

# Prisms, Pyramids – Faces, Bases.

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## Differentiate and Assess

Not every student will be ready to investigate this concept at this Level and so we will need to differentiate to ensure every student is learning at their leading edge. Select the Differentiate button on this screen.

## Integrate

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding. Select the Integrate button on this screen.

## Intervene

Some students may not yet be ready to investigate this concept at any Level, and so we will need to provide some intervention. Select the Intervention button on this screen.

# PRISMS, PYRAMIDS – FACES, BASES.

## EXPLICIT TEACHING PLAN OVERVIEW PAGE

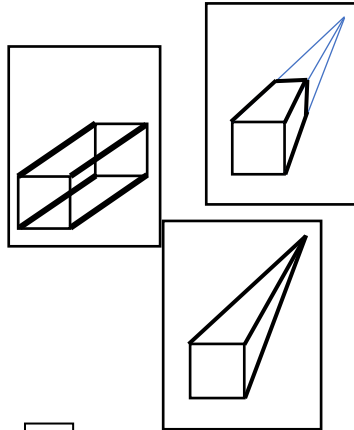
THIS PAGE IS A SUMMARY OF THE EXPLICIT TEACHING PLAN, INCLUDING STRATEGIC QUESTIONS, AND DESCRIBING THE SEQUENCE WHICH WILL OCCUR OVER MULTIPLE LESSONS.

RESOURCES: PRISMS, PYRAMIDS, RULER, PROTRACTOR, PENCIL, PAPER

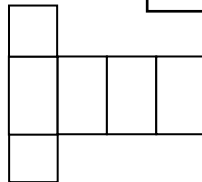
### WHAT COULD WE DO?

Children:

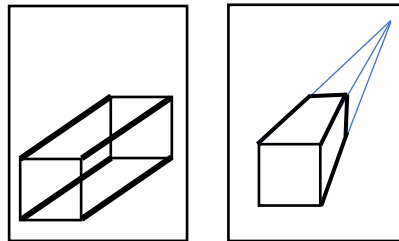
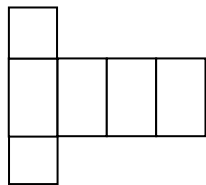
- draw a prism using a perspective point, for example,
- draw a prism using 2 bases, and connecting them with the edges, for example,
- Draw a pyramid using a perspective point, for example,



- construct a net of a prism or pyramid using its faces, for example,



- draw a prism or pyramid from seeing its net, for example,



### WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

Children

- ask one another questions about prisms and pyramids, for example:
  - ▶ How could we draw a prism?
  - ▶ Could we draw one of the bases, and a perspective point, then draw lines between the vertices of the base and the perspective point?
  - ▶ Could we draw both bases, than connect them with the edges?
  - ▶ How could we draw a pyramid?
  - ▶ Could we draw the base, and a perspective point, then draw lines between the vertices of the base and the perspective point?
  - ▶ How could we construct a net of a prism or pyramid using what we know about its faces?
  - ▶ Is there another way we could construct the net of this prism or pyramid?
  - ▶ How could we draw a prism or pyramid from seeing its net?
  - ▶ What shape are the bases?
  - ▶ What shape are the faces that are not bases?
  - ▶ How could we describe the prism's / pyramid's faces, edges and vertices?

# PRISMS, PYRAMIDS – FACES, BASES.

## EXPLICIT TEACHING PLAN

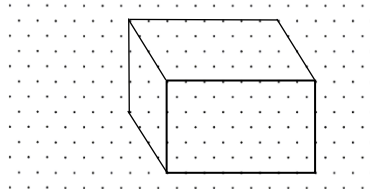
FULL EXPLICIT TEACHING PLAN, EMBEDDING DEEP RELATIONAL UNDERSTANDING, METALANGUAGE, AND QUESTIONS THAT MAY BE USED OVER MULTIPLE LESSONS.

### WHAT COULD WE DO?

Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.

Demonstrate the 3 dimensions, up and down, left to right, and front to back.

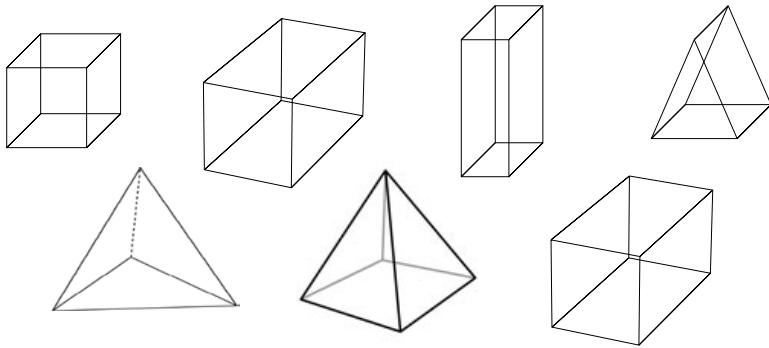
Display three-dimensional objects drawn on isometric dot paper, for example,



### WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

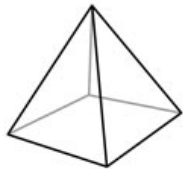
- ▶ Today brings an investigation about three-dimensional objects.
- ▶ What do you know about three-dimensional objects?
- ▶ What do you wonder about three-dimensional objects?
- ▶ Talk about three-dimensional objects with a friend.
- ▶ Is anyone ready to share what they are thinking about three-dimensional objects?
  
- ▶ We've investigated three-dimensional objects.
- ▶ And we found that 3 dimensions are up and down, left to right, and front to back.
- ▶ We've investigated drawing three-dimensional objects.
- ▶ And we found that we are trying to represent 3 dimensions on a two-dimensional surface.
- ▶ We've drawn three-dimensional objects on isometric dot paper.
  
- ▶ Today we're going to investigate drawing three-dimensional objects on a two-dimensional surface, by drawing the third dimension diagonally backwards so our eyes will interpret it as a three-dimensional object.

Display some prisms and pyramids, for example, cubes, square prisms, rectangular prisms, triangular prisms, square pyramids and triangular pyramids



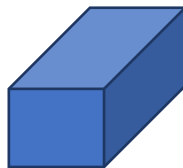
Display a prism, for example, a square prism,

Display a square pyramid, for example,

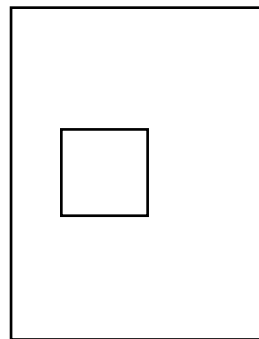


Select a prism, for example,

Place the prism so a base is facing you.

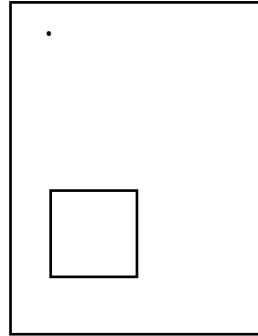


Draw a square base using, for example,

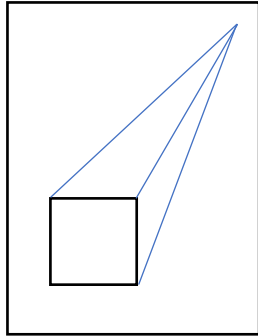


- ▶ What do you know about these three-dimensional objects?
- ▶ We've been investigating the properties of prisms and pyramids.
- ▶ We found that prisms have 2 bases.
- ▶ And we found the faces that are not bases on prisms are quadrilaterals.
- ▶ We found that pyramids have 1 base.
- ▶ And we found the faces that are not the base on pyramids are triangular.
  
- ▶ We've investigated how prisms and pyramids are named by the shapes of their bases.
- ▶ We found that a square prism has 2 square bases.
  
- ▶ And we found that a square pyramid has 1 square base.
  
- ▶ Let's select a prism to draw from different viewpoints on blank paper.
- ▶ Let's place our square prism so one of the bases is facing us.
  
- ▶ Let's draw the base that is facing us.

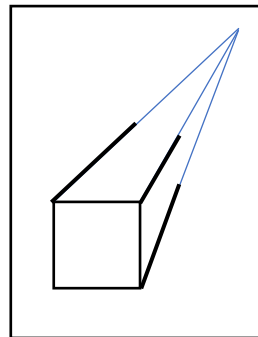
Place a dot on the paper near the top right hand corner, for example,



Children use the ruler to draw faint lines going from each vertex that we can see to the viewpoint, for example,



Children use the ruler to draw the 3 edges that we can see along those lines, for example,

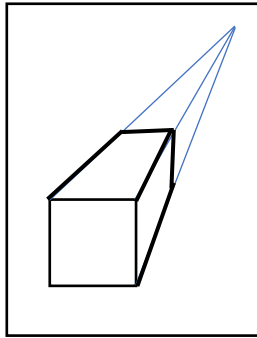


► One way we can draw this prism is to place a dot on the paper as our viewpoint.

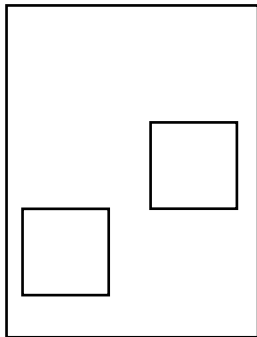
► Now we're going to use our ruler to draw faint lines going from each vertex that we can see to the viewpoint.

► Now we're going to draw the 3 edges that we can see along those lines.

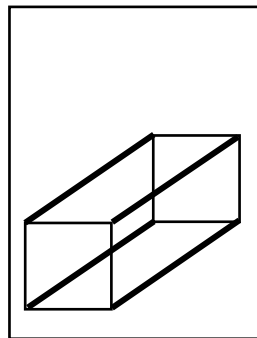
Children use the ruler to draw the edges on the other base parallel to the edges on the front base, for example,



Draw both bases, one diagonally above the other, for example,



Children use a ruler to draw edges joining the vertices on each base, for example,



▶ Now let's draw the edges on the other base that we can see. These edges will be parallel to the edges on the front base.

▶ **Another way that we can draw the prism is to draw both bases, one diagonally above the other.**

▶ Do you think we could draw the prism with one of the faces that are not the bases, facing us?

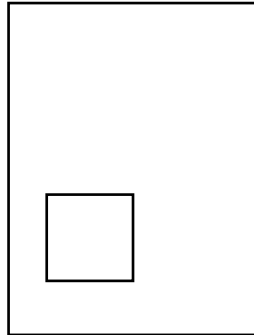
▶ Let's use a ruler to draw edges joining the vertices on each base, to create a skeletal drawing.

▶ A skeletal drawing means we can see all of the edges.

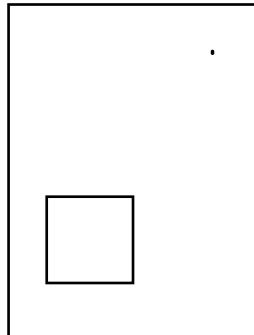
Select a pyramid, for example,



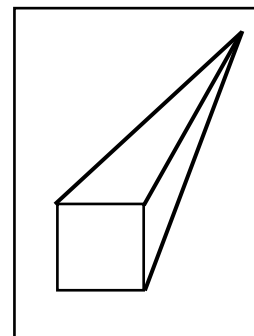
Draw a square base using, for example,



Place a dot on the paper near the top right hand corner, for example,

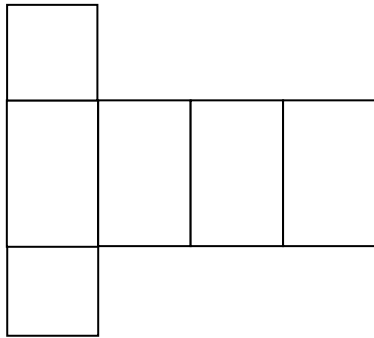


Children use the ruler to draw lines going from each vertex that we can see to the viewpoint, for example,

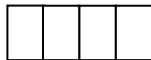


- ▶ Let's select a pyramid.
- ▶ Let's place our square pyramid so the base is facing us.
- ▶ Let's draw the base that is facing us.
- ▶ One way we can draw this pyramid is to place a dot on the paper as our viewpoint.
- ▶ Now we're going to use our ruler to draw lines going from each vertex that we can see to the viewpoint.
- ▶ The lines are the edges of the pyramid..
- ▶ Do you think we could draw the pyramid with one of the faces that is not the base, facing us?

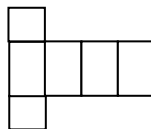
Display a cut up breakfast cereal packet, lying flat to make a net, for example,  
Record, for example, net



Draw the 4 rectangular faces that aren't bases, for example,



Draw the 2 square bases on opposite sides of the faces, for example,



► **We've investigated nets of prisms.**

► We cut up the faces of prisms, and layed them flat to make a net.

► Today we're going to construct nets of prisms and pyramids, then fold them to make the prism or pyramid.

► Let's construct the net of a square prism.

► What shape are the bases of a square prism?

► Are the bases squares?

► What shape are the faces that aren't bases on a square prism?

► Are the faces that aren't bases, rectangles?

► How many rectangular faces that aren't bases on a rectangular prism?

► Are there 4 rectangular faces that aren't bases?

► Let's start by drawing the 4 rectangular faces that aren't bases.

► Where will the bases be?


► Will the bases be on the same side of the faces?

► Or will the bases be on opposite sides of the faces?

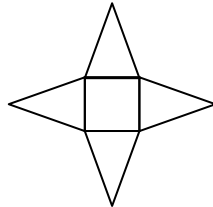
► Could we cut out and fold the net to check if it makes a square prism?

► Is there another way we could make a net of a square prism?

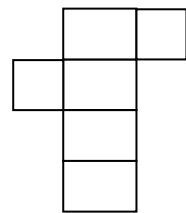


Draw the square base, for example, 

Draw the 4 triangular faces that are not the base on opposite sides of the base, for example,



Display a net of a prism or pyramid, for example,



▶ **Let's construct the net of a square pyramid.**

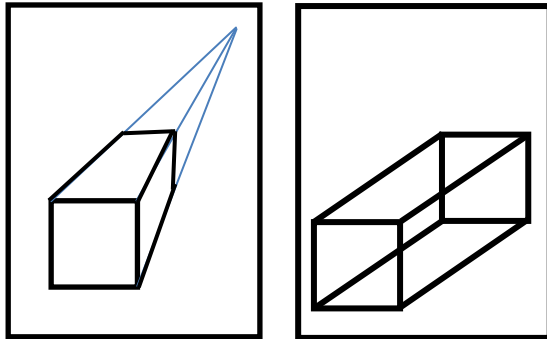
- ▶ What shape is the base of a square pyramid?
- ▶ Is the base square?
- ▶ What shape are the faces that aren't the base on a square pyramid?
- ▶ Are the faces that aren't the base, triangles?
- ▶ How many triangular faces that aren't the base on a square pyramid?
- ▶ Are there 4 triangular faces that aren't the base?
- ▶ Let's start by drawing the square base.

- ▶ Where will the triangular faces that are not the base be?
- ▶ Will the triangular faces that are not the base be on each side of the base?
- ▶ Could we cut out and fold the net to check if it makes a square pyramid?
- ▶ Is there another way we could make a net of a square pyramid?

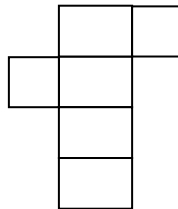
▶ **Here we have a net of a three-dimensional object.**

- ▶ What faces can you see on the net?
- ▶ Can you see some rectangular faces?
- ▶ How many bases can you see?
- ▶ Can you see 2 bases?
- ▶ If this three-dimensional object has rectangular faces and 2 bases, is it a prism or a pyramid?
- ▶ Is it a prism?

Draw the square prism by drawing a base / face and a dot to use as a perspective point, then the edges, and by drawing 2 bases and then the edges, for example,



Compare the faces on the net of a prism with the faces on the drawing of the square prism, for example,



- ▶ Do prisms have rectangular faces and 2 bases?
- ▶ What type of prism is it?
- ▶ What shape are the bases?
- ▶ Are the bases square?
- ▶ If the bases are squares, is this a square prism?
- ▶ How could we draw a square prism?

- ▶ Let's compare the faces on our net, with the faces on our prism.
- ▶ Do the faces on this prism match the faces on the net?
- ▶ Are there 2 square bases?
- ▶ Are there 4 faces that are not bases?
- ▶ Are the faces that are not bases rectangles?