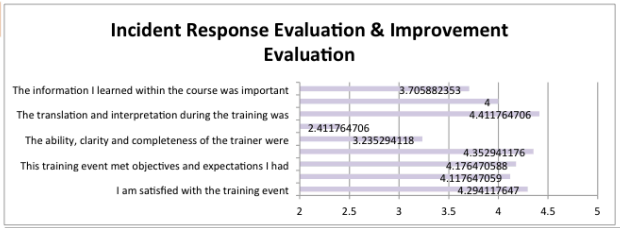
GBRMC Components: Evaluation Analysis Tools

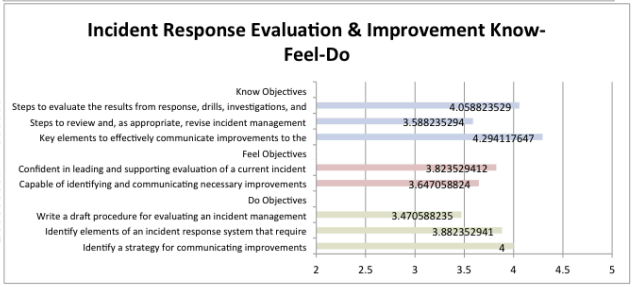
Spreadsheet to Enter Evaluation Data
Pre-made Graphs

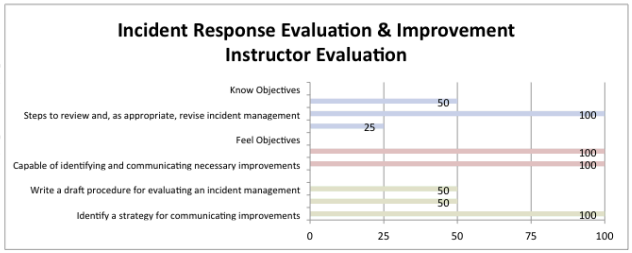
Management & Leadership Track - Incident Management & Response
Course Title: Incident Response Evaluation & Improvement

	Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	Average	Instructor Feedback	Mode	Frequency of Mode
General Questions																																									
1	I am satisfied with the training event	5	4	3	5	4	4	5	4	4	5	5	5	2	3	5	5	5																			4.2941		5	9
2	The quality and content of the training materials and presentations met my expectations	5	4	3	4	5	3	4	5	5	5	3	4	4	5	5	4	2																			4.1176		5	7
3	This training event met objectives and expectations I had prior to the course	2	3	4	5	5	5	5	5	4	5	3	4	5	3	4	4	5																			4.1765		5	8
4	The instructor or teacher was aware/familiar with the topic they discussed and its relevance to my country	3	4	4	4	5	5	5	3	5	5	5	3	3	5	5	5	5																			4.3529		5	10
5	The ability, clarity and completeness of the trainer were adequate when responding to trainee questions	2	2	2	2	4	5	5	3	3	3	3	3	3	3	3	4	5																			3.2353		3	8
6	The facility and equipment used for training was appropriate for the training provided and adequate for the number of students	2	2	2	2	2	2	2	2	2	2	2	2	4	3	4	3	3																			2.4118		2	12
7	The translation and interpretation during the training was adequate to understand the topic and interact with the instructor when needed	3	3	3	5	5	5	5	5	5	5	5	5	3	4	4	5	5																			4.4118		5	11
8	The group discussions adequately covered issues of concern relevant to my country	5	5	5	4	4	4	3	3	3	5	5	5	4	4	3	3	3																			4		5	6
9	What was your favorite or most useful topic or exercise of the course																																							
10	What was your least favorite or least useful topic or exercise of the course																																							
11	The information I learned within the course was important and relevant to my current position	3	3	5	5	5	5	3	3	3	4	4	4	4	3	3	3	3																			3.7059		3	9
12	Based on the training course what topics should receive the most attention in subsequent mentoring sessions?																																							
13	Overall, how would you suggest the course be improved?																																							
Know Objectives																																								
14	Steps to evaluate the results from response, drills, investigations, and corrective and preventive actions	5	5	5	5	5	5	4	4	4	4	4	3	3	3	3	4	3																			4.0588	50	5	6
15	Steps to review and, as appropriate, revise incident management system documents and procedures based on evaluation	3	4	5	5	5	3	3	3	4	4	4	5	5	2	2	2	2																			3.5882	100	5	5
16	Key elements to effectively communicate improvements to the incident response system	5	5	5	5	5	5	4	4	4	4	5	5	5	3	3	2	4																			4.2941	25	5	9
Feel Objectives																																								
17	Confident in leading and supporting evaluation of a current incident response system	4	5	3	6	2	4	4	4	4	4	4	5	5	2	3	3	3																			3.8235	100	4	7
18	Capable of identifying and communicating necessary improvements	4	4	4	4	4	4	5	6	3	2	2	2	5	4	4	3	2																			3.6471	100	4	8
Do Objectives																																								
19	Write a draft procedure for evaluating an incident management system	3	4	4	4	4	3	3	5	5	5	5	3	3	2	2	2	2																			3.4706	50	3	5
20	Identify elements of an incident response system that require improvement	4	5	3	3	3	5	5	5	5	2	2	3	3	3	3	5	5																			3.8824	50	5	8
21	Identify a strategy for communicating improvements	5	4	4	4	4	2	3	3	3	3	4	4	5	5	5	5	5																			4	100	5	6

Enter instructor Level 2 Feedback Here →







Public Access Site

- http://biosecurity.sandia.gov/gbrmc

GBRMC Pillars – Training Techniques

- So what's different?
  - Experiential learning
    - Small group and plenary activities
    - Breaks
    - Movement & colors
    - Debriefs, recaps
  - Outcome based
    - What do you have?
    - Where do you want to go?

GBRMC Pillars – Training Techniques

- So what's different, continued?
  - Implementation "Blind"
    - No specific training scenarios anticipated
  - Comprehensive Toolkit
    - Detailed design document and instructor guide
    - Student guide and key references
    - Evaluations
  - Leave your fingerprints
    - Trainers' Network to capture feedback, solutions, configurations, customizations, revisions, translations, etc.

Facilitate versus Teach

Train

Teach

Facilitate

Knowledge

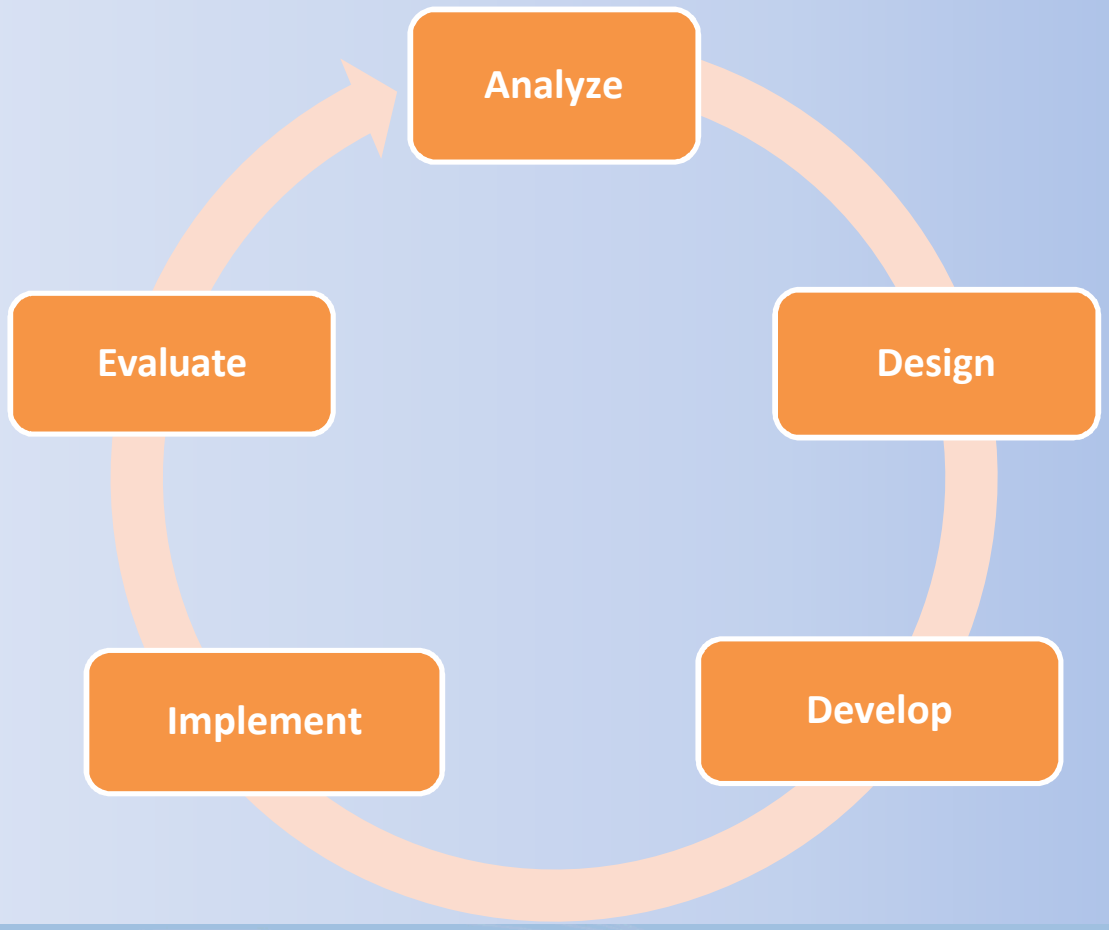
Activity Options

- Individual Work
- Pair Work
- “Snowballing”
- Small Groups
- Interactive Lecture
- “Spin-off” Discussions
- Brainstorming
- Games
- Video
- Case Study
- Role Play
- many more. . ..

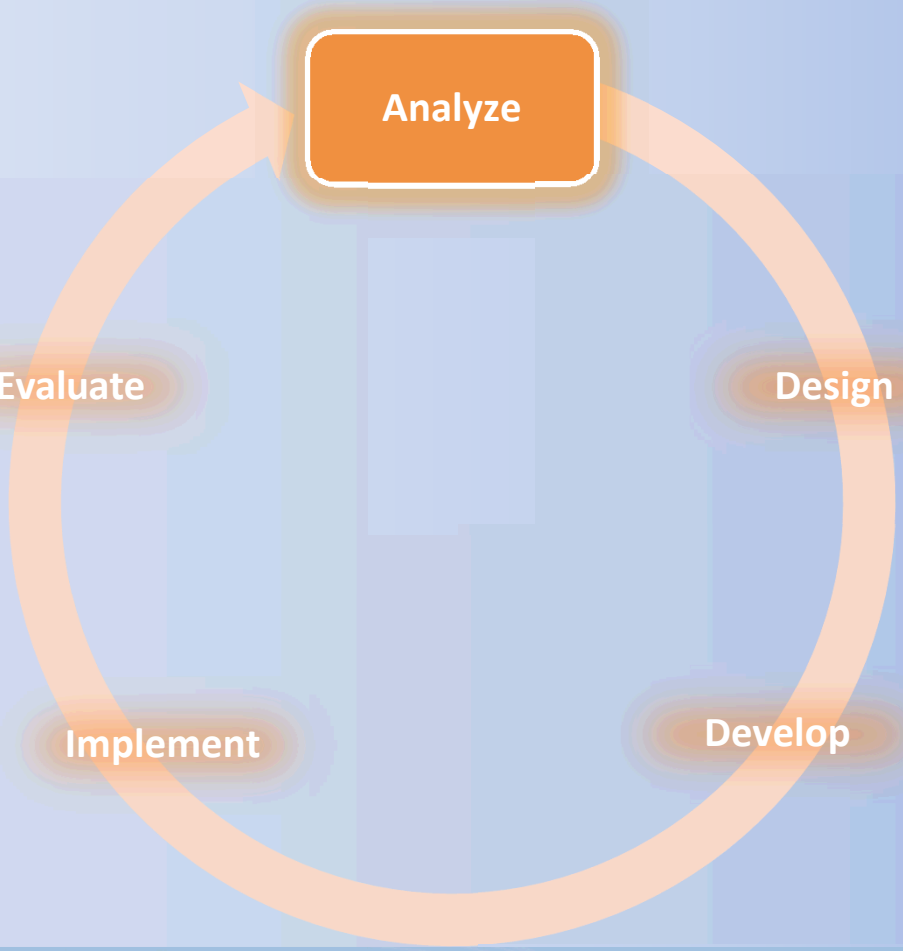
Analyze, Design, Develop, Implement, Evaluate

How to tailor resources to the Higher Education context in Yemeni Universities?

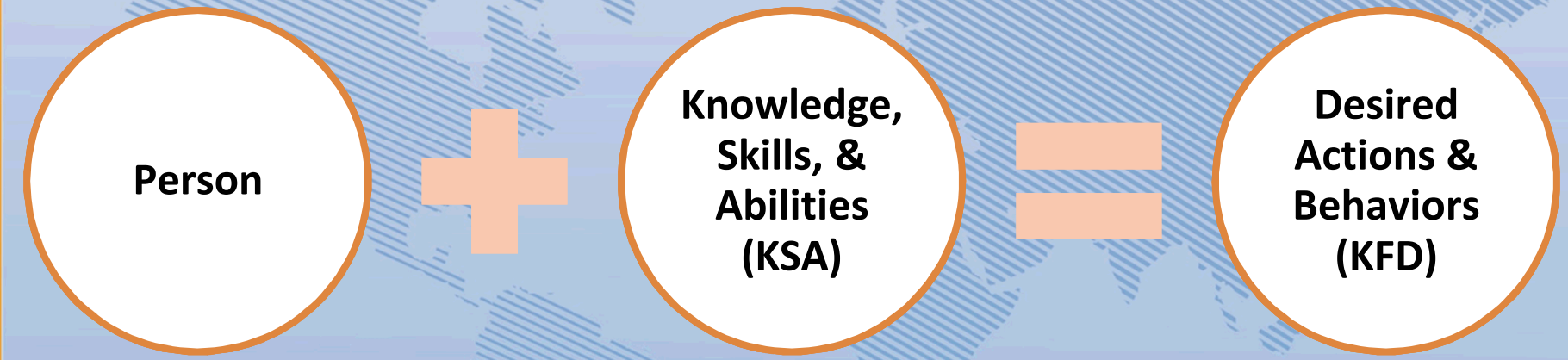
Training Design Cycle



Training Design Cycle



Why do we train?



Why do we train?

Activity: Audience/Target Students

Question: Who should be knowledgeable of biosecurity, biorisk management?

Think to: level (undergraduate, graduate); degree/specializations, job perspectives…

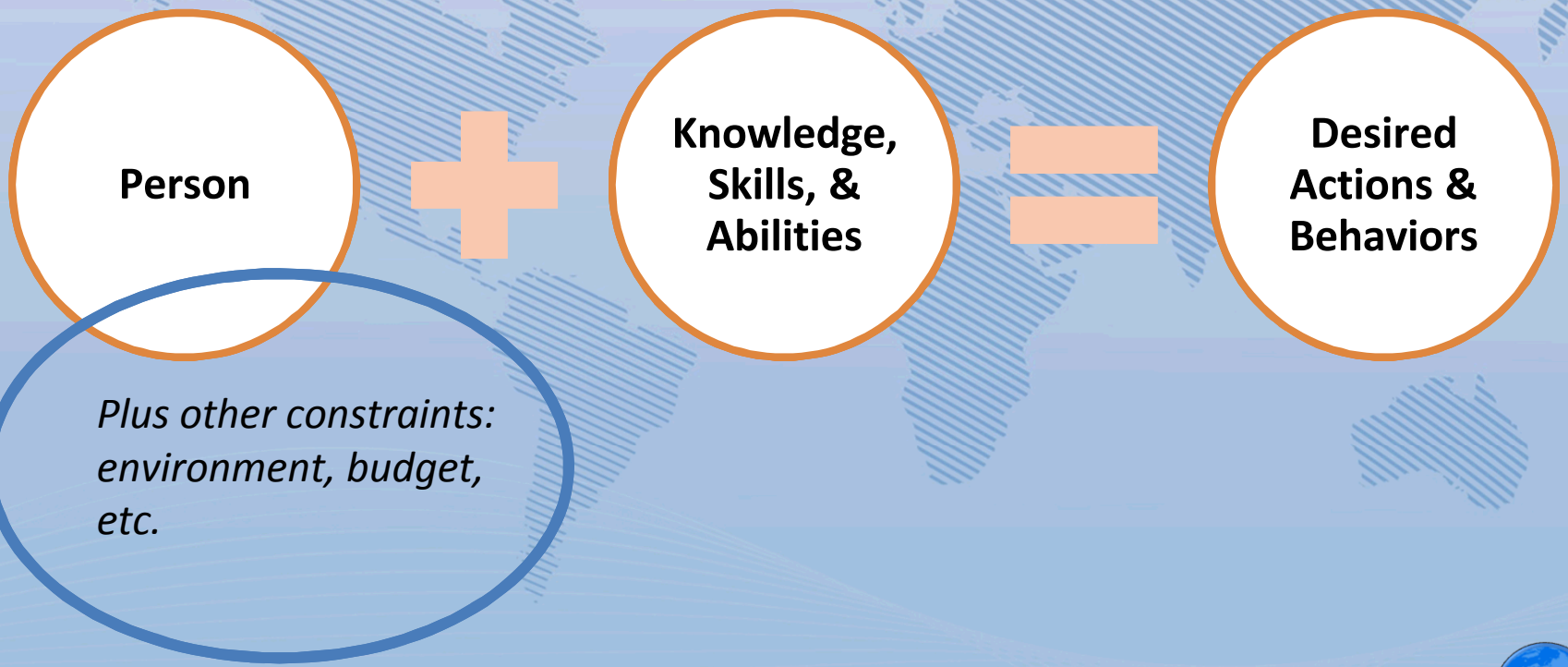
As a group, take **10 minutes** to brainstorm … write on separate sticky note.

Policy Delphi Discussion Round

Analyze. . .

What do we have?

Where do we want to go?



Activity: situation, local resources and constraints

Question: What factors would impact, influence or limit introduction of teaching biosecurity/biorisk management in higher education?

Think to current features of higher education: available teaching time in curricula; knowledge of the subject; students' cohort sizes; teaching formats (active/experiential, lectures, activities, etc)…

As a group, take **10 minutes** to brainstorm … write on separate sticky note.

Analyze. . .

What do we have?

Where do we want to go?

Plus other constraints: environment, budget, etc.

Where do we want to go?

- Organizational
- Instructional
- Personal
  - Know
  - Feel
  - Do

Levels of Learning

Level	Goal
Evaluate	Make judgments about the value of ideas or materials.
Analyze	Use concepts and models from training to create a new use
Apply	Applies what was learned in the classroom into novel situations in the work place
Learn (Comprehend)	Understand the meaning, translation, interpolation, and interpretation of the training. State a problem in one's own words.
Know	Remember material in the same form as it was taught

Analyze – Goals & Objectives

Bloom's Taxonomy of Cognitive Domains

Levels of Learning

Level	Example Verbs for Objectives
Evaluate	assess, judge, defend, predict, support
Analyze	examine, compare, critique, categorize, experiment
Apply	demonstrate, use, perform, measure, solve, build
Learn (Comprehend)	explain, describe, restate, classify, recognize
Know	list, memorize, define, recall, label

Know – Feel - Do

"People will forget what you say.

People will forget what you do.

But people will never forget the way you made them feel."

– *Maya Angelou*

For Example: KFD Objectives

- ***Know/Knowledge:***
  - …
- ***Feel/Skills:***
  - …
- ***Be Able to Do/Abilities***:
  - …

Activity – Learning Objectives

Activity: Determine what you would like a student to KNOW, FEEL, and BE ABLE TO DO once they receive biosecurity/biorisk management education.

As a group, take **10 minutes** to brainstorm … write on separate sticky note.

Policy Delphi Discussion Round

Know – Feel - Do

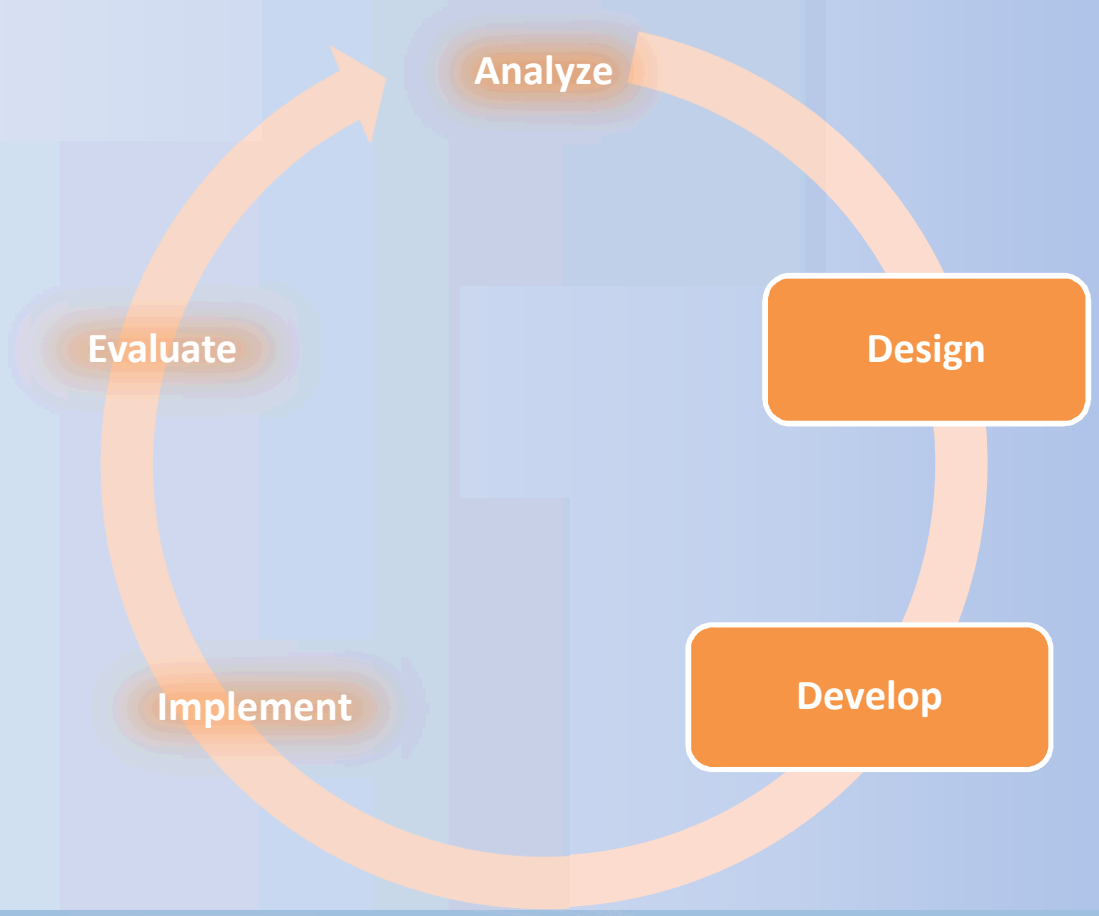
After biosafety and biosecurity education, the student will:

Know	
Feel	
Be Able to Do	

Analyze

Students (Levels/Courses)	Time	Format	Other factors	Learning Objectives (KFD)
Undergraduate Medical Laboratory	12 hours	Lectures + Activities	Size of class …	Raised awareness about safety and security Know regulations Be able to report incidents

Training Design Cycle

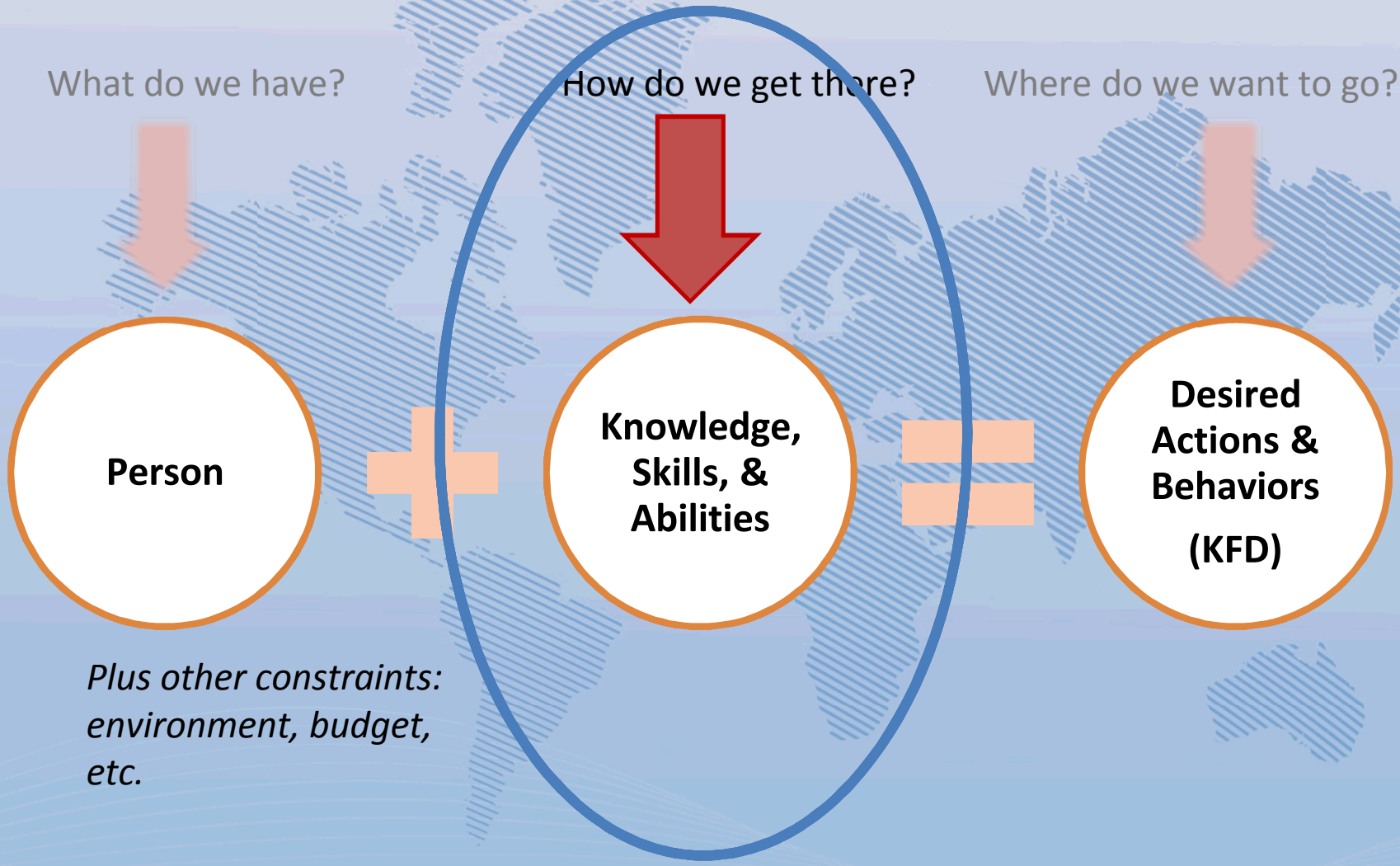


Design & Develop

What do we have?

How do we get there?

Where do we want to go?

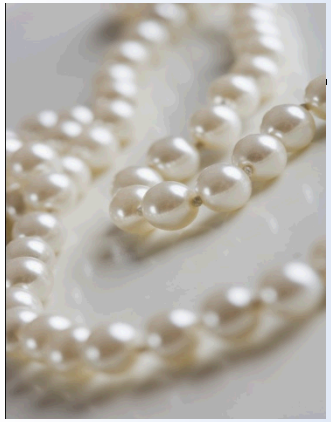


Plus other constraints: environment, budget, etc.

Design & Develop

- Identify sources and resources
  - Existing experiences in Yemeni Universities
  - GBRMC
  - Other external resources

Design & Develop

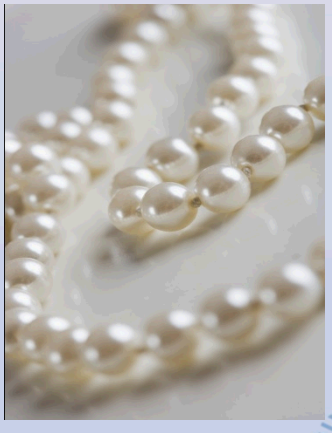


Configuration

matching objectives between training needs and resources

Customization

adding course materials to address additional objectives not met by existing resources



Configuration Example

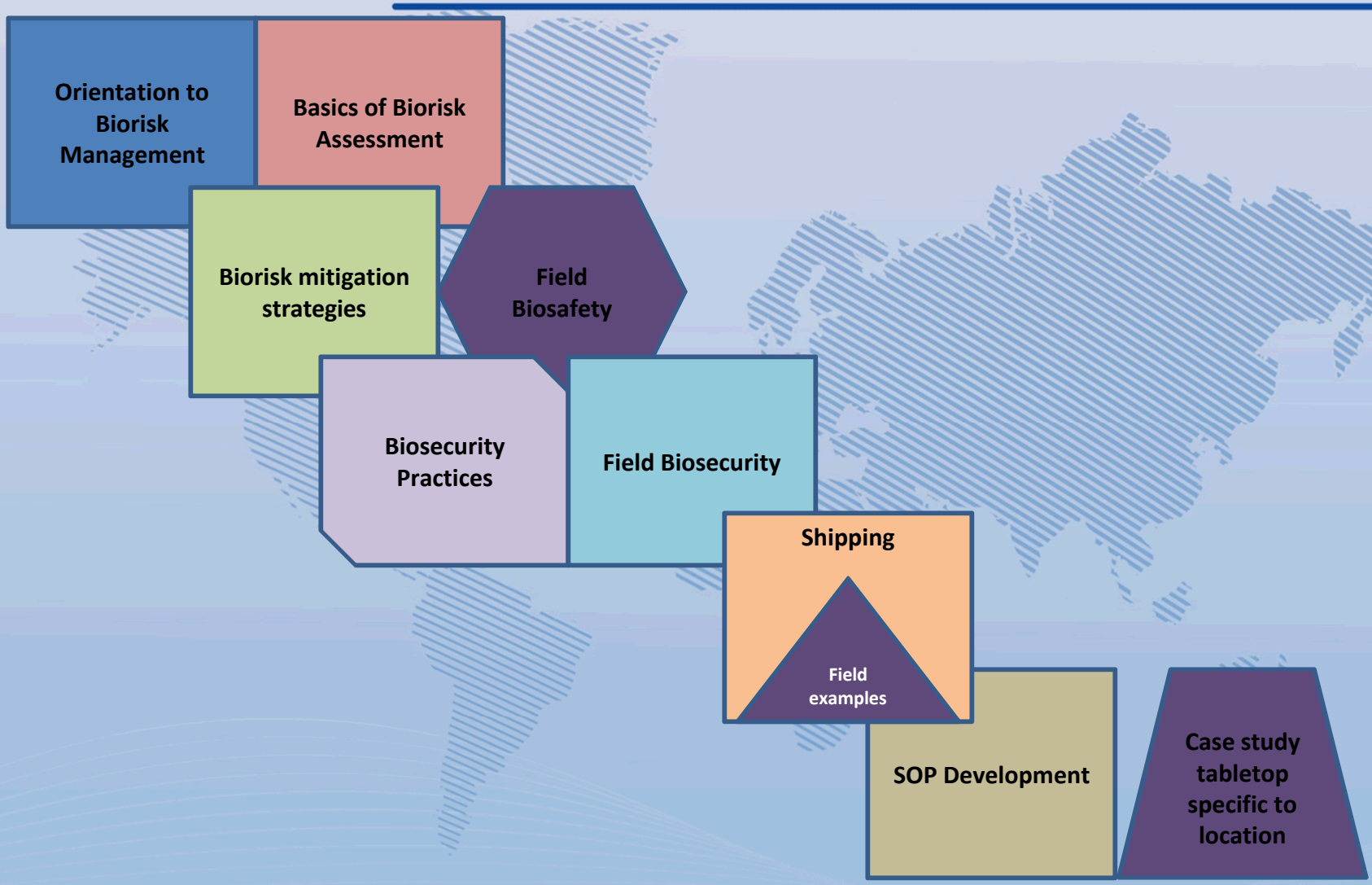
- Training Need:
  - 2 day course introducing biorisk management , risk assessment, biorisk mitigation strategies, and biorisk management performance indicators
  - Example using GBRMC courses:

Orientation to Biorisk Management	Basics of Biorisk Assessment	Biorisk mitigation strategies	Establishing BRM performance indicators

Customization Example: FETP

- Training Need:
  - 1 week biosafety and biosecurity module for Field Epidemiology Training Program

Customization Example



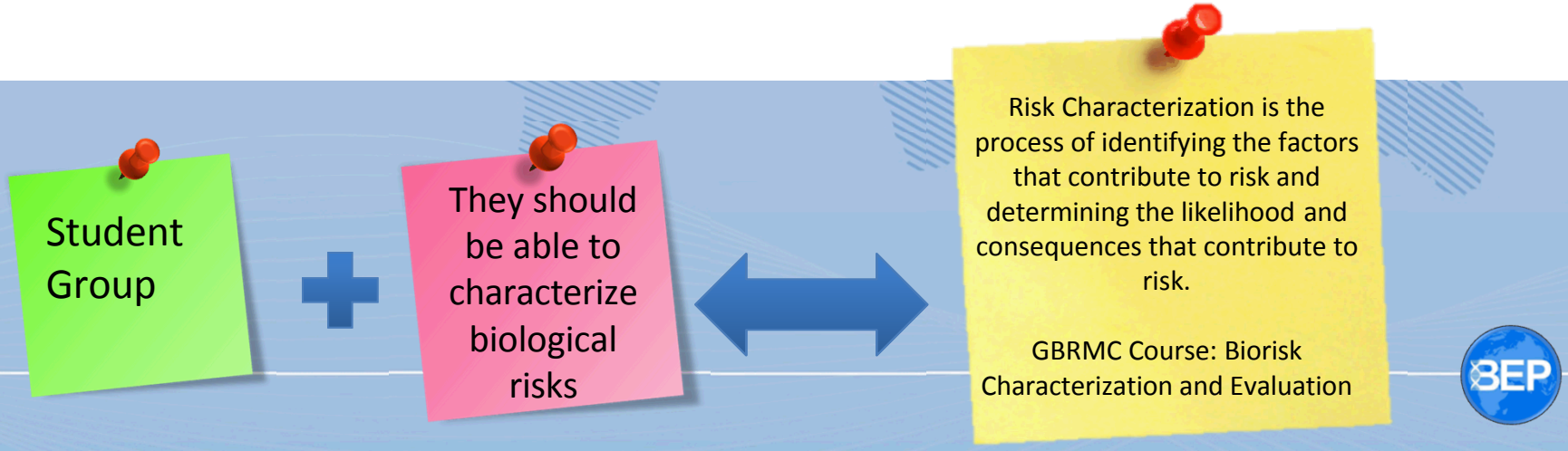
Activity – Design & Develop

Activity:

Using the

- KNOW, FEEL, DO results from the previous exercise,
- the sticky notes with training components, resources identified in Day 1 and Day 2 and
- the KEY MESSAGES cards from GBRMC courses. . .

. . .match the cards to as many audience/learning objective sticky notes couples as possible.



Options for Customization

- Demonstrations
- Guided exercises (tabletops, drills, SOP development, hands-on technique, etc.)
- Tours
- New courses with locally specific information:
  - Legal requirements
  - Facility & equipment specifics, etc.
- Replacement in existing resources of case studies and examples with locally specific examples.
- Others?

Thank You!