

ZR Professional Development: Facilitator's Guide

SpySPHERES 2016

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 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: Introduce the icebreaker activity described below; for a webinar, ask your state representatives to facilitate this warm up at their site. (10 MIN)</i>
	BRIEF INTRO/BACKGROUND TO ZR	<i>Watch Powerpoint</i>
	REVIEW OF THE ZR SCHEDULE	
	The SPHERES	<i>ACTIVITY 2: After a brief intro to the SPHERES, run through this activity. Refer to the Educator guide page 26-27 steps a,b,e/f (See also Activity 2 materials and notes later in this document). The Educator Guide is available at the following link: http://static.zerorobotics.mit.edu/docs/ms/EducatorGuide.pdf (25 MIN)</i>
	MATH REVIEW <i>Vectors, decimals, arrays, variables</i>	<i>Watch Powerpoint</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>	<i>Help educators working on laptops.</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>
2:30pm ET (1:30 CT, 12:30 MT,	INTRO TO THE 2016 GAME Show game intro video	<i>(available on the game documents page: http://zerorobotics.mit.edu/tournaments/22/info/116/0/)</i>

11:30 PT)	INTRO TO THE 2016 GAME ACTIVITY- move to space for acting out game, Overview, walk-through	<i>ACTIVITY 3: Lead the activity as described below. 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</i> http://static.zerorobotics.mit.edu/docs/ms/ActingOutGame2016.pdf (45 MIN) Please collect questions and enter into the chat for us to answer during the Q&A period which follows
	GAME Q & A- Post Activity	
	THE ZR IDE, PART 2 (work on laptops) Covering: Variables, Conditionals, Counters	Help educators following along on laptops.
	BREAK: 10 min	
4:20pmET (3:20 CT, 2:20MT, 1:20PT)	EXPLORE THE TEACHER GUIDE: (work on laptops in groups)	<i>ACTIVITY 4: After introduction, split your group into 6 groups (number of groups can be altered as needed – groups of 3-6 participants is best), then distribute worksheet (provided below) to the groups and facilitate group reporting at the end. (See Activity 4 materials later in this document)</i> (20 MIN)
	WRAP UP /Final Q and A	Please send questions over chat.
5:30pm ET (4:30CT, 3:30MT, 2:30PT)	CLOSING	Please ask educators to complete Educator Post-Training Survey.

Activities led by Facilitator

In advance of the training please print off the following materials to support activities that you will facilitate. If a webinar, these materials should be sent to state representatives with enough advance notice to prepare materials for their sites.

ACTIVITY 1:

Introduce the icebreaker activity described below; for a webinar, ask your state representatives to facilitate this warm-up at their site.

Ask participants to stand up and find someone they don't know. They must stand elbow-to-elbow, and answer a question (i.e. "where do you work?" or "what's your favorite ice cream?"). Give 2-3 minutes for pairs to answer the question. They then rotate to someone new and go knee-to-knee, then again toe-to-toe. Questions can be tailored to the group. No advance preparation needed.

ACTIVITY 2:

After a brief intro to the SPHERES, run through this activity; for webinars, have your state representatives facilitate at their sites.

Refer to the Educator guide page 26-27 steps a,b,e/f (See also Activity 2 materials and notes later in this document). The Educator Guide is available at the following link:

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

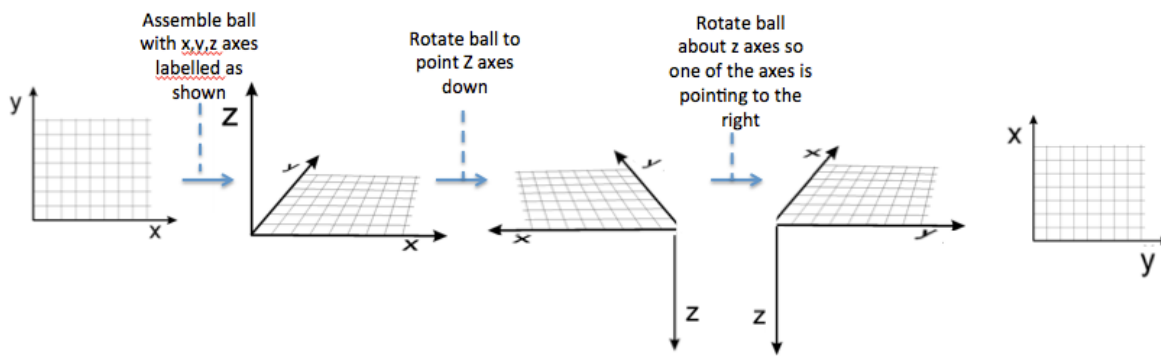
List of Materials:

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

Notes :

1) For the styrofoam ball/ ball of clay 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:

ACTIVITY 3: Lead the activity as described below. If a webinar, you will not be running the activity itself but using the grid to help explain the game, and state representatives will run the activity at their sites.

Full description of this activity game is provided at this link:

<http://static.zerorobotics.mit.edu/docs/ms/ActingOutGame2016.pdf>

Grid Set-up Check List

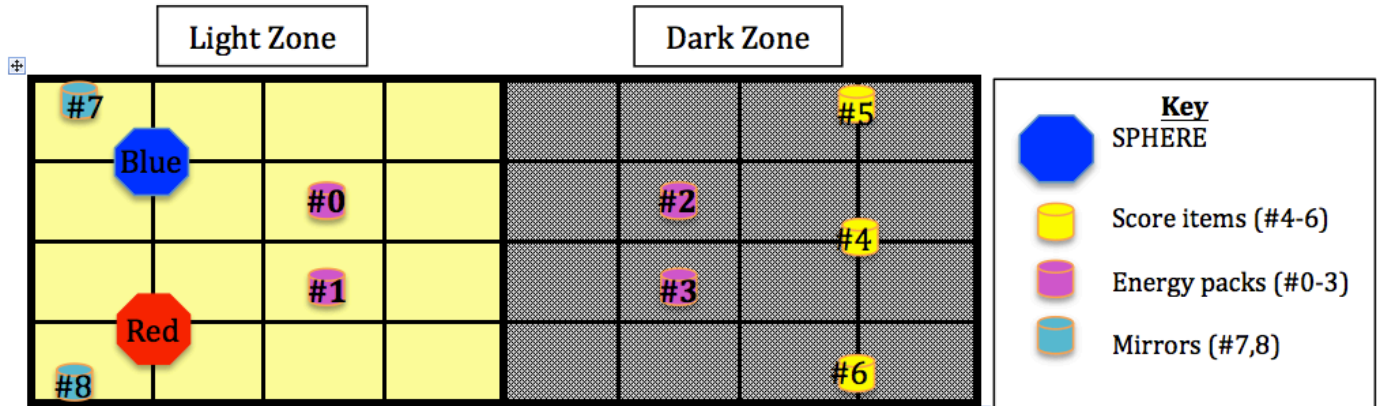


Figure 1: Game Set Up

- Lay out the 4 x 8 yard grid with blue tape or spray chalk
 - Highlight the line separating the light and dark zone (double wide tape or different color tape)
- Place the following items on the grid in their locations as shown above:
 - SPHERES starting location: Add tape marks to indicate with an “x” as shown.
 - SPHERES bucket: Set down two buckets at SPHERES locations.
 - Count out 5 marbles or florist glass in each bucket
 - Mirrors (shown as #7 and #8): Something the SPHERES can wear to indicate when the mirror is activated as a cloaking device. Example: silver emergency blanket or tinfoil wrapped hat.
 - Data Items: 3 small yellow containers/boxes/baskets/blocks
 - Energy Items: 4 small pink containers/boxes/baskets/blocks
- Have the following items ready to hand to the team/designated students at the start of the activity:
 - Team: Strategy sheets and pen/pencils
 - Dark Side Guides: 2 Buckets (empty except for information sheet); Optional sign/costume
 - Energy Rechargers: 2 Buckets (each with 15 pieces of marbles/florist glass and information sheet); Optional sign/costume
 - Picture Referees: 2 sets of Picture Cards; Optional sign/costume
 - Score Keepers: 2 clipboards with score sheets and pen/pencil
 - Optional: Place ball/beach ball onto a bucket to represent the asteroid.

List of Materials

Item /function	Qty per grid
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 cards carried by the Picture Referee <ul style="list-style-type: none"> One Green Card (for good pictures) One Black Card (bad pictures) 	2 sets
Strategy sheets, printed (provided below) <ul style="list-style-type: none"> Used to document strategy- 2 per team plus 2 extras 	6
Bag of marbles or florist glass <ul style="list-style-type: none"> These represent energy Place 5 pieces in each SPHERES bucket at start of game (10 total) Give 15 pieces to each of the students acting as Energy Rechargers (30 total). 	40
Small bucket <ul style="list-style-type: none"> Carried by each student "SPHERES" (for florist glass/energy and picture cards) Carried by each Energy Recharger (for florist glass/energy) Carried by each Dark Side Guide (for florist glass/energy) 	6
Small containers/boxes/baskets/blocks <ul style="list-style-type: none"> 4 Pink containers to represent energy 3 Yellow containers to represent data 	7
<ul style="list-style-type: none"> Print Score Sheets and Information Sheets (provided below) 	2 each
Clip board for Score Keeper's score sheet	2
Mirror item Something for the SPHERES to wear to indicate their mirror has been activated like a cloaking device. Example: silver emergency blanket or tinfoil wrapped hat.	2
Optional: Costume for SPHERES- Sunglasses; Lanyard with pretend camera (one red, one blue)	2
Optional: Identifying signs or costumes for other student roles. Examples: Dark Side Guide: black cape or black hat; Energy Recharger: fluorescent yellow shirt/hat; Picture Referee: arm band	As needed
Optional: Bell or other "alarm" Used by students acting as to announce Dark/Light Zone Switch	1

Keeping track of Number of Actions (steps)

PHASE 1				
Increment 1 (3 steps)	Increment 2 (3 steps)	Increment 3 (3 steps)	Increment 4 (3 steps)	Increment 5 (3 steps)

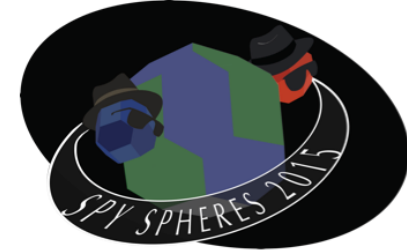
Figure 2: Five increments in each phase

Strategy Sheet

Circle one: Red SPHERES / Blue SPHERES

Assign roles for your team:

- * SPHERES (spy): _____
- * Dark Side Guide: _____
- * Energy Recharger: _____
- * Score Keeper: _____
- * Picture Referee: _____
- * Person who gives the SPHERES directions: _____
- * Increment Counter: _____



Phase 1: Increments 1-5 (number of possible steps =15)

(fill in grids below and add any additional instructions on the back of this sheet)

- 1) Draw your planned path.
- 2) Mark "P"= everywhere you plan to take a picture. (Pictures can only be taken at the end of every increment.) -OR- list here which increments you plan to take a picture:

- 3) Mark "UM"= where you plan to start to "use mirror" if you choose to use one.

Light Zone				Dark Zone			
#7							#5
Blue			#0		#2		#4
			#1		#3		
Red							#6
#8							

Key

- SPHERE
- Score items (#4-6)
- Energy packs (#0-3)
- Mirrors (#7,8)

Phase 2: Increments 6-10 (number of possible steps=15)

- 4) Mark a star where your path starts (the same place your path ends on the grid above.)
- 5) Draw the rest of your planned path using the same markings as above.

Note: You must finish the path you drew for Phase 1 before you start the path marked in phase 2 no matter where you are when the light switches.

Light Zone				Dark Zone			
#7							#5
			#0		#2		#4
			#1		#3		
#8							#6



Score Keeper's Score Sheet

	<u>Calculations</u>	<u>Points</u>
<p>Bad Pictures taken (Black Cards) <u>Keep tally here:</u> (Do calculation at game end)</p>	<p>_____ x 0.01=</p>	
<p>Good pictures taken (Green Cards)</p> <p>Write picture value in rows to the right. (not all rows will be used)</p> <p><u>Good Picture Score Criteria</u> If SPHERES have: 1. 2 grid lines between: 2.75 points 2. 3 grid lines between: 2.5 points 3. 4 or more grid lines between: 2.25 points</p>	Good Picture 1	
	Good Picture 2	
	Good Picture 3	
	Good Picture 4	
	Good Picture 5	
	Good Picture 6	
	Good Picture 7	
	Good Picture 8	
	Good Picture 9	
	Good Picture 10	
<p>Score Items collected <u>Keep tally here:</u> (Do calculation at game end)</p>	<p>_____ x 1.5=</p>	
	total	

Picture Referee's Guide

- Check that the SPHERE has 1 energy
- Check that SPHERE is facing the opponent
- Check that the opponent is in the light zone
- Check that neither the SPHERE nor the opponent is wearing the mirror cloak
- Check if SPHERES have more than 1 grid lines between them (If less than 1 grid line between them then they are too close)

If all of the above are true the Referee holds up a **green card**.
 Otherwise the Referee holds up a **black card**.



Information Sheet
Dark Side Guide/ Energy Recharger

Dark Side Guide

When your team's SPHERES is in the Dark Zone:

Take away 1 energy (marble or florist glass) for every step they take
Take away 1 energy for every picture they take (good or bad)

Note: If they run out of energy they can still take bad pictures but can no longer take good pictures.

Energy Recharger

When your SPHERE does the following:

- A) Picks up an **energy pack**
- B) **Enters the Light Zone** by either of these ways:
 - Moves from the Dark Zone to the Light Zone
 - Because the Dark/Light Zones Switch

You will recharge your SPHERES energy by giving them enough energy (marbles or florist glass) to bring their total energy to 5 (marbles or florist glass) in their bucket.

Note: If they already have 5 energy they don't get any more.

ACTIVITY 4:

After introduction split your group into 6 groups (number of groups can be altered as needed – groups of 3-6 participants is best), then distribute worksheets below to each group.

List of Materials: printed copies of this page.

Divide groups into the following categories:

- Group #1 ● Exploration
- Group #2 ● Instruction
- Group #3 ● Active Activity
- Group #4 ● Computer Programming Tutorial
- Group #5 ● Game
- Group #6 ● Assessment & Reflection

TASK: #1

Scroll through the online educator guide to identify the activities in the educator guide that are marked with the color dot your group has been assigned to investigate. (upper right corner of the activity title)

TASK #2

Pick a couple of the activities you found and have someone in your group review the activity and click on any incorporated links.

TASK #4

Share what you find with your group.

TASK #3:

Be prepared to describe something to the larger group that you found or discussed as part of your investigation to that you think that all the educators should to be aware of and should not to miss.