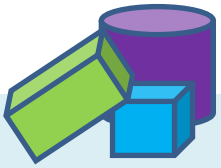
3D Pick-Up



This game allows players to integrate their knowledge of shapes, combining both 2 and 3 dimensions.

Strands:

Number & Quantity	
Algebra	
Functions	
Geometry	X
Statistics & Probability	

Materials:

- *3D Pick-Up* cards, cut apart and arranged into a deck
- 3D objects around you, 2 of each shape:
  - Pyramid
  - Rectangular prism
  - Triangular prism
  - Cube
  - Cone
  - Cylinder
  - Sphere
  - Hemisphere

Where:

Outside	
Inside	X
On-line	
On-site	

Set-Up:

- Collect three dimensional shapes for the game and place them in the center of the playing surface.
- Cut apart *3D Pick-Up* cards. Set aside name, picture, and net cards.
- Complete the **Pre-Game Activity** then shuffle the cards.
- Deal 6 cards to each player. Pile the rest of the deck face down. Turn up one card.
- Play begins with the player whose birthday is closest to today.

Pre-Game Activity: Before playing *3D Pick-Up*, look carefully at the 3D objects: Pyramid, rectangular prism, triangular prism, cube, cone, cylinder, sphere, and hemisphere. Spend a few minutes matching the name, picture, and net cards with each three-dimensional shape.

Object of the Game: Envision three dimensional shapes in your world. Connect them to their two-dimensional faces and cross-sections.

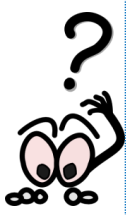
On Your Turn:

1. Start your turn with 6 cards in your hand. At most one card can come from the top of the discard pile. Collect the card from the discard pile before taking cards from the face down pile.
2. With the goal of making of four cards to fit each 3D shape, match the cards in your hand. A set contains only one of each type of card from the following card types: Shape name, real-life picture, net, face or base, and cross-section (parallel or perpendicular to the base). If you play the prism name card, you must choose a prism type: Triangular or rectangular.
3. You may work on collecting cards for multiple sets at a time. You may lay down cards for a set if you have at least 2 cards belonging to the same set.
4. When you complete a set of four cards that match the same 3D shape:
   a. Explain how each card matches the 3D shape you chose.
   b. Other players may question your choice of cards.
   c. If you successfully defend your cards, collect a 3D object that matches your card set from the center of the playing surface.
   c. If you cannot successfully defend your cards, you must put any cards you cannot justify back into your hand.
   d. You can make sets for 3D shapes even if the physical models are already claimed. However, you will score fewer points
5. Discard one of your cards. Your turn is over.
6. Play continues to the left. Each player follows steps 1 through 5.
7. Play continues until all 3D shapes have been claimed.

Scoring:

Score 3 points for each sphere you pick up. Challenge yourself!
Score 2 points for each of the other 3-dimensional shapes you pick up.
Score 1 point for each set you collect that does not have a 3D object.

To Win: The player who earns the most points wins.



Think About It:

1. For which shapes was it easiest to find cards to make a set?
2. Which shapes were the most challenging to find a full set of matching cards? Why?
3. How did you determine the shape of a cross-section?
4. Are cross-sections and bases the same shape? Why or why not?
5. Are faces and cross-sections the same shape? Why or why not?
6. Which shapes have the same cross-sections?

Variations:

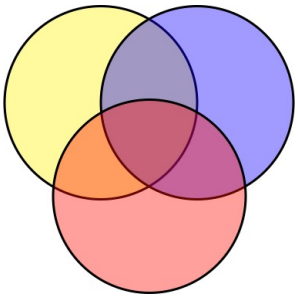
Ugly Shapes: Spread out the 3D Pick-Up cards face down on the playing surface. In turn, flip up one card onto the top of the disorganized pile. Continue to flip cards face up until three cards match the same 3D shape. Slap the cards that match. Each player collects the cards they slap. If more than one player slaps the same card, the first one who says the 3D shape three times claims the card.

3D Spoons: Pile the 3D Pick-Up cards face down in the middle of the playing surface. Place one fewer 3D shapes than number of players next to the cards. Players play *Spoons* in the usual way:

a. Deal 6 cards to each player.
b. The dealer draws a card from the deck and discards a card to the player on the left.
c. Simultaneously, each player picks up a card discarded by the player to the right then discards one card passing it to the left.
d. Play continues in this way with the dealer picking up a card from the pile and the last player discarding to the discard pile.
e. Once a player collects a set of 4 cards that match a 3D shape, the player grabs a 3D shape (to match the set of cards). Other players grab the remaining shapes.
f. The player to go out must reveal and explain the set of cards collected. If the cards do not form a set the player is out.

3D Shape Comparison: Shuffle the *3D Pick-Up* name, picture, and net cards. Deal 4 cards to each player. Make a Venn Diagram with 3 intersecting circles (see the figure at left). Place three different face cards in the Venn Diagram. In turn, place cards in sections of the Venn Diagram to show which shapes have which faces in common. For example, if the blue region contains a triangle and the red region contains a square, a square-based pyramid fits in the purple wedge where these two colors overlap. If the yellow region contains a rectangle, then a triangular prism with 3 square sides fits in the intersection of all three faces. Play continues until all players place their cards. Notice which 3D shapes share the same faces. Relabel each region, this time with a cross-section. After you have played several rounds, consider the following:

a. Which 3D shapes are related to each other? How?
b. Which cross-section was shared by the most shapes?
c. Which face card was shared by the most shapes?
d. Arrange the 3D shapes in a way that shows what faces they have in common.
e. Arrange the 3D shapes in a way that shows what cross-sections they have in common.



Helpful Hints:

- To see a cross-section, imagine a plane intersecting the shape parallel or perpendicular to the base.
- For a horizontal cross-section, stand up and look down at the top of the shape. What shape is the intersection of the shape with a horizontal plane?
- To see a vertical cross-section, raise the shape to eye level and look at it straight on. What shape is the intersection of the shape with a horizontal plane?