

# Pattern Games and I/O Machines

**Estimated Time: Varies for each game**

## SUMMARY

Below is a collection of games to play that help teach pattern recognition. After that, the basic steps of how a function works are covered with the “Input/Output” machine game. These are fun for all ages!

## WHAT YOU’LL LEARN

- Pattern recognition
- How to fill in or extend patterns
- The basics of how a function works

Materials Used	Resources Used
<ul style="list-style-type: none"> <li>• 100 count sheet</li> <li>• Blocks (e.g., Lego Bricks)</li> <li>• See below for others</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">More Pattern Activities</a></li> <li>• Input/Output Machine <a href="#">Video</a></li> <li>• <a href="#">Function Builder Basics Simulation</a></li> <li>• <a href="#">Function Builder Simulation</a></li> </ul>

## WHAT TO DO

### Pattern Games

- Skip Counting – A simple game for all ages, use the 100 chart below and have your kid color in numbers while counting by something other than 1’s (by 6’s, 13’s, etc). If you read it like a book, there is a pattern (every X numbers is shaded), but is there a pattern as you read it top to bottom? What about diagonal patterns? What about patterns if you look at the ones or tens digit?
- Building with Blocks – Any type of blocks work, but each type lends itself to different complexity. Not only can you create patterns in one dimension, but you can include patterns with color and size of blocks, as well as 3D patterns. Lego bricks work very well here. Creating the pattern is best for younger kids, but asking kids to make their own patterns for you to figure out is a great way to get kids thinking and stretch their minds.
- Sorting – Frankly, sorting is a great skill for picking out patterns. The best part is that it doesn’t really matter what the objects are. For example, if you’re using building blocks you can have kids sort them by size, shape, or color, but you can also have them change what they are sorting by. You can also have them sort whatever dishes or toys are laying around. You can also set this up as a game where you guess what criteria your child used for sorting as a way to gamify this activity. Giving them sorting criteria works, too. My kid knows that a sorting game is coming when the laundry comes out.

- Scavenger Hunts – Scavenger hunts can be a lot of work to set up if you have specifics that you want found, but you can find a lot online. Another method is to lay out broad criteria and let your child explore scavenger hunt ideas. Ask your kid to find a toy that starts with every letter of the alphabet, or just something in the house. Outdoor scavenger hunts are fun as well. Finding something of every color, something that is interesting to every sense (use this at your own risk), or have your kid put together a set of things that you have to guess what the pattern is!

### Input/Output Machines

- The Input/Output Machine is a simple game in which you put something into it and something comes out.
  - a. You must provide what sorts of things can go in, like numbers, letters, animals, words, etc.
  - b. Each input should have the same output each time. That means that if you put a 1 in and a 4 comes out, the 4 should come out each time you put a 1 in.
  - c. Guess the rule that the machine is using for each input to get to an output.
  - d. Some additional rules may include:
    - i. Shift 3 letters forward.
    - ii. Make nouns plural.
    - iii. Reverse words.
    - iv. Turn plants into foods made from the plants.
    - v. Turn animals into... maybe too grim.
    - vi. Change colors.
    - vii. For numbers, any expression like “ $x+3$ ” or “ $x^2 +4$ ” works, depending on your kid’s age.
  - e. See the video in the Resources section for more info.
  - f. There are also 2 great Function Builder simulations to play with in the Resources section.

### TIPS

- All of these games can be short or long and can be played throughout daily life.
- A quick game board with letters on it can make for easier scavenger hunts. “Place something that starts with that letter on each spot on the board” keeps it from being too messy.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>
<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>
<b>41</b>	<b>42</b>	<b>43</b>	<b>44</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>48</b>	<b>49</b>	<b>50</b>
<b>51</b>	<b>52</b>	<b>53</b>	<b>54</b>	<b>55</b>	<b>56</b>	<b>57</b>	<b>58</b>	<b>59</b>	<b>60</b>
<b>61</b>	<b>62</b>	<b>63</b>	<b>64</b>	<b>65</b>	<b>66</b>	<b>67</b>	<b>68</b>	<b>69</b>	<b>70</b>
<b>71</b>	<b>72</b>	<b>73</b>	<b>74</b>	<b>75</b>	<b>76</b>	<b>77</b>	<b>78</b>	<b>79</b>	<b>80</b>
<b>81</b>	<b>82</b>	<b>83</b>	<b>84</b>	<b>85</b>	<b>86</b>	<b>87</b>	<b>88</b>	<b>89</b>	<b>90</b>
<b>91</b>	<b>92</b>	<b>93</b>	<b>94</b>	<b>95</b>	<b>96</b>	<b>97</b>	<b>98</b>	<b>99</b>	<b>100</b>