

ZR Professional Development: Facilitator's Guide to May 9th Training

Important Notes:

- 1) Please plan to set up the game grid (ACTIVITY 3 below) before the training begins. Allow yourself an hour for setup.
- 2) Materials lists and additional details for all activities are provided after the agenda

Time	Activity	Facilitator role
11:00 am ET (10:00 CT 9:00 MT, 8:00 PT)	ARRIVAL	<i>Please confirm that educators have completed the Educator pre-survey.</i>
11:30am ET (10:30 CT 9:30 MT, 8:30 PT)	WELCOME/GROUND RULES/INTRODUCTIONS <i>Warm Up Game: Person to Person</i>	<i>ACTIVITY 1: We will introduce this icebreaker activity and ask you to facilitate this warm up at your site. (10 MIN)</i>
	BRIEF INTRO/BACKGROUND TO ZR	
	REVIEW OF THE ZR SCHEDULE	
	The SPHERES	<i>ACTIVITY 2: After a brief intro to the SPHERES we will invite sites to run through this activity: - Refer to the Educator guide page 26-27 steps a,b,d (See Activity 2 materials and notes later in this document). The Educator Guide is available at the following link: http://zerorobotics.mit.edu/docs/ms/EducatorGuide.pdf (25 MIN)</i>
	MATH REVIEW <i>Vectors, decimals, arrays, variables</i>	
	BREAK: 15 min	
12:45am ET (11:45 CT, 10:45MT, 9:45 PT)	ZR IDE, PART 1: <i>(work on laptops)</i> <i>Covering: Arrays, setPositionTarget, setAttitudeTarget</i>	
1:45pm ET (12:45 CT, 11:45 MT, 10:45 PT)	LUNCH/SNACK BREAK:	<i>If possible please provide some refreshments for the lunch/snack break or ask educators to bring food with them. (30 MIN)</i> <i>If you have questions from your group please collect them and send them in via chat during the lunch break for the Q and A period after lunch.</i>
2:30pm ET (1:30 CT, 12:30 MT,	Q and A and INTRO TO THE 2015 GAME Show game SIMULATION	

11:30 PT)	INTRO TO THE 2015 GAME ACTIVITY- <i>move to space for acting out game, Overview, walk-through</i>	<i>ACTIVITY 3: You will not be running the activity itself but using the grid to help explain the game. The Game setup instructions and List of materials are provided in this document. (See Activity 3 materials later in this document). Full description of this activity game is provided at this link: http://zerorobotics.mit.edu/docs/ms/ActingOutGame2015.pdf The game overview powerpoint is also helpful and is available here: http://zerorobotics.mit.edu/docs/ms/MSZRGame2015.pdf (45 MIN)</i>
	THE ZR IDE, PART 2 <i>(work on laptops) Covering: Variables, Conditionals, Counters</i>	
	EXPLORE THE TEACHER GUIDE: <i>(work on laptops in groups)</i>	<i>ACTIVITY 4: After introduction please ask educators to count off by 4 to split the group, then distribute worksheets to groups and facilitate group reporting at the end. (See Activity 4 materials later in this document) (20 MIN)</i>
	BREAK: <i>10 min</i>	
4:20pmET (3:20 CT, 2:20MT, 1:20PT)	CREATING MOCK ZR DAILY SCHEDULES: <i>(small group work)</i>	<i>ACTIVITY 5: Please distribute worksheet for partners to work in pairs. (See Activity 5 materials later in this document) (20 MIN)</i>
	REFLECTION/OVERFLOW	<i>ACTIVITY 6: PLEASE write vocab terms on a beach ball or on slips of paper (placed in a box). Ask participants to form a circle and pass the ball or box and say one thing they learned about the word that their left thumb touches on the ball or that they pick from the box. (See Activity 6 materials later in this document) (10MIN)</i>
5:30pm (4:30CT, 3:30MT, 2:30PT)	CLOSING	<i>Please ask educators to complete Educator Post Training Survey</i>

Activities led by Facilitator

In advance of the training please print off the following materials to support activities that you will be helping to facilitate

ACTIVITY 1:

We will introduce this icebreaker activity and ask you to facilitate this warm up at your site. No advance preparation needed.

ACTIVITY 2:

After a brief intro to the SPHERES we will invite sites to run through this activity: - Refer to the Educator guide page 26-27 steps a,b,d. The Educator Guide is available at the following link: <http://static.zerorobotics.mit.edu/docs/ms/EducatorGuide.pdf>

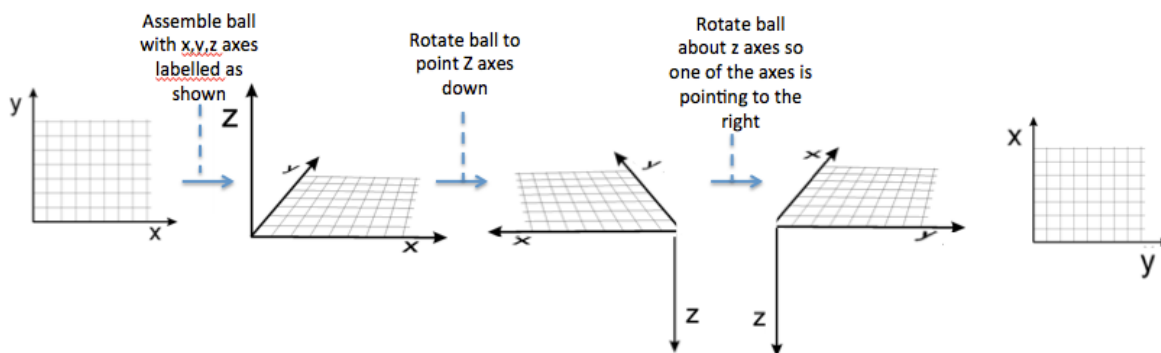
List of Materials:

Styrofoam balls (or playdough), toothpicks, tape to label toothpicks with x,y,z,, markers
Paper and tape to post X,Y labels on wall of room

Notes :

1) For the styrofoam ball part of the activity:

- Global coordinate system of ISS- Positive Z axis points toward Earth
- The coordinate axes in the game use the ISS Global coordinate system and so looks different from what is familiar to the students
- Have educators insert toothpicks into Styrofoam ball and rotate as shown below.



2) Have educators use their bodies as SPHERES to practice the ISS Global coordinate system turning to face in the directions of the +/-x, +/-y, +/-z axes.

ACTIVITY 3:

You will not be running the full activity itself but using the grid to help explain the game. The Game setup instructions and List of materials are provided below. Full description of this activity game is provided at this link: <http://static.zerorobotics.mit.edu/docs/ms/ActingOutGame2015.pdf>. The game overview powerpoint is also helpful and is available here:

<http://static.zerorobotics.mit.edu/docs/ms/MSZRGame2015.pdf>

Grid Set-up Check List

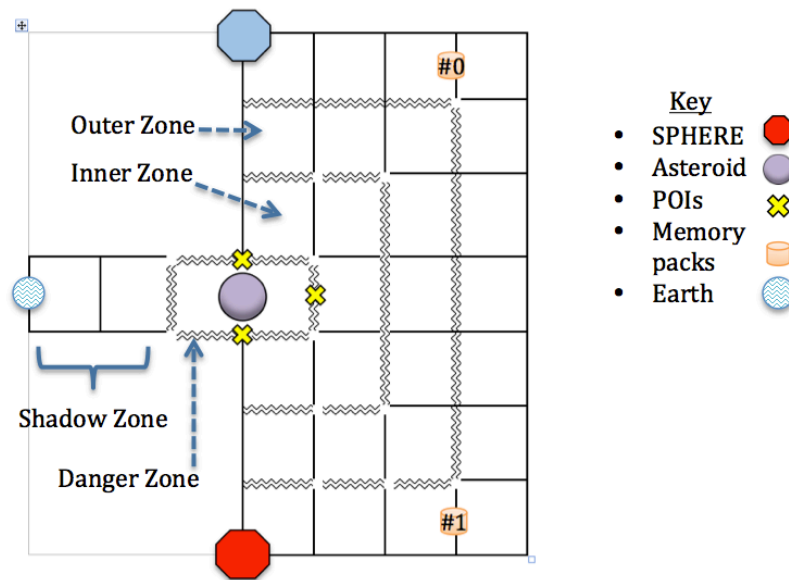


Figure 1: Game Set Up

- Lay out the 4 x 7 yard grid with blue tape or spray chalk
 - Highlight the Zone markings, as shown with squiggly lines in the figure.
 - Make lines wider or a different color (for example, use double wide tape or add markings to tape with a sharpie)
- Add shadow zone region (2 x 1 yard)
- Place the following items on the grid as shown above:
 - POI locations Add tape marks to indicate with an “x” as shown.
 - Memory Packs: Set down two containers representing memory packs (shown as #1 and #2). Place 1 popsicle stick, representing an extra memory slot, in each memory pack container.
 - Set down two containers at Earth location. Place 4 popsicle sticks in each Earth container
 - SPHERES bucket: Set down two buckets at SPHERES locations.
 - Count out 9 marbles or florist glass and place in bucket
 - Place 2 popsicle sticks representing memory slots in each bucket
 - Asteroid: Optional: Place ball/beach ball onto a bucket to represent the asteroid.


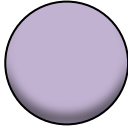



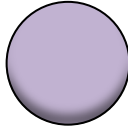



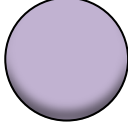



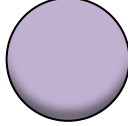



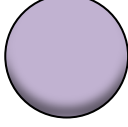



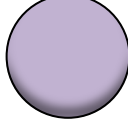


List of Materials

Item /function	Qty
Rolls of Blue Tape (60 yds rolls) or Spray Chalk <ul style="list-style-type: none"> To create game grid 	2
Yard sticks or measuring tape <ul style="list-style-type: none"> To help layout game grid 	1
Picture card sheets, printed and cut apart (provided below)	1
Popsicle sticks <ul style="list-style-type: none"> Two given to each SPHERES at start of game One placed in each of two memory pack containers at start of game Extras kept at Earth 	8
Bag of marbles or florist glass <ul style="list-style-type: none"> Represent points Place 9 pieces in each SPHERES bucket at start of game 	18
Roll of /sheet of stickers (motivational stickers or colored dots) <ul style="list-style-type: none"> Used to keep track of the bonus points. 1 sheet is enough for educator training 	1
Small buckets <ul style="list-style-type: none"> Carried by each student "SPHERES" for points, memory slots, photos 	2
Small containers/boxes <ul style="list-style-type: none"> One for each of the two memory packs Two at Earth's location, one for each team 	4
Score sheet for Earth (score keeper) , printed (provided below)	2
Pen/pencil	4
Optional: Bucket with ball/beach ball- Place ball on the bucket to represent the asteroid.	1
Optional: Costume for SPHERES- Lanyard with pretend camera (one red, one blue)	2
Optional: Flip chart or White Board to keep track of increments within each phase	1

Keeping track of Number of Actions (step, take picture, upload, etc)

PHASE 1					
Increment 1 (5 actions)	Increment 2 (5 actions)	Increment 3 (5 actions)	Increment 4 (5 actions)	Increment 5 (5 actions)	Increment 6 (5 actions)
1	1	1	1	1	1
1	1	1	1	1	1
1	1	1	1	1	1
1	1	1	1	1	1
1	1	1	1	1	1

Picture Cards: Each row = 1 set of cards. Give 1 set of cards to each POI. (Print on card stock or attach to 3x5 cards; Cut apart along shaded lines.)

<p><u>BLUE SPHERES</u> </p> <p>2 points</p>  <p><u>Inner Zone Picture</u></p>	<p><u>BLUE SPHERES</u> </p> <p>3 points</p>  <p><u>Outer Zone Picture</u></p>	<p><u>RED SPHERES</u> </p> <p>2 points</p>  <p><u>Inner Zone Picture</u></p>	<p><u>RED SPHERES</u> </p> <p>3 points</p>  <p><u>Outer Zone Picture</u></p>
<p><u>BLUE SPHERES</u> </p> <p>2 points</p>  <p><u>Inner Zone Picture</u></p>	<p><u>BLUE SPHERES</u> </p> <p>3 points</p>  <p><u>Outer Zone Picture</u></p>	<p><u>RED SPHERES</u> </p> <p>2 points</p>  <p><u>Inner Zone Picture</u></p>	<p><u>RED SPHERES</u> </p> <p>3 points</p>  <p><u>Outer Zone Picture</u></p>
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Earth's Score Sheet

PHASE 1	Calculations	Points
Uploaded pictures (2 or 3 points each)		
Bonus points (0.5 points each)	_____ x 0.5=	
Pictures not uploaded at end of Phase 1 (0.1 points each)	_____ x 0.1=	
	Phase 1 total	

PHASE 2	Calculations	Points
Uploaded pictures (2 or 3 points each)		
Bonus points (0.5 points each)	_____ x 0.5=	
Pictures not uploaded at end of Phase 2 (0.1 points each)	_____ x 0.1=	
	Phase 2 total	

PHASE 3	Calculations	Points
Uploaded pictures (2 or 3 points each)		
Bonus points (0.5 points each)	_____ x 0.5=	
Pictures not uploaded at end of Phase 3 (0.1 points each)	_____ x 0.1=	
	Phase 3 total	

END OF GAME-points in bucket	Calculations	Points
Number of marbles/florist glass left in the SPHERES bucket (1 points each)	_____ x 1=	
	Points in Bucket	

	Points
PHASE 1 total	
PHASE 2 total	
PHASE 3 total	
END OF GAME-Points in Bucket	
GAME TOTAL	

ACTIVITY 4:

After introduction please ask educators to count off by 4 to split the group, then distribute worksheets below to groups #1-4 and facilitate group reporting at the end.

List of Materials: printed copies of Group 1-4 materials below, poster paper, colored markers

GROUP 1:*TASK #1:*

What are the goals of each of the 5 weeks?

Where do you find those in the teacher guide?

Create an informational poster about the themes, goals, and general focus of each of the 5 weeks, and references to where that information can be found in the teacher guide.

TASK #2:

What and where are each of the appendixes?

How will they be useful when planning and implementing the activities in the teacher guide?

Are there are other purposes for them?

Create an informational poster for your peers about what you find.

GROUP 2:

Choose 1 person in the group to be an example educator, and imagine that you are helping to prepare and implement “What’s the Logic?” (page 36) at his/her program.

Go through the lesson plan for “What the Logic?” and identify exactly what the instructor will do to prepare, set up, and implement this activity.

Think about questions such as:

- What space are you going to do this activity in?
- What materials do you need? How are you going to get them? When? And who will purchase them?
- Are there any hyperlinks in the lesson plan that you need to follow? Do any of them need to be “live” for the activity (meaning, do you need internet access, a projector, etc) or are they for you to reference before the activity?
- Are there any worksheets to be printed out? Where are they found?
- What are some potential pitfalls of this activity, and how can you help this instructor prepare for them?

Create an information poster for your peers about this process, answering some or all of these questions. Include any insights that arise during your planning, or that come from veteran ZR teachers.

GROUP 3:

Dig into the elements of the Educator Guide's activity plans. There are step-by-step instructions, but also much more!

Create an informational poster for your peers about all of the elements of the activity plans, including things like links, notes, colored text boxes, and more. What are all of these things? How are they used?

Be sure to explore multiple activity plans to be sure you capture everything.

GROUP 4:

Choose 1 person in the group to be an example educator, and imagine that you are helping to prepare and implement “Coordinate Hunt” (Optional Activity 1, page 32) at his/her program.

Go through the lesson plan for “Coordinate Hunt” and identify exactly what the instructor will do to prepare, set up, and implement this activity.

Think about questions such as:

- What space are you going to do this activity in?
- What materials do you need? How are you going to get them? When? And who will purchase them?
- Are there any hyperlinks in the lesson plan that you need to follow? Do any of them need to be “live” for the activity (meaning, do you need internet access, a projector, etc) or are they for you to reference before the activity?
- Are there any worksheets to be printed out? Where are they found?
- What are some potential pitfalls of this activity, and how can you help this instructor prepare for them?

Create an information poster for your peers about this process, answering some or all of these questions. Include any insights that arise during your planning, or that come from veteran ZR teachers.

ACTIVITY 5: Please print enough copies this *worksheet to distribute for partners to work in pairs.*

The Mock Schedule sheets provide two different approaches for choosing activities for Week 1: A) Think about the learning goals and pick activities FIRST (page 1), or B) Work out the timing for your week and then go back and make sure that all of those goals are hit.

**Zero Robotics Middle School Program
Mock Schedule – Week 1**

Program: _____

At the end of Week 1, students should be able to....

Goal <i>What they should learn this week</i>	Activities <i>How you will teach it, what they will do</i>	Assessment <i>How you will know they achieved the learning goal</i>
Understand the basic overview of the middle school ZR program and that they will be programming satellites on the ISS		
Understand that the SPHERES satellites are maneuvered by computer programs, rather than by humans		
Understand the “problem” they must address in their player design		
Understand the basic structure and elements of a computer program and what is involved in debugging a program		
Be aware that math and physics are involved in maneuvering the SPHERES satellites		
Be able to complete short programming tasks in the ZR IDE using the instructions provided		
Be able to work together in teams to solve problems		

Day 1

Time	Activity	Time	Prep work

Day 2

Time	Activity	Time	Prep work

Day 3

Time	Activity	Time	Prep work

Day 4

Time	Activity	Prep work

Day 5

Time	Activity	Prep work

ACTIVITY 6

PLEASE write vocab terms on a beach ball or on slips of paper (placed in a box). Ask participants to form a circle and pass the ball or box and say one thing they learned about the word that their left thumb touches on the ball or that they pick from the box.

List of Materials: beach ball, or slips of paper in a box

Vocab words:

SPHERES

Coordinate

Asteroid

Array

Conditional

Solar flare

x,y,z

z

vector

programming

ISS