

## Commercial Physical Knowledge Games

The following games have in common the characteristic of promoting knowledge about physical phenomena. Children have opportunities to reason about gravity, balance, force, and trajectory. Therefore, these games can be a valuable part of a preschool and early elementary science curriculum.

For more information about physical knowledge activities, see:

Kamii, C. & DeVries, R. (1978/1993). *Physical knowledge in preschool education: Implications of Piaget's theory*. New York: Teachers College Press.

### **Ants in the Pants**

This game is sort of like tiddly-winks, but easier. Children try to flip plastic ants into a container shaped like a pair of overalls. Each child flips a different color. Children have to figure out what is the best way to exert pressure on their ant in order to make it fly into the pants. They must also think about how to aim their ant and the optimum distance away from the pants to place the ant. The teacher can ask questions such as "Is it easier to get your ant in when you put it closer to the pants?" "What happens when you press down harder?" etc.

*Problem:* As the rules are written, children all flip their ants at once, making the game pretty chaotic. The winner is the first person to get all of his or her ants into the pants. If you change the rules so that children take turns flipping one ant at a time into the pants, children can watch each other succeed or fail in getting their ants into the pants and can learn from each other. This also promotes cooperation.

Goals:

1. Fine motor coordination
2. Spatial reasoning
3. Physics (force, distance, trajectory)
4. Turn taking

### **Don't Spill the Beans**

Children take turns carefully placing one bean at a time onto the carefully balanced lid of the bean jar that tips easily to one side or the other. If a player tips the bean jar and spills the beans, he or she must take the spilled beans and add them to his or her collection. The object of the game is to be the first person to get rid of all his or her beans. Children must try to figure out what causes the bean jar to tip (too many beans on one side), thus reasoning about the physics involved in balancing. Children have the opportunity to count their beans, although children do not need to know how to count to play this game. Finally, this game does not need to be played as a competitive game. Children can simply play the game, taking turns placing beans on the jar and watching as they succeed or fail in keeping the jar upright.

Goals:

1. Fine motor coordination
2. Counting
3. Physics (weight and balance)
4. Turn taking

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## **Topple**

Children take turns rolling a die and placing a disk on the correct row (corresponding to the number on the die) of the balancing tower. The disks can be placed on top of each other, and the stacks can get very high. Fine motor coordination is promoted as children must be careful how they place the disks on the tower, so as to keep it from toppling. This game can also be played like *Don't Spill the Beans*, (see above). Also, some children prefer to make the tower fall. The rules can be adapted for this, or they can simply experiment with trying to make it fall (in which case it is not a game, but is still a valuable activity).

*Problems:* The scoring system is much too complicated for kindergarten and first grade children. It may be better played as a cooperative game. Children can take turns rolling the die and placing disks on the tower, with the object of get all of the disks onto the tower without making it topple. In this way, children can talk together about where the best place to put a disk is, and why. Another problem is that the row numbers are very difficult to see. We suggest writing over them with a marker.

Goals:

1. Number recognition
2. Physics (weight and balance, gravity)
3. Turn taking

## **Don't Break the Ice**

In this game of physics, children take turns with a mallet tapping blocks of "ice" out of a square frame where they are wedged in. One large block is the size of four small blocks (2 X 2) and holds the Iceman. The object of the game is *not* to be the one to cause the Iceman to fall through the ice.

Children have the opportunity to reason about the physics of what holds the ice in place. They must decenter to notice both the vertical and horizontal rows, and to notice that an ice block can remain in the frame only if it is being held in place by a row of ice blocks. Children must notice the effects on other ice blocks of tapping out any particular block of ice. Fine motor coordination is promoted as children must tap carefully, hitting only the block they intend to hit. This game does not have to be played competitively. Children can simply take turns tapping out ice blocks, trying not to cause the Iceman to fall. Or some children prefer to play with the goal of making the Iceman fall.

Goals:

1. Fine motor coordination
2. Physics (force, balance, gravity)
3. Decentering (vertical and horizontal lines)
4. Turn taking

## **Ring Toss**

Children take turns throwing rings and trying to get them around two posts. Children have the opportunity to reason about distance, force, and trajectory, as they think about where is the best place to stand to throw the rings, whether it is better to throw the rings up or across, and how hard to throw them. Children exercise their reasoning as they make comparisons such as, "When I throw the ring softly, I can aim it better, but it doesn't go as far, and when I throw it hard, it goes far, but I have trouble aiming." This game can also promote number reasoning if children choose to keep score.

Goals:

1. Gross motor coordination
2. Physics (force, distance, trajectory)
3. Number (score keeping)
4. Turn taking

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