Lesson 9

Add-ons

Pre-Lesson Ideas:

* Have students create a variable for the speed of a shape. Have them use that variable inside the math expression . Change this variable inside of an if statement to see how it changes the way the shape moves.

- Have students pull out a piece of paper and write out a math expression using a variable, like x = x + 2. Then, have students draw out how the shape would move with a math expression like this.
- Ask the students how you could change the math expression to make the shape move to the left, instead of the right. Any answer where you subtract from x is correct.

Post-Lesson Ideas:

Reflection Questions

1) How did we change the direction of our shape?

Possible Answers: We use the expression: speed = - speed (for whatever variable we use).

2) What type of games use this series of if statements?

Possible Answers: Pong

Further Development

* Have students change the color along with the direction.
* Have students create multiple shapes and have them bounce off the walls at different times.
* Create boundaries for the top and bottom, including the two sides. This works best if the speed variables for the x and y variables are of different values.

Lesson 9

Set Up

Side to Side:

* Practice controlling movement with a series of if statements.

Project Goal:

1) Generally, what should the project look like?

A simple shape moving bouncing back and forth across the screen

2) What skill(s) are being learned/ practiced?

3) What concept are students gaining insight on?

Manipulating variables to move objects.

Programming/ Math Vocabulary:

Speed -

Lesson 9

Outline

Introduction to Topic:

“Today we are going to be using conditional statements to make a shape bounce, back and forth, across the screen.

Project Breakdown:

1) Make a shape move across the screen

2) Declare a variable for the speed of the shape

3) Create an if statement that changes the speed of the shape

4) Create a second if statement to make another boundary

5) Problem solve and trouble shoot errors

Example Projects/ Basic Source Code:

```
// define variables for x
var x = 0;
var speedx = 2;
draw = function( )  {
//draw an ellipse
fill(0,0,0);
ellipse(x+50, 300, 50, 50);
//use math expression to add 5 to
the x coordinate
x = x + speedx;
//use a conditional statement to reverse
the direction of the ellipse at 700
if ( x > 700 ) {
speedx = - speedx;
}
//use a conditional statement to reverse
the direction of the ellipse at 0
if ( x < 0 ) {
speedx = - speedx;
}
};
```

Lesson 9

Troubleshooting

Common Mistakes and Confusions:

1) Not closing brackets

Every curly bracket ({ }) has to have and open and close bracket, or else the computer with throw and error.

2) Correct syntax for an if statement

if (some condition) {

some action

}

3) Writing an if statement inside of another one

Students will eventually write these types of if statements, but for this project they do not want to. These if statements should stay separate because they do not rely on eachother.

FAQ's:

1) Why create a variable for speed?

This is a dynamic way to change the direction of a moving shape. There are other methods, but they are more complex and it is easier to make errors. You can always chellenge to students to find other methods.

2) Can I use just one if statement?

Yes! You can, you just have to use the command for or (||). However, I suggest you let students practice writing multiple if statements.