**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM:  | WEEK:  | STRAND: Measurement & Geometry | **SUB-STRAND:** 3D Space 1 | **WORKING MATHEMATICALLY:** MA3-1WM & MA3-3WM |
| OUTCOMES: MA3-14MG | **Identifies three-dimensional objects, including prisms and pyramids, on the basis of their properties, and visualises, sketches and constructs them given drawings of different views.** |
| **CONTENT:**  | **Compare, describe and name prisms and pyramids*** Identify the ‘base’ of prisms and pyramids
* Recognise that the base of a prism is not always the face where the prism touches the ground
* Name prisms and pyramids according to the shape of their base, eg rectangular prism, square pyramid
* Recognise that prisms have a ‘uniform cross-section’ when the section is parallel to the base
* Recognise that the base of a prism is identical to the uniform cross-section of the prism
* Recognise a cube as a special type of prism
* Determine that the faces of prisms are always rectangles except for the base faces, which may not be rectangles
 |
| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | **Pre-Assessment****Worksheet** – Have students match up pictures of 3D objects to their names. Also have students list the properties of each 3D object in a table headed name of object, number of faces, number of vertices and number of edges.  |
| WARM UP / DRILL | **3D Shape Sort –** Have a bag containing multiple 3D objects and have students tip it out onto the floor. They then race to see who can sort the objects into the categories, *Prisms, Pyramids and Other* the quickest. Perhaps have one or two students doing the sorting, but they can listen to the advise from the class as to where to place objects they are unsure of. |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | I have two triangular bases. My other faces are rectangles. What object am I? |
| QUALITY TEACHING ELEMENTS | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge
* Deep understanding
* Problematic knowledge
* Higher-order thinking
* Metalanguage
* Substantive communication
 | * Explicit quality criteria
* Engagement
* High expectations
* Social support
* Students’ self-regulation
* Student direction
 | * Background knowledge
* Cultural knowledge
* Knowledge integration
* Inclusivity
* Connectedness
* Narrative
 |
| RESOURCES | Set of 3D objects, IWB presentation on 3D objects, video on identifying bases to determine if an object is a prism or pyramid <http://on.aol.com/video/how-to-identify-prisms-275615142> , plasticine, unifix cubes, fishing line.  |

**TEACHING AND LEARNING EXPERIENCES**

|  |  |
| --- | --- |
| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * **Explicitly communicate lesson outcomes and work quality.**
* **Define and Reinforce metalanguage** used in this unit e.g. three-dimensional shape (3D), prism, cube, pyramid, base, uniform cross-section, face, edge, vertex (vertices), apex, top view, front view, side view, depth, net. Have students create or add to existing maths glossary.

View video on identifying ‘bases’ of prisms and pyramids. <http://on.aol.com/video/how-to-identify-prisms-275615142> * On completion of the video, use a variety of 3D objects or use pictures on the IWB and go through each object with students. Students identify whether the object is a prism or pyramid and specify its name.
* **Investigate various prism**

**cross-sections**. Aalso discuss the term ‘uniform cross-section’. Refer to mathsisfun site. <http://www.mathsisfun.com/geometry/cross-sections.html> or <http://www.icoachmath.com/math_dictionary/uniform_cross_section.html>  | LEARNING SEQUENCERemediationS2 or Early S3 | * Investigate and revise 2D shapes and their properties.
* Review nets of various 3D objects and terminology.
* Review the properties of a prism and a pyramid.
 |
| LEARNING SEQUENCES3 | * **Creating 3D objects:** Give students a variety of different prism nets and have students construct and then decorate them. In pairs investigate the similarities between each prism. Discuss the key features of a prism.
* **Barrier Game**: In pairs, students sit opposite each other with a barrier between them. Student A selects a prism and describes how to draw it. Student B follows the instructions to draw the object. Both students reflect on the drawing. Students then reverse roles.
* **Rectangular Prisms:** Students are given 24 interlocking cubes. They are asked to make a rectangular prism with a volume of 24 cubic units. They describe their rectangular prism in terms of its length, breadth and height, then record this information. The teacher poses the question. ‘Can you make other rectangular prisms with a volume of 24 cubic units?’ Students attempt to do this, record their results and describe what they noticed. Students draw a simple perspective drawing of each prism showing depth. *Variation:* Students make prisms with a variety of volumes and discuss.
* **Plasticine models/cross-sections:** Have students create various prisms using plasticine and have them use fishing line to explore making various cross-sections. Have students record their observations and sketch their findings.
* **Investigation:** Students explore the school and take photos of various prisms with iPads. Upon returning to class, students share photos with other groups and then create a drawing or collage of their photos.
* **Assessment** – Create a written assessment that has various prisms and pyramids. Students name the 3D objects and draw the cross section for each. Students then list the properties for each object.
 |
| LEARNING SEQUENCEExtension Early S4 | **Extension:** Have students investigate how they could work out the volume of various prisms. Students should begin with unifix cubes and then move onto more complicated measurements.Have students create various buildings and structures using 3D objects that they have created using various materials. |
| EVALUATION & REFLECTION | **Student Engagement: Achievement of Outcomes:****Resources: Follow Up**: |